

20th International Technical Conference on the Enhanced Safety of Vehicles



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Outline



1. Safety Problems

2. Intelligent Safety Technologies

3. Current and Future Technologies

4. Integrated Safety Concept

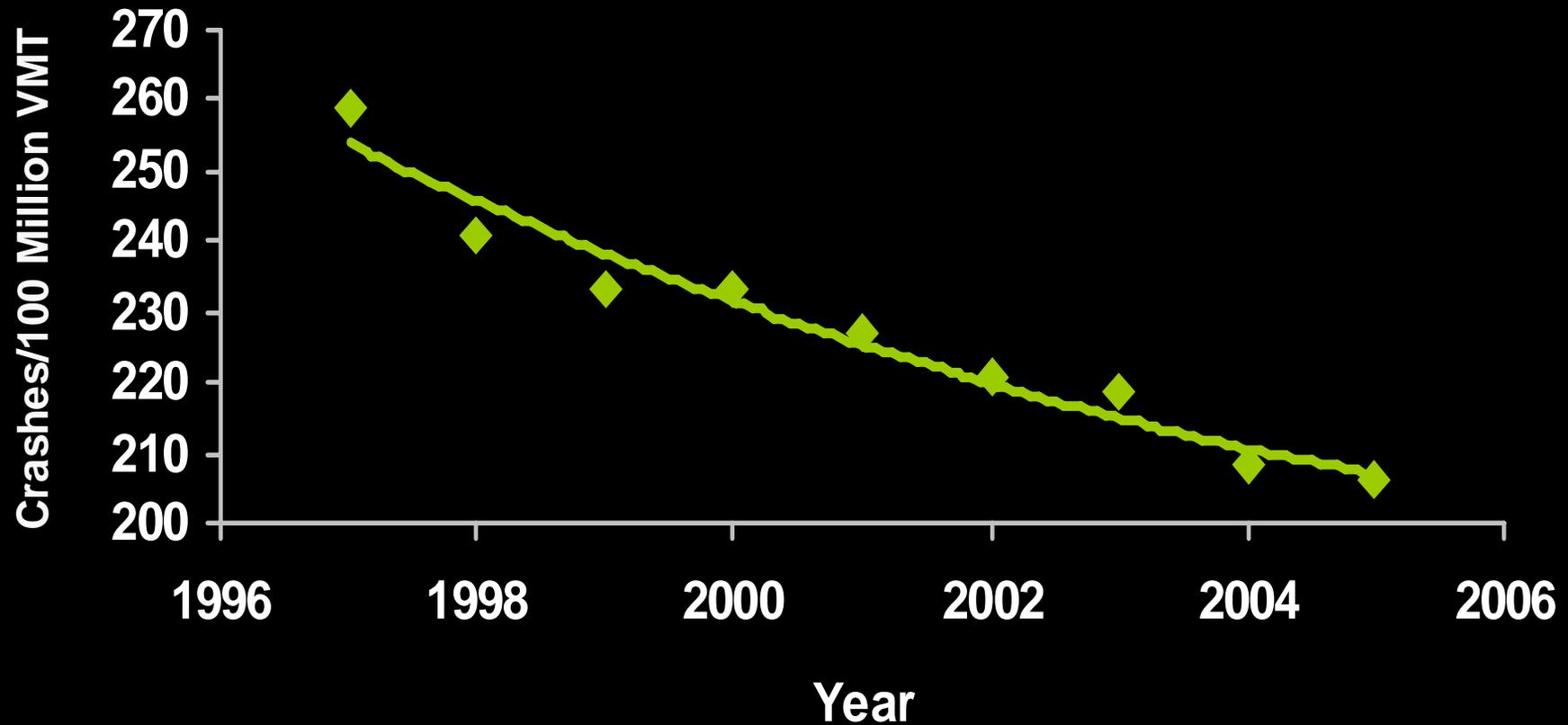
5. Conclusions

Persons Killed and Rate 100M VMT



Source: 2005 FARS

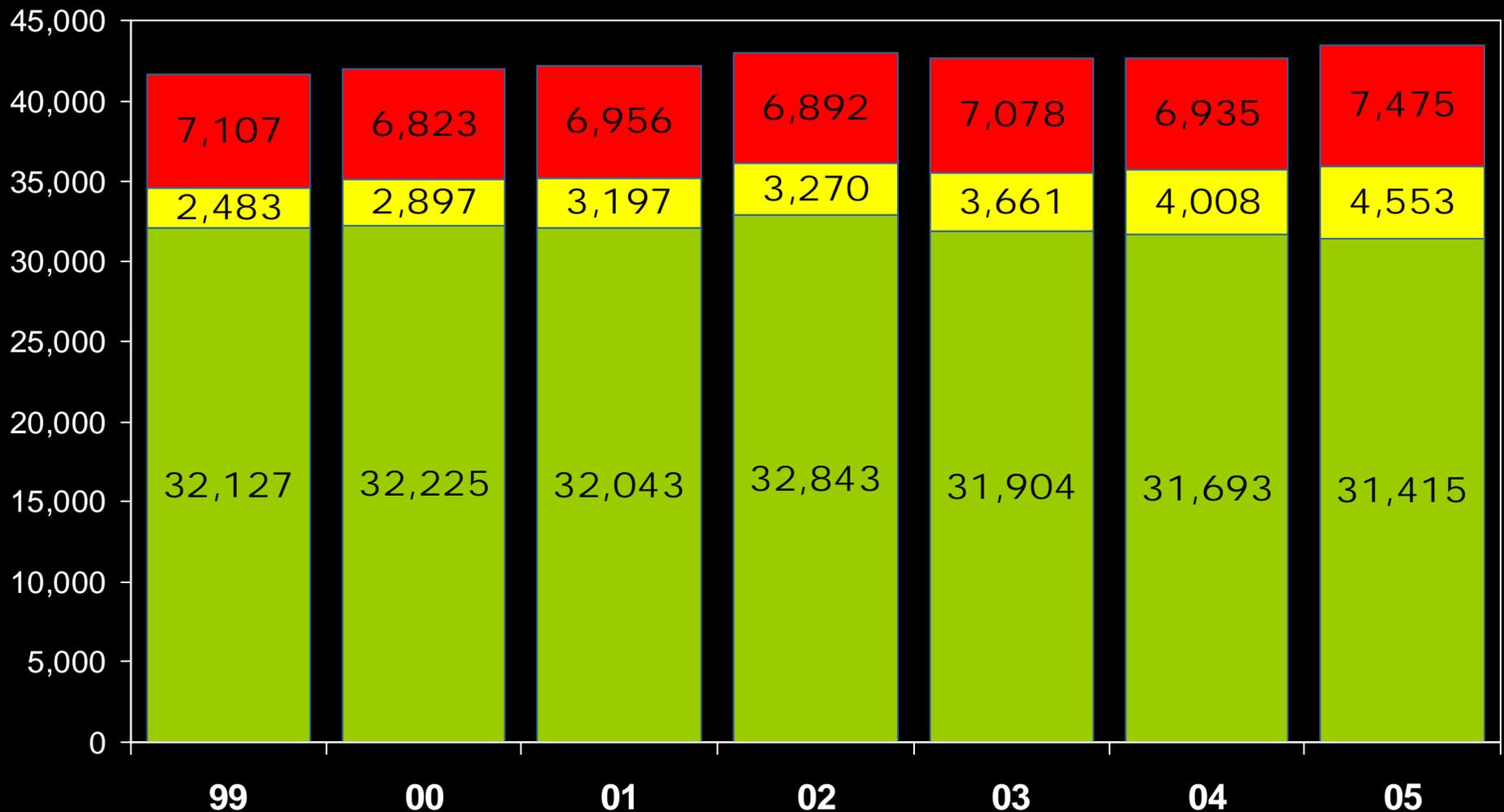
Trends in Crash Rates – All Crashes



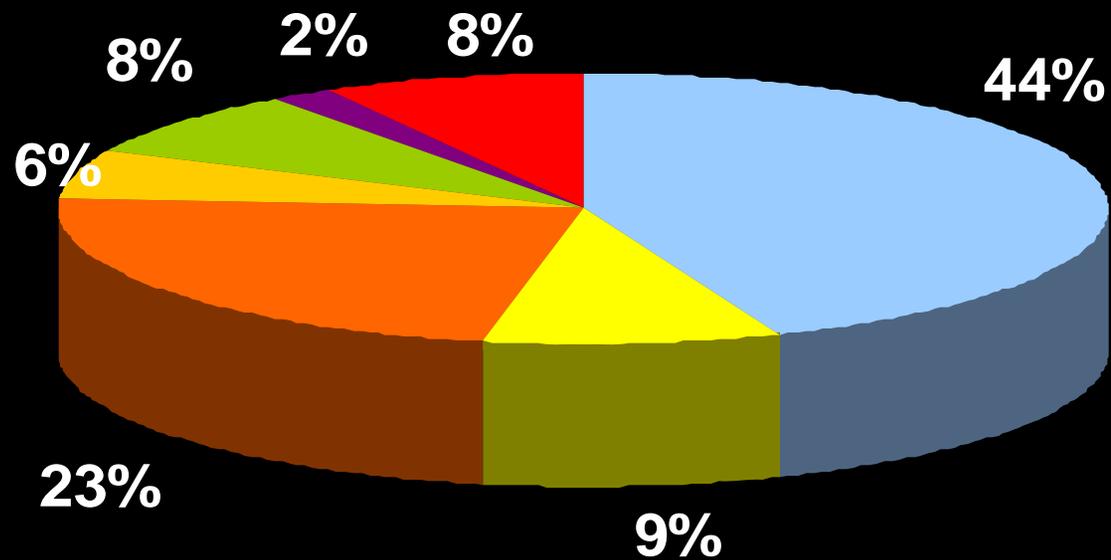
Motor Vehicle Fatalities



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



Crash Causal Factors

