



Permit Process for Testing Highly Automated Vehicles (HAVs) in Maryland

Brief Structure of Process

- The intent of this process is to create a collaborative, constructive, and expedient pathway for the testing of highly automated vehicles in Maryland. while maintaining a safe environment for all who use Maryland's transportation systems and facilities.
- A process framework is set out herein. Each case will be handled according to its unique circumstances and this framework provides the flexibility necessary to accommodate many different testing scenarios.
- This process is a living document that will be reviewed and amended as necessary to be consistent with federal guidance and needs of the state.
- Manufacturers and other entities interested in testing highly automated vehicles in Maryland will first complete and submit an Expression of Interest (EOI) form on Maryland Department of Transportation (MDOT) Motor Vehicle Administration (MVA) website. The website provides high-level information on the process and support expected.
- On submission of an EOI, the entity will immediately receive notification that the EOI was received.
- The MDOT MVA will contact the testing organization within seven (7) business days to better understand the testing plan and timeline needs of the entity, and then notify the Technical Subcommittee of a pending request.
- The Technical Subcommittee will designate a Point of Contact (POC) who will evaluate infrastructure needs and other testing requirements, and also review regulatory applicability, public outreach plans, and safety considerations and safeguards to be established during this stage.
- As discussions progress, the entity will file the Application for HAV Testing with MDOT MVA; MDOT MVA will provide a written response within 30 business days of filing.
- Once approved, the entity can begin preparing their test activities. The entity will file one Application for HAV Permit for each vehicle to be tested; each vehicle is to have a unique permit number that is accessible to law enforcement.
- Throughout the process, the POC will facilitate an ongoing dialogue with the entity, other business units of MDOT and other state and local agencies, as necessary to address questions. A collaborative posture by all parties will result in the most successful execution of tests.
- Test execution.
- Regular reporting and continued dialogue of potential progression to next phases.

I. Federal Guidance on HAV Testing

- A. In October 2018, United States Department of Transportation (USDOT) released *Automated Vehicles 3.0, Preparing for the Future of Transportation* (AV 3.0). The AV 3.0 builds upon and incorporates previous guidance released in 2016 and 2017, and affirms USDOT's commitment to supporting the safe, reliable, efficient, and cost-effective integration of automation into the broader multimodal surface transportation system. AV 3.0 also reiterates USDOT's six guiding principles, including to encourage a consistent regulatory and operational environment.
- B. The Federal Automated Vehicles Policy of 2016 includes a Model State Policy that suggests each State should develop a process of application for manufacturers to test HAVs in their state with an internal process for issuing test vehicle permits by the motor vehicle licensing agency.

II. Definitions (only for purposes of this document)

- A. "Deployment" is the operation of an HAV by members of the public who are not employees or agents of the designer, developer, or manufacturer of an HAV.
- B. "Highly Automated Vehicles (HAVs)" are vehicles that contain systems referred to as Conditional (Level 3), High (Level 4) and Full (Level 5) Automation as defined in the Society of Automotive Engineers (SAE) specification J3016. These are systems that rely on the automated driving system (not on a human) to monitor the driving environment and perform some or all of the driving functions.
- C. "Highly Automated Vehicle Systems (HAV Systems)" are any combination of hardware and software that perform one or more driving functions (e.g., freeway driving, automated taxi, self-parking) by controlling and combining braking, throttle and steering functionality. The capability of a system is broken down into levels depending on the system's ability to monitor the driving environment and perform some or all of the driving functions as defined by SAE J3016. In this document, an HAV system is one that is SAE Level 3 and higher.
- D. "Manufacturers" is an individual or company that manufactures HAVs for testing and deployment on public roadways. Manufacturers include original equipment manufacturers (OEMs), multiple and final stage manufacturers, alterers (individuals or companies making changes to a completed vehicle prior to first retail sale or deployment), and modifiers (individuals or companies making changes to existing vehicles after first retail sale or deployment).
- E. "Other Entity" is any individual or company that is not a manufacturer, and is involved with designing, supplying, testing, selling, operating, deploying or helping to manufacture HAVs.
- F. "Test Operator" is an occupant of an automated vehicle who has been designated by the manufacturer / other entity to conduct testing of an HAV. The test operator may not be performing the driving task in an HAV, but is still responsible for certain aspects of the journey (i.e., inputting a destination for the vehicle, following the rules of the road, etc.), and for testing purposes must still hold all the credentials of a driver.
- G. "Testing" is pre-deployment design, development, demonstration and testing of HAVs on roadways open to public travel prior to commercial sale or deployment.

III. Applicability

- A. Any vehicle that is being tested or operated on roadways that are closed to the public do not have to be titled, registered, or safety inspected prior to operation.
- B. If the intention of the manufacturer or entity is to test HAVs on any roadways in Maryland that are open to public travel, the manufacturer or entity must obtain an HAV permit from MDOT MVA.**
- C. If testing is only occurring on public roadways temporarily closed for public travel, there may not be a need for an HAV permit but prior notification and coordination may be necessary to authorize temporary closure of a public roadway.
- D. Depending on the type of testing, other permitting processes may also be applicable related to infrastructure needs and road closures.

