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Summary: Request for Public Comments for Testing and Verifying Compliance of Transport Vehicle with a Fully Automated Driving System on Public Roads

Agency: National Highway Traffic Safety Administration (NHTSA)

Parent Agency: Department of Transportation (DOT)

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Action:

Notice of request for public comments

Action Reply: Public Submission

Date Posted: August 14, 2019

Comments Submitted By:

David DeVeau

DEVCO Design & Development

Westfield, MA 01085

Attachments: (File Name)

DOT-NHTSA-ADS-DV-Testing-Levels_David-DeVeau.pdf

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Definitions:

ADS; Automated Driving System
DV; Dedicated Vehicle
PTV; Passenger Transport Vehicle
PDV; Package Delivery Vehicle

Introductory

The following public comments within the capacity of an independent safety advocate are intended to address the NHTSA's efforts to gather input from stakeholders and the public regarding what approaches to propose to address potential challenges to the verification of the compliance with the Federal Motor Vehicle Safety Standards (FMVSS) of Automated Driving System-Dedicated Vehicles (ADS-DV) that lack traditional manual controls.

These comments are in regards toward support of cooperation for the DOT / NHTSA / NCAP Rating System for all road vehicles that by nature of specifying applicable testing will clarify safety requirements or exemptions and will further budgets for engineering designs and engineered testing.

The level of these tests are defined at driving capacity Level-4 as defined by SAE International Levels of Automation as specified in SAE-J3016.

SAE-J3016 is a standard for design feature descriptions and conditions of use at levels from human driver to full automation.

NHTSA is a DOT safety administrator of all road vehicles to include testing and approval of all safety features.

To expedite the development of all vehicle safety innovations for crash protection features and for collision avoidance at all levels of automated vehicle features, all types of testing must be perfectly clear.

As to any developing innovation being tested on public roads, there must be a minimum requirement for public safety that must be proven and therefore tested by an independent NHTSA certified testing facility.

Further self-certification of minimum public safety requirements must not be allowable for any level of permitted public road testing.

Therefor in the interest of furthering solutions for increasing public road transportation safety the testing levels and testing conditions of dedicated automated vehicles must be defined as per the following examples.

ADS-DV-PTV Testing Levels

YEAR – MAKE – MODEL

Crash Protection Levels:

L0: Occupant Safety Systems

Structural Absorption and or Diversion for Compartment Integrity

Personal Restraints and or Movement Absorption for All Seat Locations

L0-P: Pedestrian Safety Systems

Structural Absorption and or Diversion

Collision Avoidance Levels:

L1: Warning Systems (Not Applicable, No Human Driver Systems)

Audio and or Visual and or Tactile Vibration Alerts

L1-P: Pedestrian Warning Systems

External Audio and or Visual Alerts

L2: Assist Systems (Not Applicable, No Human Driver Systems)

Tactile Resistance and or Initial Intervention

Directional and or Speed Counter Measures

L3: Automatic Systems (Not Applicable, No Human Driver Systems)

Complete Intervention and or Activation

Directional and or Speed Control

L4: Autonomous Systems

Directional and or Speed Control

No Human Driver Interface and or Intervention

ADS-DV-PDV Testing Levels

YEAR – MAKE – MODEL

Crash Protection Levels:

L0: Occupant Safety Systems (Not Applicable, Package Delivery Only)
Structural Absorption and or Diversion for Compartment Integrity
Personal Restraints and or Movement Absorption for All Seat Locations

L0-P: Pedestrian Safety Systems
Structural Absorption and or Diversion

Collision Avoidance Levels:

L1: Warning Systems (Not Applicable, Package Delivery Only)
Audio and or Visual and or Tactile Vibration Alerts

L1-P: Pedestrian Warning Systems
External Audio and or Visual Alerts

L2: Assist Systems (Not Applicable, Package Delivery Only)
Tactile Resistance and or Initial Intervention
Directional and or Speed Counter Measures

L3: Automatic Systems (Not Applicable, Package Delivery Only)
Complete Intervention and or Activation
Directional and or Speed Control

L4: Autonomous Systems
Directional and or Speed Control
No Human Driver Interface and or Intervention

ADS-DV-PTV Crash Protection Measurements

PASS: External Bruising and Abrasions

PASS: Internal Joint Sprains

PASS: Internal Organ Bruising

FAIL: External or Internal Damage

FONT / SIDE / REAR:

ALL MAIN SEAT LOCATIONS: (Nearest to Doors or Windows)

Humanoid Crash Dummy

225 Pound Male Adult

180 Pound Female Adult

80 Pound Adolescent Child

ANY SECONDARY SEAT LOCATION: (In the Middle or Center)

Humanoid Crash Dummy In Additional Safety Seat

Up to 80 Pound Child

CONDITIONS:

- Vehicle Areas Defined Collide At Speed Specified
- All Occupants Are Measured and Visually Inspected For Crash Results
- Occupant Compartment Is Observed For Intrusion Of Occupied Areas
- Laboratory Conditions Simulate Actual Crash Conditions Within 80%

ADS-DV-PTV-PDV Collision Avoidance Measurements

AUTOMATED DRIVING SYSTEMS:

Autonomous Directional and Speed Control
No Human Driver Interface or Intervention

CONDITIONS:

- Autonomous Systems Are Measured On Ability To Anticipate and or Calculate Course and Perform Actions
- All Systems Are Measured On Ability To Perform Specific Tasks On Specified Road Types Within A Range of Environmental Conditions Up To Speed Specified.
- Laboratory Conditions Simulate Actual Collision Conditions Within 80%

ADS-DV-PTV Testing Request Conditions

YEAR – MAKE – MODEL

Forward / Rearward Brake:

Automatic: Brake Control; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Collision Avoidance Abilities

Proximity; Front 75 feet from 39 to 0 mph / Rear 20 feet from 19 to 0 mph

Note: Braked Stopping Ability Is Dependent On Conditions and or Obstacles Introduced

Speed Control:

Warning: Internal & External Audio & Visual Alerts; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Collision Warning Abilities

Automatic: Speed Control; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Course Awareness Abilities

Speed Range; Front 0 to 39 / Rear 0 to 19 mph

Note: Forward / Rearward Brake Is Active

Lane Keep / Lane Departure:

Warning: Internal & External Audio & Visual Alerts; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Lane Change Warning Abilities

Automatic: Lane Keep / Lane Departure Steering Control; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Course Maneuvering Abilities

Speed Range; Front 0 to 39 / Rear 0 to 19 mph

Note: Forward / Rearward Brake and Speed Control Are Active

Notes:

- 1) Additional information will be required to cite exemption to existing law to explain ADS-DV substitute safety feature with equal or better ability.
- 2) Additional information will be required to explain software update protocol and cyber security conditions.
- 3) Additional information will be required for electronic data transfer of crashes to the NHTSA for evaluation of recall or like action for resolve of safety issue.
 - Reports must be electronically submitted within 48 hours that result in failed conditions of passenger or pedestrian crash protection.
 - Reports must be electronically submitted within 120 hours that result in immobility of vehicle to operate safely.
 - Reports must be electronically submitted within 240 hours that were a result of the vehicle operating outside of approved conditions.

ADS-DV-PDV Testing Request Conditions

YEAR – MAKE – MODEL

Forward / Rearward Brake:

Automatic: Brake Control; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Collision Avoidance Abilities

Proximity; Front 45 feet from 29 to 0 mph / Rear 20 feet from 19 to 0 mph

Note: Braked Stopping Ability Is Dependent On Conditions and or Obstacles Introduced

Speed Control:

Warning: External Audio & Visual Alerts; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Collision Warning Abilities

Automatic: Speed Control; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Course Awareness Abilities

Speed Range; Front 0 to 29 / Rear 0 to 19 mph

Note: Forward / Rearward Brake Is Active

Lane Keep / Lane Departure:

Warning: External Audio & Visual Alerts; Moderate Weather; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Lane Change Warning Abilities

Automatic: Lane Keep / Lane Departure Steering Control; Day Only; City Street Traffic Conditions; Other Vehicle, Pedestrian, and Bicycle Recognition; Course Maneuvering Abilities

Speed Range; Front 0 to 29 / Rear 0 to 19 mph

Note: Forward / Rearward Brake and Speed Control Are Active

Notes:

- 1) Additional information will be required to cite exemption to existing law to explain ADS-DV substitute safety feature with equal or better ability.
- 2) Additional information will be required to explain software update protocol and cyber security conditions.
- 3) Additional information will be required for electronic data transfer of crashes to the NHTSA for evaluation of recall or like action for resolve of safety issue.
 - Reports must be electronically submitted within 48 hours that result in failed conditions of passenger or pedestrian crash protection.
 - Reports must be electronically submitted within 120 hours that result in immobility of vehicle to operate safely.
 - Reports must be electronically submitted within 240 hours that were a result of the vehicle operating outside of approved conditions.

ADS-DV-PTV Testing Request Levels

YEAR – MAKE – MODEL

DOT Testing Level	DOT Testing Speed	Testing Conditions Vehicle Direction of Travel and/or Area Location of Vehicle Impact	SAE-J3016 Design Level
L0	41 to 49 mph	Front; Center to 3/4 / All Passengers Pass Crash Protection	Not Applicable
L0	31 to 39 mph	Front; 1/2 to 1/4 / All Passengers Pass Crash Protection	Not Applicable
L0	21 to 29 mph	Rear; Center to 3/4 / All Passengers Pass Crash Protection	Not Applicable
L0	21 to 29 mph	Side; Center to 3/4 / All Passengers Pass Crash Protection	Not Applicable
L0p	11 to 19 mph	All; Absorption and/or Diversion Of Pedestrian Impact Forces	Not Applicable
L1p	21 to 29 mph	Front; Passenger & Pedestrian Warning	L0
L1p	11 to 19 mph	Rear; Passenger & Pedestrian Warning	L0
L4	0 to 39 mph	All; Fully Automated Driver – No Human Driver Interface	L4
L4	0 to 39 mph	All; Course Ability / City Street & Traffic Conditions	L4
L4	21 to 29 mph	Front; Pedestrian & Bicycle Collision Avoidance	L4
L4	11 to 19 mph	Rear; Pedestrian & Bicycle Collision Avoidance	L4

ADS-DV-PDV Testing Request Levels

YEAR – MAKE – MODEL

DOT Testing Level	DOT Testing Speed	Testing Conditions Vehicle Direction of Travel and/or Area Location of Vehicle Impact	SAE-J3016 Design Level
L0	31 to 39 mph	Front; Center to 3/4 / Absorption Of Other Vehicle Impact Forces	Not Applicable
L0	21 to 29 mph	Rear; Center to 3/4 / Absorption Of Other Vehicle Impact Forces	Not Applicable
L0	21 to 29 mph	Side; Center to 3/4 / Absorption Of Other Vehicle Impact Forces	Not Applicable
L0p	11 to 19 mph	All; Absorption and/or Diversion Of Pedestrian Impact Forces	Not Applicable
L1p	21 to 29 mph	Front; Pedestrian Warning	L0
L1p	11 to 19 mph	Rear; Pedestrian Warning	L0
L4	0 to 29 mph	All; Fully Automated Driver – No Human Driver Interface	L4
L4	0 to 29 mph	All; Course Ability / City Street & Traffic Conditions	L4
L4	21 to 29 mph	Front; Pedestrian & Bicycle Collision Avoidance	L4
L4	11 to 19 mph	Rear; Pedestrian & Bicycle Collision Avoidance	L4

DOT / NHTSA / NCAP Safety Rating Sticker – PTV

YEAR - MAKE - MODEL				
105mph ★	Crash / Collision - Safety Ratings - (Standard or Regulated / Optional / Other Colors)			
	Protection	Avoidance		Safety Features
95mph ★	Front Center-3/4			Separable Safety Cage
85mph ★				
75mph ★	Front 1/2-1/4	Rear Center-3/4		
65mph ★	Side Center-3/4			
55mph ★				
45mph ★	Front Center-3/4			All Full Seat Airbags
35mph ★	Front 1/2-1/4		ALL Traffic Automatic	2-1/2 Hour Run Time
25mph ★	Rear Center-3/4	Side Center-3/4		Front Pedestrian Automatic
15mph ★	Front Pedestrian	Rear Pedestrian		Rear Pedestrian Automatic
National Highway Traffic Safety Administration (NHTSA) Crash / Collision Tests Are Under Laboratory Conditions At Speed Indicated +/- 4mph Crash Protection For Passengers In All Seat Locations At 100% Survival Collision Avoidance Technology Has 100% Proof Of Function Actual Crash / Collision Conditions Are Simulated Within 80% For Additional Information Go To www.SaferCar.gov				SILVER 55+ Years BLUE Family Needs GOLD Performance

Example: Passenger Transport Vehicle Safety Rating Sticker

Protection / Avoidance

Are Relative To All Passengers and Pedestrians that are also Inclusive of Bicycle and Like Pedestrian Operated Vehicles As Rated by Official Authority with Applicable Statements

Safety Features

Are Included By Manufacturer and Relative To This Vehicle Only

Note:

Speed Based Rating System Equals More Stars For Faster Safer Cars

DOT / NHTSA / NCAP Safety Rating Sticker – PDV

YEAR - MAKE - MODEL					
Crash / Collision - Safety Ratings - (Standard or Regulated / Optional / Other Colors)					
Protection		Avoidance		Safety Features	
105mph ★					
95mph ★					
85mph ★					
75mph ★					
65mph ★					
55mph ★					
45mph ★					500LB Load Capacity
35mph ★	Front Center-3/4				Crash Absorption
25mph ★	Rear Center-3/4	Side Center-3/4	ALL Traffic Automatic	Front Pedestrian Automatic	2-1/2 Hour Run Time
15mph ★	Front Pedestrian	Rear Pedestrian		Rear Pedestrian Automatic	

National Highway Traffic Safety Administration (NHTSA)

Crash / Collision Tests Are Under Laboratory Conditions At Speed Indicated +/- 4mph
 Crash Protection For Other Vehicle Passengers At 100% Survival
 Collision Avoidance Technology Has 100% Proof Of Function
 Actual Crash / Collision Conditions Are Simulated Within 80%
 For Additional Information Go To www.SaferCar.gov

SILVER

BLUE

GOLD

55+ Years

Family Needs

Performance

Example: Package Delivery Vehicle Safety Rating Sticker

Protection / Avoidance

Are Relative To Other Vehicles and Pedestrians that are also Inclusive of Bicycle and Like Pedestrian Operated Vehicles As Rated by Official Authority with Applicable Statements

Safety Features

Are Included By Manufacturer and Relative To This Vehicle Only

Note:

Speed Based Rating System Equals More Stars For Faster Safer Cars

Conclusion

As stated in this introductory the SAE-J3016 Standard from its initial implementation and throughout its revision process is about the levels of design perimeters. Although proven to be very useful for design engineering, is lacking in clarity for testing engineering.

Test design engineering can not have overlapping levels. A division of testing levels must be clearly defined for accurate and provable testing. Further manufacturing engineers must have clear testing directives for achievements of provable safety design innovations at all levels.

As shown in this proposal by implementing a DOT Testing Level Standard in conjunction with the SAE J3016 Design Level Standard all design and testing conditions in interest with compliance for advancing road safety regulations and consumer notification are clearly addressed as follows:

- Applicable Testing Levels are clearly distinguished per vehicle design
- Applicable Testing Conditions are clearly defined per vehicle design
- Replaces the Manufacturer Petition with NHTSA Certified Testing
- Expedites Competitive Development of Safety Innovations at All Levels
- SAE J3016 is clarified as a Engineering Design Standard Reference
- NHTSA Crash / Collision Testing is clarified as a simplified Standard
- DOT / NHTSA / NCAP Speed Based Rating System is Perfectly Clear



DOT / NHTSA / NCAP 10 Star Speed Safety Rating

**For All Levels Of Public Road Vehicle Safety
From Prototype Testing To Production
Certified Officially Proven Public Safety**