Accelerating Innovative Safety Technologies Into The Fleet

March 17, 2006

AORC Panel Discussion

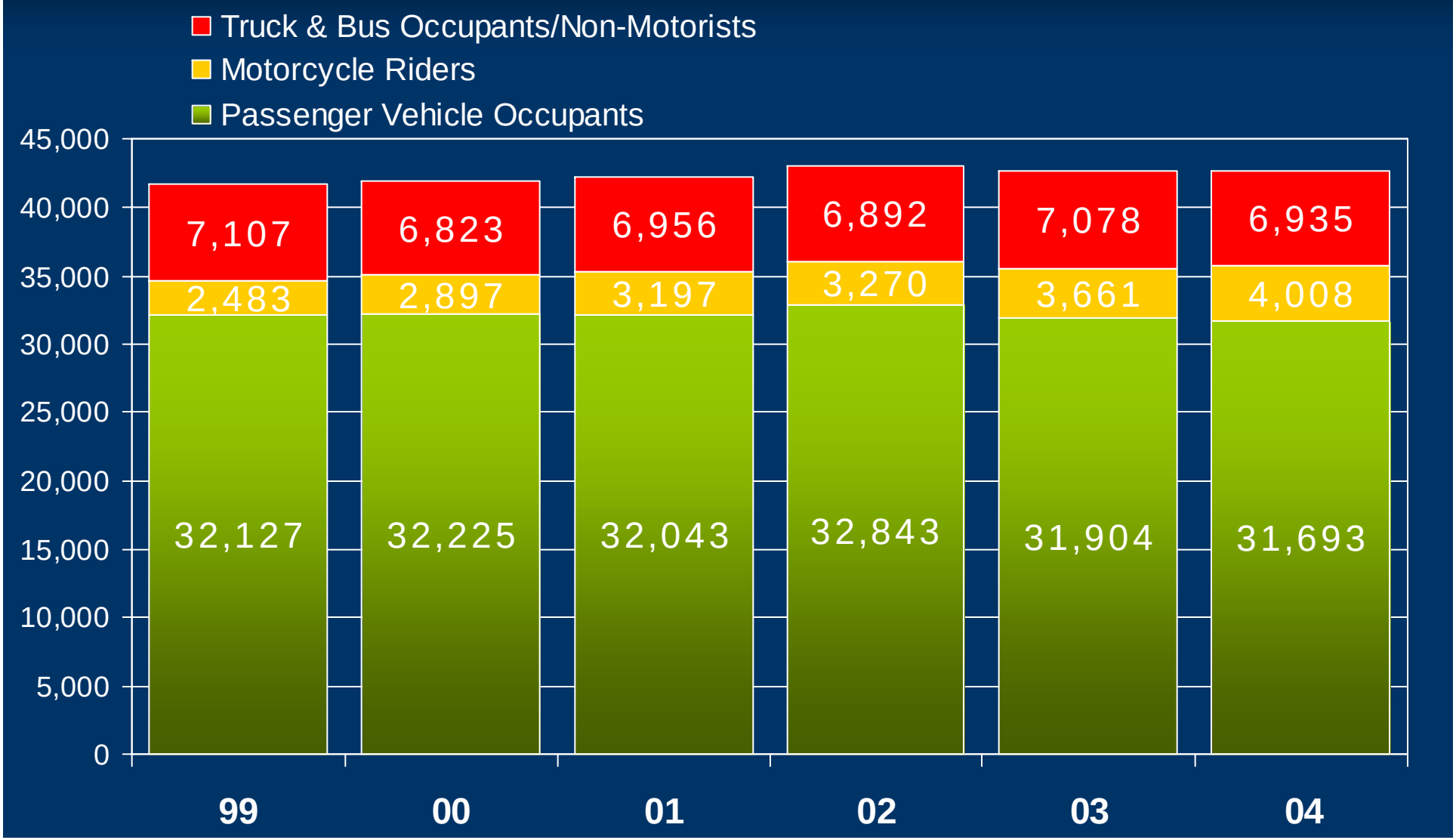
Joseph N. Kanianthra Ph.D (Mech.Eng)
Associate Administrator for Vehicle Safety Research, NHTSA

www.nhtsa.dot.gov
nhtsa
people saving people

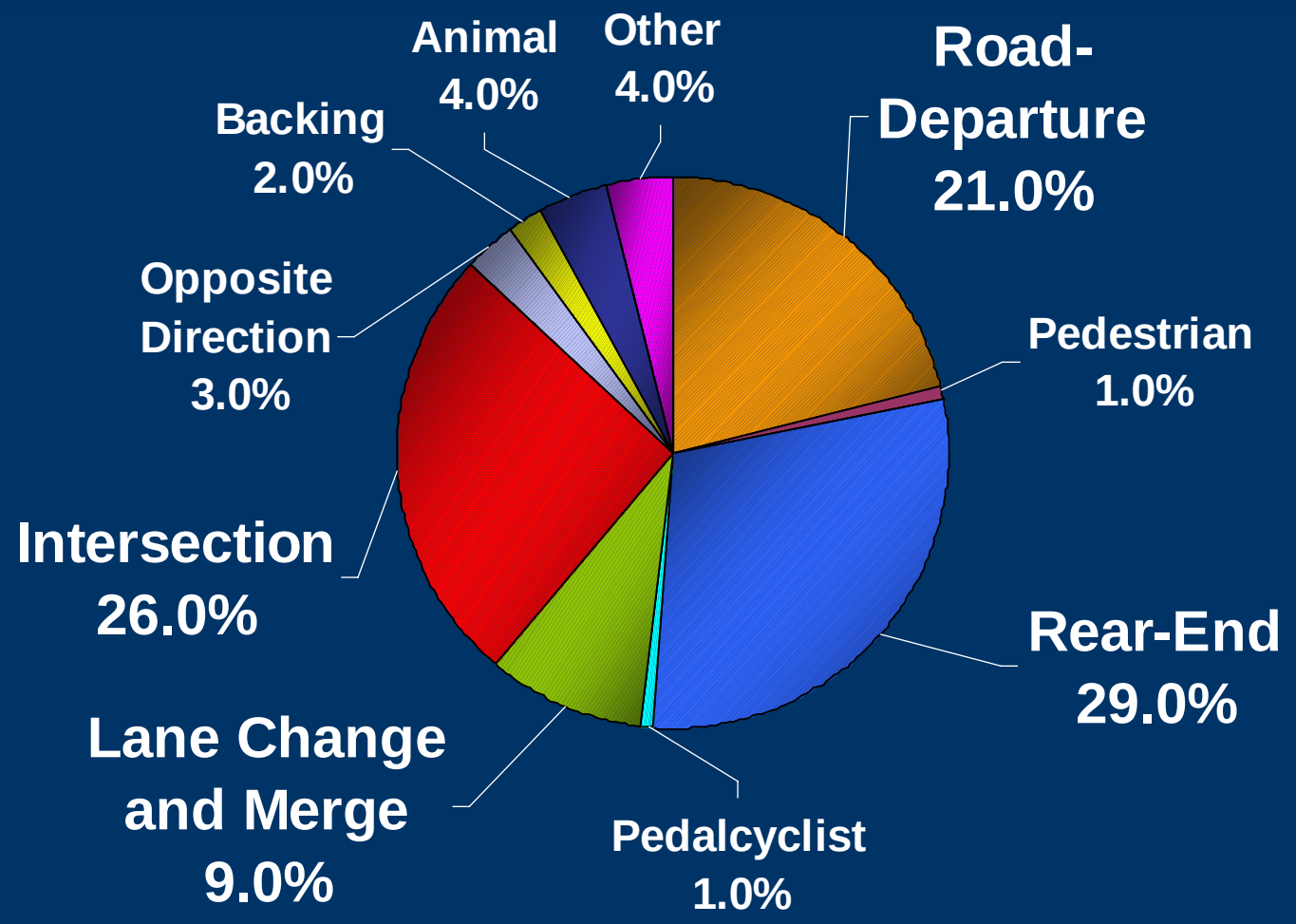
Outline

1. Safety Problems
2. Safety Priorities
3. Role of Technologies in Safety
4. Accelerating Innovative Technologies
5. Conclusions