IV. Initiating Process

- A. MDOT MVA website will include notice of the need to collaborate, general information on process, and a fillable form to submit an EOI by any manufacturer or other entity that is interested in testing of HAVs on Maryland roadways open to public travel.
- B. The EOI includes:
 - 1. Name of the manufacturer or other entity, the corporate physical and mailing addresses of the manufacturer or other entity, the in-State physical and mailing addresses of the manufacturer or other entity, if different than the corporate address.
 - 2. Name of the HAV program administrator/director and the contact information for the program administrator/director.
 - 3. General information on plans to test HAVs on Maryland roadways open to public travel.
- C. The submittal of an EOI will generate an internal process to notify the points of contact within MDOT and MSP to navigate through the process with private sector companies, to include a multi-disciplinary group of experts that will assist in evaluating various scenarios for future cooperation more efficiently.
- D. The manufacturer or other entity can expect an initial response within seven (7) business days of submitting an expression of interest.
- E. Once dialogue has begun, each instance will be handled according to its unique circumstances.
- F. The purpose of every communication is to ensure public safety on Maryland roadways.

V. Process for Approval of Permits

- A. If the intent is to test HAVs on any roadways in Maryland that are open to public travel, an application for permitting HAV testing will be required.
- B. Once the application is submitted to MDOT MVA, it will be processed and an initial determination made within 30 days.

- C. Prior to permitting testing, MDOT MVA will consult with, and get approvals as appropriate, from state and local agencies, to include Maryland State Police, MDOT/SHA, MDTA and local jurisdictions, as applicable, for the requested location(s) of expected testing.
- D. If approved, MDOT MVA will issue an authorization to the manufacturer or other entity to allow testing and issue a permit to each test vehicle.

VI. Issues to be Addressed During the Permit Process

- A. Identification of each test operator, their driver's license number, and the jurisdiction in which the operator is licensed.
- B. Self-certification that HAV safety training has been provided to the employees, contractors, or other persons designated by the manufacturer or other entity as operators of the test vehicles.
- C. Agreement that test operators are to be responsible for following all traffic rules of the road, and responsibility of all traffic violations in the HAVs being tested on roadways open to public travel, are that of the permit holder.
- D. Identification of each vehicle to be used for testing, with VIN or serial number, vehicle type, and other unique identifiers such as the year, make, and model.
- E. Self-certification that each vehicle meets all applicable Federal Motor Vehicle Safety Standards or equivalent; or is the subject to an exemption from such standards by National Highway Traffic Safety Administration (NHTSA).
- F. Self-certification of a reasonable measure of previous testing of the technology in the test vehicles under controlled conditions that simulate the real-world conditions (various weather, types of roads, times of the day and night, etc.) to which the applicant intends to subject the vehicle on public roadways, prior to testing on roadways open to public travel.
- G. Assurances from the manufacturer or entity of the safety and compliance plan for testing vehicles on roadways open to public travel, to include a copy of the Safety Assessment Letter (SAL) submitted to National Highway Traffic Safety Administration (NHTSA) for the vehicle(s) being testing, or if SAL was not submitted, then to include both 1 and 2 below:
 - 1. To include the Operational Design Domain of the HAVs (how and where the HAV is supposed to function and operate), including:
 - i. Test vehicles storage site(s)
 - ii. Proposed test location(s) (areas or corridors)
 - iii. Proposed transport plan for movement from storage site(s) to test location(s)
 - iv. Emergency response – Cut-Off Switches

2. Self-certification that the SAL points have been addressed:
 - i. Object and Event Detection and Response: Perception and response functionality of the HAV system;
 - ii. Fall Back (Minimal Risk Condition): response and robustness of the HAV upon system failure;
 - iii. Validation Methods: Testing, validation, and verification of an HAV system;
 - iv. Data Recording and Sharing: HAV system data recording for information sharing, knowledge building and for crash reconstruction purposes;
 - v. Post-Crash Behavior: Process for how an HAV should perform after a crash and how automation functions can be restored;
 - vi. Privacy: Privacy considerations and protections for users;
 - vii. System Safety: Engineering safety practices to support reasonable system safety;
 - viii. Vehicle Cybersecurity: Approaches to guard against vehicle hacking risks;
 - ix. Human Machine Interface: Approaches for communicating information to the driver, occupant and other road users;
 - x. Crashworthiness: Protection of occupants in crash situations;
 - xi. Ethical Considerations: How vehicles are programmed to address conflict dilemmas on the road; and
 - xii. Federal, State and Local Laws: How vehicles are programmed to comply with all applicable traffic laws.
- H. Proof of liability and insurance coverage
 1. Evidence of ability to satisfy a judgment or judgments for damages for personal injury, death, or property damage caused by a vehicle in testing in the form of an instrument of insurance, a surety bond, or proof of self-insurance, for no less than 5 million U.S. dollars.
 2. All testing vehicles must carry motor vehicle insurance. The manufacturer or other entity permitted to test HAVs is the liable party for any of their vehicles and drivers / operators of their vehicles.
- I. Identification of any wireless communication components of the test, operating in either licensed or unlicensed spectrum. Unlicensed components shall be compliant with Title 47 Code of Federal Regulation, Part 15 (47CFR15).
- J. Notification of any registration and titling of each vehicle to be used for testing.
- K. Reporting Crashes
- L. Regular Reporting and Renewal Application
- M. Right to Cancel