AUTONOMOUS VEHICLES
Implications for Planning
by Ryan Snyder
AUTONOMOUS VEHICLE FUTURE
Problems Solved or Auto-Dystopia
**LEVELS OF AV TECHNOLOGY**

**LEVEL 0**
- human-driver does everything

**LEVEL 1**
- vehicle assists with certain functions

**LEVEL 2**
- vehicle does some driving, human monitors environment

**LEVEL 3**
- vehicle drives/monitors, but human takes over when required

**LEVEL 4**
- full self-driving automation only in certain environments

**LEVEL 5**
- full self-driving automation all the time
STATE OF THE ART

Human Error Crashes

93% of crashes are caused by HUMAN ERROR

1 fatality per 18.55 million miles driven**

1 injury crash per 637,000 miles driven**

Google has had 1 crash per 125,000 miles driven; no report on injuries/fatalities; none the fault of the car

STATE OF THE ART
Communications Technology

NHTSA is experimenting with Vehicle-to-Vehicle (V2V) technology

General Motors will have V2V technology on some cars by 2017*

US DOT is now testing Vehicle-to-Infrastructure (V2I) technology

Google plans to have Level 4 technology in 2018.

Commercial AV car service aiming for operation in Singapore in 2018.

Uber plans to have fully autonomous ride-hailing service in 2021.

Continental Automated Systems projects producing cars with a high level of self-automation in 2025.

22%-59% of vehicles on the road could be self-driven by 2025.

Uncertain, but within the foreseeable future.


+ nuTonomy Blog, Sept 23, 2016
ECONOMICS

58 cents/mile to drive an average car*

= $725/month

With carsharing, roughly less than 72 hours/month better than owning ($10/hour)

Cost of transit bus drivers 54% of operating costs**

At some point is it cheaper to take “driverless Uber pool” than to own.

Then why own a car?

*“Your Driving Costs 2015”, American Automobile Association
POTENTIAL BENEFITS

User Conveniences

- Mobility for those who don’t drive
- Better use of time
- Less stress
- Deliveries
- Select an appropriate vehicle for the trip
TECHNOLOGICAL CAPABILITIES

Increased Capacity
POTENTIAL BENEFITS

Capacity & better use of streets

- Roughly double
- Less congestion
- More opportunities for road diets
POTENTIAL BENEFITS

Capacity & better use of streets
TECHNOLOGICAL CAPABILITIES
Repurposing Space in Our Streets
TECHNOLOGICAL CAPABILITIES

Optimized Traffic Flow
TECHNOLOGICAL CAPABILITIES

Lane Clearance for Priority Vehicles
TRANSIT BENEFITS

- Feeder Service
- Increased service
- Faster service
- New viable ridesharing services
- Possibility of high-speed buses
GREATER USE OF MICRO TRANSIT

Source: www.gizmodo.com
TECHNOLOGICAL CAPABILITIES

High-Speed Buses
TECHNOLOGICAL CAPABILITIES

Long distance high-speed bus
TECHNOLOGICAL POSSIBILITIES
Enhanced detection of pedestrians and bicycles
RURAL CONTEXT

- Likely more user-owned
- Possible new micro-transit services
- New ridesharing services
- Likely later roll out than urban areas
REPLACING PARKING LOTS/STRUCTURES
GREATER USE OF ELECTRIC VEHICLES

Source: www.all-electric-vehicles.com
POTENTIAL BENEFITS
FASTER Emergency ACCESS

Less congestion to drive in

With lane clearance, emergency vehicles could have priority
POTENTIAL DRAWBACKS

Job Loss

- Likely the biggest problem from AVs
- Bus, taxi, truck, delivery driver jobs
- Some other auto industry jobs
- Need retraining programs to emerging technologies
POTENTIAL DRAWBACKS

*Encouraging driving and longer commutes*

- Better use of time not driving
- No stress
- Reduces “cost” of driving
- Enact policies to encourage efficient travel
POLITICS OF ALGORITHMS

Determining Priority

- Private companies might start lobbying for control
- Prioritize multi-occupant vehicles over single-occupant cars
- Ped/Bike priorities
- System needs to reflect good policy over politics
POLICIES

- Decide where AVs can operate during transition
- Equipment requirements
- Revisit the issue of a requirement for the driver
- Research & Development
POLICIES

- Pricing strategies
- Give time advantages
- Liability issues
- MUTCD issues
- Parking codes
CONCLUSIONS

- AVs offer many potential benefits
- Policy can and should speed AV
- Policy should ensure beneficial outcomes
- We should change assumption in today’s decisions
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