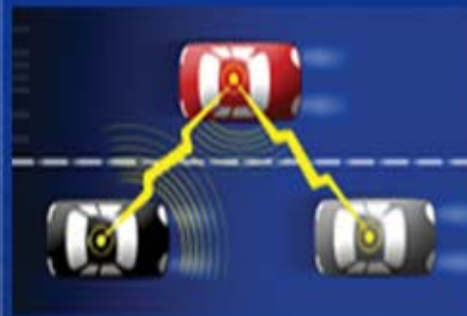


The U.S. ITS World Congress ❖ Palm Springs, California

Intelligent Technologies: NHTSA's Approach to Future Crash Safety

June 5, 2007



Joseph Kianianthra Ph.D.(Mech.Eng.)
Associate Administrator for Vehicle Safety Research
NHTSA, U.S. DOT

Outline

1. Safety Problems

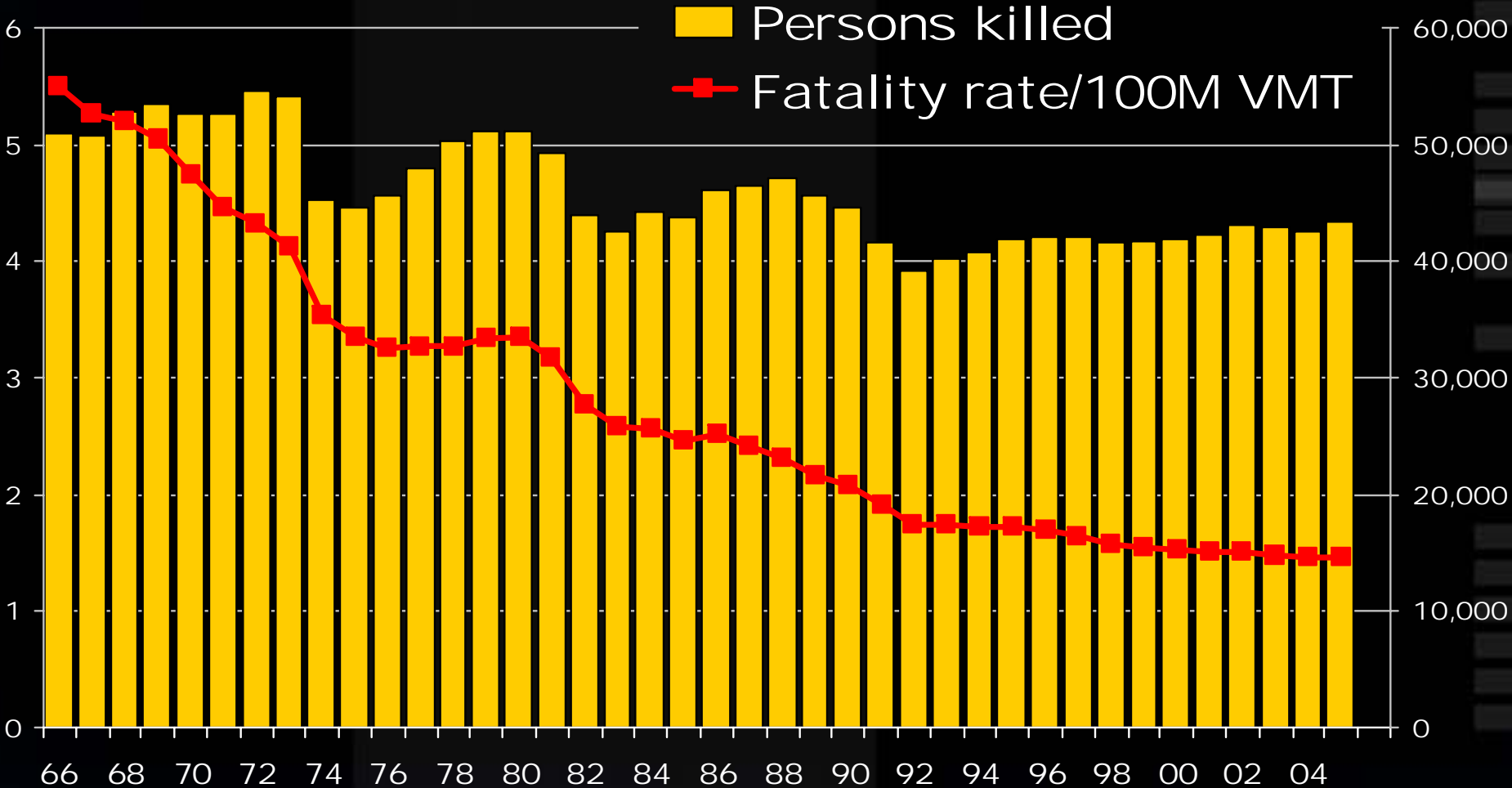
2. Intelligent Safety Technologies

3. Current and Future Technologies

4. Integrated Safety Concept

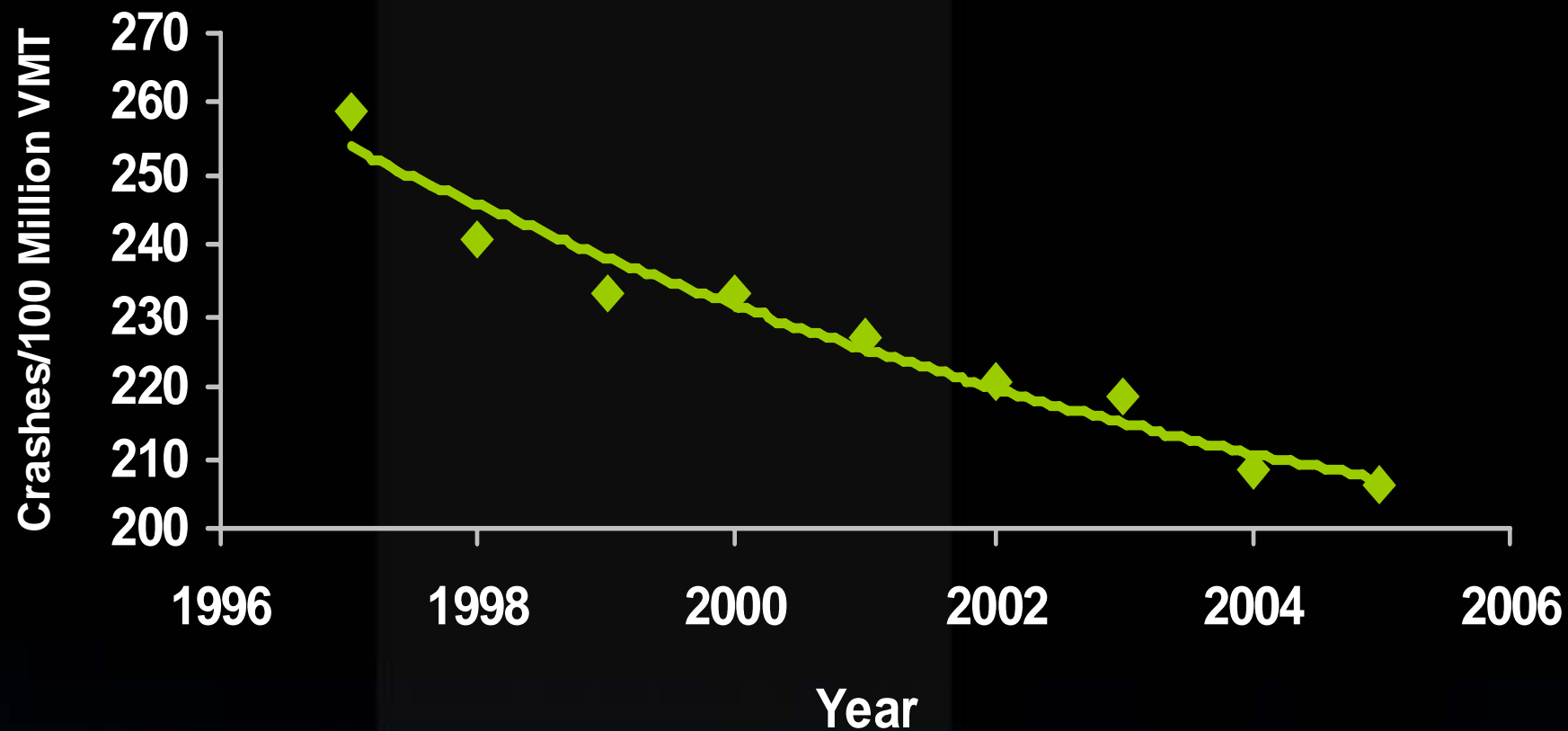
5. Conclusions

Persons Killed and Rate 100M VMT

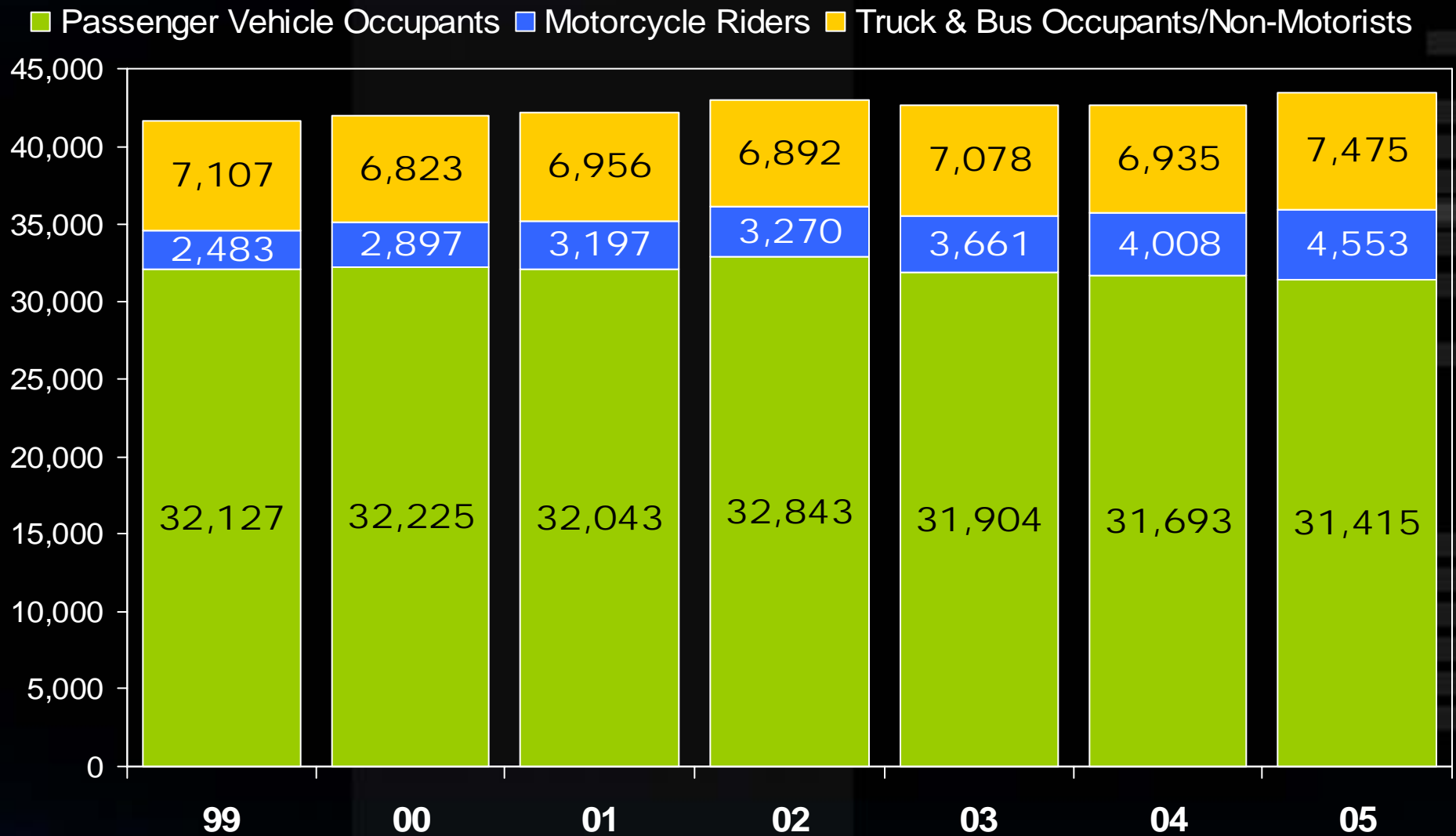


Source: 2005 FARS

Trends in Crash Rates – All Crashes

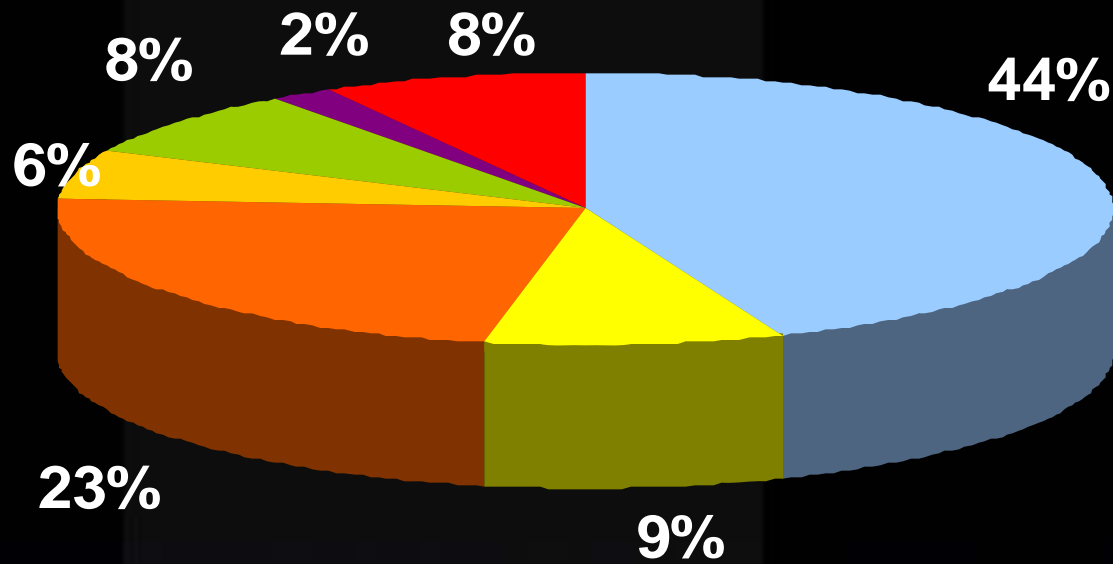


Motor Vehicle Fatalities



Crash Causal Factors

