

20th International Technical Conference
on the Enhanced Safety of Vehicles



Lyon, France
June 18-21, 2007

Outline



1. Safety Problems

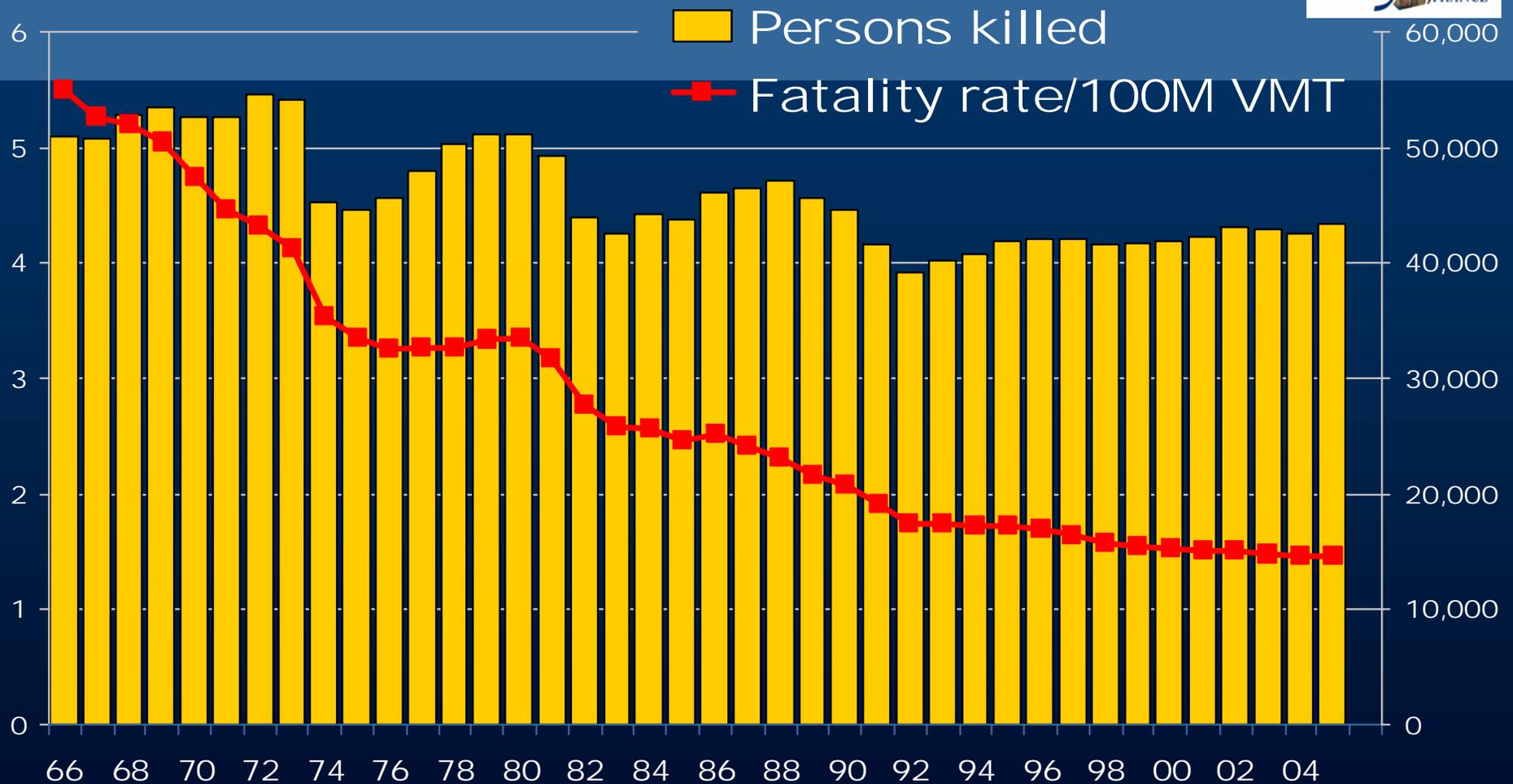
2. Intelligent Safety Technologies

