Testing of Automated Vehicles

Ensar Becic, PhD
Overview

• Federal guidance and lack of requirements
  - Production-level ADS
  - Test-level ADS

• State requirements and policies
  - Arizona
  - Examples from other states
Automated Vehicles - Development

- Safety promise of automated vehicles
- Testing of ADS has risks when conducted on public roads
  - Testing of ADS has failures and exposes limitations
  - Establishing appropriate safeguards when testing on public roads
  - Establishing processes for assessment of risk mitigation strategies
Federal Guidance for ADS

- No standards or performance protocols for ADS
  - Uber ATG test vehicle met all FMVSS
- National Highway Traffic Safety Administration (NHTSA) Automated Vehicles (AV) policy; Ver. 1, 2, 3
  - Applicable for production- and test-level systems
  - Safety-related areas
NHTSA Automated Vehicles Policy

• Cursory guidance for safety areas
• No metrics for determining how to achieve goals of safety areas
• Self-assessment reports based on AV policy
  - Voluntary submission; only 16 reports received
  - NHTSA does not provide assessment of the reports
  - Great variability in content provided in the reports
Needed Federal Improvements

- Mandatory submission of safety self-assessment reports before testing
  - Considered in initial AV policy
- Assessment and approval of self-assessment reports
  - Approval can provide minimum safeguard for testing
  - Holistic view necessary for examining adequacy of risk management
State Legislation

• Some states have started legislating requirements or developing policies for ADS testing
• Limitations of traditional division of oversight between NHTSA and states
  - Applicability to ADS testing
  - Unclear who controls vehicle (computer or human)
  - Greater risk for testing on public roads
Arizona Requirements

• Executive Order 2018-04
  - Developers conducting ADS testing *without* operator inside vehicle required to submit statement acknowledging meeting few basic requirements
  - Developers conducting ADS testing *with* operator inside vehicle not subject to special requirements
• Uber ATG was not required to apply for testing
Current Arizona Requirements

• After crash, Arizona DOT revoked testing privilege for Uber ATG
• Since crash, Arizona has not established additional requirements for testing
• ADS testing with operator inside vehicle still not subject to special requirements
Testing Policies in Other States

• 29 states have some ADS-related policy (June 2019)
  - Great variability in testing requirements or conditions

• Pennsylvania
  - Task force examines testing applications
  - Permit requires specialized training for vehicle operators
  - No driverless ADS testing allowed
  - Process is voluntary (all developers have complied)
Testing Policies in Other States

• California
  - Task force examines testing applications
  - Specialized training for vehicle operators
  - Regular submission of incident and disengagement reports
  - Driverless ADS testing allowed
    - All developers (62) test with operator inside vehicle
  - Application approval mandatory for testing
Needed State Improvements

- Mandatory application for ADS testing
- Establishment of task force to review applications
- Examine tester’s plan for:
  - Mitigating safety risks associated with crashes and operator inattentiveness
  - Appropriateness of countermeasures for testing conditions
Summary

- Development of automated vehicles is ongoing
- ADS testing on public roads has risks
- Safely reaching safety promise of automation:
  - Mandatory processes for examining risk mitigation of ADS testing (federal and state)
  - Lessons learned from this investigation