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**NHTSA**

# Overview of NHTSA Research Programs

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# Agenda

**1. Organization and Budget**

**2. Research Objectives and History**

**3. Vision for Vehicle Safety**

**4. Program Overview**

# Research Mission and Goals

- Advance Scientific Knowledge in support of NHTSA's mission
  - Identify Opportunities for Increasing Safety
    - Crashworthiness, Crash Avoidance, Restraint systems
  - Understand Performance of Advanced Technologies
    - Crash Prevention, Crash Severity Reduction, Integrated Safety
  - Develop Objective Tests to Discriminate Performance
  - Address Human-Vehicle Performance Issues
  - Retain Leadership in Human Injury Research
  - Support Rulemaking, Consumer Information and Enforcement Programs
  - Research Programs in Vehicle Safety

# Research Products for Enhancing Safety



**Countermeasures  
Development**



**ESV Conference**



**Technical Reports**



**Research Papers**



**Congressional  
Reports**



**Data & Analysis**



**Test Tools  
& Procedures**



# 20th Enhanced Safety of Vehicles Conference

## Innovations for Safety: Opportunities and Challenges

Palais des Congrès de Lyon France

June 18 - 21, 2007

Sponsored by: U.S. Department of Transportation - National Highway Traffic Safety Administration

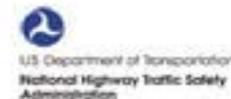
[ESV HOME](#)

[HELP](#)



### 20th ESV Conference

- ▶ Welcome
- ▶ Preliminary Announcement
- ▶ Program Overview
- ▶ Registration
- ▶ Exhibition
- ▶ Call for Abstracts
- ▶ Collegiate Student Safety Technology Design Competition



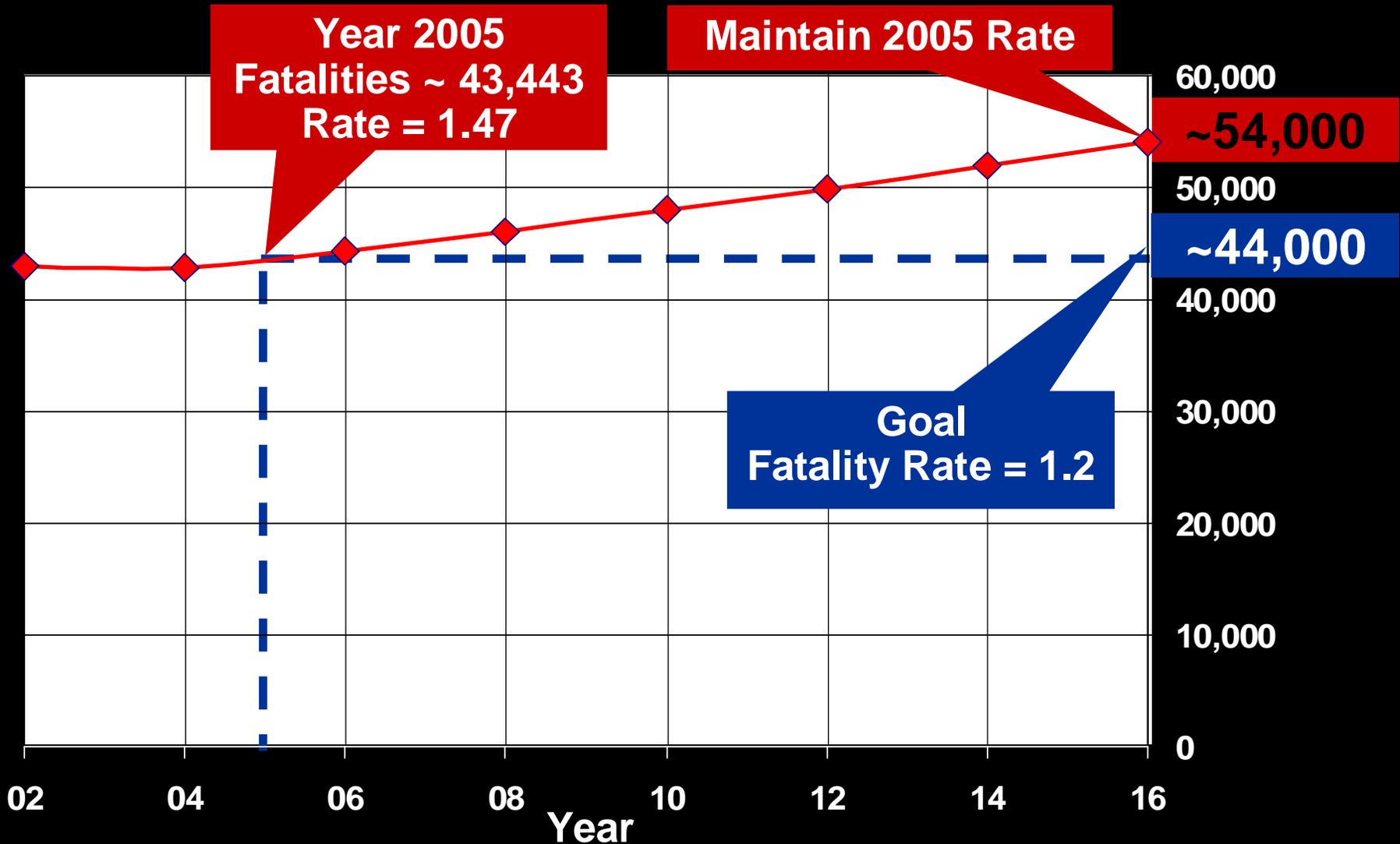
### ESV Program / Information

- ▶ History
- ▶ Photo Gallery
- ▶ Government Focal Points
- ▶ Past ESV Proceedings
- ▶ ESV Home
- ▶ [nhtsa.gov](http://nhtsa.gov)



**Save the Date!**  
June 18-21, 2007

# Fatality Reduction Goal is Challenging



# the future...

## vision

Provide national leadership in setting, prioritizing and implementing a safety research agenda that will lead to effective vehicle-based safety concepts.

Provide the scientific knowledge to support NHTSA's motor vehicle and traffic safety goals.

Provide support and cooperate in forums involving foreign countries, industry, and others to develop and implement collaborative safety research programs.

## Strategic Plan Goal #1

"Develop, Enhance, and Evaluate Technology and Mitigation Concepts to Advance Safety"

Translation: What are strategies that OVSR can use to explore new technologies and facilitate their rapid deployment to enhance motor vehicle safety?

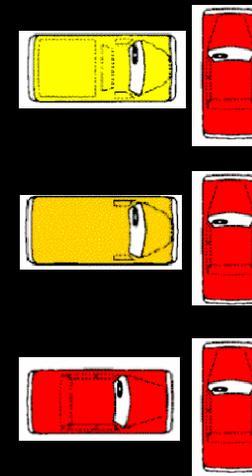
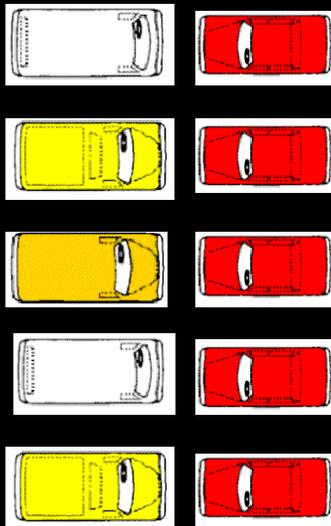
## Strategic Plan Goal #2

"Refine the Research Process to Achieve Organizational Excellence"

Translation: What operational improvements should be made within OVSR to support the strategies from Goal #1

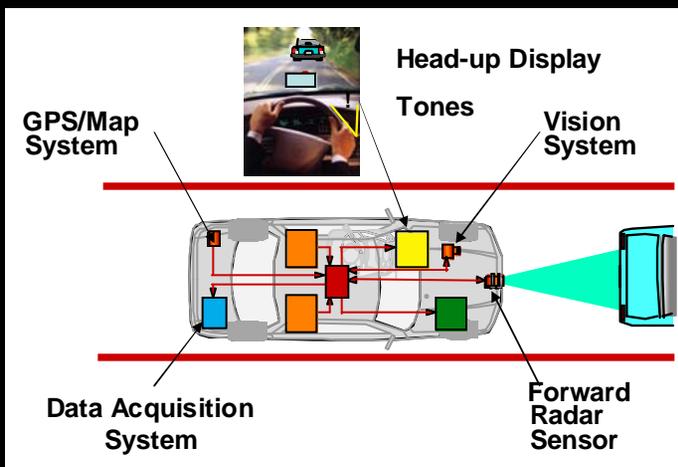
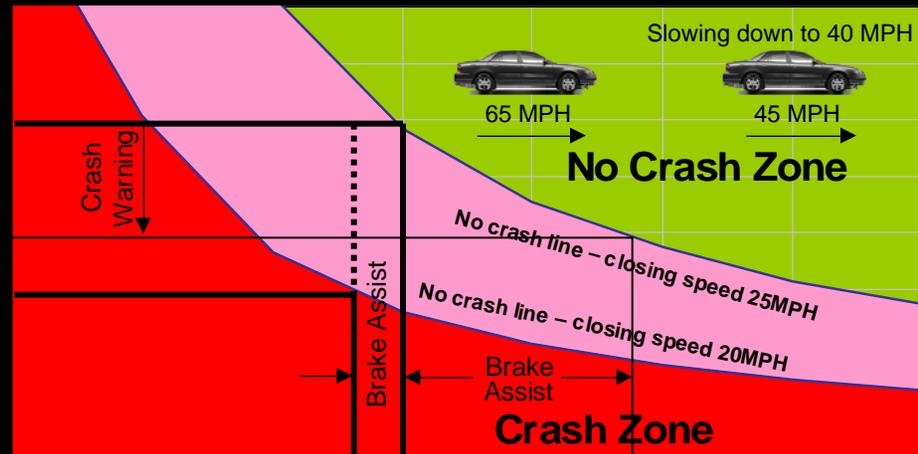