3. Current and Future Technologies

4. Integrated Safety Concept

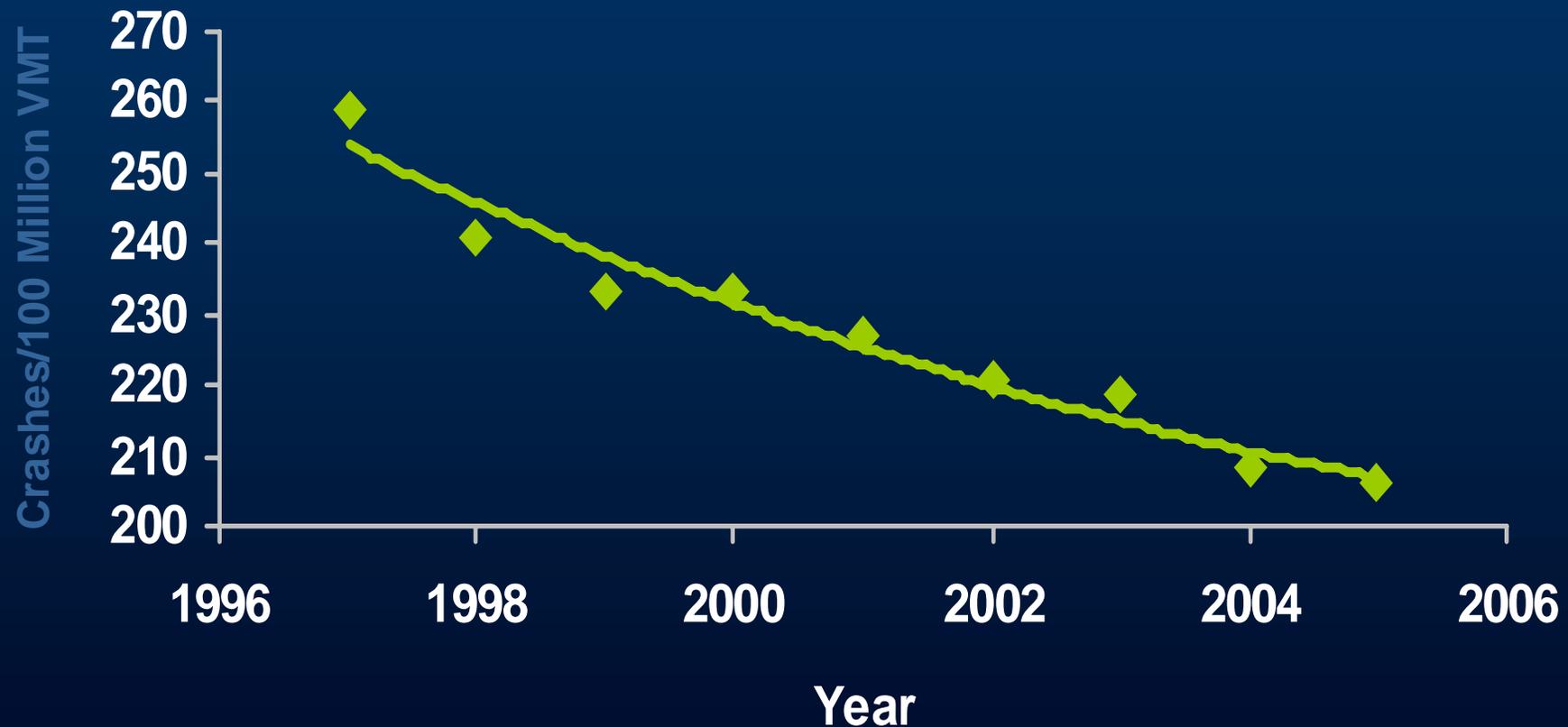
5. Conclusions

Persons Killed and Rate 100M VMT



Source: 2005 FARS

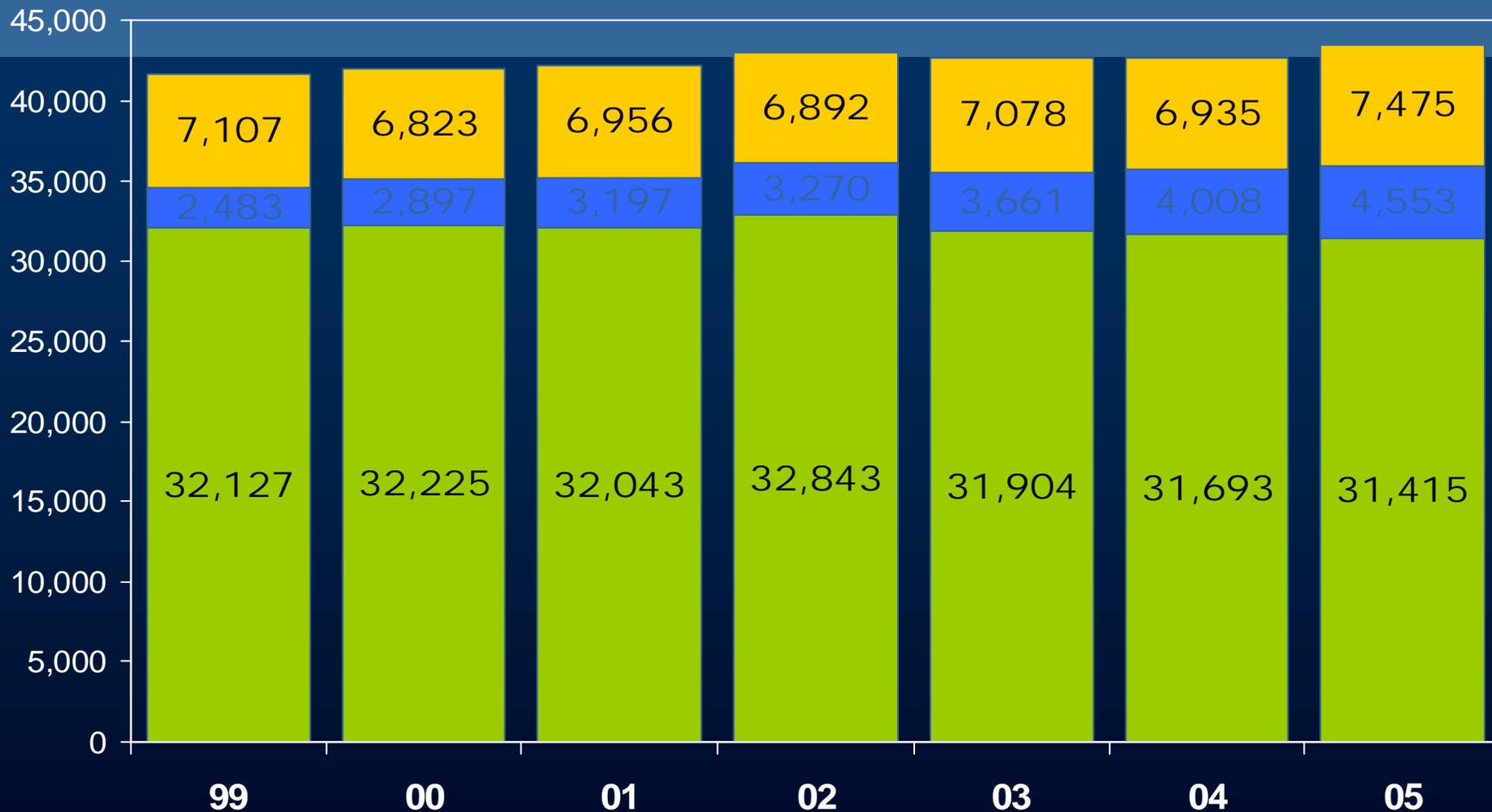
Trends in Crash Rates – All Crashes



Motor Vehicle Fatalities



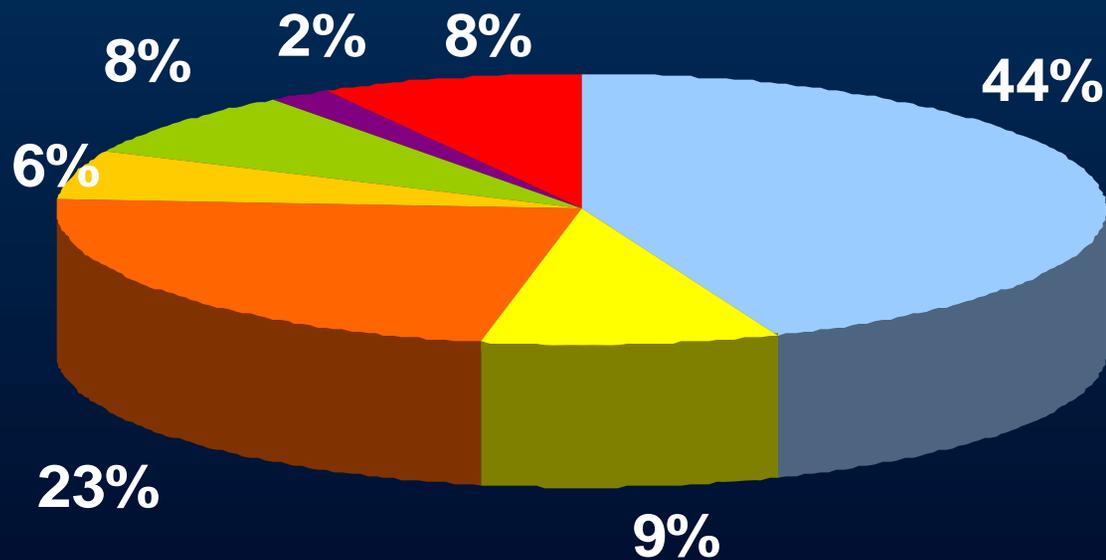
■ Passenger Vehicle Occupants ■ Motorcycle Riders ■ Truck & Bus Occupants/Non-



