Automated Vehicle State Policy Issues

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Getting past Automated Vehicle (AV) safety rhetoric

AV safety in a nutshell

Policy points:
- Societal benefits
- Public road testing
- Municipal preemption
- SAE Level 2/2+/3 issues
- Federal vs. state regulation
- Other policy issues

Revisiting common myths
“Robotaxis Are Not Prone To Human Error” (??)

Instead, you get Robot Error

Two Cruise cars in San Francisco became wrapped in downed Muni wires and caution tape at Leavenworth Street and Clay Street on March 21, 2022.  Courtesy of John-Phillip Bettencourt
Nobody knows when/if Autonomous Vehicles (AVs) will be safer than human drivers
- Reduced fatality rates are aspirational

Some humans drive drunk
- On average they are still good and adaptable

But computers lack common sense
- Machine Learning can fail in novel situations

Computer drivers can be imperfect
- Might hit a bus – even if lidar sees the bus
- Safety must be engineered, not assumed
Elements of AV Safety

1. Safe as a human driver on average
   - ~75M to 125M miles/fatality for S.F., including impaired

2. Avoiding risk transfer onto vulnerable populations
   - Pedestrian harm should not increase – even if net harm is reduced

3. Avoid negligent computer driving
   - Running red lights and stop signs is not OK

4. Conform to industry safety standards
   - Including SAE J3018 for public road testing

5. Address other ethical & equity concerns
   - Avoid local preemption; manufacturer accountability for harm
Benefits accrue only after AVs are safe and reliable

- 100++ million miles to confirm reduced fatalities
- Near term, “safe” might mean lower reliability

Ask the hard questions

- What benefits will there be right now?
  - “Benefits disabled” but no wheelchair access
  - “Already saving lives” with about 1 million miles
  - “Promise unprofitable thing X” with no regulation

- What public costs will there be right now?
  - Congestion and blocked emergency responders
  - Risk of harm from still-under-development software on public roads

Policy Point: Societal Benefit

[Image of a traffic jam with text: A Swarm of Self-Driving Cruise Taxis Blocked San Francisco Traffic for Hours. More than a half-dozen Cruise-branded Chevy Bolts were reportedly stuck blocking lanes for hours.]

Policy Point: Public Road Testing

- There is no such thing as driverless testing

- Safety driver should stay in until safety is proven
  - Require SAE J3018 testing safety standard
  - Test with driver not touching controls
  - “Beta” is road testing, not SAE Level 2

- Driver-out should be testing the business model, not safety
  - Software updates need driver-in qualification testing
Companies push for municipal preemption
- Argue that cities will ban AV testing
- How is this working out in San Francisco?

Middle ground: responsive to local conditions
- Munis can forbid testing for specific situations
  - School zones during student transit times
  - Parades, fires, 1st amendment events, construction
- Munis can selectively suspend service
  - Keep away from emergency scenes after firefighter incidents
  - Avoid high-activity neighborhoods after fire truck crash
- Munis must be able to enforce traffic laws
Policy Point: SAE Level 2/2+/3 Vehicles

- Already deployed on roads
  - Fatalities, injuries due to driver complacency
  - No substantive regulations beyond sparse recalls
- Level 3 “gives driver time back”
  - Is driver criminally liable for a fatality?
  - Mercedes Benz only talks about product liability
- Create a clear duty of responsibility for the computer driver
  - When computer is driving, manufacturer is responsible party
  - Defined, non-zero safe harbor transition time back to human driver
  - Liability attaches to manufacturer for inadequate driver monitoring

➤ Detailed proposal for state regulation on this topic

https://bit.ly/45xuTBg
Policy Point: Federal vs. State Regulation

Problem: computer driver is “equipment”

- NHTSA/FMCSA should control equipment
  - Ability of computer driver to adhere to state laws
  - ANPRM NHTSA-2020-0106 AV framework

- States should control computer driver behavior
  - Hold computer drivers to same duty of care as a human driver
  - Determine and enforce driving behavioral rules
  - Ability to revoke driver licenses based on negligent driving
  - Munis need ability to enforce & report negligence to state DMV
Other Policy Points

- Economic impact
  - Saturation of fully automated vehicles is decades away
  - City-by-city / route-by-route for foreseeable future
  - Still need humans for remote support, maintenance, testing
  - Still need people for last few feet of delivery, security, etc.

- Required arbitration
  - Impairs transparency (and safety) with secret outcomes
  - Degrades balance of power if mandatory

- Equity issues
  - Will underserved populations benefit without regulatory mandate?
  - Will road testing impose risk on the vulnerable?
Quick List of Myths

- “Humans are terrible drivers” / “94% Human Error”
  - Computers lack common sense; they make mistakes too
- “We have 5 MILLION miles of testing”
  - Proof of saving lives requires 100 million to 1 billion miles
- “Level 2/2+ makes cars safer”
  - AEB helps safety; Some Level 2/2+ systems decrease safety
- “We, the manufacturer, take responsibility” (for product liability)
  - The more urgent issue is tort/criminal, not product liability
- “Current laws and regulations are enough” ➔ FALSE
  - Liability issues; Software safety regulation; L2+ loophole
  - Little regulatory pressure for promised benefits
Liability-based proposal for state AV regulation & podcast
- [https://safeautonomy.blogspot.com/2023/05/a-liability-approach-for-automated.html](https://safeautonomy.blogspot.com/2023/05/a-liability-approach-for-automated.html)

Video lecture series on autonomous vehicle safety:
- Keynote AV Safety overview video: [https://youtu.be/oE_2rBxNrfc](https://youtu.be/oE_2rBxNrfc)
- Mini-course: [https://users.ece.cmu.edu/~koopman/lectures/index.html#av](https://users.ece.cmu.edu/~koopman/lectures/index.html#av)

“Safe Enough” book & talk video:

UL 4600 AV safety standard book & talk video:

US House E&C testimony: