Proposing the Standardized Autonomous Vehicle Evaluation and Deployment (SAVED) Framework: A Federal, Centralized Approach to AV Regulation

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Executive Summary

Autonomous vehicles (AVs) are rapidly proliferating on U.S. roads, but oversight has failed to keep pace. This gap increases safety risks, undermines public confidence, and produces uneven conditions for innovation across states and communities. The Standardized Autonomous Vehicle Evaluation and Deployment (SAVED) framework addresses these challenges through four policy pillars:

- Federal Compliance Standards: Establish a clear national safety floor by requiring enforceable performance standards for safety, cybersecurity, and operational testing prior to deployment.
- Sandbox Zones: Authorize time-limited, geographically defined pilot programs that allow controlled regulatory flexibility while maintaining baseline safety requirements, enhanced monitoring, and mandatory incident reporting.
- Federal–State Collaboration: Pair uniform federal standards with state implementation flexibility, supported through grants, technical assistance, and shared research infrastructure.
- Public Trust and Equity: Improve transparency and accountability by requiring accessible public reporting, disability access expectations, and equity safeguards so that risks and benefits are not concentrated in a small set of communities.

The SAVED framework balances innovation with robust oversight, creating a uniform regulatory environment that safeguards public safety and builds consumer confidence.

Introduction

Autonomous vehicles (AVs) have evolved from small-scale pilots into large-scale services such as driverless ride-share “robotaxis.” While their rapid development signals innovation, U.S. regulatory structures need to catch up. While traditional vehicles face rigorous federal standards before deployment, only a patchwork of federal tools and state permitting regimes governs AV deployment with no uniform, enforceable national pre-deployment performance standard for automated driving. High-profile fatal crashes involving automated driving system testing programs and widely deployed driver-assistance technologies, including the 2018 Uber ADS fatality and multiple Autopilot-related investigations, have

prompted increased regulatory scrutiny and new federal reporting requirements.[1]

Currently, regulation varies widely by state. Arizona emphasizes rapid deployment with minimal restrictions, while California mandates stringent testing and reporting.[2] These inconsistencies create confusion for manufacturers and risk for the public. With consumer trust in AVs low, only 13% of drivers in 2025 expressed full confidence, a uniform federal framework is necessary.[3]

The SAVED framework responds to these gaps with enforceable federal standards and designated innovation sandboxes. These interventions safeguard public safety while allowing space for continued technological growth.

The Autonomous Vehicle Problem

As AV services scale beyond pilots, deployment must be matched with credible safety assurance, transparency, and equitable access. The current oversight model leaves several unresolved gaps:

- **Technical risk and system reliability:** AV performance depends on complex software and machine learning that can fail through perception and planning errors, software defects, and cybersecurity vulnerabilities, particularly in rare or complex roadway conditions.[4]

- **Documented serious incidents:** High-profile crashes involving automated driving testing programs and widely deployed driver-assistance technologies have resulted in fatalities and injuries, intensifying public scrutiny and raising questions about accountability and minimum safeguards.[5]

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[1] National Transportation Safety Board, *Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian, Tempe, Arizona*, Accident Report NTSB/HAR-19/03 (Washington, DC: NTSB, 2019) https://www.ntsb.gov/investigations/accidentreports/reports/har1903.pdf ; National Highway Traffic Safety Administration, *Standing General Order on Crash Reporting for Automated Driving Systems and Level 2 Advanced Driver Assistance Systems*, amended 2023.https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting

[2] Arizona Department of Transportation (ADOT), *Autonomous Vehicles Testing and Operating in the State of Arizona*; Office of the Governor of Arizona, *Executive Order No. 2018-04* (Mar. 1, 2018); California Department of Motor Vehicles (DMV), *Autonomous Vehicles Program* (testing, disengagement, and collision reporting requirements).https://azdot.gov/mvd/services/professional-services/autonomous-vehicles-testing-and-operating-state-arizona

[3] American Automobile Association (AAA), "AAA: Fear in Self-Driving Vehicles Persists" (annual autonomous vehicles survey; 13% of U.S. drivers would trust riding in a self-driving vehicle), https://newsroom.aaa.com/2025/02/aaa-fear-in-self-driving-vehicles-persists/

[4] National Highway Traffic Safety Administration (NHTSA), *Standing General Order on Crash Reporting for Vehicles Equipped with Automated Driving Systems (ADS) and Level 2 Advanced Driver Assistance Systems* (crash reporting requirement reflecting safety risks associated with complex automated systems) https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting

[5] National Transportation Safety Board (NTSB), *Collision Between Vehicle Controlled by Developmental Automated Driving System and Pedestrian, Tempe, Arizona, March 18, 2018* (NTSB/HAR-19/03); National Highway Traffic Safety Administration (NHTSA) Office of Defects Investigation (ODI), *Additional Information Regarding EA22-002 Investigation* (Apr. 25, 2024) (summarizing crashes involving Tesla Autopilot with reported deaths and injuries) https://static.nhtsa.gov/odi/inv/2022/INCR-EA22002-14496.pdf

- **Rising incident reporting:** Federal and state reporting systems show an increase in reported ADS and Level 2 incidents over time, reflecting expanded deployment and evolving reporting requirements, and underscoring the need for consistent national data and benchmarks.[6]

- **Regulatory fragmentation:** State-by-state variation in permitting, reporting, and operational constraints creates uncertainty for manufacturers operating across jurisdictions and produces uneven protections for the public.

