

HOW TO TEST AUTOMATED DRIVING SYSTEMS IN COLORADO

AUTONOMOUS MOBILITY TASK FORCE



AUTONOMOUS MOBILITY TASK FORCE



Dear interested Automated Driving System tester:

The State of Colorado believes in a shared vision of a safer highway system by advancing the deployment of autonomous vehicle technologies. The General Assembly of the State of Colorado, through SB 17-213, created a safe harbor that allows Automated Driving Systems (ADS) which are otherwise not capable of complying with all applicable laws and rules to test in the State.

The process outlined in this packet requests information from you that will allow the Autonomous Mobility Task Force to consider how testing of your ADS may be approved in Colorado. The process generally follows the recommendations and guidelines set forth by the National Highway Traffic Safety Administration.

Thank you for your interest in testing your ADS in Colorado! We look forward to working with you.



BACKGROUND & INSTRUCTIONS

By adoption of Senate Bill 17-213, codified at § 42-1-102, C.R.S., § 42-4-110, C.R.S., and § 42-4-242, C.R.S., the General Assembly of the State of Colorado created a safe harbor that allows automated driving systems which are otherwise not capable of complying with all applicable laws and rules to test their system. Persons or companies seeking to comply with the safe harbor provision (“Applicants”) are required to complete the process created by the Colorado State Patrol (“CSP”) and the Colorado Department of Transportation (“CDOT”).

This Application Packet details how to submit an application for the safe harbor review process. Generally, this process entails providing basic information about system safety, insurance, data sharing and privacy policies, and driver and vehicle self-certification. It aims to ensure autonomous vehicles are not unnecessarily prohibited from testing this technology in Colorado due to an inability to comply with the “rules of the road,” while ensuring participating persons and companies have considered important aspects of autonomous vehicle operation and adding transparency to the testing and approval process.

A. The Autonomous Mobility Task Force

Applications are processed through the Autonomous Mobility Task Force (the “Task Force”). The Task Force is an informal, non-policy making body designed to allow CSP and CDOT staff to create and manage the safe harbor review process, as well as to process safe harbor review applications.

CDOT and CSP created the Task Force to collaborate, discuss and assess issues surrounding autonomous vehicles. CSP and CDOT have also asked the Colorado Department of Revenue, Division of Motor Vehicles (“DOR”) to sit on the Task Force, both to provide insight and expertise to the agencies, as well as to ensure information is shared between CSP, CDOT, and DOR.

B. General Instructions

Responses. Applicants must provide a response to each statement. Please provide the information requested in the order it is requested and using the headings and numbering contained herein so that the agencies can clearly discern the information intended to satisfy each requirement.

Complete Applications Only. Aside from information provided as a response to any request for additional information from the Task Force, application materials must be submitted in a single PDF file.

Sufficiency of Response. Although more responsive information is better than less, the agencies do not expect lengthy or extremely detailed responses. The agencies do, however, expect the answers to include sufficient information so that the agencies can understand, generally, how the system is supposed to operate and how it should respond to common driving tasks and environmental conditions.

Requests for Additional Information. Upon receipt of an application and preliminary review by the agencies, the agencies may request additional information. Applicants shall coordinate with the Task Force to ensure a timely response with the additional information.



Rejection for Failure to Sufficiently Respond. Failure to complete any question, failure to clearly identify a response to any question, or failure to provide the required insurance documentation, self-certification, or requests for additional information, may result in a rejection of the application due to the agency's inability to ascertain basic facts of the system.

Information Subject to Open Records Requests. Please keep in mind that submitted documentation will likely be subject to disclosure under the Colorado Open Records Act, § 24-72-201, *et seq.*, C.R.S. Applicants who submit any such information are strongly encouraged to clearly identify the information they consider trade secret or proprietary, along with a detailed rationale. Notwithstanding any such identified information, the agencies make no guarantees that such information will not be disclosed pursuant to the Colorado Open Records Act. Applicants are encouraged to review the act with their attorney prior to submission.

