

84th Annual Meeting Transportation Research Board

Highway Safety:

Future Options That Will Make a Difference

A Vehicle Perspective

January 13, 2005



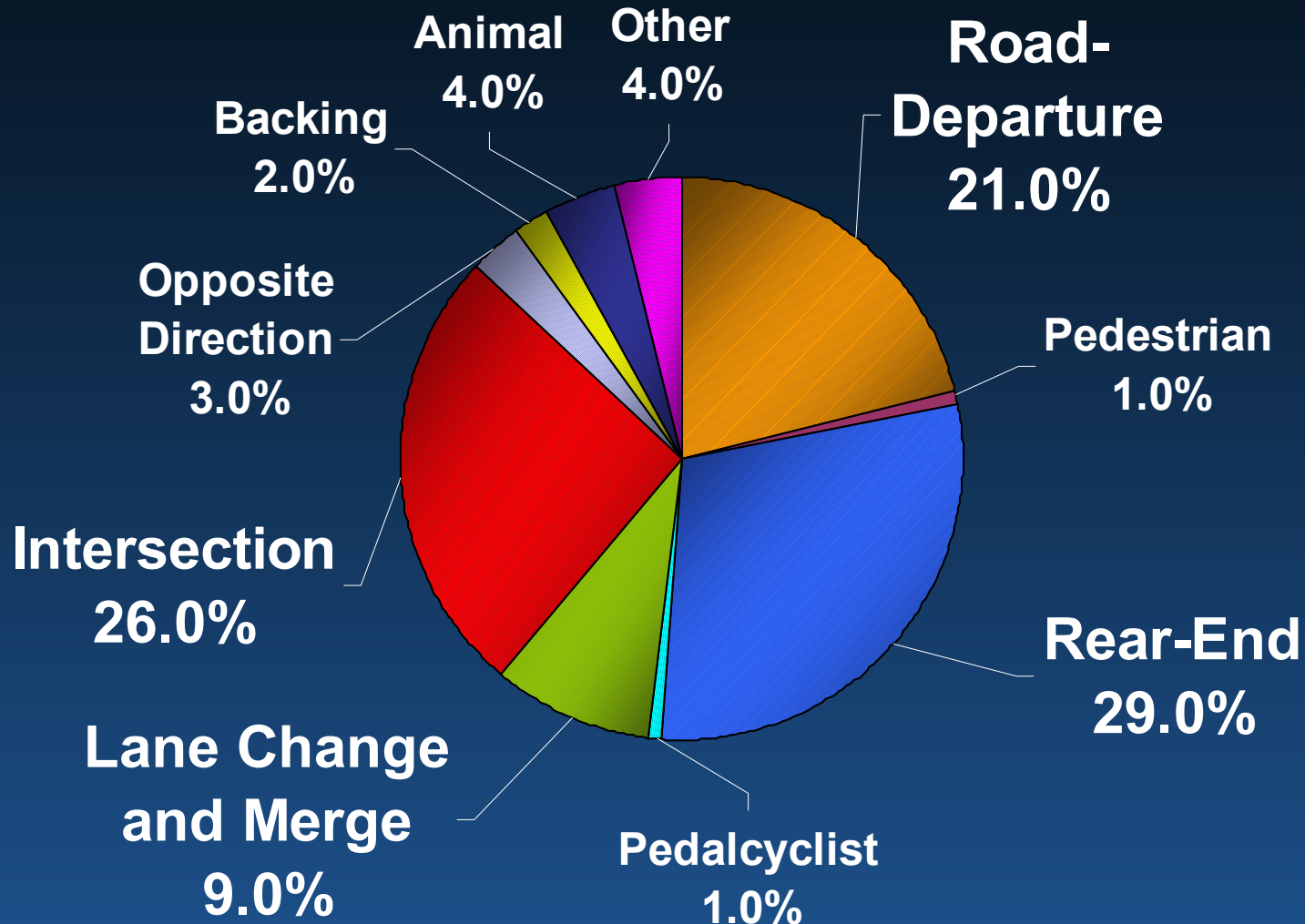
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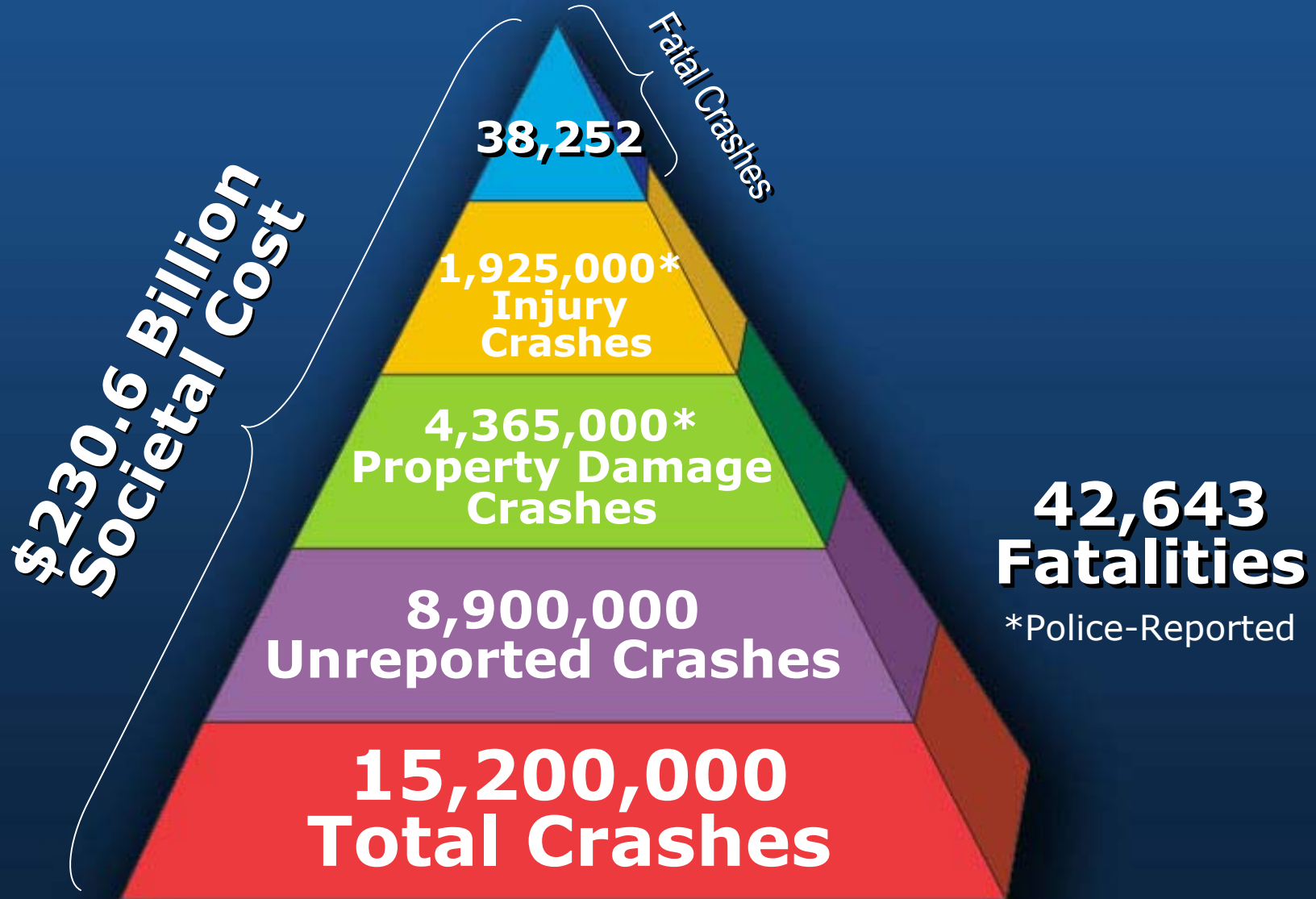
National Highway Traffic Safety Administration