Crash Causal Factors



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

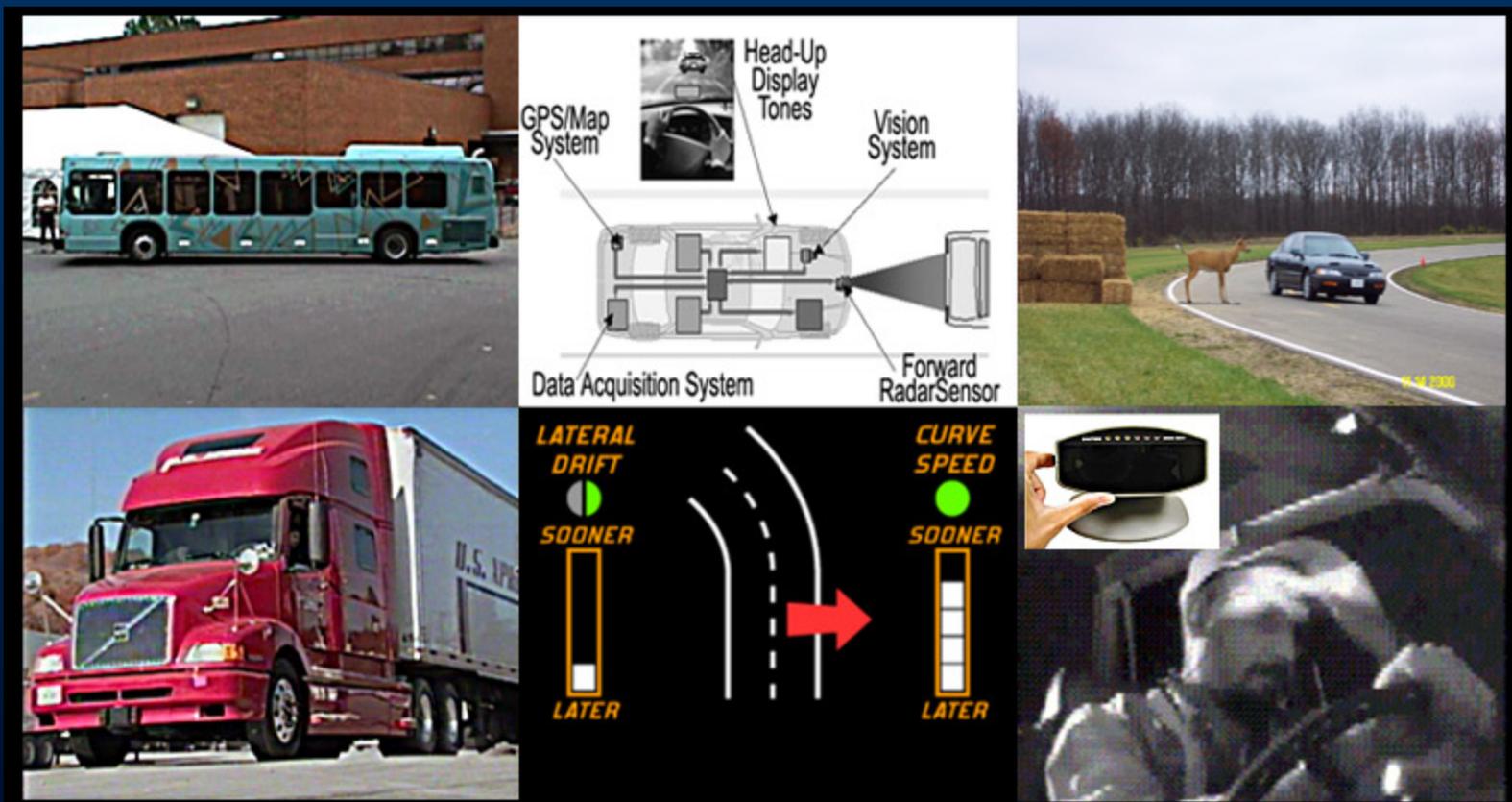




Approach for Intelligent Technologies

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

Field Operational Tests

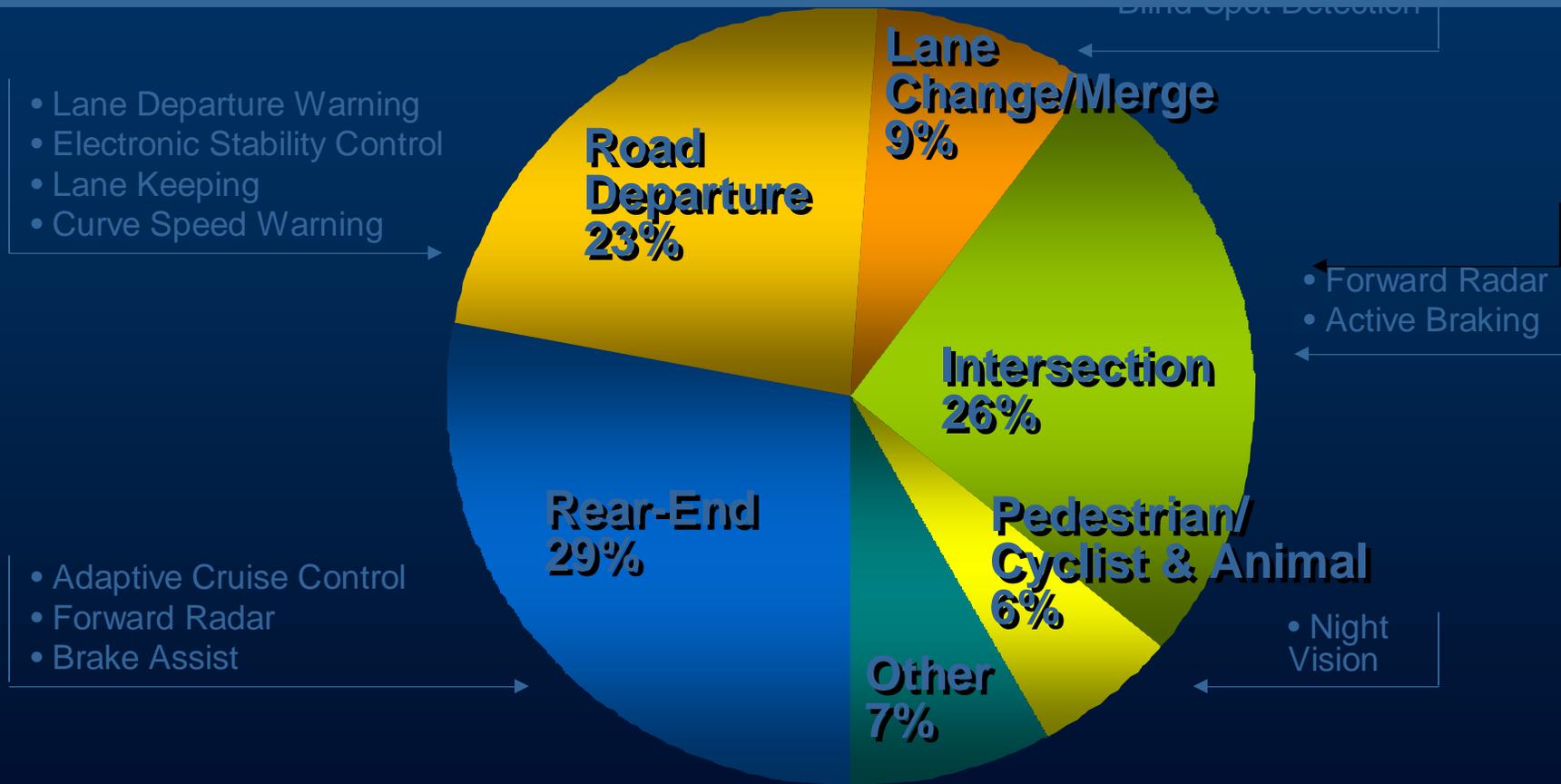




New ITS Safety Initiatives (5 – 6 Year Program Plan)