# Frontal Compatibility Research



# Advanced Technologies for Safety

- Crash Warning
- Brake Assist
- Prepare Occupants
- Adapt Restraints



# Frontal & Side Impact Crashworthiness



- Offset car crashes cause 85,000 lower extremity injuries / year
- Up to 8,000 injuries are preventable
- Test procedures being evaluated



- Side impact rule adds head protection
- Anticipates about 1,000 lives saved
- New dummies being evaluated

# Ejection Mitigation Research

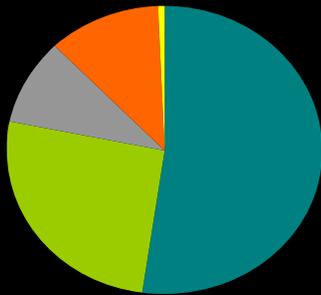
- Analyzed the Safety Problem
- Developed Hardware and Test Procedures
- Evaluated Countermeasure Effectiveness and Feasibility
- Evaluating Current Fleet Performance



**Ejection  
Mitigation**



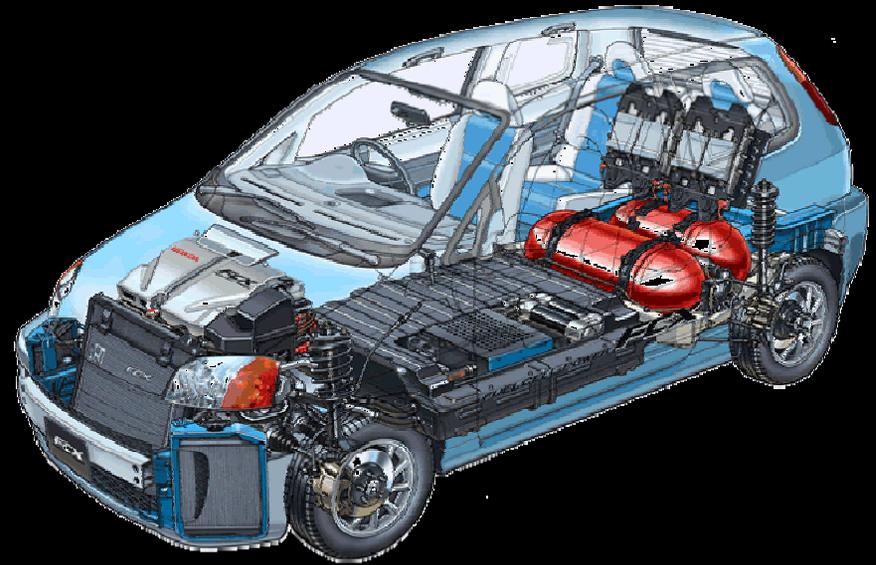
# Child Safety Crashworthiness



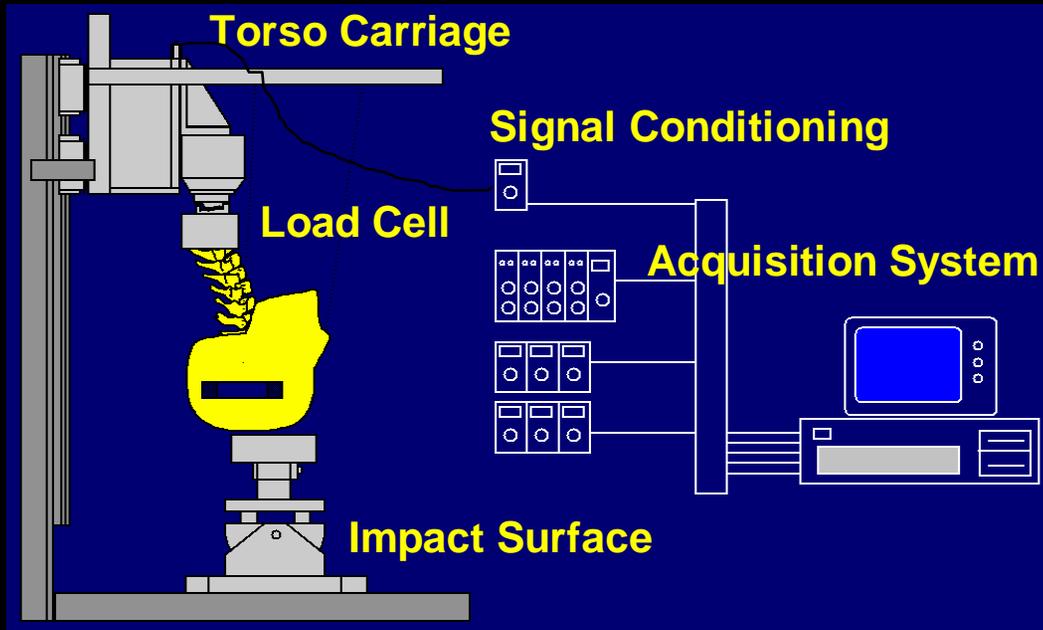
- Half of all rear occupants are children 0-12 years old.
- Developing tests to evaluate booster seats for 10 year old children
- Developing test to evaluate child restraints in side crashes.