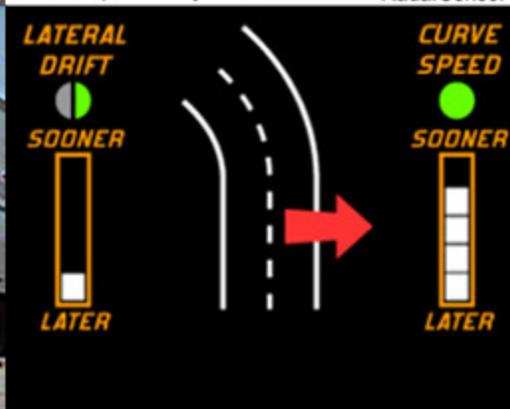
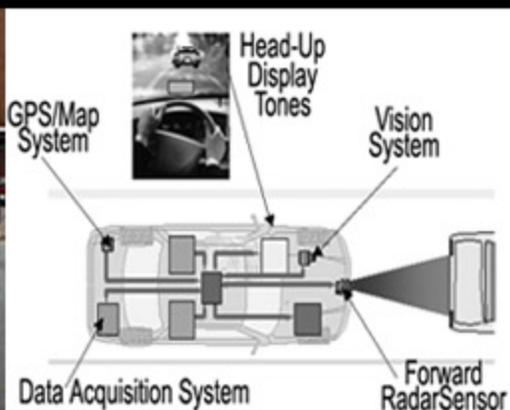


Approach for Intelligent Technologies



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

Field Operational Tests

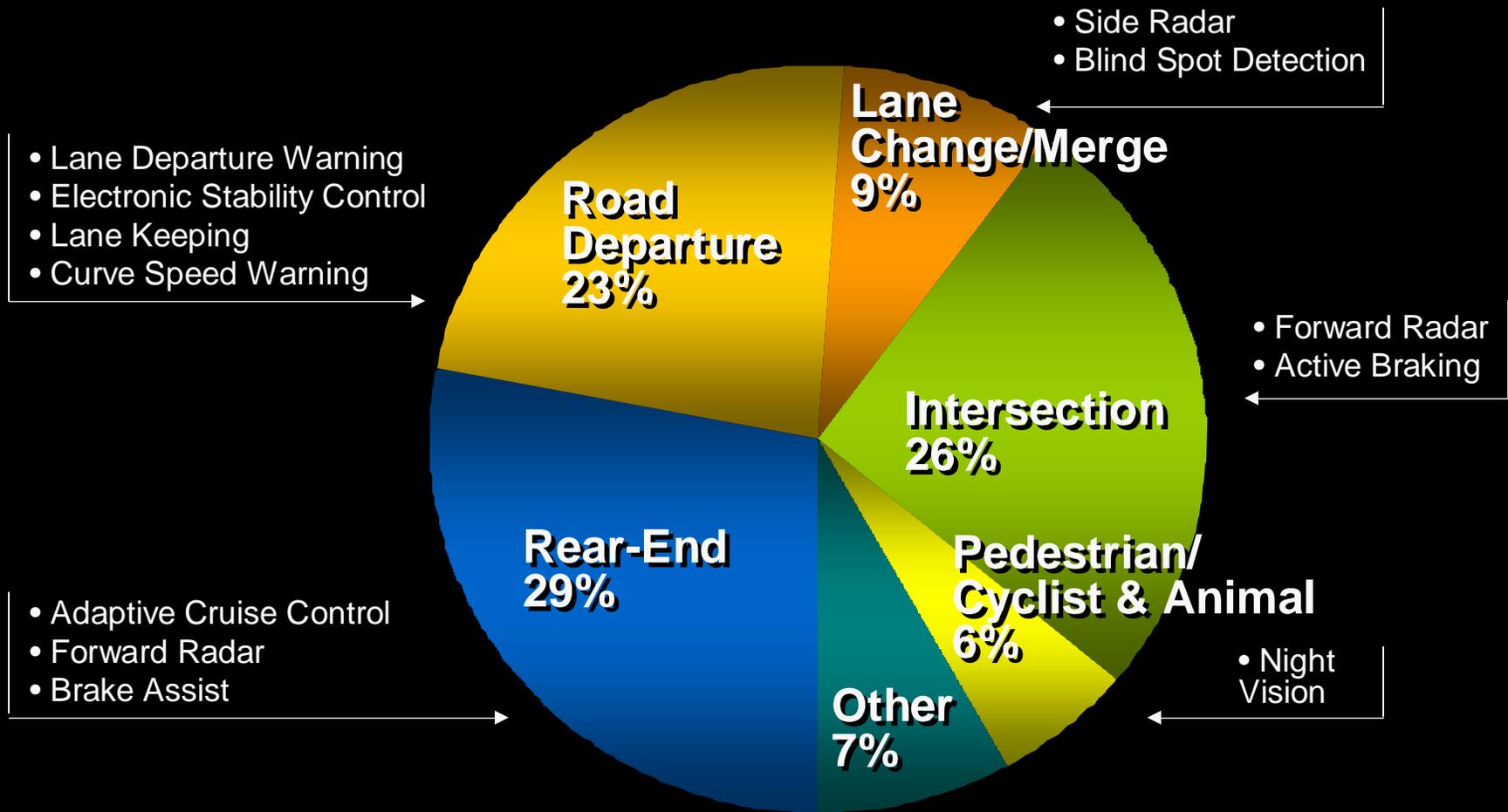


New ITS Safety Initiatives (5 – 6 Year Program Plan)



