National Highway Traffic Safety Administration

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Testing Advanced Crash Avoidance Technologies with 3D Surrogate Vehicles

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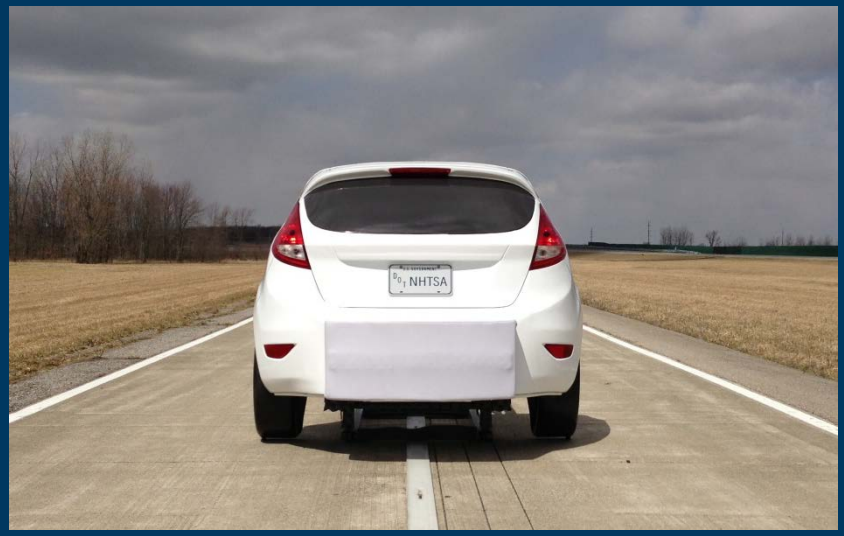
Presentation Overview

- Why 3D surrogate vehicles are necessary
- Examples of tests performed with NHTSA's equipment
- Considerations for global harmonization

3D Surrogate Vehicle Relevance

- Basic AEB testing only requires surrogates be accurately representative from the rear aspect only
  - NHTSA SSV
  - Euro NCAP EVT
- Future evaluations will require more flexibility
  - Intersections
  - Approaching traffic
  - Offset rear-end crashes
  - Additional false positive scenarios
- It is not feasible or safe to evaluate such scenarios with real “target” vehicles and short time-to-collisions

Strikeable Surrogate Vehicle (SSV)



NHTSA AEB Test Using the SSV

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Recently Purchased Equipment

- Dynamic Research Inc. (DRI) Guided Soft Target (GST)
  - Low Profile Remote Vehicle (LPRV)
  - Micro Soft Car 360
  - Hatchback Soft Car 360
- Unique capabilities of NHTSA's LPRV
  - Compatible with heavy vehicles
  - Includes a provision for Connected Vehicle use

McD Scenario

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McD Scenario (cabin view)

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Left Turn Across Path Scenario

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Left Turn Across Path Scenario (cabin view)

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Intersection Scenario

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Intersection Scenario (cabin view)

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Blind Spot Intervention Scenario

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Platform Performance

- Excellent accuracy and repeatability
- Short battery life when operated at high speed
- Shell geometry being assessed
  - Contribution to overall radar return characteristics
  - Ability to be overrun by any light vehicle

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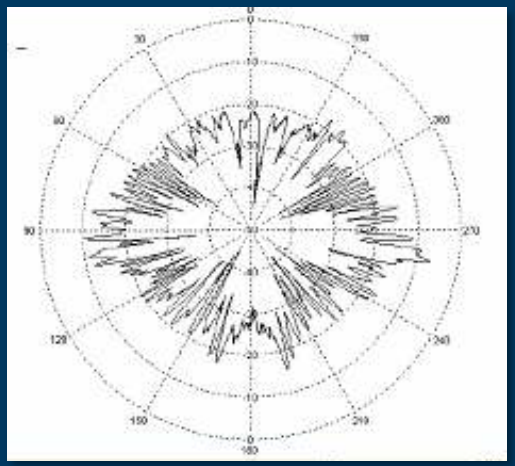
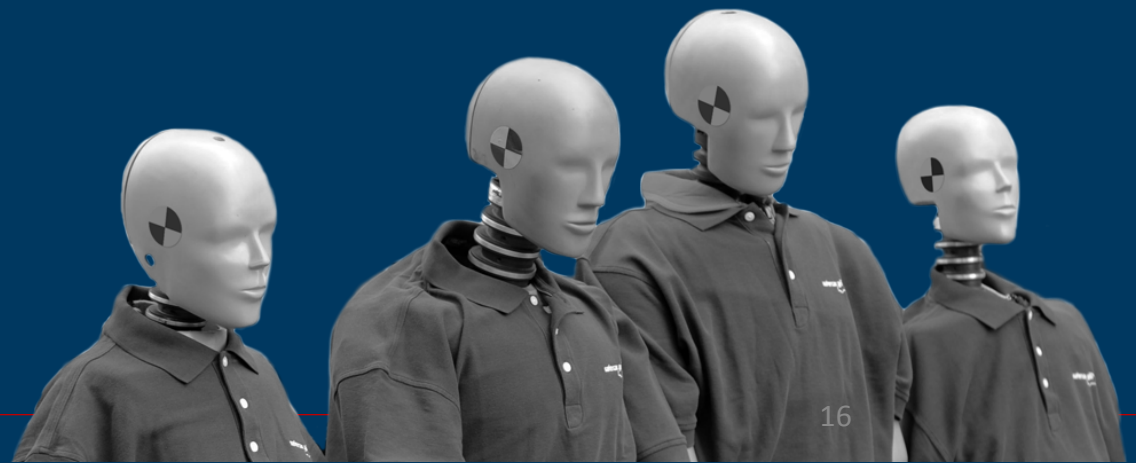
Surrogate Vehicle Radar Characteristics