- ❖ 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

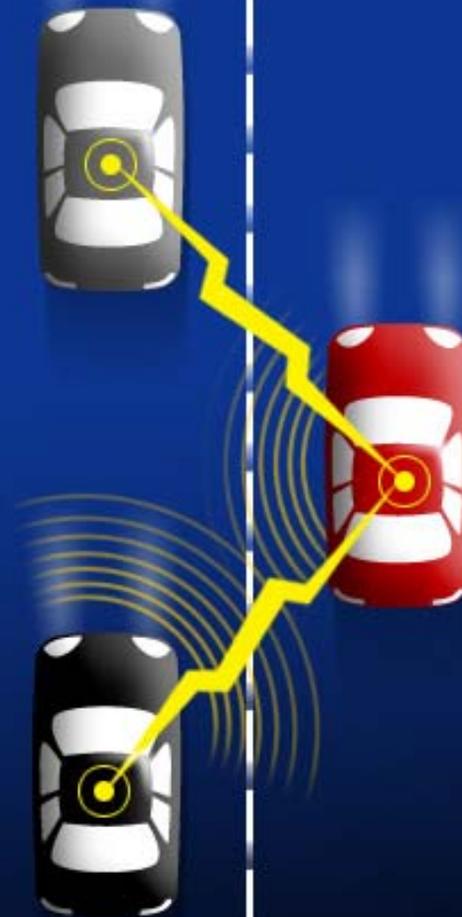
Forward Collision Warning

Blind Spot Warning

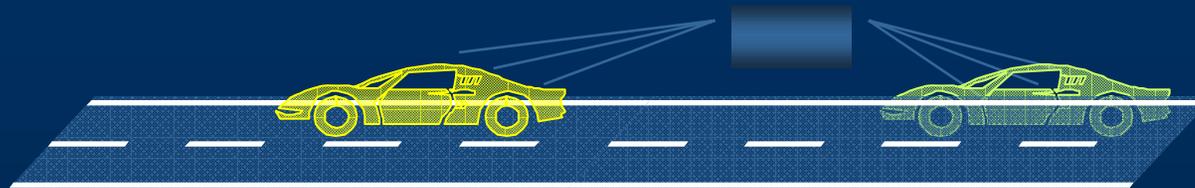
Lane Change Warning

Do Not Pass/On-Coming Crash Warning

Intersection Movement Assist



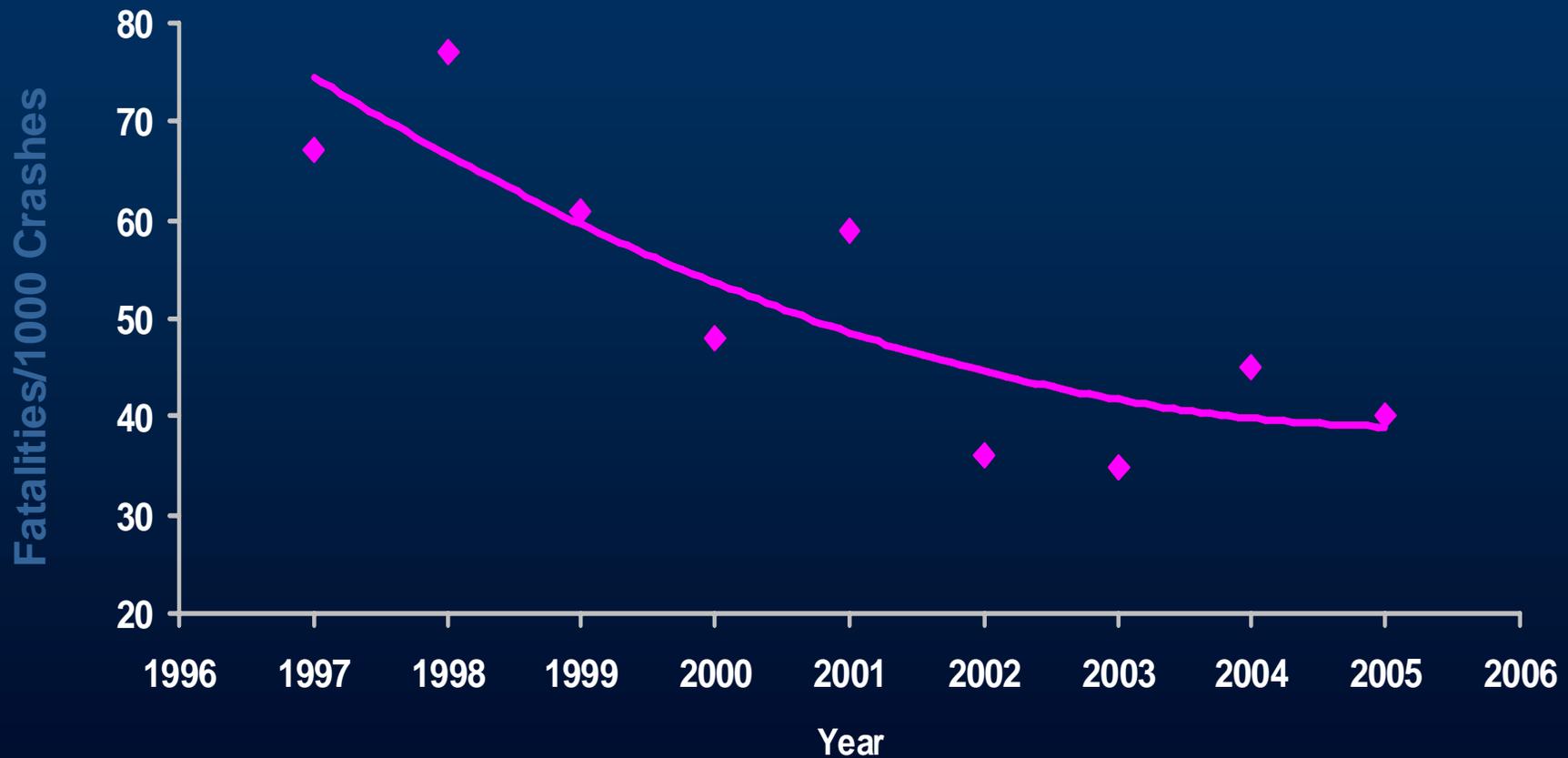
Connecting Vehicles and Infrastructure



Creating an “enabling communication infrastructure”