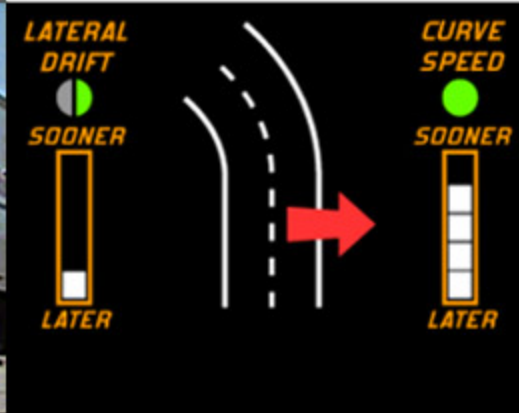
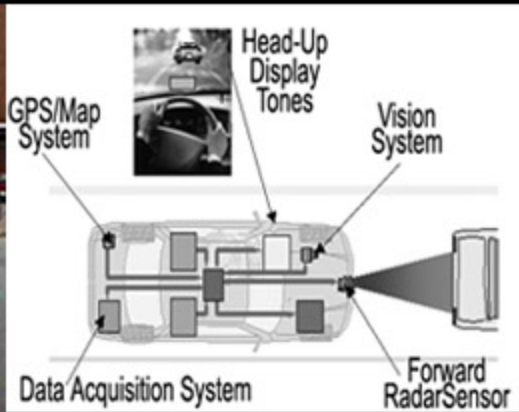
- Recognition Errors
- Erratic Actions
- Decision Errors
- Drunk
- Drowsy
- Vehicle Defects
- Bad Surface Conditions



Approach for Intelligent Technologies

- **Performance Specifications**
- **Objective Test Procedures**
- **Field Operational Tests**
- **Independent Evaluation**