C. Questions

Questions about the Application, the Application review process, or any other aspect of the agencies' review of the safe harbor process can be directed via e-mail to:

Ashley Nylen, Assistant Director of Mobility Technology
Colorado Department of Transportation
ashley.nylen@state.co.us

With CC to:

Kay Kelly, Chief of Innovative Mobility
Colorado Department of Transportation
kay.kelly@state.co.us

And:

Leonard Dittman, Captain
Colorado State Patrol
leonard.dittman@state.co.us

D. Application Processing

Applications will generally be processed on a first-come, first-serve basis. The agencies review and discuss applications on an as-needed basis. Complete submissions can expect a response within two months of their submission, but the agencies reserve the right to take additional time or to conduct one or more requests for additional information.



E. Expedited Process

The Autonomous Mobility Task Force has outlined an Expedited Process for those applicants in which their deployment features a nearly identically similar operational design domain and vehicles to an application with prior Task Force approval. To qualify for the Expedited Process, the applicant must meet all elements of the items numbered below:

1. The applicant must have applied to the Colorado Autonomous Mobility Task Force previously, completed the full process, and passed all Task Force requirements, including providing a close-out report to the Task Force.
2. The applicant must demonstrate a safe and successful initial deployment. This includes:
 - a. compliance with Task Force application
 - b. no major incidents, events, or safety issues

Applicants may apply requesting the Expedited Process review; however, sole discretion resides with CDOT and CSP regarding approving an applicant to go through the Expedited Process

All elements outlined in this packet are required for submission for applicants applying to the Task Force under the Expedited Review process. However, applicants that qualify for the Expedited Review process may not require a formal presentation to the Task Force and may only require 50 percent of the total number of vehicles featured in the application to complete the Minimum Safety Standard.

F. Application Approval

Although the review process is largely, if not entirely, ministerial, the agencies reserve the right to document information, guidance, or cautionary notices concerning the system or the information provided in the Application.

G. Application Outline

- Part 1 Operational Domain
- Part 2 Safety Information
- Part 3 Driver Certification(s)
- Part 4 Vehicle Certification(s)
- Part 5 Insurance Certification



IMPORTANT NOTICES & LIMITATIONS

Review Limitations & Acceptance of Risk. The Autonomous Mobility Task Force process entails a limited review, most of the contents of which is self-certified by the person or company submitting the application. The Applicant is solely responsible for ensuring the safe operation of its vehicle (s). Neither the Task Force nor its represented state agencies makes any warranties or guarantees concerning the safety of any tested vehicles. All risk associated with its technology, including risk of any harm caused by or to its vehicle(s), remains with the Applicant. While SB17-213 declared that the development of autonomous vehicles will, indeed, one day lead to greater overall safety – safe operation of any vehicle(s) during this testing phase is of utmost concern. The Applicant should strongly consider the latest recommendations and guidelines of the latest National Highway Safety Traffic Safety Administration.

Self-Certification. Representations that the Applicant makes in the self-certification may or may not be independently confirmed by CDOT and CSP.

Cybersecurity. The Applicant is encouraged to maintain adequate cybersecurity protocols to stop the vehicle immediately upon a breach of cybersecurity or to allow the vehicle(s) to be stopped immediately by a human operator.

Request for Updates. If, in the duration of the requested testing period, any new information arises as to the approved testing operation, the Autonomous Mobility Task Force requires that the Applicant submit a supplement to the Autonomous Mobility Task Force prior to using any new vehicle, or any vehicle with significant new or updated software or hardware.



PART 1



OPERATIONAL DOMAIN



PART 1: OPERATIONAL DOMAIN

Please provide the following information for the operational domain of the Automated Driving System (ADS) that is being requested for testing.

- 1) Define the ADS Operational Design Domain (ODD), and include the operating parameters and limitations of the system including:
 - a. Operational aspects including steering, braking, accelerating and monitoring the vehicle and the roadway; and
 - b. Operational domain including where and when the ADS is designed to operate, including limitations.
- 2) Define the Object and Event Detection and Response (OEDR), including:
 - a. Tactical aspects including responding to events (incidents, crashes/emergency responders, etc.), change in road conditions such as weather, determining when to change lanes, turning, using signals, following signage and other related actions; and
 - b. Tactical/technical aspects of how ADS determines destinations or way points of driving.
- 3) Limitations in compliance with state and federal law that applies to the function that the ADS is operating.
- 4) Outline any required changes or modifications to Colorado's transportation system needed to operate the ADS.
- 5) If applying for expedited review, please detail and confirm the similarity of the vehicle and its supporting technology to your company's prior deployments to the Autonomous Mobility Task Force.

Requested Testing Duration

Please provide the following logistical information for the testing request.