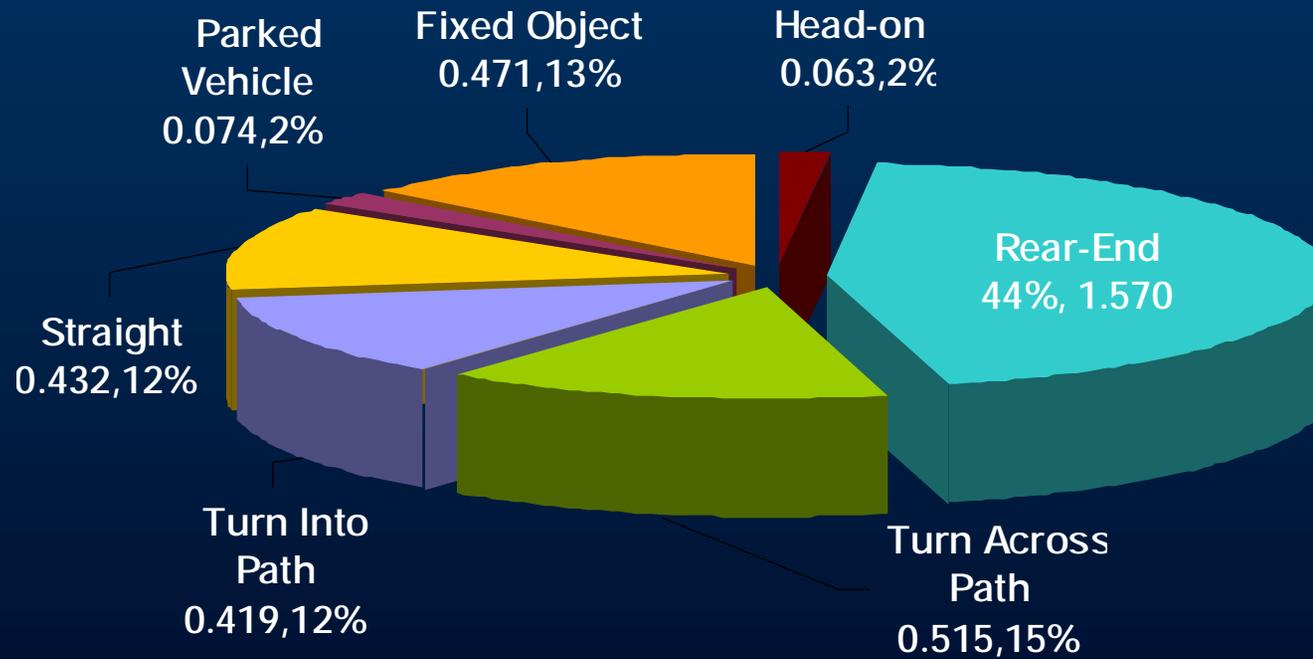


Trends in Fatality Rates in head on crashes

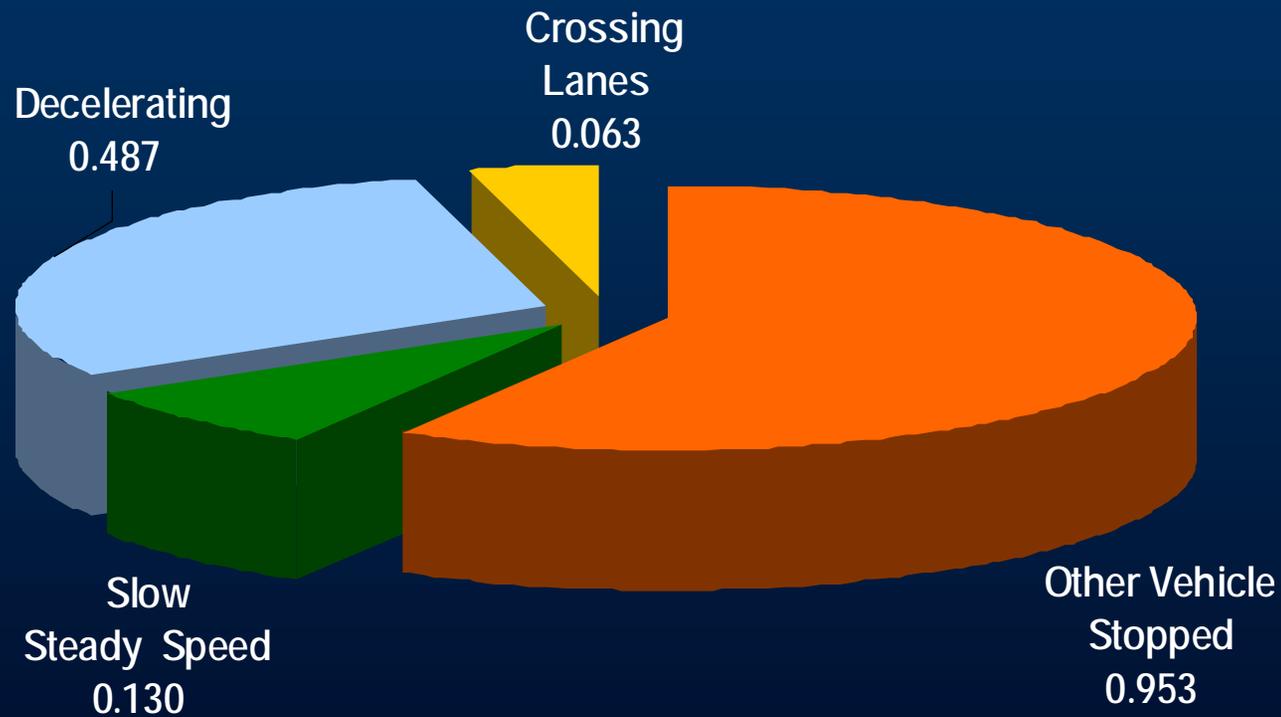




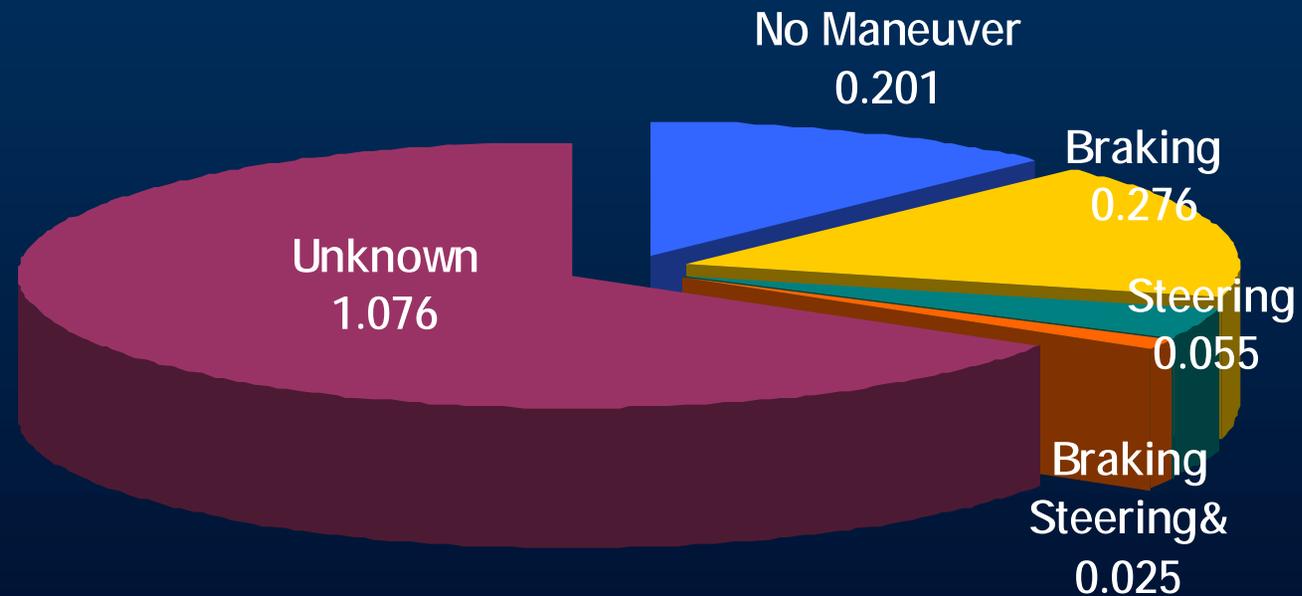
Frontal Crashes - Millions



Critical Events – Crashes in Millions



Driver Actions – Crashes in Millions



Importance of Crash Timelines

PREVENTION

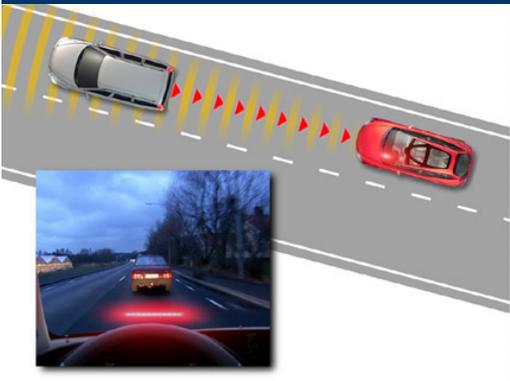
SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



