



National Transportation Safety Board

Testing of Automated Vehicles

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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