- 5) The location, testing routes, and parameters under which the ADS is proposed to be tested.
- 6) Date(s) of requested testing.
- 7) Define the conditions under which testing will be cancelled.

Communications and Coordination

- 8) Submit a proposed communications and coordination plan, including parameters for coordination with other entities/local jurisdictions for requested deployment.

Note: Task Force will be the primary liaison with local jurisdictions with technical support and engagement by applicant.



Other Relevant Information

- 9) Please define any unique characteristics of the proposed testing of ADS.
- 10) Please provide any information related to the ADS that have been submitted to any other government agency (federal, state, or local).
- 11) Please provide any letters or documentation from the National Highway Traffic Safety Administration (NHTSA) or any other federal entity related to the ADS.



PART 2



SAFETY INFORMATION



PART 2: SAFETY INFORMATION

Performance Observations. The State of Colorado is responsible for validating the safe operating parameters of autonomous vehicles. NHTSA, as defined by updated Automated Vehicle Guidelines (September 2017), is responsible for assessing ADS system safety. The state of Colorado will validate self-certification through a review of all submitted documents and conduct system performance observations during final testing prior to deployment.

- 1) Applicants must submit a **Safety and Compliance Plan** for testing vehicles. The Plan must include a self-certification of testing of the ADS and the technology in the test vehicles in conditions that simulate the real-world conditions (such as various weather, types of roads, times of the day and night, etc.) in which the applicant intends to subject the vehicle on public roadways. The Plan must include the following information:
 - a. Define how and when the system engages with the ADS and the human operator.
 - b. List all incidences and vehicle accidents involving the Applicant's ADS on public roads which have occurred within the past three years. "Incidences" include all accidents, collisions, breakdowns, or encounters with law enforcement.
 - c. Define the system detection, fallback approach and safeguards designed to identify and prevent accidents in the following scenarios:
 - i. Mechanical failure;
 - ii. Software failure;
 - iii. Pulled over vehicle on the shoulder;
 - iv. Object, animal or pedestrian in the road; and
 - v. Disengagement on curve or different road conditions.
- 2) List any and all previous or pending legal actions related to the ADS.
- 3) For applicants requesting the Expedited Review, please detail any and all safety incidents, issues, or events that occurred in prior deployments approved by the Autonomous Mobility Task Force.

Disengagements

Please provide the following information for disengagements:

- 1) Definition of a disengagement;
- 2) Provide reports of all disengagements and the cause; and
- 3) A proposed plan of response for disengagements during testing.



Data Sharing and Digital Security

- 6) Please provide information about the approach to data collection and sharing during testing and in the event of an incident or accident.
- 7) Please provide information about how applicant is approaching data security and ensuring safety of ADS from unauthorized access the electronic data of a motor vehicle to obtain data or control of the vehicle.





COLORADO AUTONOMOUS MOBILITY TASK FORCE

AUTOMATED DRIVING SYSTEM

MINIMUM SAFETY STANDARDS VERIFICATION

Any Autonomous Driving System (ADS) operating on Colorado roads must successfully demonstrate the following basic safety functions during a physical vehicle inspection by the Colorado State Patrol

Name of entity submitting vehicle for consideration:

Description of vehicle:

Date:

- 1) **Object and Event Detection and Response** – ADS shall sense and react to mobile and stationary objects within the operational design domain
 - Did the autonomous vehicle, while in motion and in ADS mode, successfully avoid stationary and mobile objects? Yes No

- 2) **Fallback** – ADS shall detect a malfunction, accident, or loss of vehicle control and independently return to a minimal risk condition.
 - Did the autonomous vehicle respond safely and appropriately to a malfunction, accident, or loss of vehicle control? Yes No

- 3) **Human Machine Interface** – ADS shall inform the human operator or occupant that the ADS is engaged, malfunctioning, or transitioning vehicle control.
 - Did the autonomous vehicle successfully inform the human operator or occupant when transitioning vehicle control? Yes No