- **Road traffic injuries is a huge public health problem**
 - Killing nearly 1.2 million people a year
 - Disables 20 – 50 million more
- **Road traffic crash problem can be corrected**
- **Traffic exposure and crash probability results in crash risk**
- **Accurate data are essential to monitor trends and develop intervention strategies**
- **Smart vehicles and new technologies are opening new opportunities for road safety.**

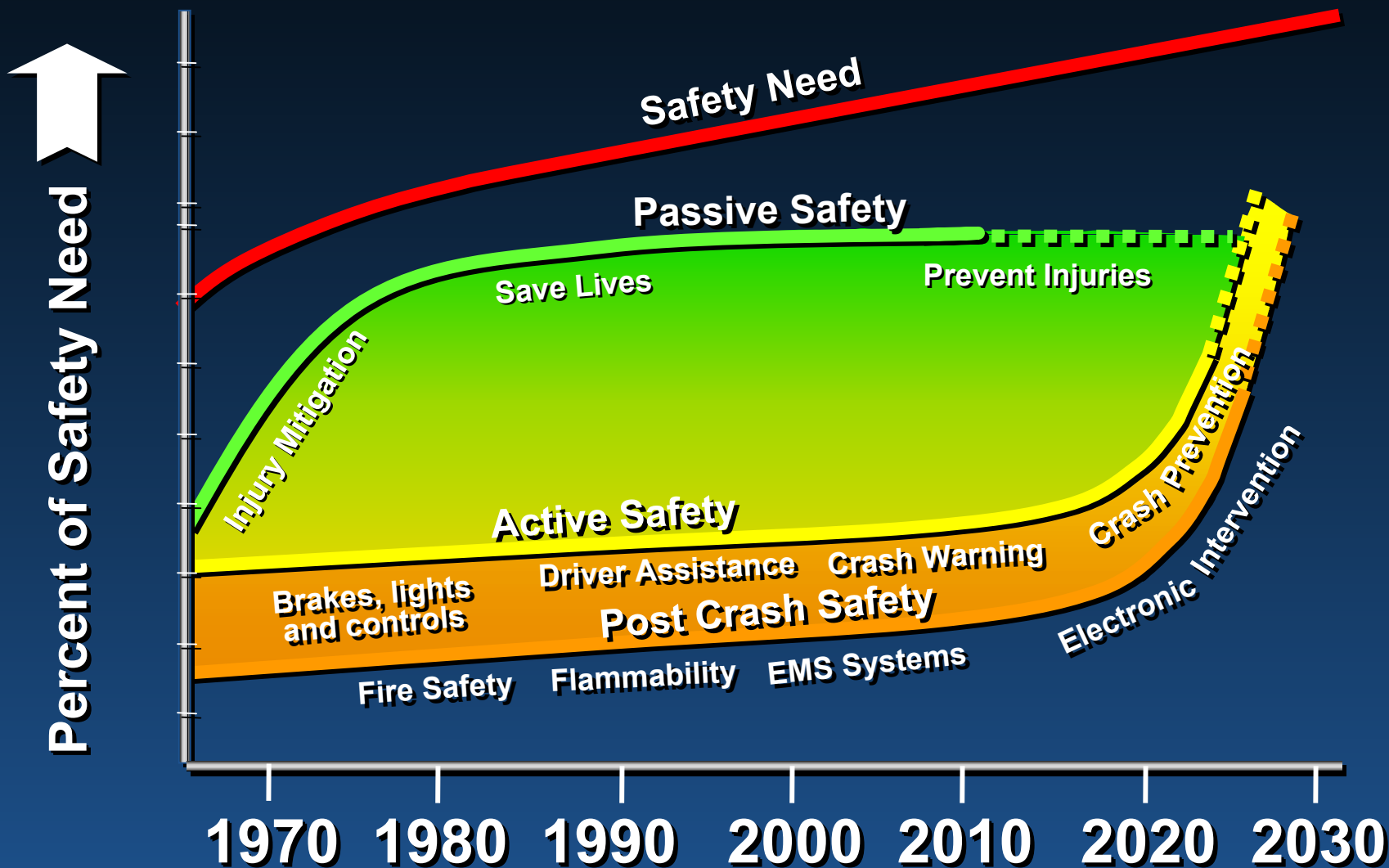
Crashes of all Severities, 2000 GES



The Crash Epidemic



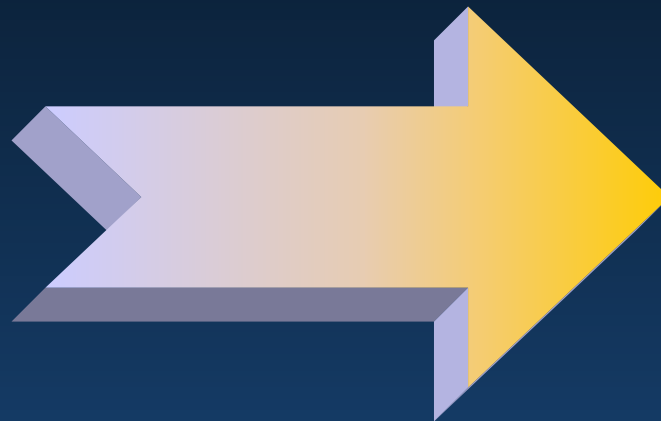
The Safety Need



Evolution of Vehicle Safety

The Past

Crash
Worthiness



The Future

**Crash
Avoidance**

Crash Time Line

Prevention



Protection



0

100 m.sec.

1hr



Severity
Reduction

Post
Crash

Total Safety



Why Advanced Technologies?