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

Crash Avoidance Technologies

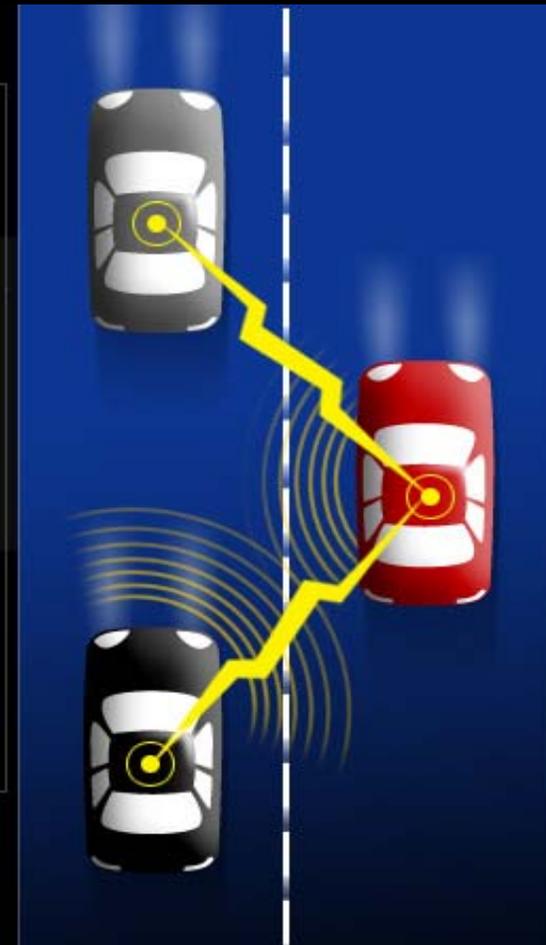


6.2 million police reported crashes
Source: 2004 NASS GES Data

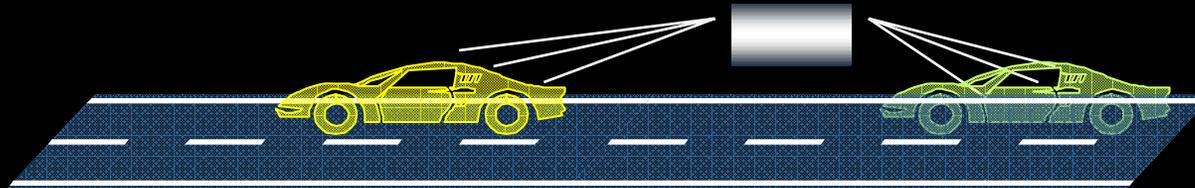
Vehicle to Vehicle Communications Support



- Emergency Electronic Brake Lights
- Forward Collision Warning
- Blind Spot Warning
- Lane Change Warning
- Do Not Pass/On-Coming Crash Warning
- Intersection Movement Assist