- **Equity and access concerns:** Early AV deployment has been concentrated in a limited number of urban markets, raising questions about equitable access, disability inclusion, and whether risks and benefits are distributed fairly across communities.

Current Regulatory Approaches

At present, federal AV policy relies heavily on voluntary guidance and reporting requirements, rather than a uniform, enforceable pre-deployment performance standard for automated driving.[7] NHTSA's *Automated Driving Systems 2.0: A Vision for Safety* (2017) outlines recommended safety practices, including attention to cybersecurity, but it is nonbinding.[8]

This voluntary structure leaves major gaps:

- **Liability:** No uniform framework specifies how responsibility should be allocated among manufacturers, software developers, fleet operators, and human occupants when an ADS is implicated in harm.[9]

- **Bias and Accessibility:** Existing federal AV guidance does not establish enforceable accessibility expectations for AV services, including disability access and rider support.[10]

- **Cybersecurity:** Federal guidance encourages cybersecurity best practices, but there is no consistent, mandatory cybersecurity assurance baseline tied to AV deployment authorization and

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[6] California Department of Motor Vehicles (DMV), *Autonomous Vehicle Collision Reports* (reporting total collision reports; "903 collision reports" as of Dec. 19, 2025). https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-collision-reports/ Accessed December 15, 2025

[7] National Highway Traffic Safety Administration (NHTSA), *Automated Vehicles for Safety* (overview of federal AV policy tools and guidance). https://www.nhtsa.gov/vehicle-safety/automated-vehicles-safety. Accessed December 15, 2025.

[8] NHTSA, *Automated Driving Systems 2.0: A Vision for Safety* (Washington, DC: U.S. Department of Transportation, 2017). https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf Accessed December 15, 2025.

[9] Congressional Research Service, *Safety Considerations for Automated Passenger Vehicles* (Washington, DC: CRS, July 22, 2025). https://www.congress.gov/crs-product/R48605 Accessed December 15, 2025.

[10] U.S. Department of Justice, *Americans with Disabilities Act (ADA) Requirements: Transportation* (guidance overview). https://www.transit.dot.gov/ADA Accessed December 15, 2025.

ongoing monitoring.[11]

In the absence of enforceable standards for testing, reporting, and performance, regulators and the public lack timely visibility into risks, and corrective measures tend to occur only after serious events.

The SAVED Framework: A Federal Approach

- **Federal Compliance Baseline:** Establish a mandatory national safety floor for AV deployment through enforceable performance standards for system safety, operational testing, and cybersecurity, coordinated by DoT and NHTSA.

- **Pre-Deployment Safety Evaluation:** Require standardized, independent evaluation prior to deployment, including scenario-based simulation testing and controlled on-road validation within the vehicle's defined operational design domain (ODD).

- **Accessibility and Nondiscrimination:** Require AV services to meet disability access expectations and rider support requirements, with clear metrics for accessibility and nondiscrimination (including accommodations for riders with disabilities).

- **Cybersecurity Assurance:** Require baseline cybersecurity safeguards, vulnerability disclosure processes, and incident response standards as a condition of deployment authorization.

- **Incident Reporting and Transparency:** Standardize crash and safety incident reporting and submit reports to a national database with privacy protections, enabling public transparency and regulator access to comparable safety metrics across operators.

- **SAVED Advisory Board:** Create an advisory body within DoT that includes technical experts, safety and disability advocates, and state and federal officials to recommend updates to standards on a regular cycle, with formal DoT rulemaking and public notice-and-comment for major changes.

- **Sandbox Pilot Programs:** Authorize time-limited, geographically defined state pilots that allow controlled regulatory flexibility while preserving the federal safety baseline, enhanced monitoring, and mandatory reporting

Major Constituencies

- **Federal Agencies (DoT/NHTSA):** Gain a clearer mandate and more consistent data for oversight, while requiring expanded technical capacity in automated driving,

[11] NHTSA, *Automated Driving Systems 2.0: A Vision for Safety* (2017) (cybersecurity addressed as recommended practice rather than enforceable standard) https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/13069a-ads2.0_090617_v9a_tag.pdf Accessed December 15, 2025.

cybersecurity, and safety evaluation.

- **State Governments:** Retain a meaningful role in implementation through permitting and pilot program administration, supported by federal funding and technical assistance, while aligning state rules with the federal safety baseline.

- **Industry (AV Developers and Fleet Operators):** Benefit from regulatory clarity and consistent performance expectations across jurisdictions, reducing compliance uncertainty and enabling responsible scaling.

- **Public Stakeholders (Safety, Disability, Community Groups):** Gain enforceable protections, improved transparency, and formal mechanisms to shape standards, with explicit attention to accessibility and equitable distribution of benefits and risks.

Conclusion

Autonomous vehicles represent transformative potential but also pose unprecedented risks. Current fragmented oversight fails to provide adequate safeguards. The SAVED framework addresses these deficiencies by introducing enforceable, uniform standards, supported by innovation sandboxes and strong federal oversight.

By balancing safety, equity, and innovation, SAVED ensures that as the U.S. transitions into an era of driverless cars, public trust and well-being remain at the center of policy. Adopting SAVED will allow the U.S. to lead globally in responsible and ethical AV governance.