- **Technologies often bring new opportunities**
- **Potential for total safety benefits**
- **Save lives, prevent injuries and reduce the economic costs**

Currently Available Systems

- Extensions of the anti-lock brake (ABS) family of products: Traction control, Electronic yaw-stability control, braking assistance and rollover control.
- Adaptive cruise control
- Night vision systems
- Automatic crash notification systems
- Backing crash warning systems
- Extensions of basic airbag restraint systems, such as occupant mass and seat position sensors and multi-stage airbag inflators
- Lane-position assistance systems
- Voice-activated navigation systems
- Event data recorders

The Challenge

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

Crash Prevention **TECHNOLOGIES**

HAZARD	Night Vision System	Adaptive Cruise Control	Electronic Stability Control	Brake Assist	Traction Control	Roll Stability Advisor	Roll Stability Control	Curve Over Speed	Drowsy Driver Alert	Other Specify	Other Specify	Other Specify
Run-off-road Crashes												
Intersections Crashes												
Frontal Crashes (C to C longitudinal)												
Non-motorist												
Rollover												
Elderly Driver												
Young Driver												
Inexperienced Driver												
Impaired Driving, Drugs, Alcohol												
Impaired Driving, Distraction												
Speeding												
Inclement Weather												
Reduced Visibility, Darkness (pedestrian)												
Impaired Driving, Drowsiness												
Reduced Visibility, Fog												
Animal in Road (nighttime)												

Please fill out the attached table of hazards versus technologies by placing a **high (H)**, **medium (M)**, **low (L)**, or **not applicable (-)** in each cell in indicate your judgment of the potential for each of the technologies to impact each of the hazards, given further development.

- **Two prerequisites**
 - Objective tests that are related to relevant types of crash
 - Computational foundation for incorporating test results and other data sources into a credible estimate of safety impact

Delivery of Auto Safety

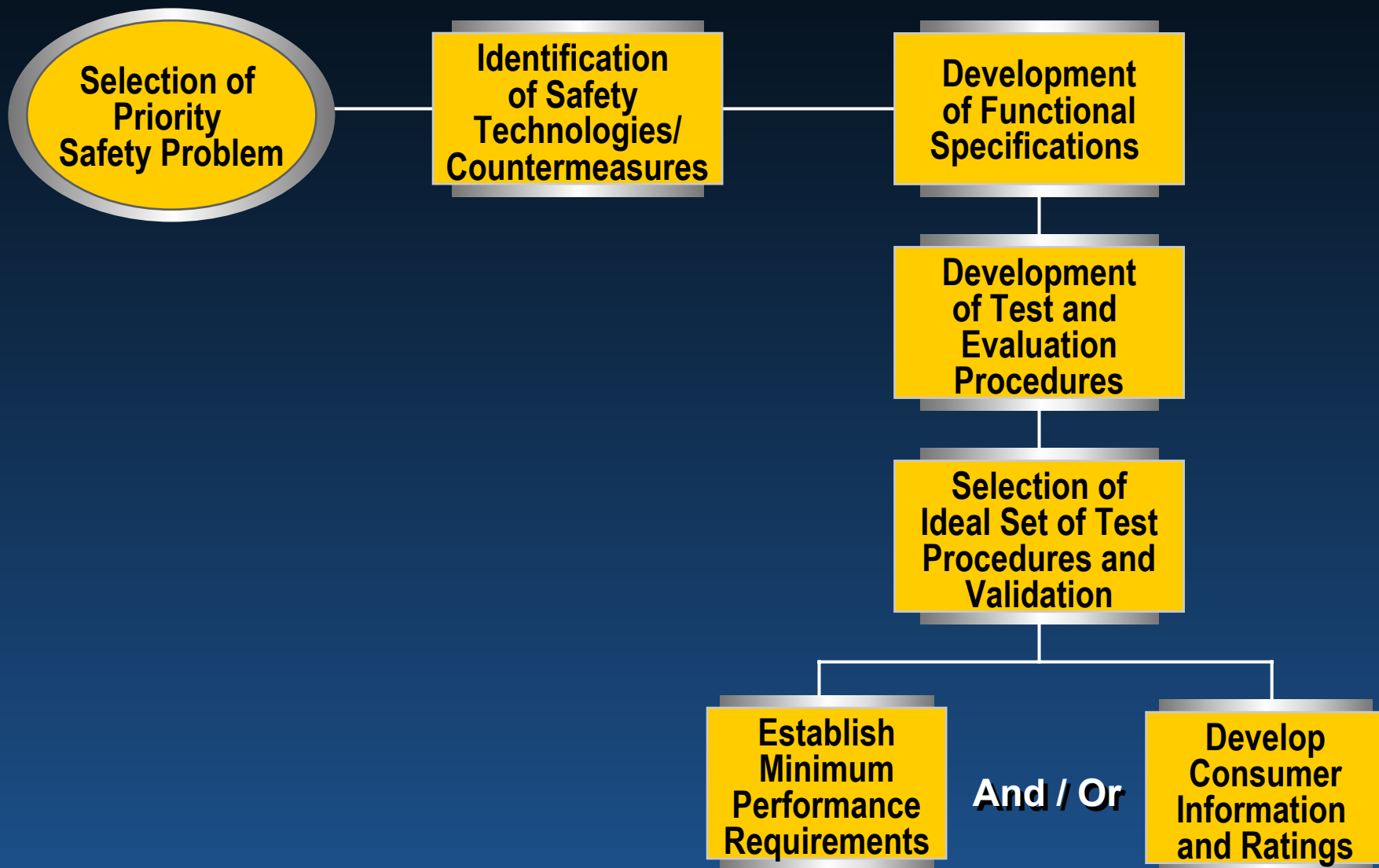
TRADITIONAL APPROACH

- Define problem
- Develop safety countermeasures
- Evaluate benefits
- Regulation

NEW APPROACH

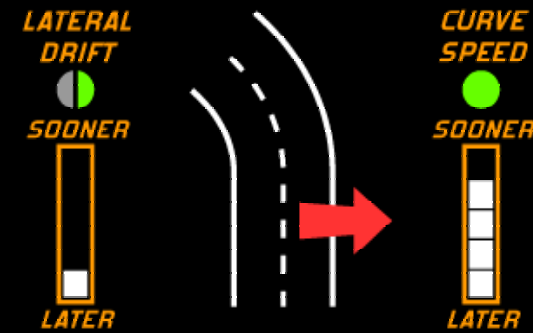
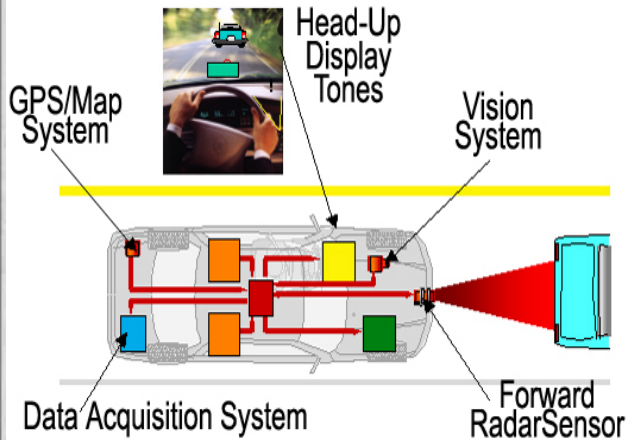
- Identify Technologies
- Estimate Benefits
- Collaborative Research
- Deployment
- Monitor Benefits

Strategies For Deployment of Advanced Safety Technologies



U.S. IVI Program

IVI PROGRAMS



ADVANCED SAFETY RESEARCH

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

- **Integrated Vehicle-Based Safety Systems (IVBSS)**
- **Intersection Crash Prevention Systems (CICAS)**
- **Vehicle-Infrastructure Integration (VII)**
- **Next generation 911**

Integrated Vehicle-Based Safety Systems (IVBSS)

- **Program motivation**
 - More than 3 million rear-end, road departure, and lane change crashes (60% of total crashes)
- **Facilitate introduction and commercialization of effective integrated safety systems**

Cooperative Intersection Collision Avoidance Systems (CICAS)

- **Every year at intersections:**
 - 9100 FATALITIES
 - 1,500,000 INJURIES
 - 3,000,000 CRASHES
- **To develop and demonstrate cooperative intersection collision avoidance systems**
- **To assess the value and acceptance of cooperative collision avoidance systems**

Vehicle Infrastructure Integration (VII)

- Creating an “enabling communication infrastructure”
- Emphasis safety applications

Leveraging Prior Work

- Performance Specifications
- Objective Test Procedures
- Field Operational Tests
- Enabling and Enhancing Technologies
- Independent Evaluation

Conclusions

- **Safety Needs Novel Approaches**
 - Collaborative research
 - Innovative regulatory approaches
 - Consumer information and education
 - Closer cooperation between Government and Industry

How to accelerate deployment?

- Estimate Safety Benefits and show Feasibility
- Use Market Forces
- Develop Performance Specifications and Objective Tests.