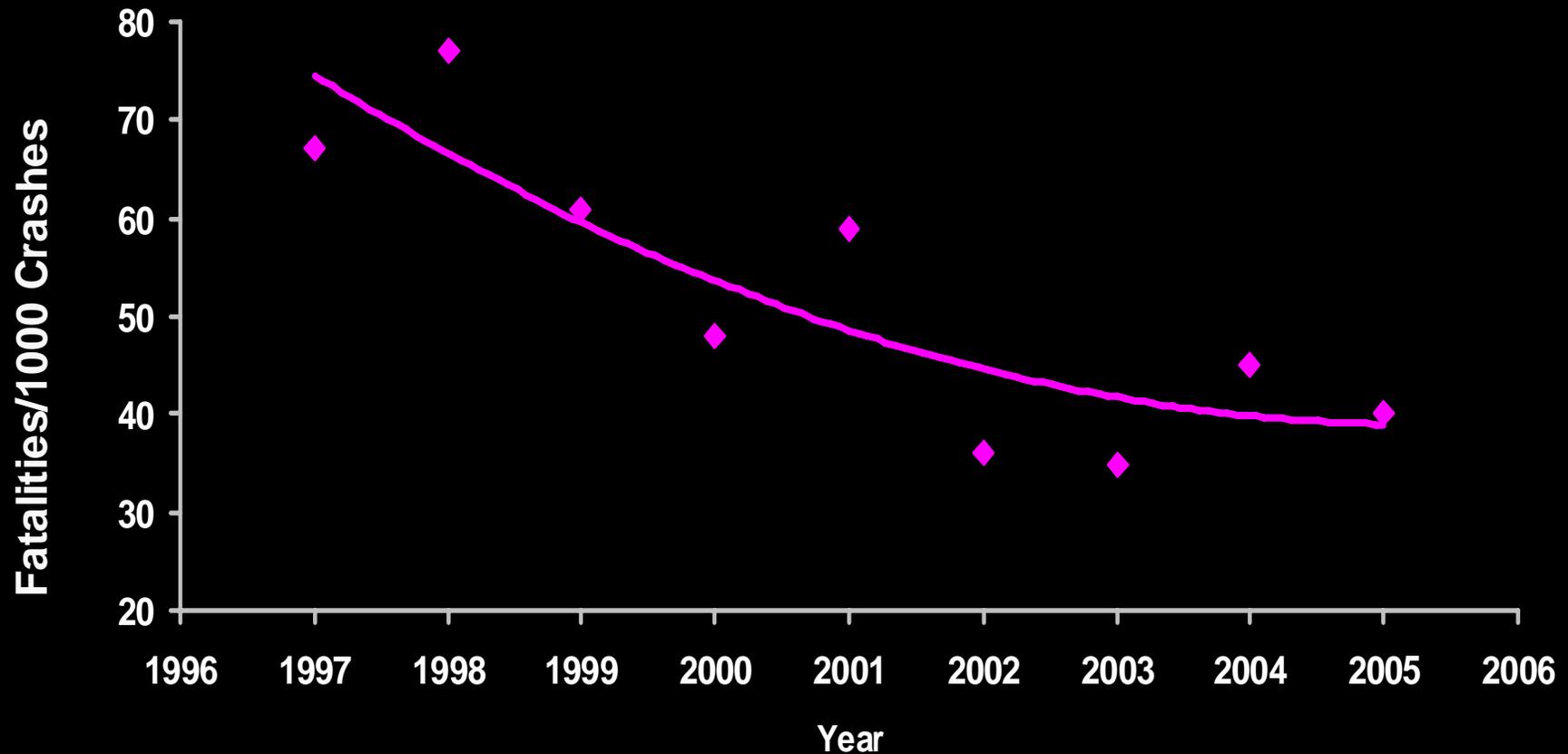
Connecting Vehicles and Infrastructure



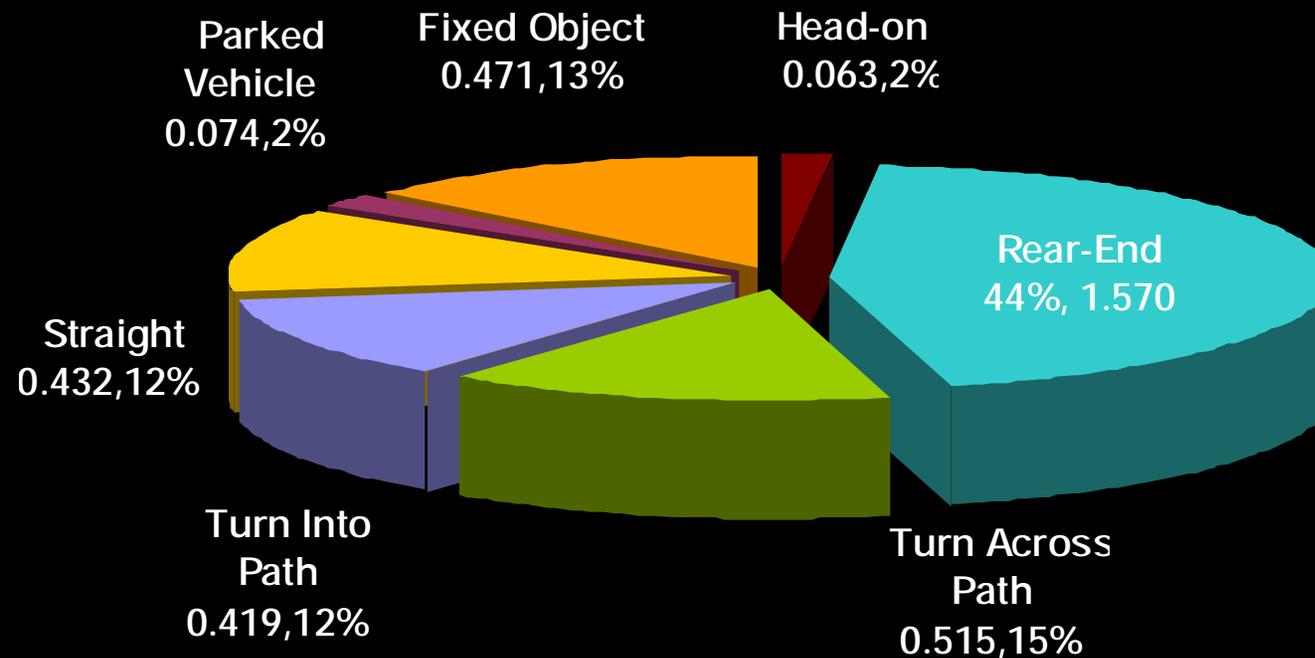
Creating an “enabling communication infrastructure”