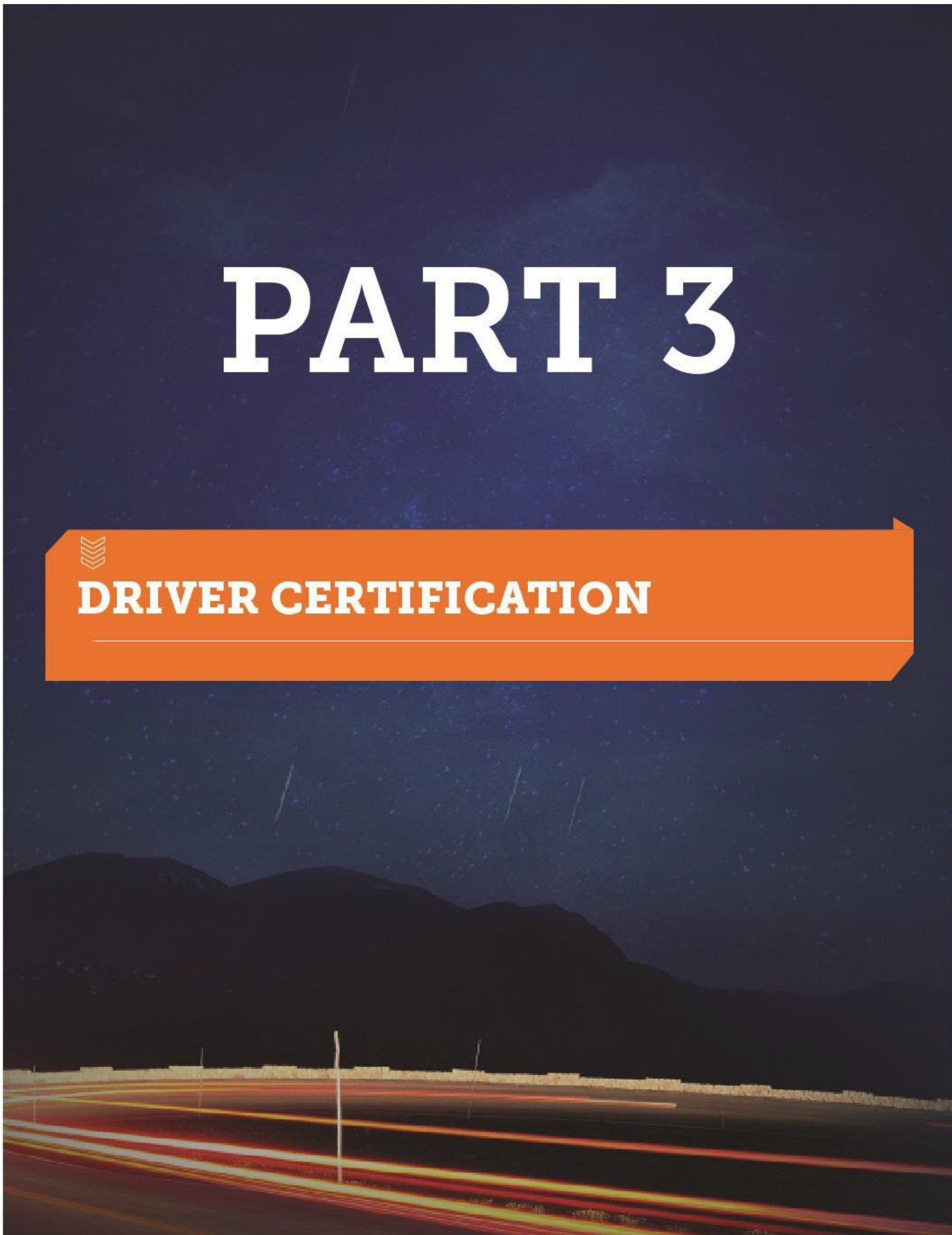
- 4) **Human Intervention** – If ADS is designed to transition vehicle control to and from a human operator, it shall demonstrate a successful transition of control.
 - Did the autonomous vehicle successfully transition control to the human operator, if applicable? Yes No

- 5) **Safety Assessment** – Did the autonomous vehicle pass a safety inspection which demonstrated that it could successfully complete the above functions?
 - Yes No

PART 3



DRIVER CERTIFICATION



PART 3: DRIVER CERTIFICATION

If a human driver will be present in the vehicle or will be monitoring from a control center, please provide the following information:

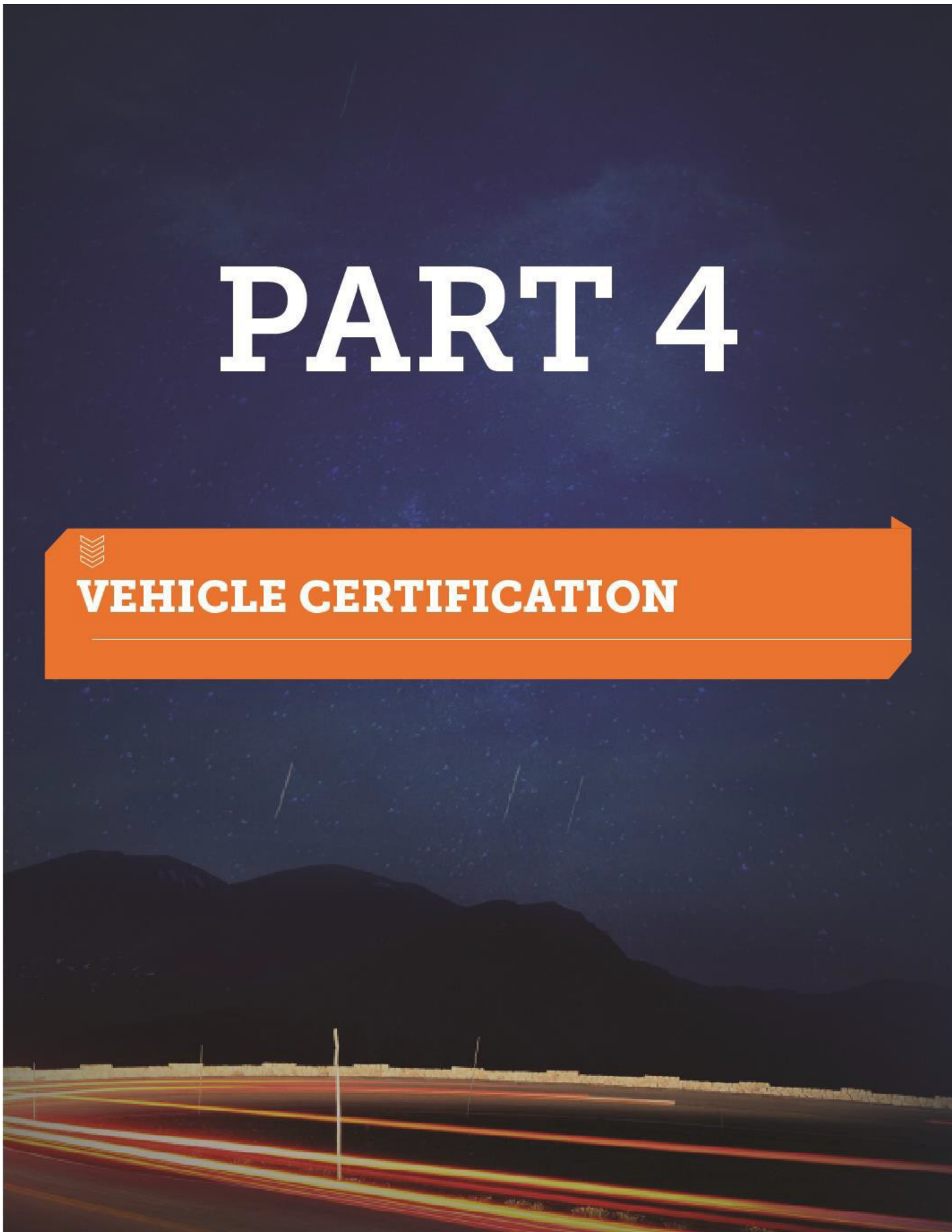
- 1) Certification that the driver/operator testing and training program is specific to the ADS; and
- 2) Identification of each test driver/operator, including the driver's or commercial driver's license number, and the state, jurisdiction or country in which the driver/operator is licensed.
- 3) The applicant agrees to notify CDOT of additional drivers or operators that may be added during the deployment. CDOT shall be notified prior to the operation of the vehicle by any additional driver or operator.



PART 4



VEHICLE CERTIFICATION



PART 4: VEHICLE CERTIFICATION

- 1) Please identify each vehicle to be used during testing/deployment, including providing each vehicle's VIN, vehicle type, year, make, and model.
- 2) Please provide certification that the vehicle(s) meets or exceeds all regulations for the vehicle, including if appropriate Federal Motor Vehicle Safety Standard (FMVSS) certifications.
- 3) If the requested testing is for a commercial vehicle, please submit all applicable regulatory requirements.
- 4) Please provide any information about the ADS or vehicle that was submitted to the National Highway Traffic Safety Administration.