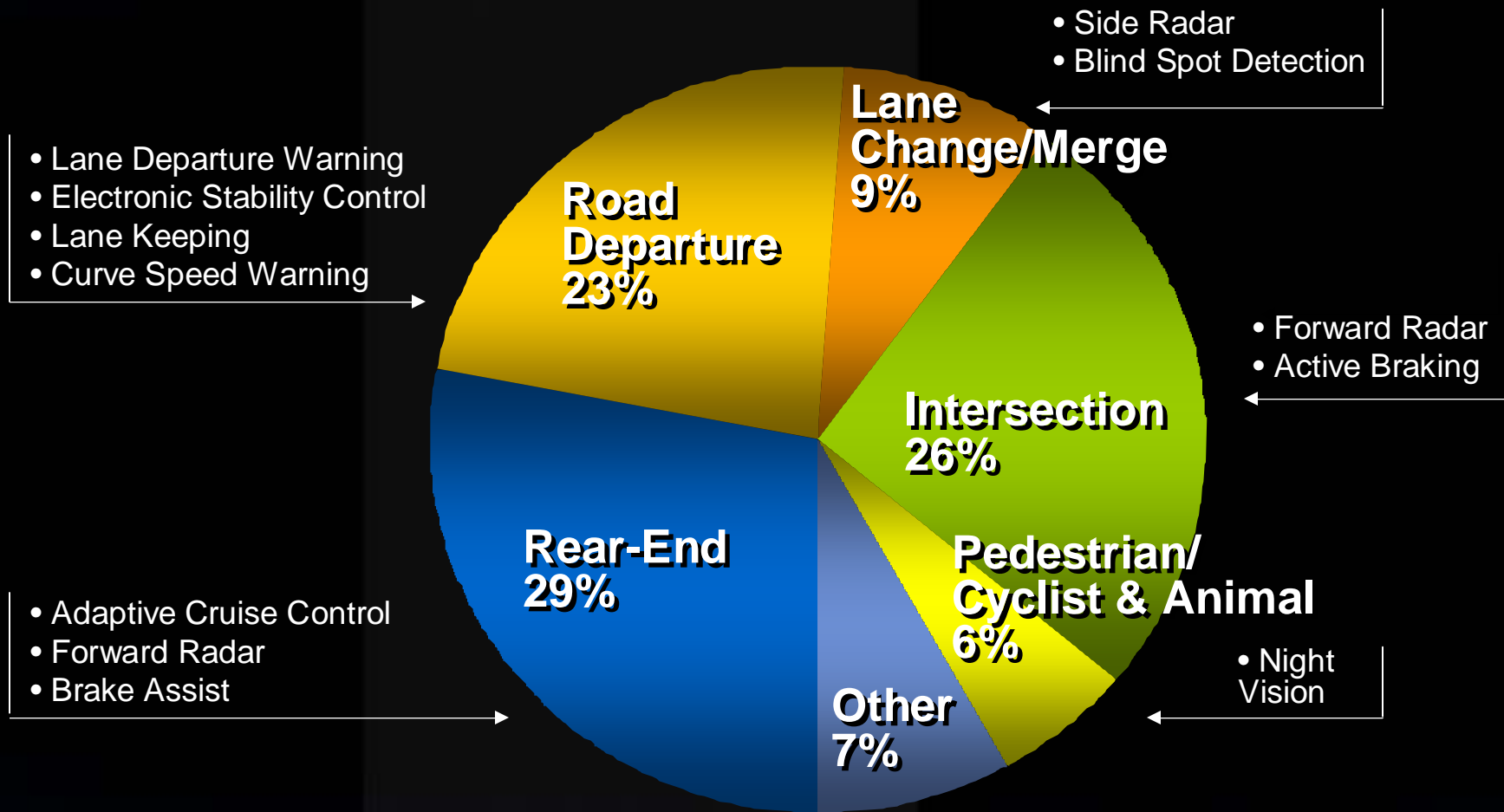
Field Operational Tests



New ITS Safety Initiatives (5 – 6 Year Program Plan)

- **Integrated Vehicle-Based Safety Systems (IVBSS)**
- **Intersection Crash Prevention Systems (CICAS)**
- **Vehicle-Infrastructure Integration (VII)**