# Hydrogen and Fuel Cell Safety

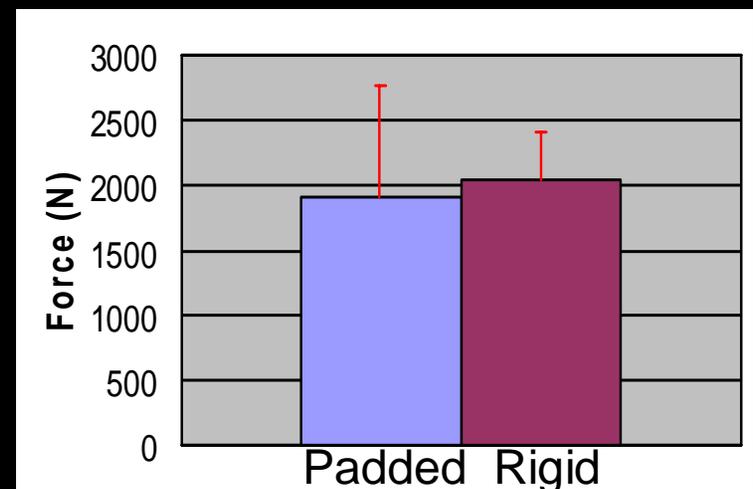
- Integrity of high pressure storage in crash, FMVSS 304
- Effects of altered mass, stiffness on fleet compatibility
- Electrical isolation of high voltage during/after crash, FMVSS 305
- Major carmakers are testing hydrogen vehicles.



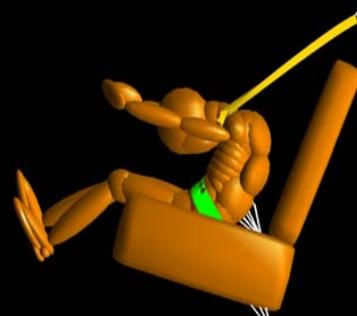
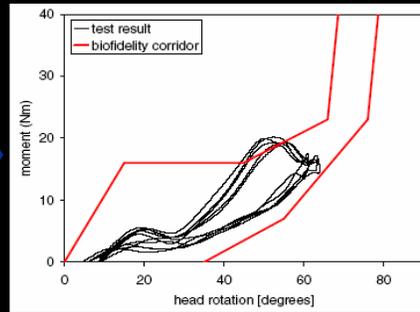
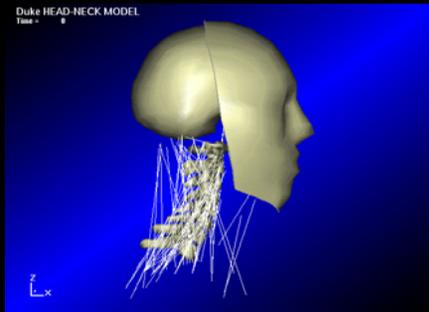
# Impact Biomechanics Research



- Neck Injury Research
- Head and Brain Injury Research
- Thorax and Abdomen Injury Research
- Lower Extremity Injury Research