HUMAN / PRE- EVENT



Volvo forward collision warning

Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



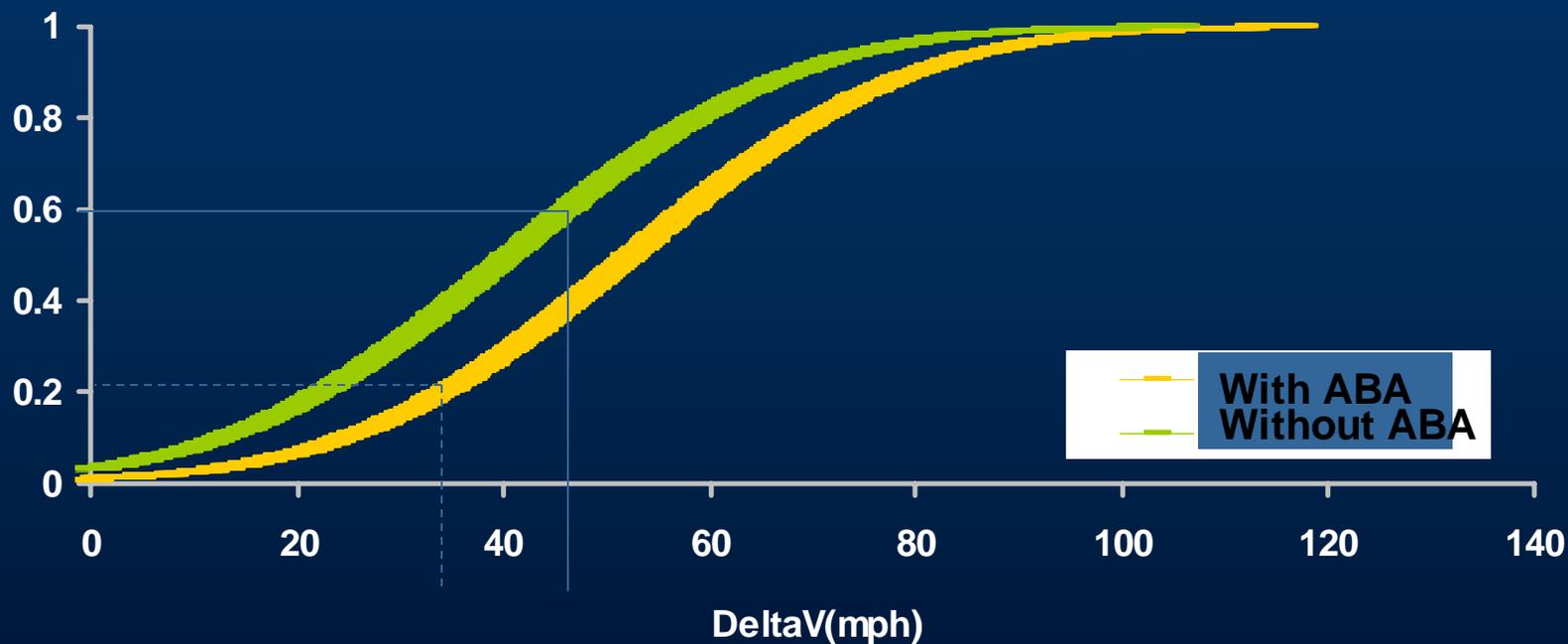
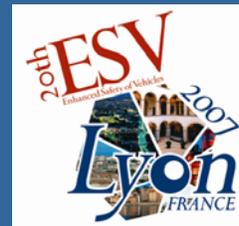
-1000

-500

VEHICLE / EVENT



for Head-on Collisions ABA: 0.8g @ TTC = 0.5 sec



Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

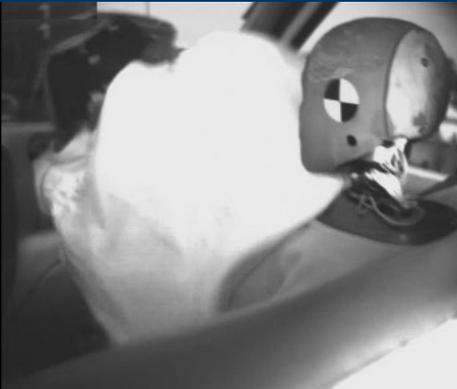
INJURY MITIGATION

MEDICAL ATTENTION



0 200msec.