Crash Avoidance Technologies



6.2 million police reported crashes
Source: 2004 NASS GES Data

Vehicle to Vehicle Communications Support

Emergency Electronic Brake Lights

Forward Collision Warning

Blind Spot Warning

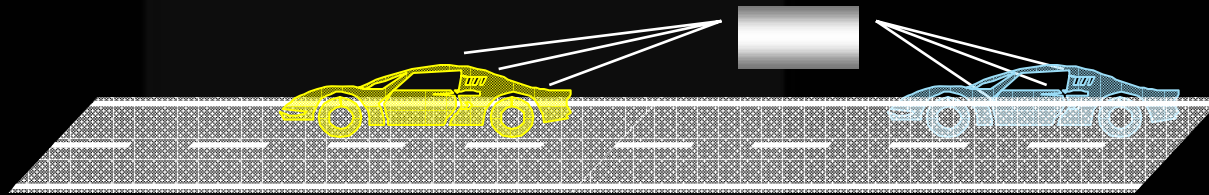
Lane Change Warning

Do Not Pass/On-Coming Crash Warning

Intersection Movement Assist



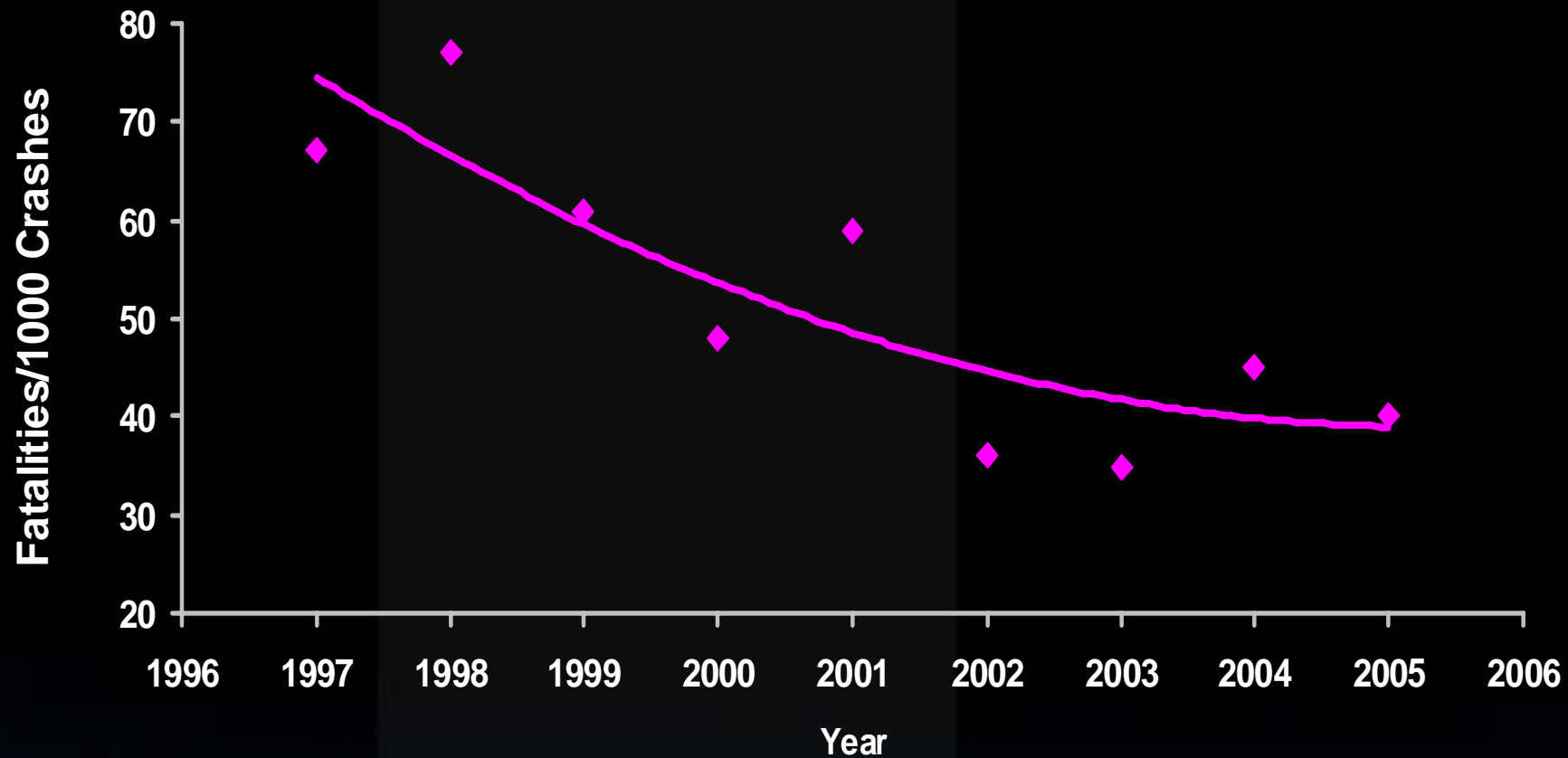
Connecting Vehicles and Infrastructure



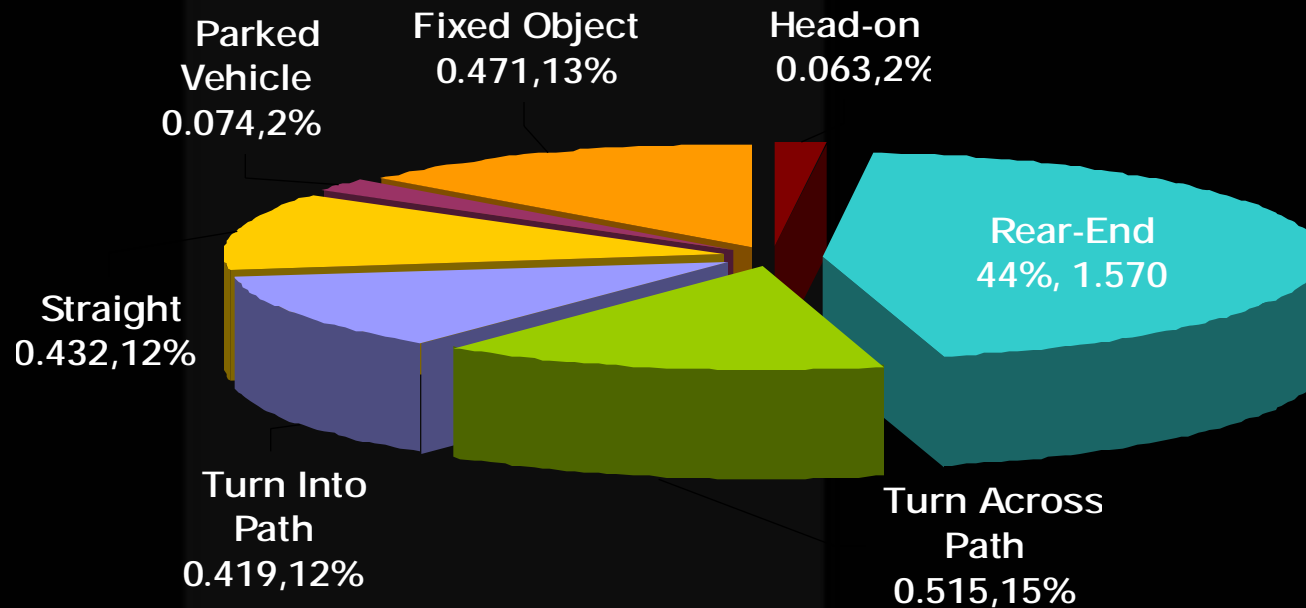
Creating an “enabling communication infrastructure”