# Injury Criteria Development



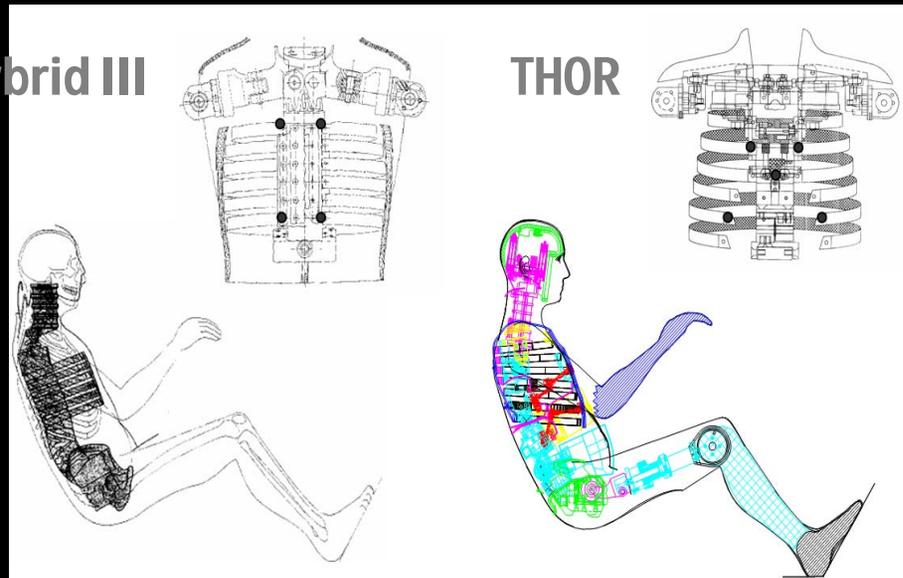
# Crash Dummy Specification and Assessment

(THOR : Test Device for Human Occupant Restraint)

THOR



Hybrid III



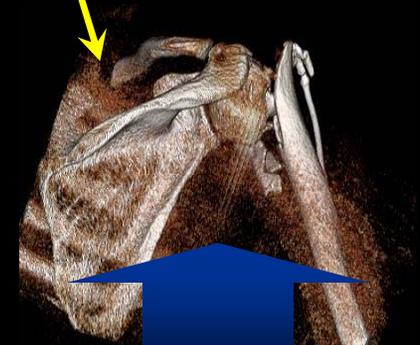
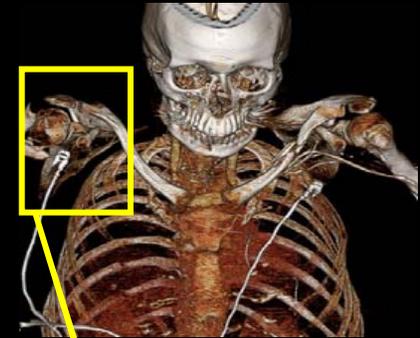
THOR

- Improve assessment of head strikes
- Provide facial injury assessment
- Improve neck injury assessment
- Evaluation of advanced restraint systems
- Detect wheel & belt interactions with lower torso
- Improve assessment of hip & ankle/ foot injuries



# Crash Injury Data Analysis

(CIREN: Crash Injury Research Engineering Network)



Advance the science of the

# Defects Analysis

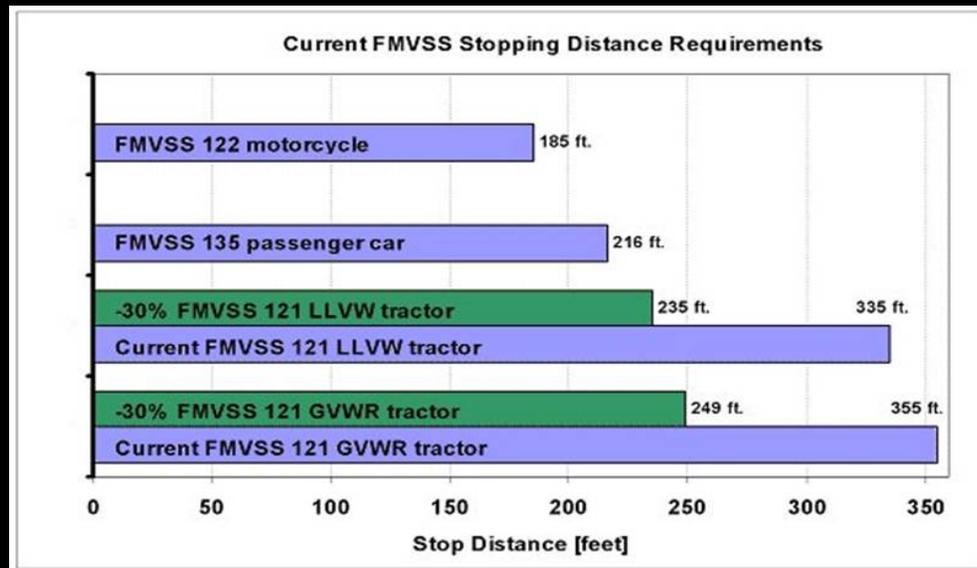
- Engineering Analysis to Support ODI
  - Testing
  - Field investigations
  - Forensic in nature
- Determine if System or Component Performs Inappropriately
- If So, Determine Consequence to Safety