- Limited evaluations indicate the Soft Car 360s and NHTSA SSV elicit nearly identical AEB performance in rear-end crash scenarios
- Industry feedback from scanning events hosted by Thatcham suggest improvements be made to further refine realism
- NHTSA will be working with MTRI to address this feedback



Harmonization



Need for Collaboration

- To promote harmonization of test methods, identification of a surrogate vehicle appropriate for global use is of interest to governments, testing organizations, and industry
- Collaborative research is presently underway
- Feedback explaining why specific improvements are needed is welcome and appreciated
  - The earlier these technical discussions occur the better!
  - A decision on what 3D surrogate the agency will use for advanced technology evaluations is expected later this year

Core Elements of a Global Surrogate Vehicle

- An acceptable global surrogate must safely and appropriately balance realism, durability, and ease-of-use

- Mounting points should be compatible with a range of robotic platforms
- When used with the global surrogate, each surrogate/platform combination should produce comparable test results

Points for Consideration

- How will findings and developments be exchanged among stakeholders in an efficient way?
- How will the effect of wear-and-tear be quantified and documented?
- When will a surrogate vehicle “design freeze” need to be imposed to best promote harmonization?
  - Will it be respected?
- What is a reasonable surrogate vehicle life cycle?
  - Technology advances may require future design changes
  - Design changes must be objectively and consistently implemented
- If the surrogate is produced at different locations worldwide, how will consistency be insured?