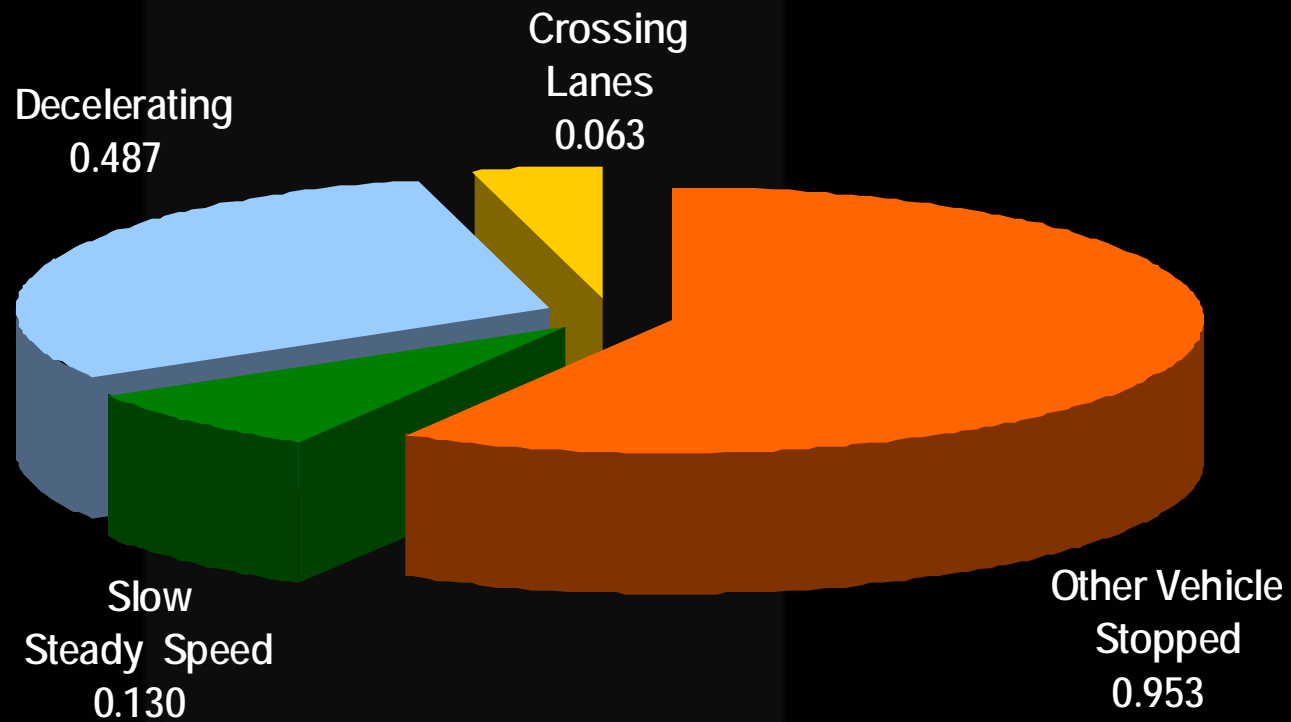
Trends in Fatality Rates in head on crashes



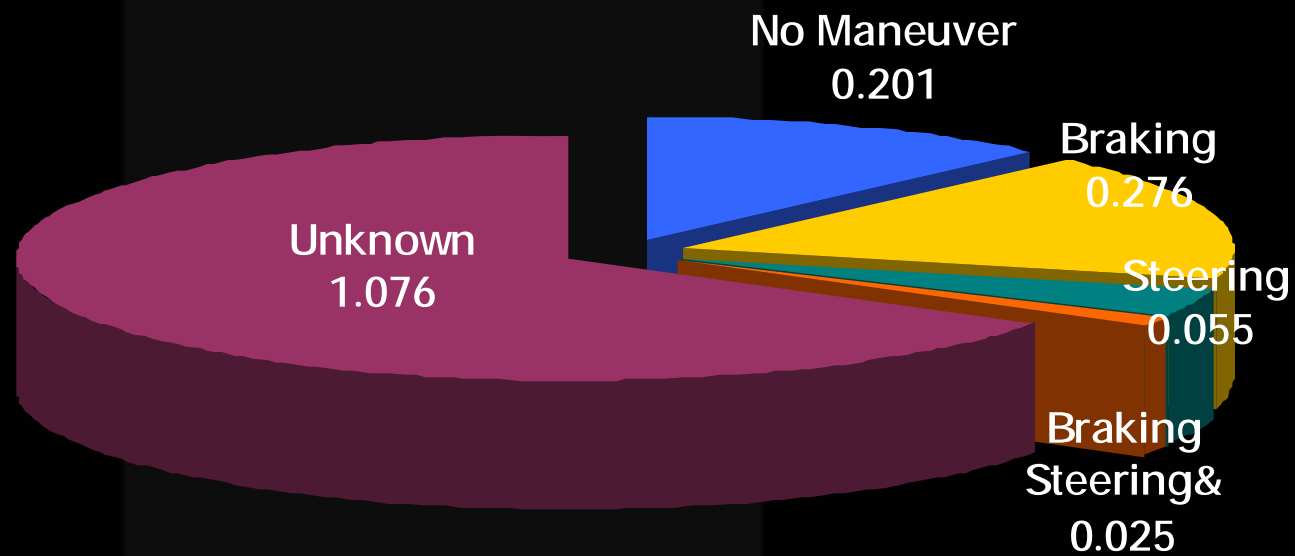
Frontal Crashes - Millions



Critical Events – Crashes in Millions



Driver Actions – Crashes in Millions



Importance of Crash Timelines

PREVENTION

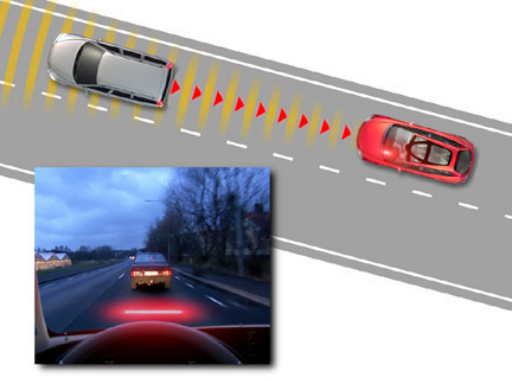
SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