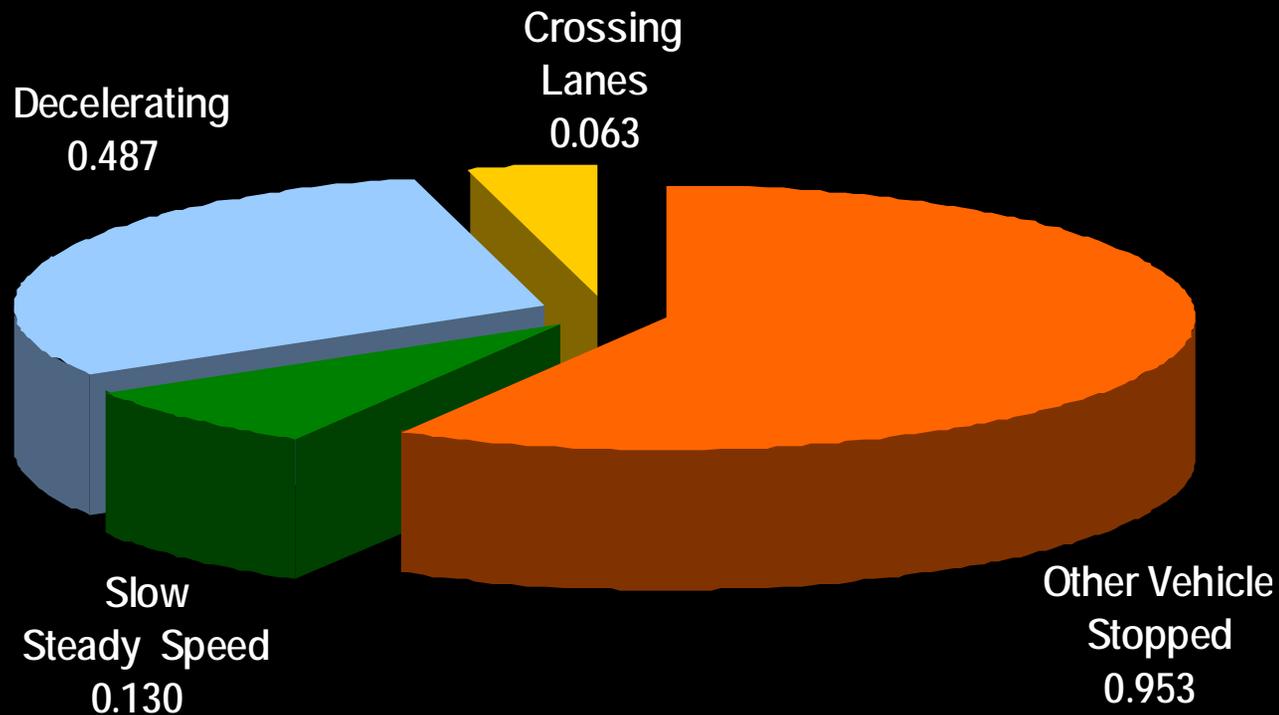
Trends in Fatality Rates in head on crashes



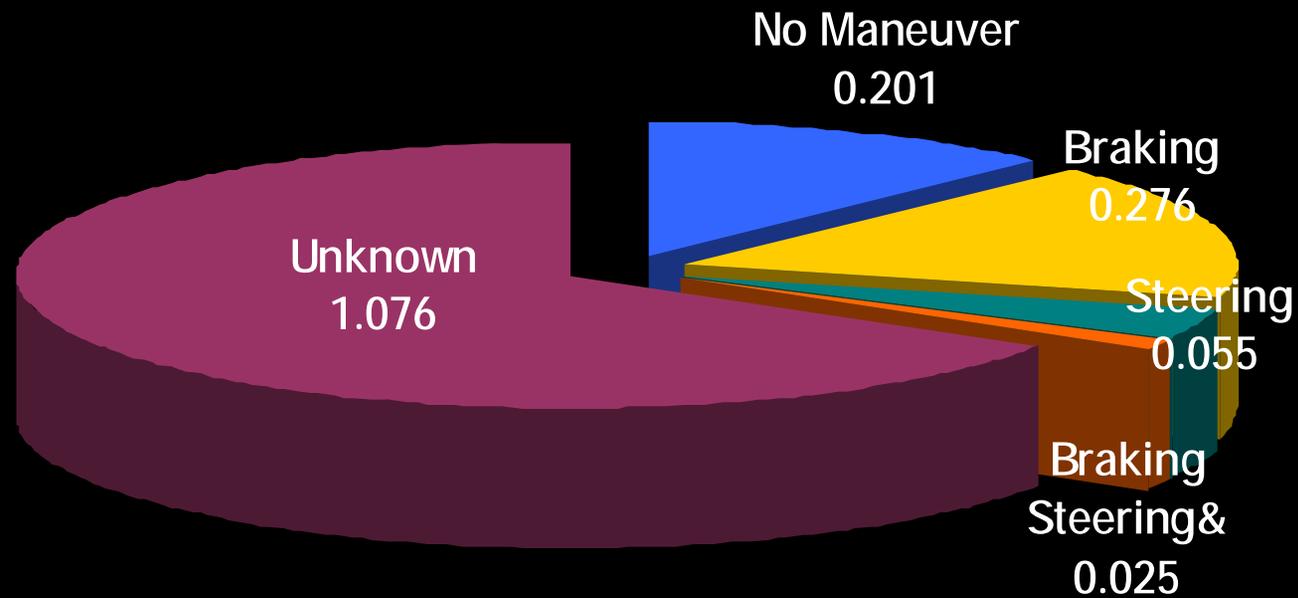
Frontal Crashes - Millions



Critical Events – Crashes in Millions



Driver Actions – Crashes in Millions



Importance of Crash Timelines

PREVENTION

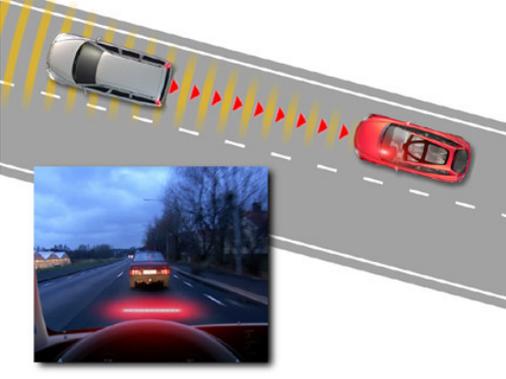
SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