Colorado Autonomous Vehicle Registration Requirements Checklist

Vehicle: _____

- Evidence of valid driving privilege

AND

- Ownership Documents
 - Manufacturer's Certificate of Origin or;
 - Title Issued by Colorado or Another Jurisdiction or;
 - Registration Issued by Colorado or Another Jurisdiction

OR

- Completion of Temporary Special Event Application, when required
 - Letter of Authorization from the U.S. Department of Transportation NHTSA, if Applicable
 - Proof of Insurance
 - Statement of Fact DR2444
 - Documentation of Intended Use
- Secure and Verifiable Identification (For Special Event Autonomous Vehicle Testing License Plate)
 - Any Colorado Driver License, Colorado Driver Permit or Colorado Identification Card, Current or Expired One Year or Less
 - Out-of-State Issued Photo Driver's License or Photo Identification Card, Photo Driver's Permit Current or Expired One Year Or Less
 - U.S. Passport or U.S. Passport Card, Current or Expired Less Than 10 Years.
 - Valid Foreign Passport with I-94 or Valid Processed or I551 Stamp. Exception: Canadian Passport May Not Have I-94 Attached
 - Valid I-94 Issued By U.S. Immigration with L1 or R1 Status and a Valid Canadian Drivers License or Valid Canadian Identification Card
 - Valid I551 Resident Alien / Permanent Resident Card. No Border Crosser or USA B1/B2 Visa/BCC Cards
 - Valid I688 Temporary Resident, I688B, and I766 Employment Authorization Card with Intact Photo.
 - Valid U.S. Military ID (Active Duty, Dependent, Retired, Reserve and National Guard)
 - Tribal Identification Card with Intact Photo (U.S. or Canadian)
 - Certificate of Naturalization with Intact Photo
 - Certificate of U.S. Citizenship with Intact Photo

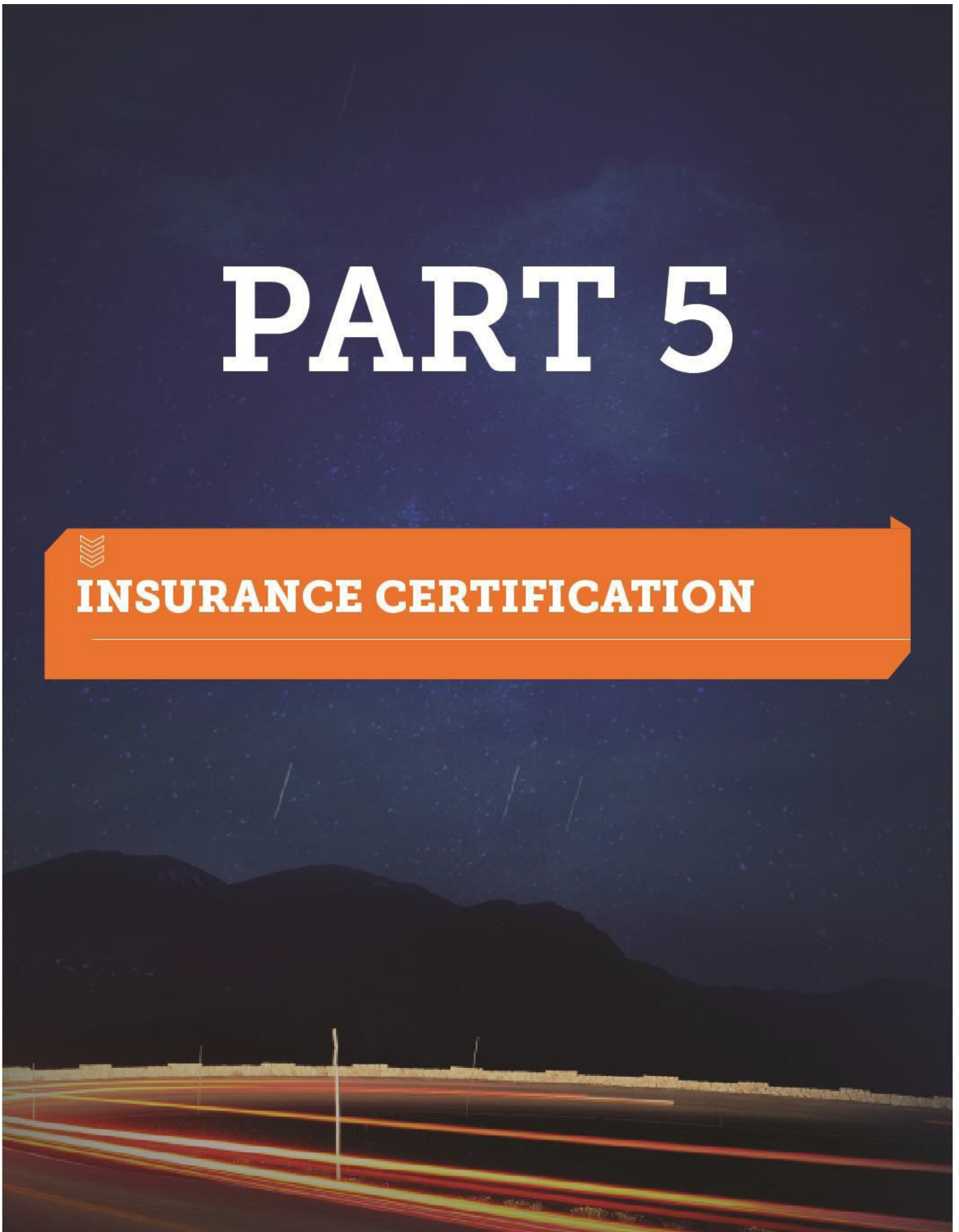
Flavio Quintana, Deputy Director, Division of Motor Vehicles