HUMAN / PRE- EVENT



Volvo forward collision warning

Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



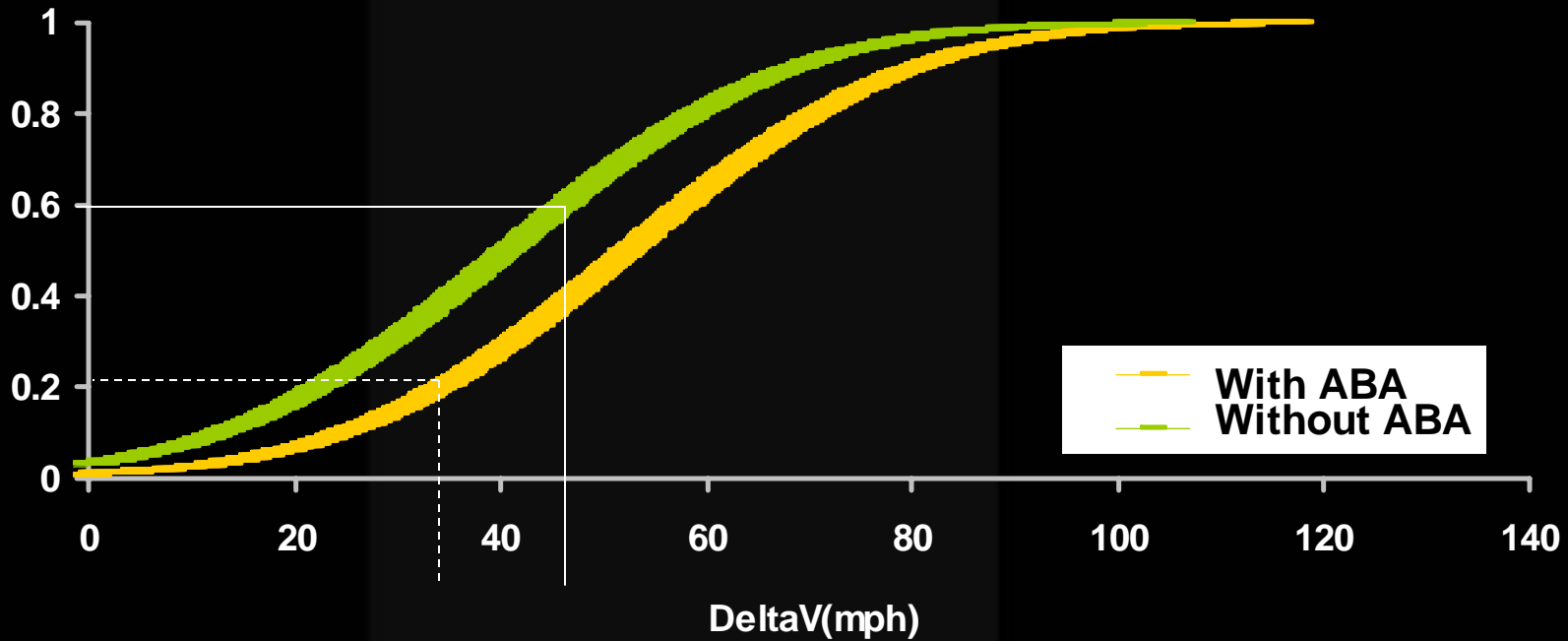
-1000

-500

VEHICLE / EVENT



Hypothetical Example of Cumulative Delta V for Head-on Collisions ABA: 0.8g @ TTC = 0.5 sec



Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

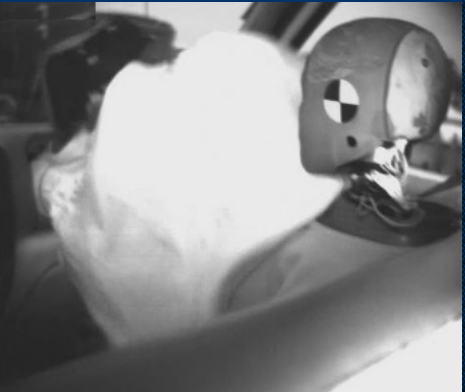
INJURY MITIGATION

MEDICAL ATTENTION



0 200msec.

VEHICLE / EVENT



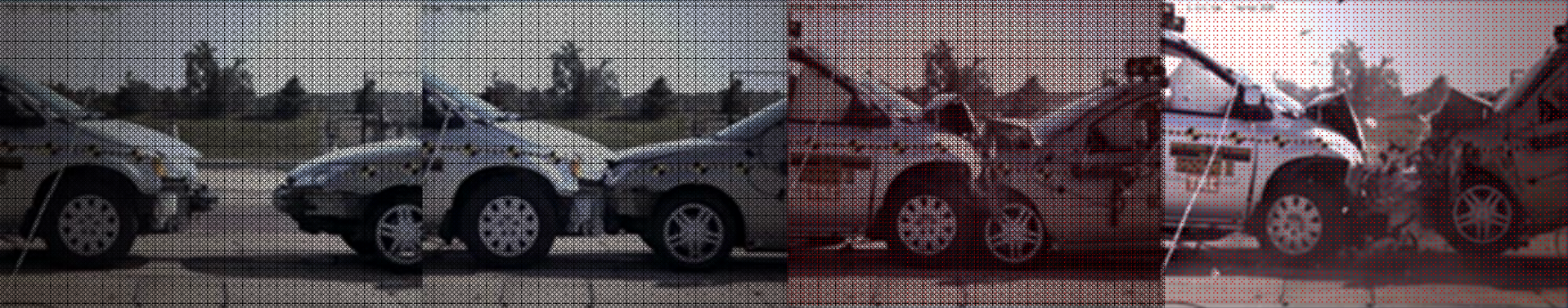
Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