HUMAN / PRE - EVENT



Volvo forward collision warning

Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

INJURY MITIGATION

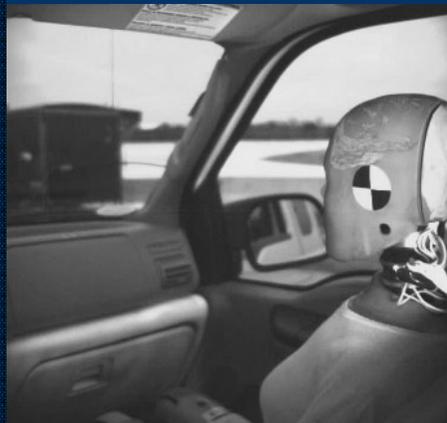
MEDICAL ATTENTION



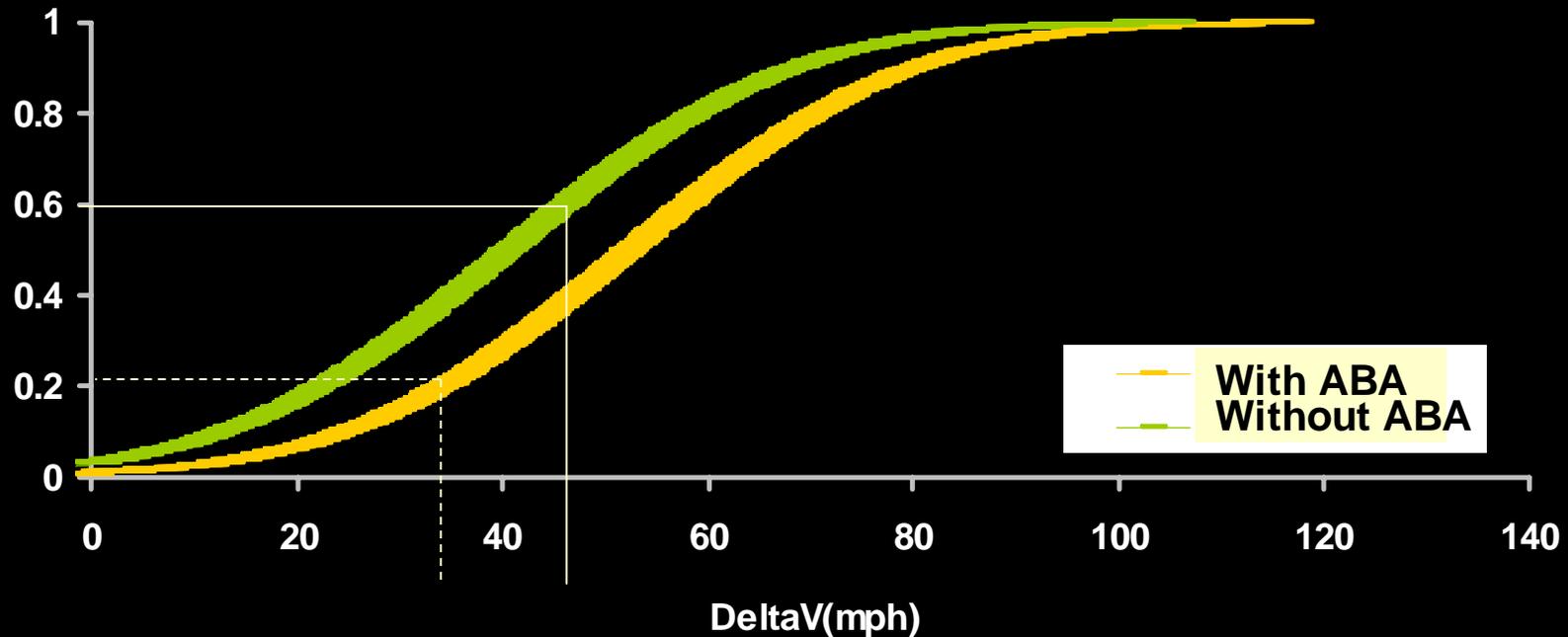
-1000

-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

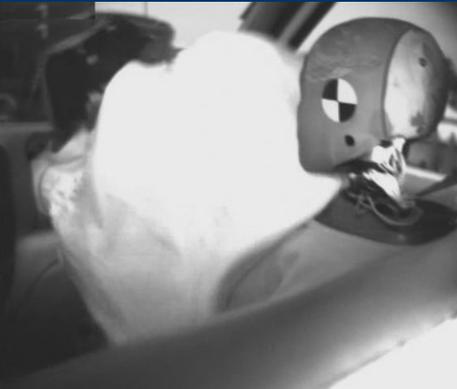
INJURY MITIGATION

MEDICAL ATTENTION



0 200msec.