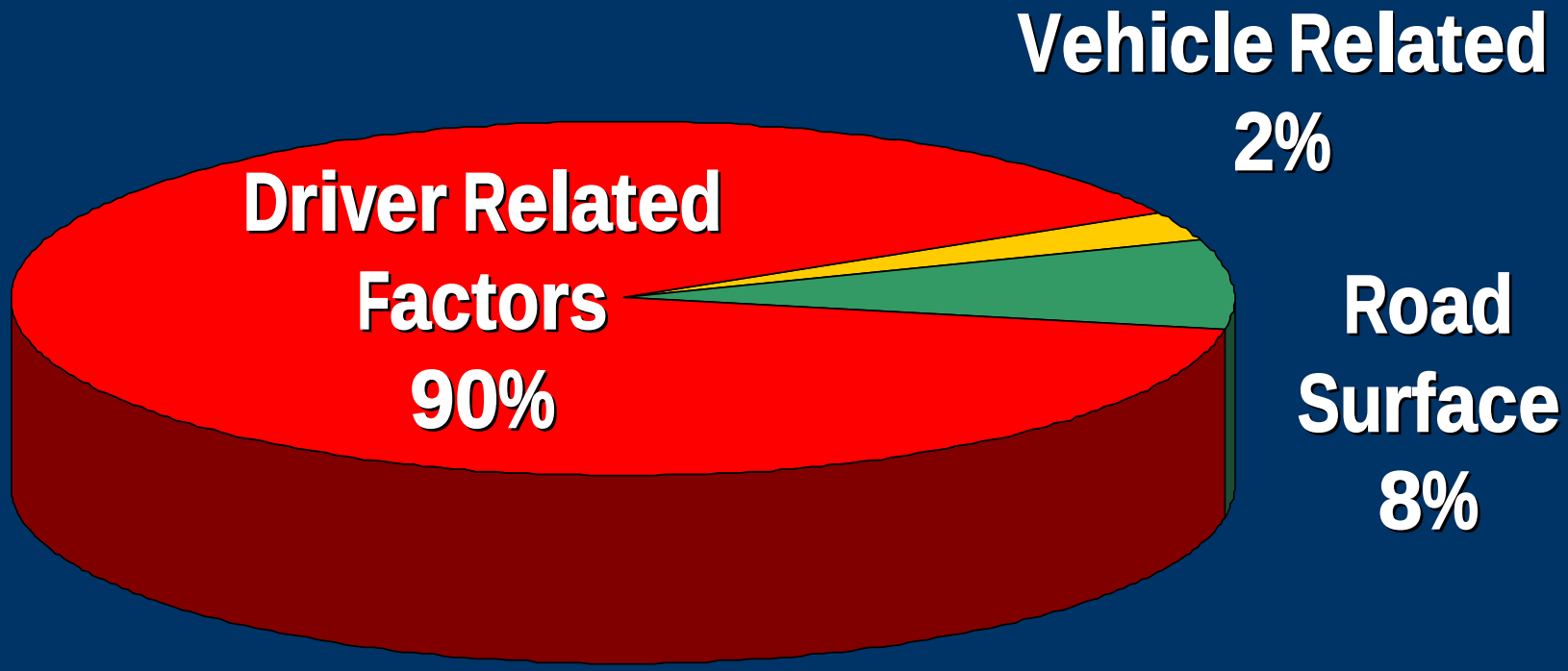
Motor Vehicle Fatalities



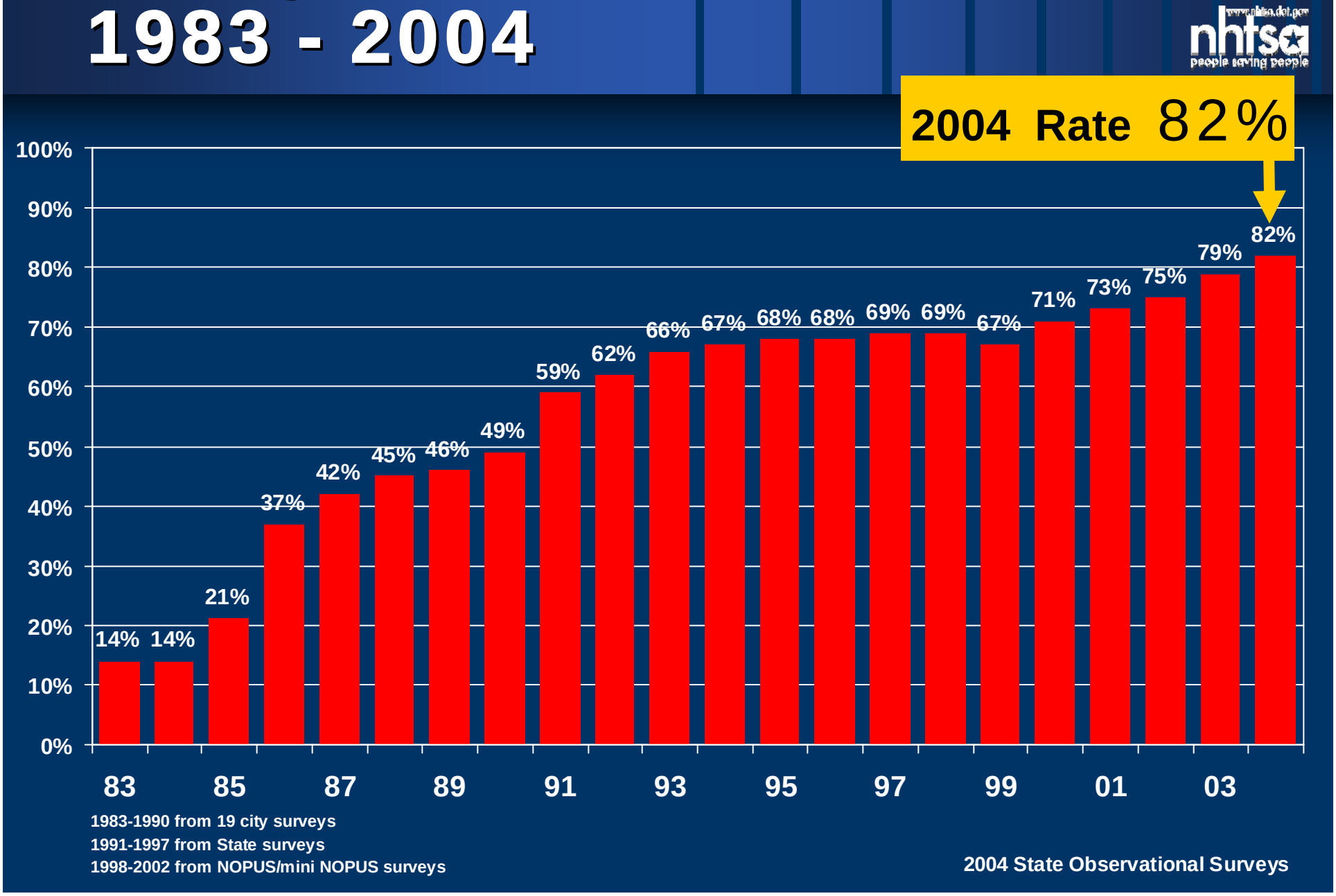
Crashes of all Severities, 2000 GES



Crash Causal Factors



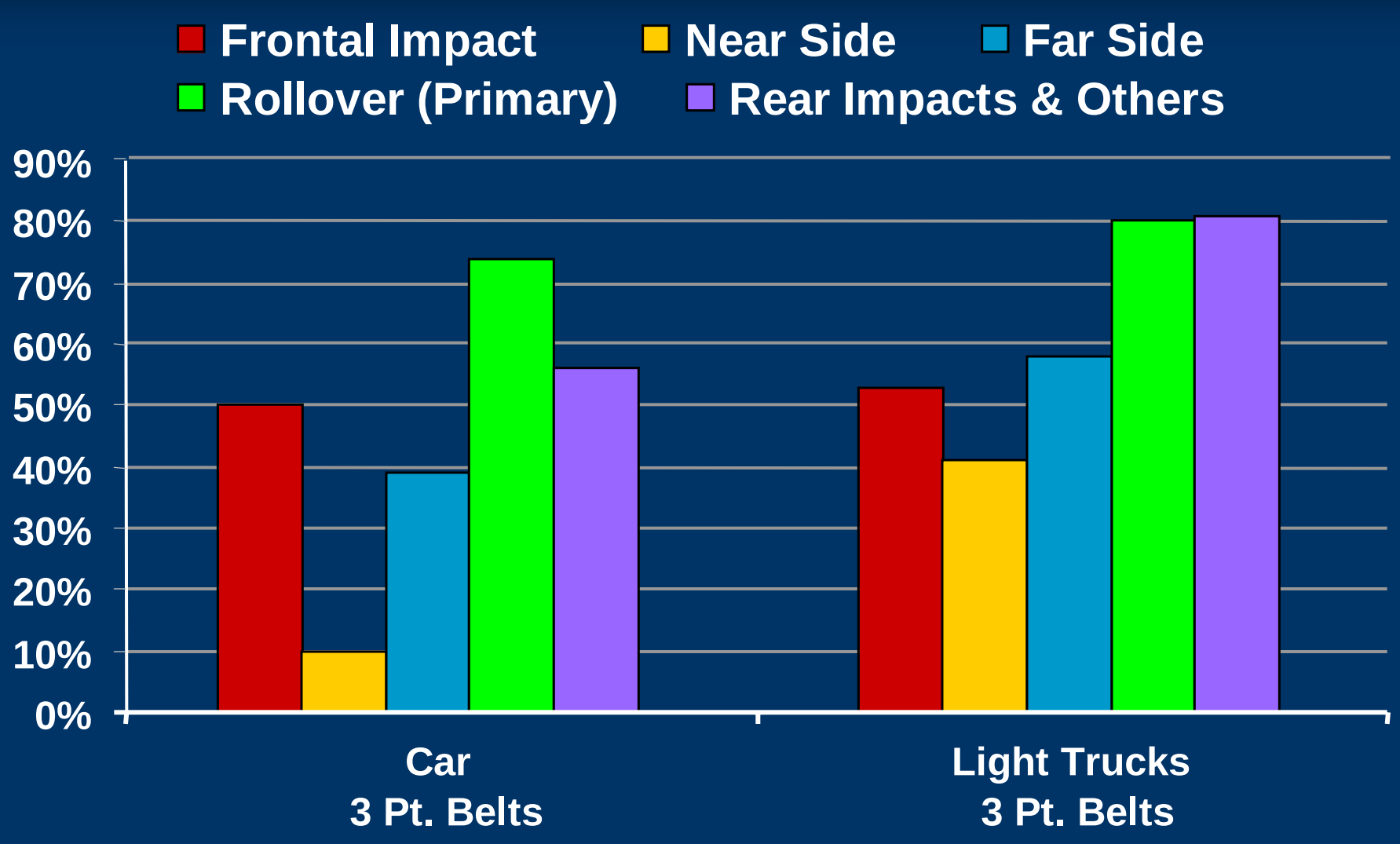