VEHICLE / EVENT



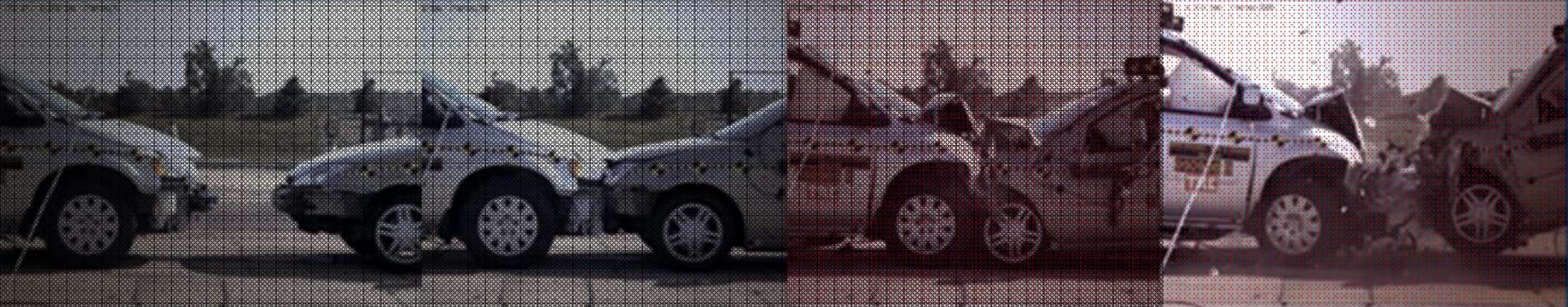
Importance of Crash Timelines

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

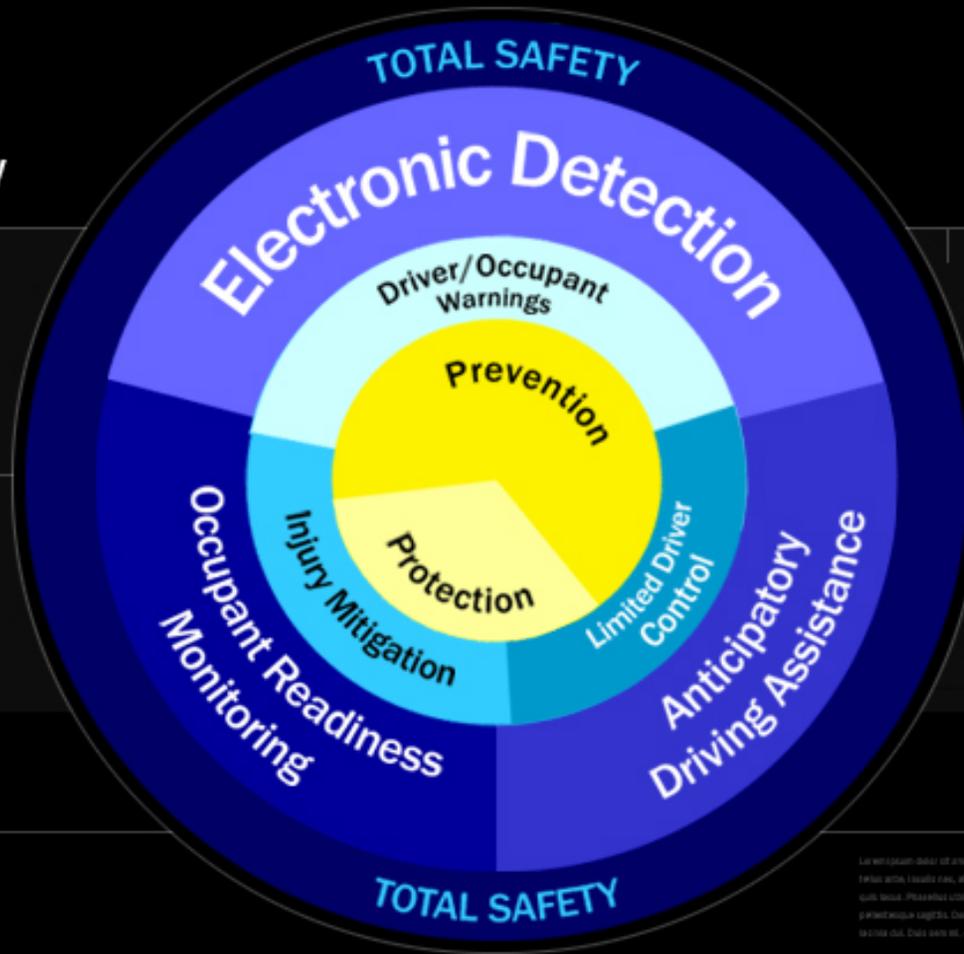
Alcohol / Impairment Detection
Intersection Collision Avoidance Systems
Automatic Collision Notification
Road Departure Warning Systems
Automatic Braking
Rear-End Collision Avoidance System
Brake Assist
Blind Spot Warning
Lane Departure Warning
Roll Stability Control
Adaptive Cruise Control
Night Vision
Electronic Stability Control

2006

2010

2014

Total Safety



Le véhicule doit être en état de marche, sans défauts susceptibles de provoquer des accidents graves. Le véhicule doit être en état de marche, sans défauts susceptibles de provoquer des accidents graves. Le véhicule doit être en état de marche, sans défauts susceptibles de provoquer des accidents graves. Le véhicule doit être en état de marche, sans défauts susceptibles de provoquer des accidents graves.



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

ESV Conference is coming soon!



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

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Agenda



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