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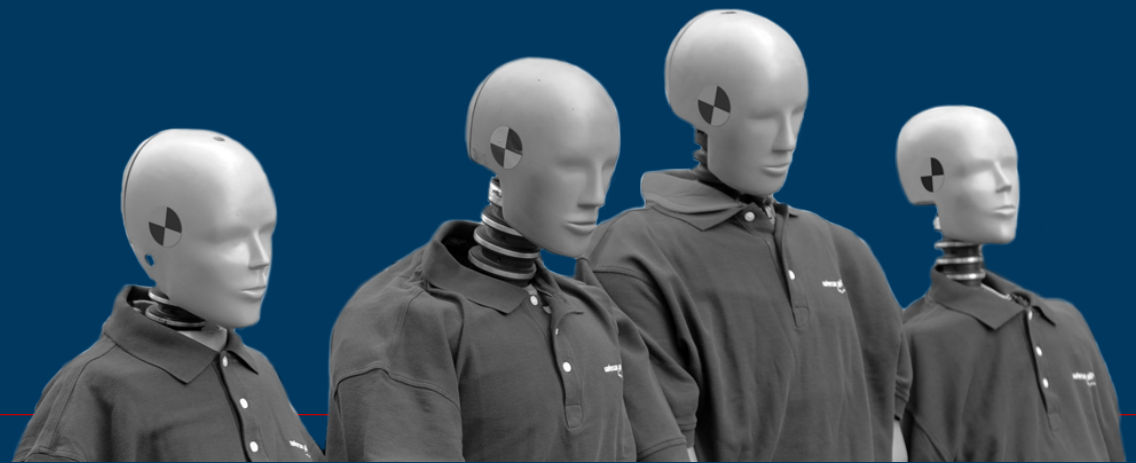
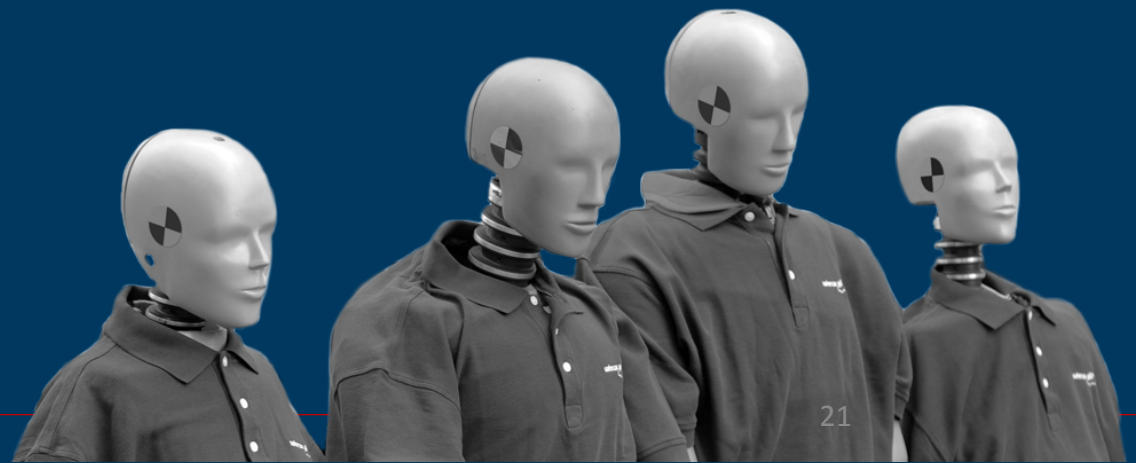
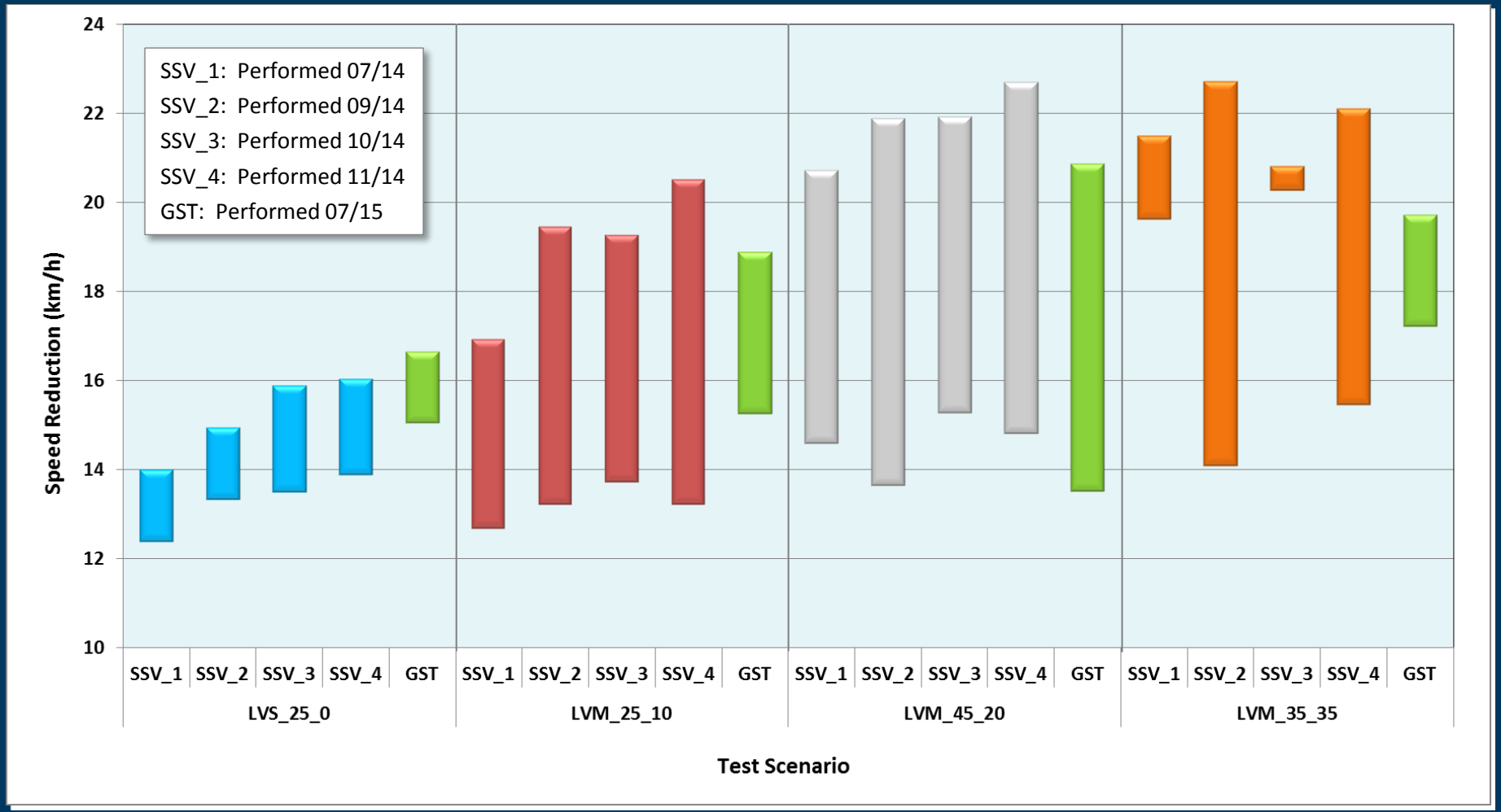


Bonus Slides



SSV vs. GST Smart ForTwo
(2014 Jeep Grand Cherokee CIB Speed Reductions)



Blind Spot Intervention Scenario (oops!)

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