Date

PART 5



INSURANCE CERTIFICATION



PART 5: INSURANCE CERTIFICATION

Below are the insurance certification requirements that are required for Automated Driving System roadway testing in Colorado:

- 1) Umbrella Insurance of no less than \$5 million;
- 2) Commercial General Liability Insurance of no less than \$1 million;
- 3) Vehicle Insurance of no less than \$1 million; and
- 4) If necessary, a surety bond of no less than \$5 million. (Note: surety bond is required if excess/umbrella insurance is not included or limits are lower than above)

These insurance policies should be evidenced on an ACORD Certificate of Insurance. Included below is a sample certificate with highlights in the areas that should be completed.

A few tips for reviewing the certificate:

- The “Producer” and “Insured” boxes should be complete and the “Insured” should match the company name that is requesting approval.
- It is important to note the policy effective and expiration dates are current and that the testing dates are included in that time period. If the policy is set to renew during the testing period, the company should submit an updated certificate before renewal occurs.
- Confirm that the “Limits” sections are completed and that the dollar amounts are at least those listed above.
- The “Description of Operations” section should also include details about the testing and can refer back to another document that is included in the documentation provided.





CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	PHONE	FAX
	E-MAIL ADDRESS	NAIC#
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR	TYPE OF INSURANCE	ADDL	SUBR	POLICY NUMBER	POLICY EFF	POLICY EXP	LIMITS
TYPE		INSD	WVD		MM/DD/YYYY	MM/DD/YYYY	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE \$
	CLAIMS-MADE <input type="checkbox"/> OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence) \$
	GEN'L AGGREGATE LIMIT APPLIES PER:						MED EXP (Any one person) \$
	POLICY <input type="checkbox"/> rir <input type="checkbox"/> LOC						PERSONAL & ADV INJURY \$
	OTHER:						GENERAL AGGREGATE
	AUTOMOBILE LIABILITY						PRODUCTS - COMP/OPAGG \$
	ANY AUTO						\$
	OWNED AUTOS ONLY						COMBINED SINGLE LIMIT (Ea accident) \$
	SCHEDULED AUTOS						BODILY INJURY (Per person) \$
	HIRED AUTOS ONLY						BODILY INJURY (Per accident) \$
	NON-OWNED AUTOS ONLY						PROPERTY DAMAGE Per Occident \$
	UMBRELLA LIAB						\$
	OCCUR						EACH OCCURRENCE \$
	EXCESS LIAB						AGGREGATE \$
	CLAIMS-MADE						\$
	OED						RETENTIONS \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY						PER ST TUTE OTH-ER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory In NH)						E.L. EACH ACCIDENT \$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE \$
							E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS | LOCATIONS/ VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

[Redacted area]

CERTIFICATE HOLDER	CANCELLATION
	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE