Assessment, Evaluation, and Approaches to Modification of FMVSS that may Impact Compliance of new Vehicle Designs Associated with Automated Driving Systems

January 2018
Agenda

• Goal
• Technical Translations
• Current Research Context
• Research Phasing and Process
• Stakeholder Engagement
• Introduce VTTI Team
Goal

Provide NHTSA findings and results needed to make informed decisions regarding Technical Translations of FMVSS that address the challenges of self-certification and compliance verification of innovative new vehicle designs precipitated by Automated Driving Systems (ADS).
Technical Translations

- Develop translations that address the challenges of innovative new vehicle designs that are also inclusive of current conventional designs.
  - Adapt regulations text and test procedures to encompass new vehicle designs.
  - Translations need to be concept/design agnostic.
  - A translation will not impact or change the safety intent of a standard.
  - A translation will not impact or change current minimum safety performance measures.
Translating for the Body versus Translating for the Brain

• FMVSS “are regulations written in terms of minimum safety performance requirements for motor vehicles or items of motor vehicle equipment” (49 C.F.R. §571).
• Currently: Body and Brain tested independently
  – FMVSS sets “body” performance requirements to support the ability of a human driver’s “brain” to complete the Dynamic Driving Tasks (DDT) and any DDT fallback.
    • Vehicle Brakes = Body (FMVSS 135)
    • Human driver = Brain (Driver Licensing; e.g., obeying stop signs; KSA)
• Current Research Scope: Translate for Body (New Design)
Research Phasing

- **Phase I Priority (initial) Research**
  - NHTSA will identify initial FMVSS including potential gaps that can be investigated over the initial 12 months.

- **Phase I Short Term Research**
  - This phase would cover short term efforts that would entail the technical translations that could be identified, developed, research tested and evaluated within an 18 month time period.

- **Phase II Long Term Research**
  - This phase would cover the modification that would take longer and are more complex than Phase I Priority 12 and Phase I Short Term.
Research Process

- Scoping
- Planning
- Development
- Test and Evaluation

Stakeholder Engagement
Stakeholder Engagement Process

Technical Translation Research Engagement

- NHTSA Working Groups
- VTTI Expert Peer Reviews
- VTTI Stakeholder Working Groups
- NHTSA Review
- VTTI Stakeholder Feedback Workshops
- Technical Translation Findings

NHTSA Stakeholder Outreach
### ADS-DV Framework

- 6 Categories/30 Features
- 4 Concept vehicles
  - Conventional
  - Transitional
  - Unconventional
  - Low-Speed Unconventional

<table>
<thead>
<tr>
<th>Category</th>
<th>Vehicle Feature</th>
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<tbody>
<tr>
<td><strong>Entry/Egress</strong></td>
<td>Conventional Doors</td>
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<td>Unconventional Doors</td>
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<td><strong>External Communication</strong></td>
<td>Auditory Indicator</td>
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<td>Exterior Illumination</td>
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<td>Stop Lamp</td>
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<td>Taillamps</td>
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<td>Turn Signals</td>
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<td>Wireless Intent Communication</td>
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<tr>
<td><strong>Seating Configuration &amp; Occupant Protection</strong></td>
<td>Conventional Seating</td>
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<td></td>
<td>Unconventional Seating</td>
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<tr>
<td><strong>User Communication</strong></td>
<td>Mounted Displays (Outside View/Media)</td>
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<td>Panic Button (ICE) (Voluntary)</td>
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<td>Portable Device Destination Input</td>
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<td>Portable Device User Communication</td>
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<td>Portable Device Window/Comfort Input</td>
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<td>Telltales</td>
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<td><strong>Vehicle Control</strong></td>
<td>Accelerator/Brake Pedal</td>
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<td>Bidirectional Vehicle Motion</td>
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<td>Parking Brake System (Human Activated)</td>
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<td>Shifter</td>
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<td>Steering Wheel</td>
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<td><strong>Visibility</strong></td>
<td>Headlamp</td>
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<td>Hood</td>
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<td>Mirror</td>
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<td>Rear Visibility System</td>
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<td>Sun Visor</td>
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<td>Window</td>
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<td>Window Defog/Defrost</td>
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<td></td>
<td>Windshield (&lt;70% Transmissivity)</td>
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<td>Windshield Wiper</td>
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Core Team

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Dynamic Research, Inc.
NAPA Research Corporation

Stakeholder/Peer Reviewer Group

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Core Group