**Ford Cruise Control Fires**

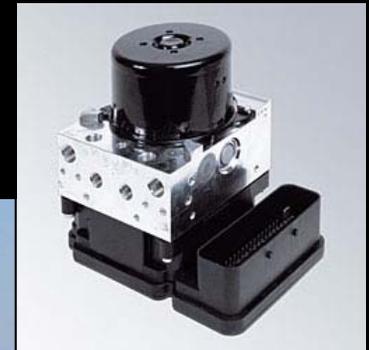
# Heavy Truck Brake Research

- Reduce truck stopping distance
  - Past research was the basis of an NPRM published Dec 2005
  - Support current FMVSS 121 rulemaking for straight trucks
  - Develop test procedure for semi-trailer ABS



# Light Vehicle Brake Assist Research

- New 2006 project
- Evaluate driver performance using brake assist technology
- Determine crash avoidance/severity reduction capability
- Evaluate safety benefits



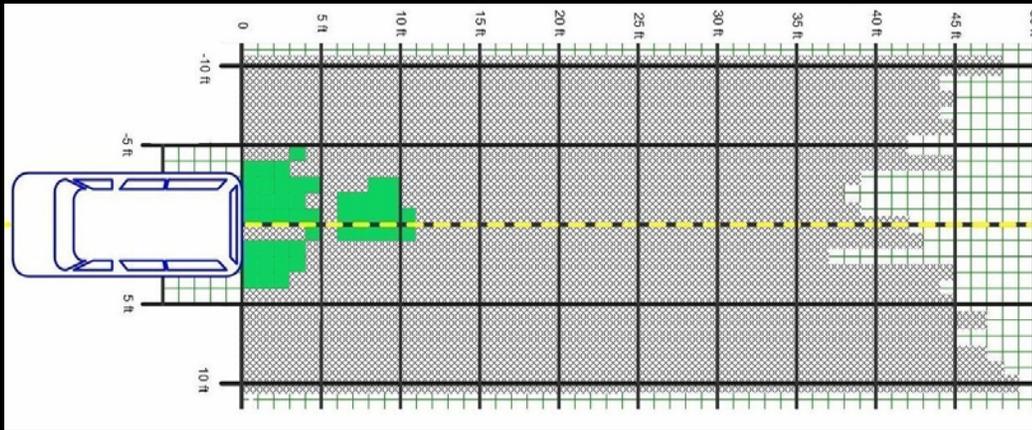
# Tire Aging Research

- Have developed method for artificially aging tires based on “real-world” data.
- Developing compliance test for aged tires.



- Agency wide team working on report to Congress and possible rulemaking.
- Shared information and data with ASTM and industry.

# Backover Avoidance Research



- Testing systems on medium straight trucks.
- Planned Research

- Tested OE and aftermarket systems for mandated report to Congress.



# Electronic Stability Control Research



- Developed over-steer prevention performance test for NPRM.
- Supported Rulemaking in developing NPRM.
- Researching under-steer mitigation and roll stability control (RSC) for light vehicles.