VEHICLE / EVENT



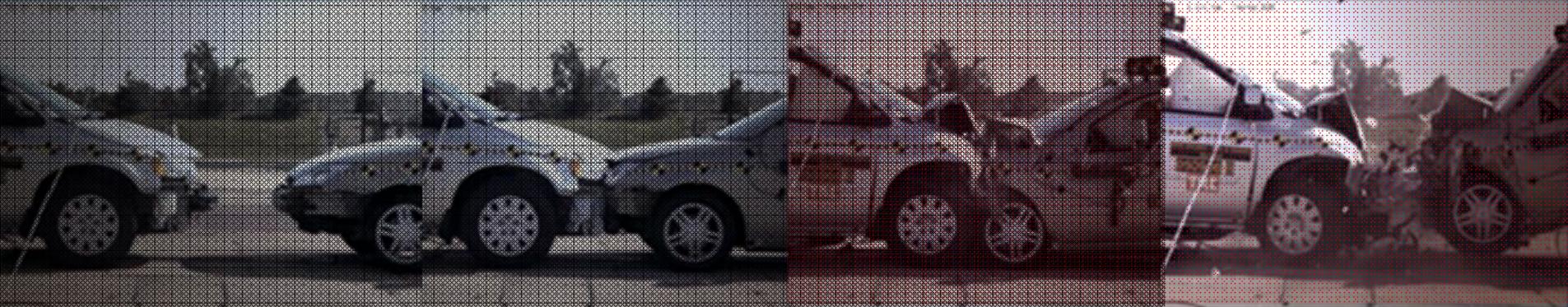
Importance of Crash Timelines

PREVENTION

SEVERITY REDUCTION

INJURY MITIGATION

MEDICAL ATTENTION



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

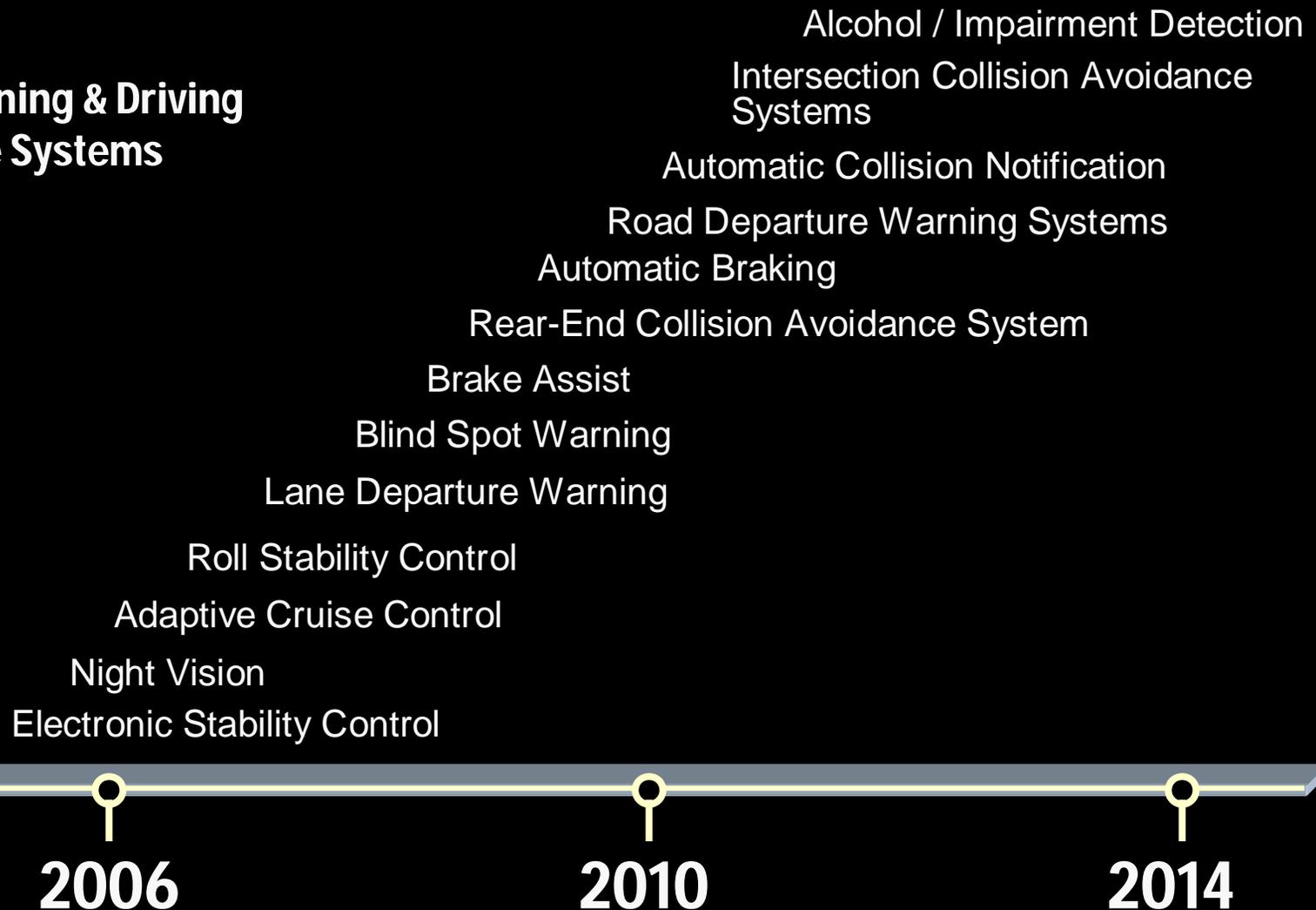
2006

2010

Automotive Technologies Timeline



Driver Warning & Driving Assistance Systems



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