ENVIROMENT / POST EVENT



The Challenge

**How do we know if these
systems, and others,
improve or degrade safety?**

Driver Assistance System Assessment Process

Describe

System Performance

Analyze

Supporting Data

Perform

Objective Tests

Estimate

Benefits



Automotive Technologies Timeline

Occupant Protection
Systems

Adaptive Restraint System

Whip-Lash Protection

Reversible Belt Tensioners & Load Limiters

Occupant Readiness Monitoring

Belt Minders

Child Seat Mounting Systems

Comprehensive Restraint Systems (belts & airbags)

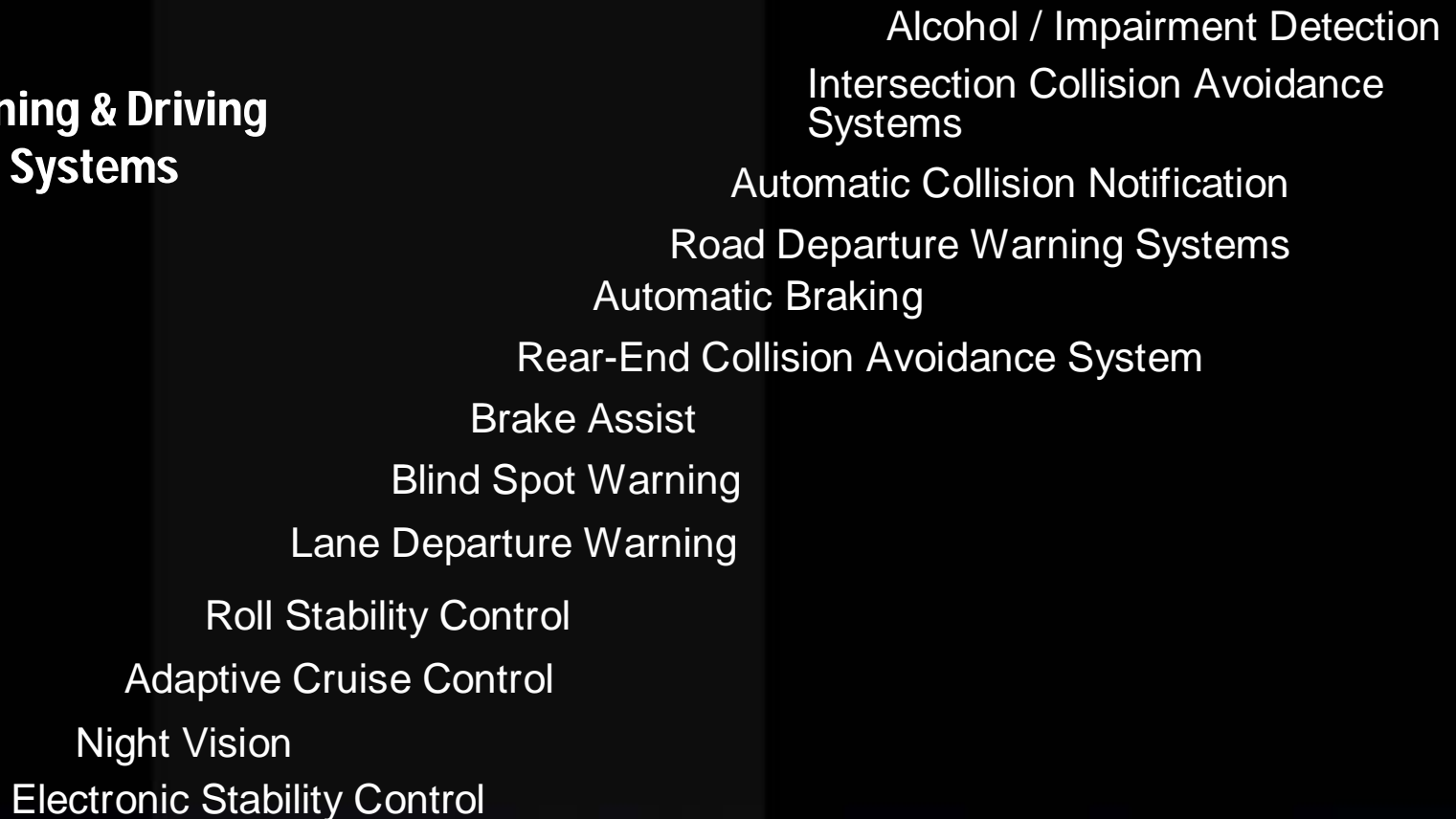
Energy Absorbing Structures

2006

2010

Automotive Technologies Timeline

Driver Warning & Driving Assistance Systems



2006

2010

2014

Conclusions

- **Integrated Safety has enormous safety potential**
- **Advanced technologies offer new opportunities**
- **Need to optimize the benefits at each step**
- **Make sure there are no unintended consequences**
- **Consumers will give limited chance to do it right**

ESV Conference is coming soon!



20th International
Technical Conference
on the Enhanced Safety
of Vehicles

Lyon, France
June 18-21, 2007
<http://www-esv.nhtsa.dot.gov>

<http://www-esv.nhtsa.dot.gov>