Safety Belt Use Rates 1983 - 2004



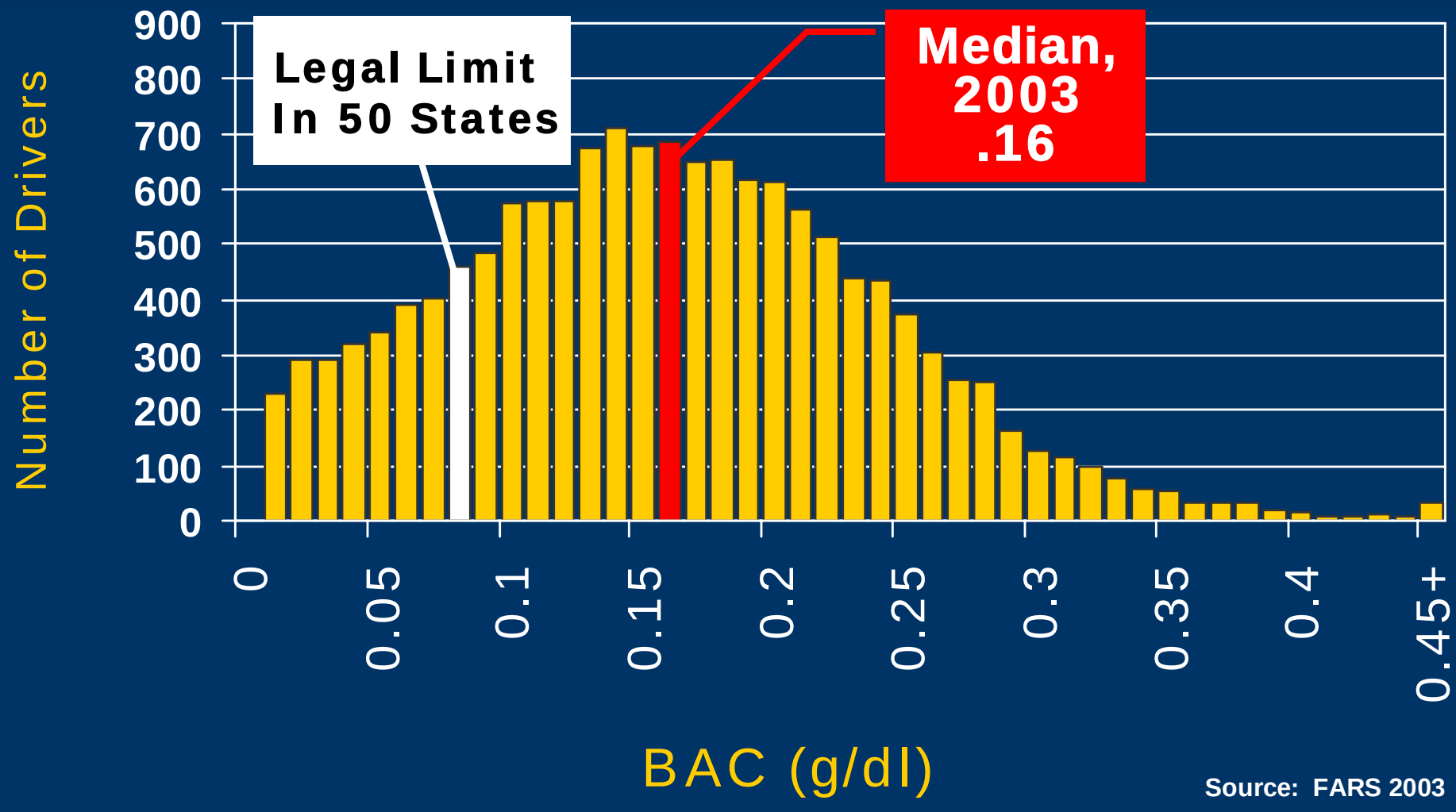
1983-1990 from 19 city surveys
1991-1997 from State surveys
1998-2002 from NOPUS/mini NOPUS surveys

2004 State Observational Surveys

Effectiveness of Safety Belts



Drivers Involved in Fatal Crashes with Positive BACs (BAC>0), 2003



Source: FARS 2003

Rollover Priorities

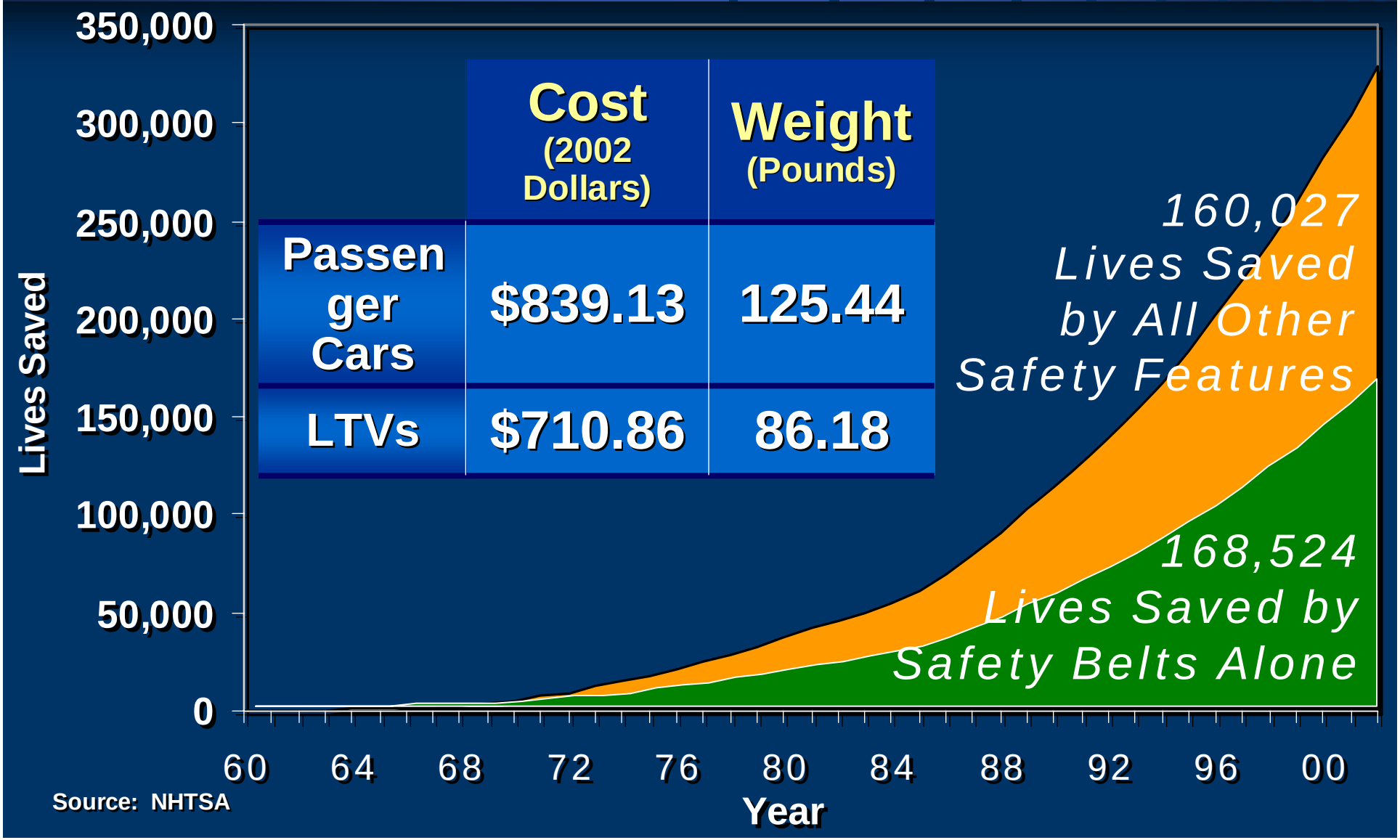
Safety Belts

Rollover Prevention

Ejection Mitigation

Structural Integrity

Lives Saved by Safety Technologies, '60 - '02 : 328,551



Source: NHTSA

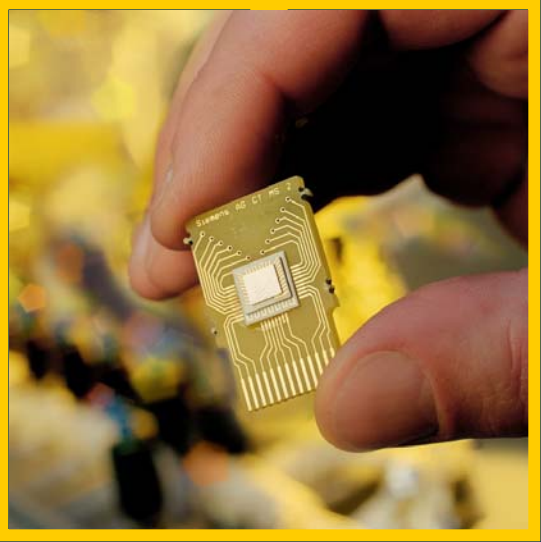
Advanced Car Seating Restraint Systems

Alcohol Screening Systems

- System needs to be totally unobtrusive
- Nearly 100 percent accuracy essential
- Multiple sensing assures reliability

Tru touch skin biometric sensor

- Passive system that “sniffs” ambient air
- Applications include testing for alcohol in exhaled breath, vehicles, and other enclosed spaces



Siemens sensor technology to detect gases and smells

Data Collection

Why do we need EDRs ?

- **New technologies**
  - Stability control systems
  - Advanced air bags
  - Other devices that do not leave evidence
- **Better pre-crash data**
- **Better crash severity parameter estimates**
- **Better crash reconstruction**
- **Automated collision notification**

GM SDM Units
SDM-Sensing and Diagnostic Module

Data Collection

100 CAR NATURALISTIC DRIVING STUDY

Understanding normal driving performance is important.

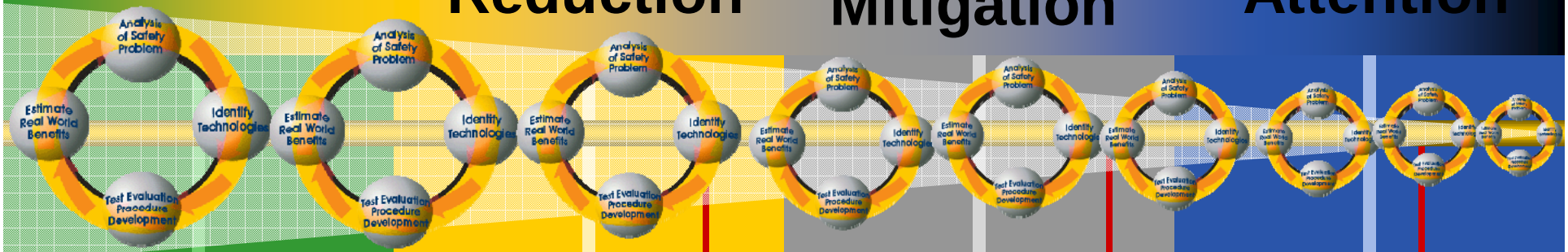
Crash Time Line

Prevention

Severity Reduction

Injury Mitigation

Medical Attention



Crash may not be prevented-but **Severity** can be **Reduced**

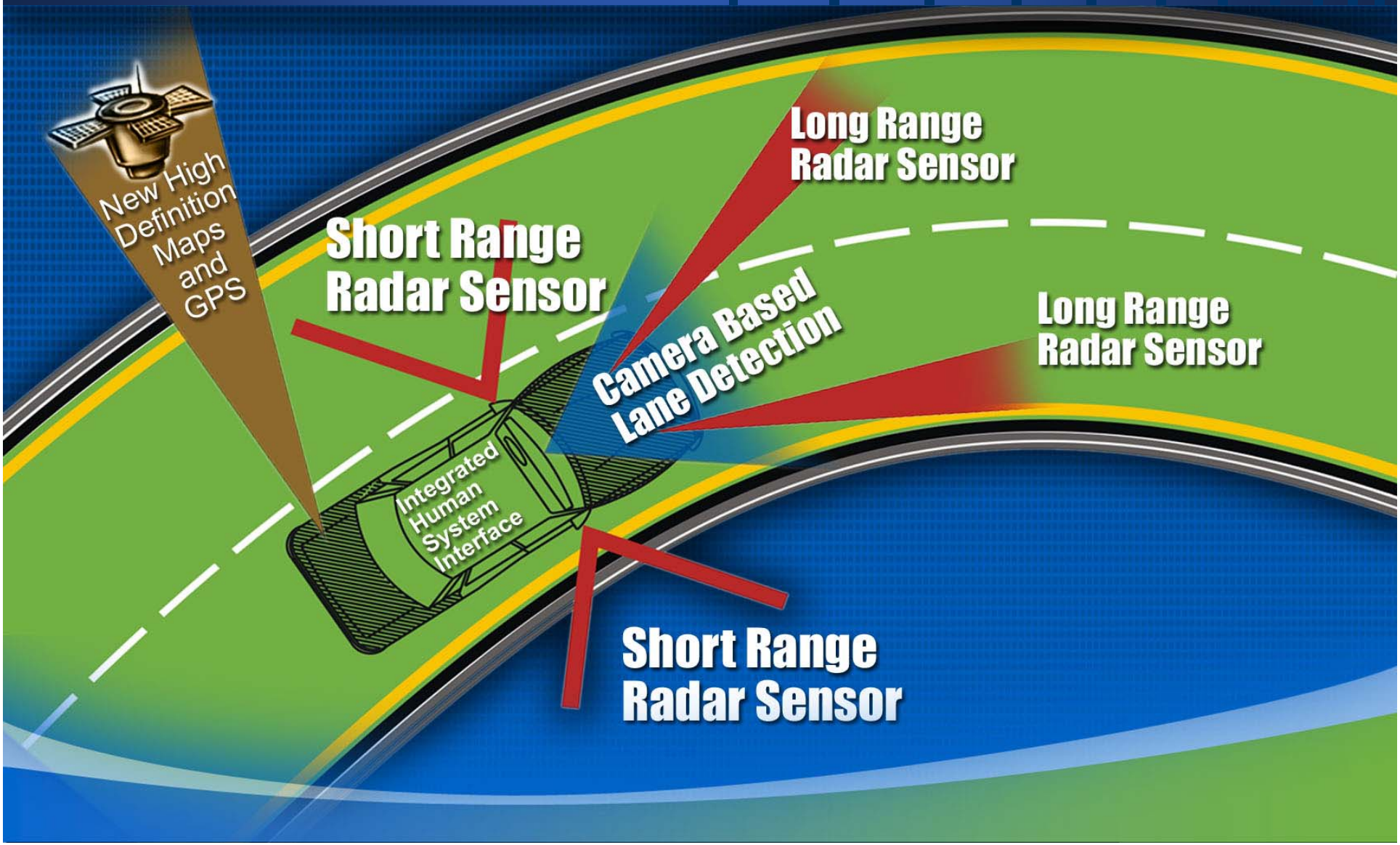
0

100 m.sec.

1 hr

Developed by: Joseph N. Kanianthra

Technology Opportunities



Total Safety

Developed by: Joseph N. Kanianthra

Intersection Collision Avoidance

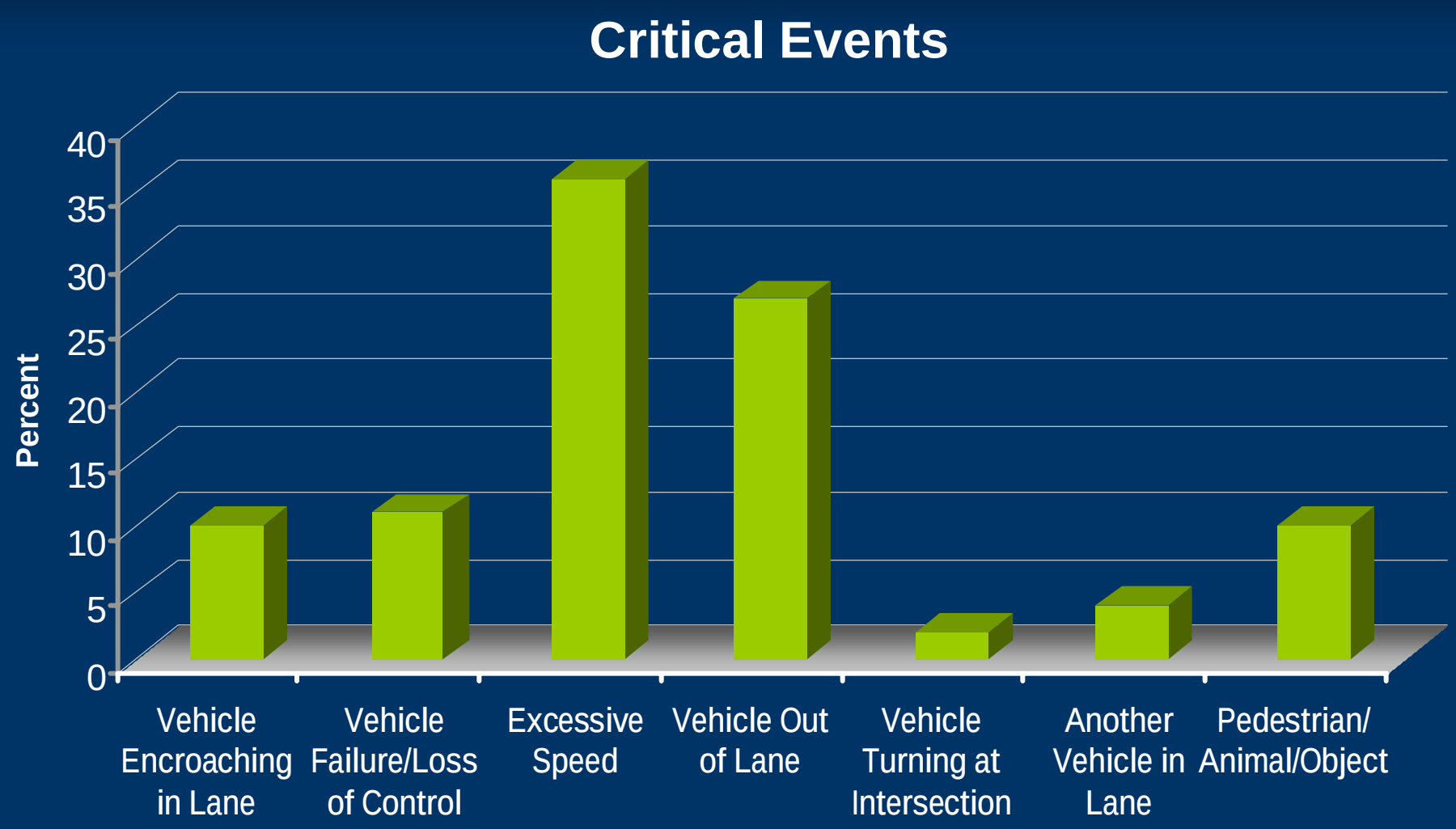
Why Advanced Technologies?