- Researching Heavy Truck ESC and RSC systems.
- Anticipate future rulemaking

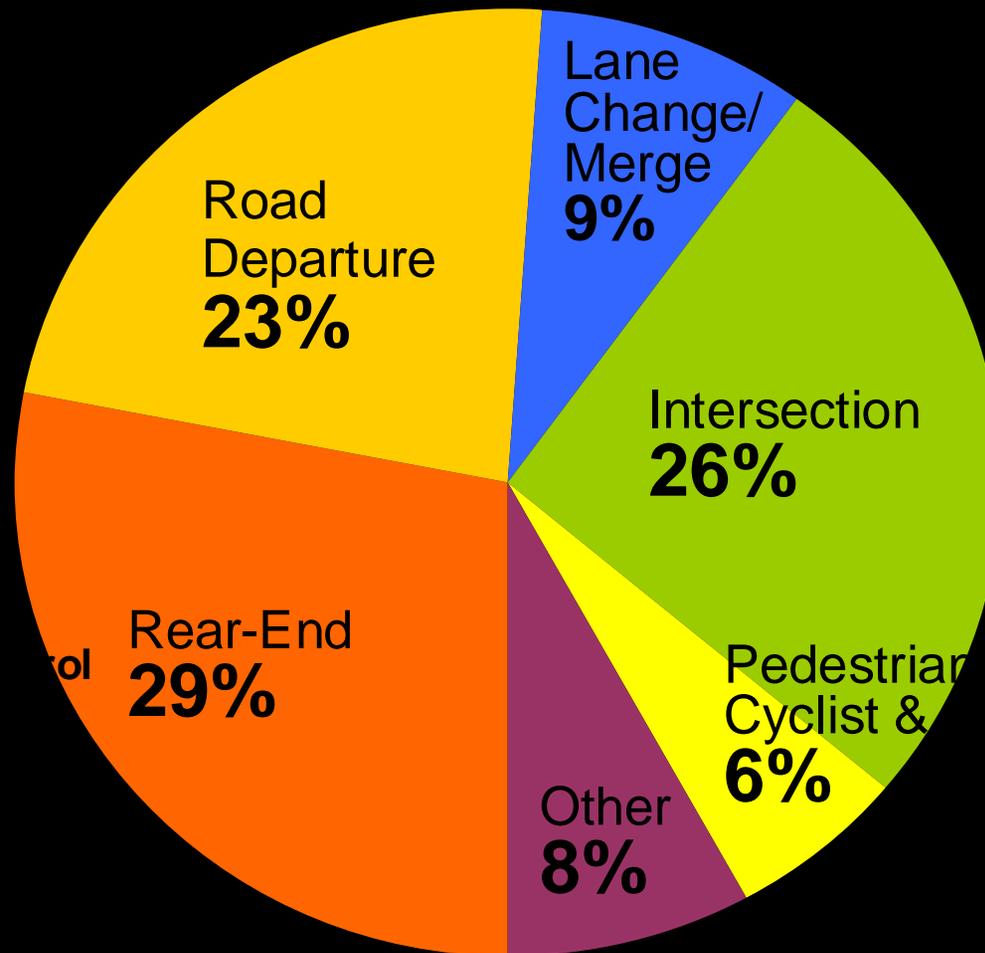


# Intelligent Transportation Systems (ITS)

- Application of advanced technologies to improve transportation safety and mobility

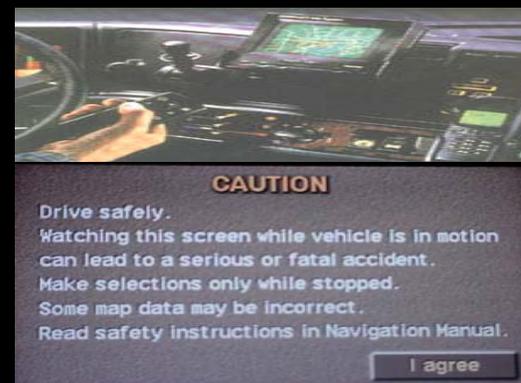
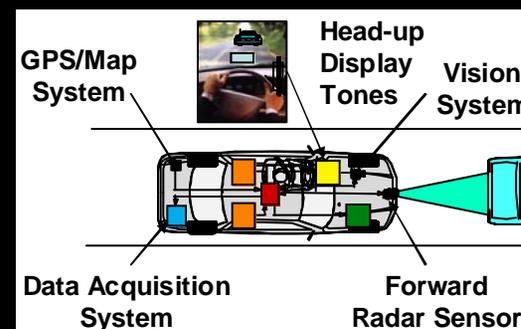


# Crash Avoidance Technologies

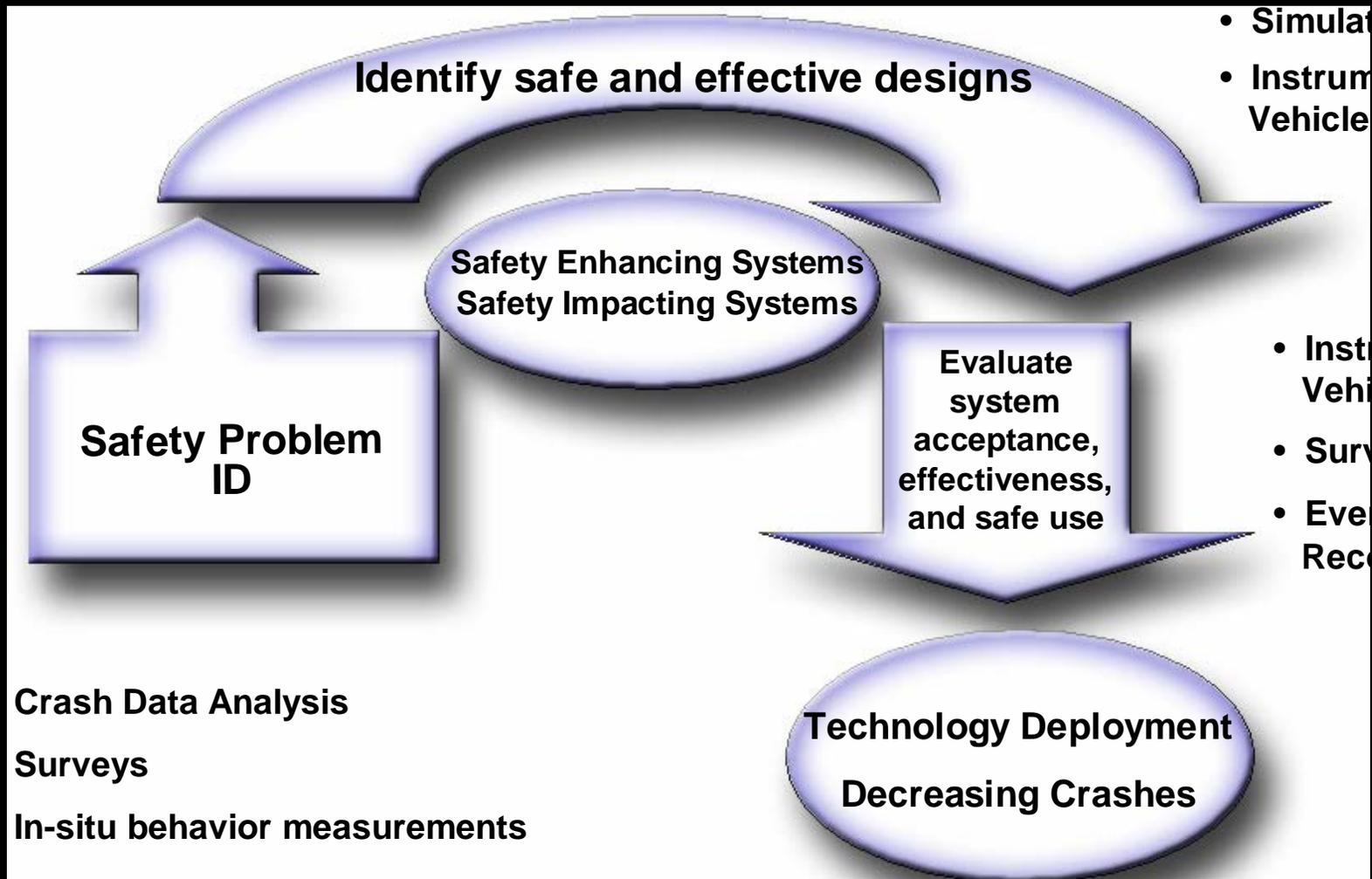


# NHTSA ITS Activities

- IVBSS
  - Rear-end, run-off-the-road, and lane- change crash countermeasure systems
- CICAS
  - Stop sign & signal violation warning
- VII
  - Deployment of an integrated communications infrastructure
- NG911 (NTI)
  - Foundation for public emergency services in a wireless mobile society

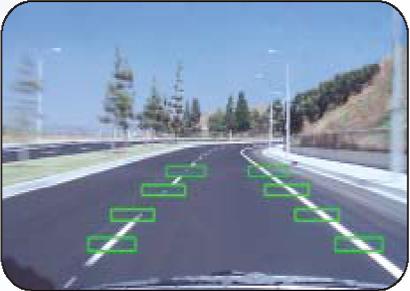


# Integration of Human Factors Research in Vehicle Safety Research



# Driver Assistance Systems

Forward Collision, Lane Change, Road Departure, Adaptive Cruise Control, Night Vision

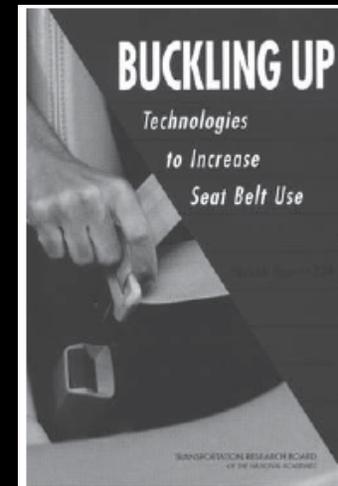
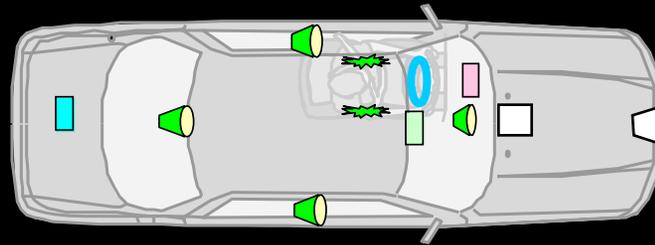


Lane Departure Warning computer image

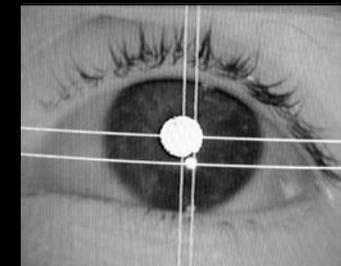


# Driver Monitoring Systems

- Safety Belt Reminder Systems
- Distraction Monitoring System
- Teen Driver Monitoring
- Alcohol Impairment Monitoring



**ELECTRONIC  
COPILOT  
FOR TEEN DRIVERS**



# Vehicle Lighting



# Conclusions

- Research Supports Rulemaking Needs
- New Technologies Offer New Opportunities for Enhancing Safety
- Effectiveness Evaluation is Essential for Facilitating Deployment
- Seamless Integration of Crash Prevention and Protection is the Future
- Leveraging Resources and Collaborative Efforts Needed
- Limited Longer-Term Research Will Help