- Technologies often bring new opportunities
- Potential for total safety benefits
- Save lives, prevent injuries and reduce the economic costs
- Technologies can compensate for human deficiencies
- However, must ensure enhancement of safety

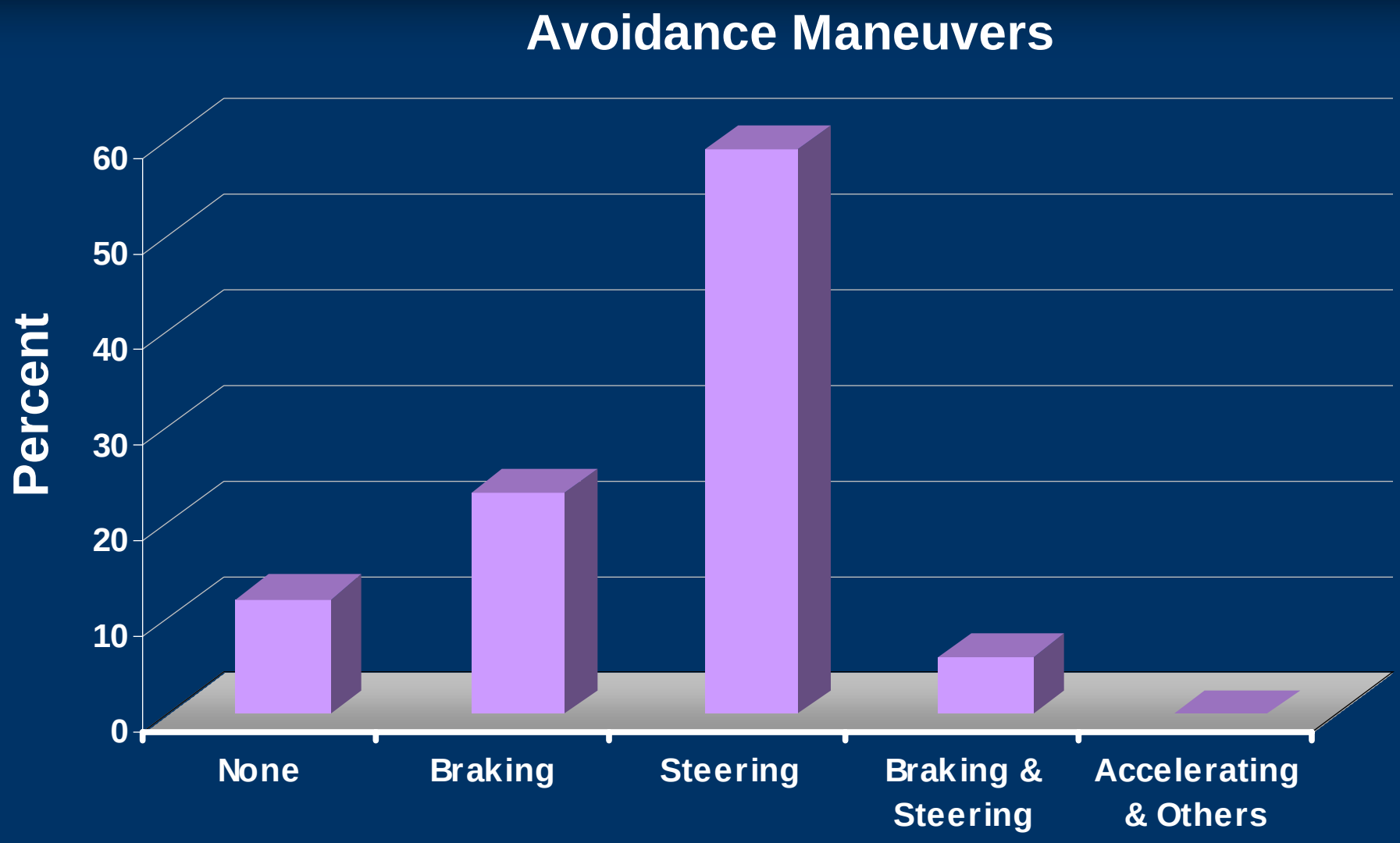
Total Safety Cycle

Developed by: Joseph N. Kanianthra

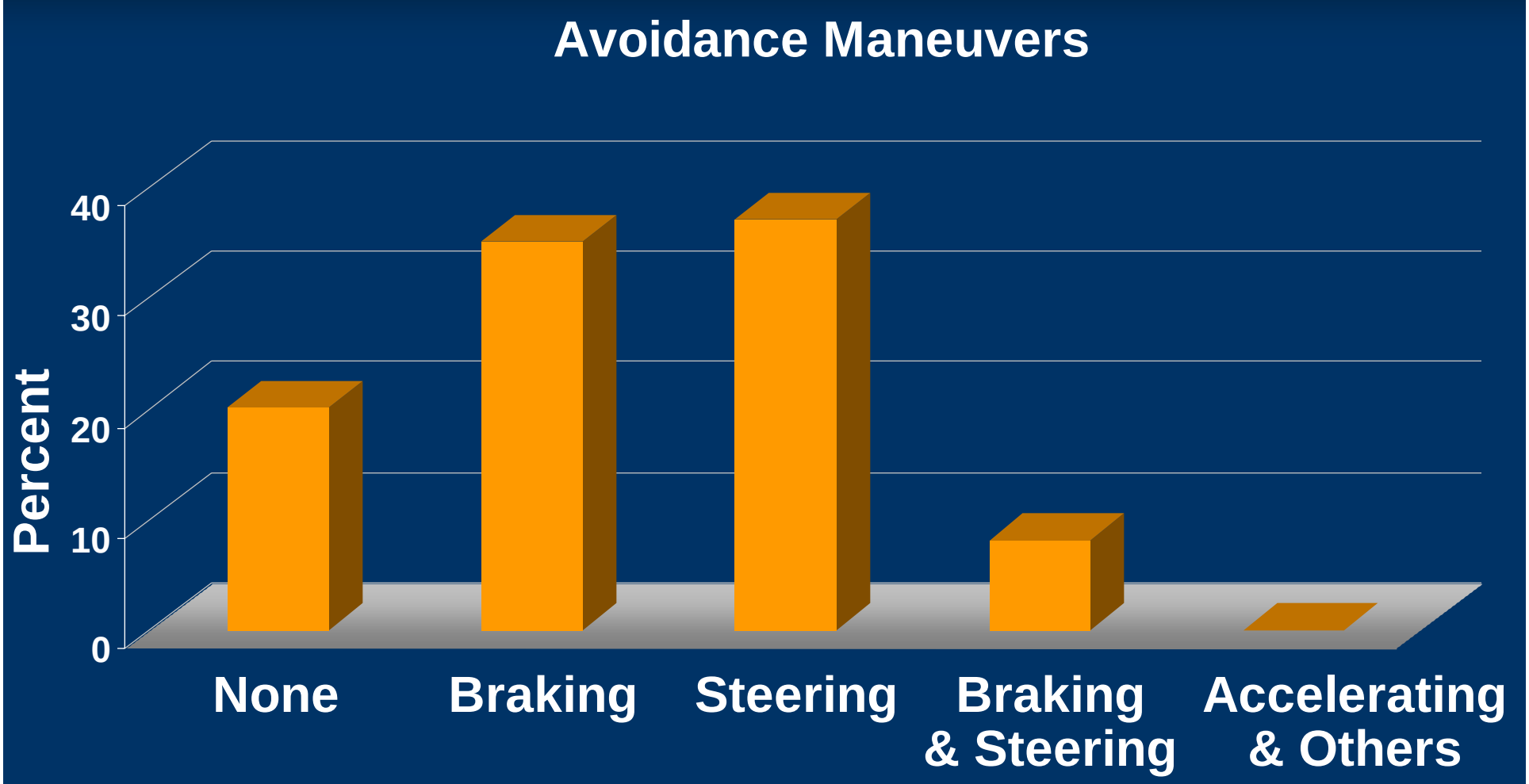
First Harmful Event - Rollover



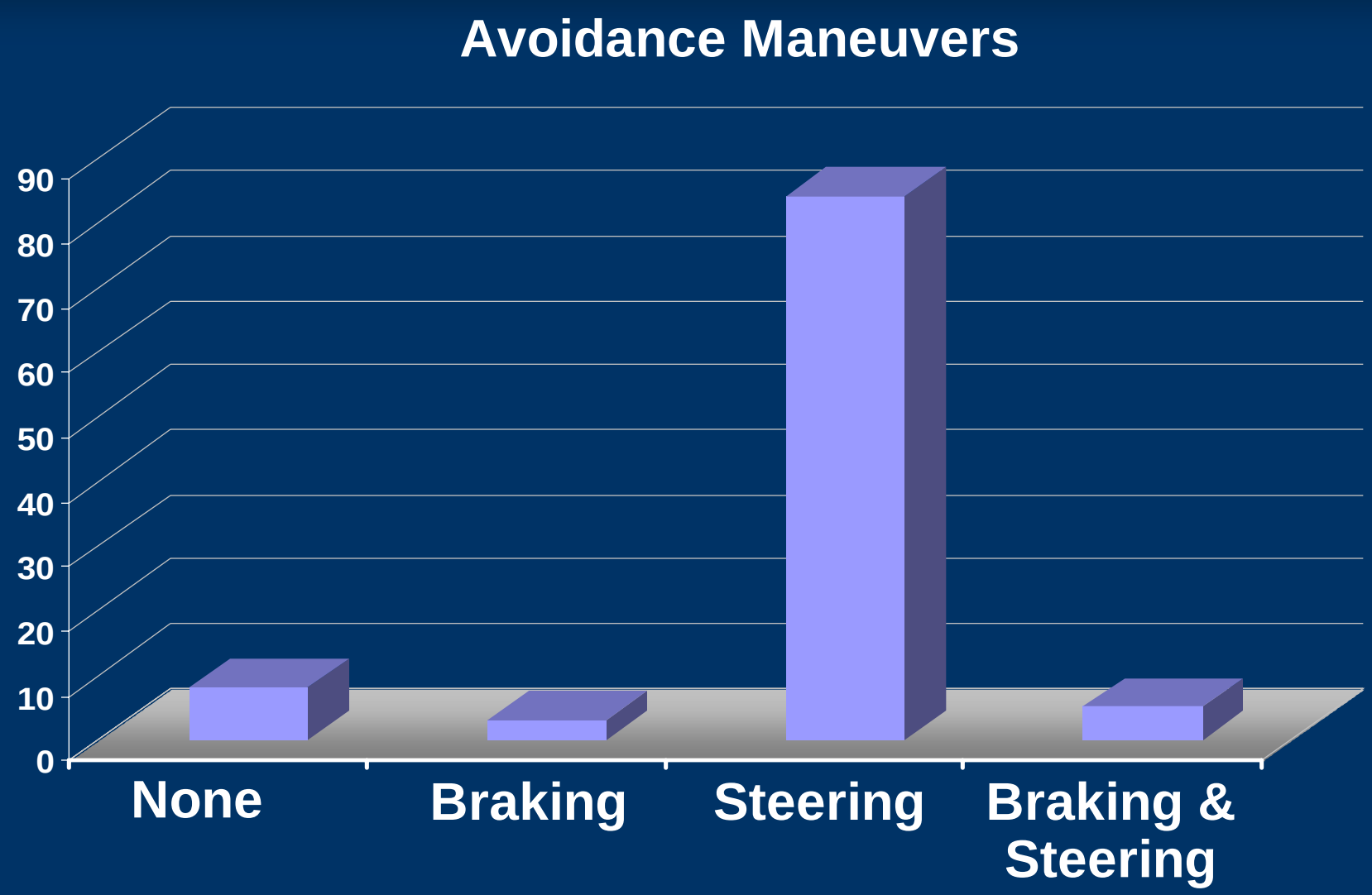
First Harmful Event - Rollover



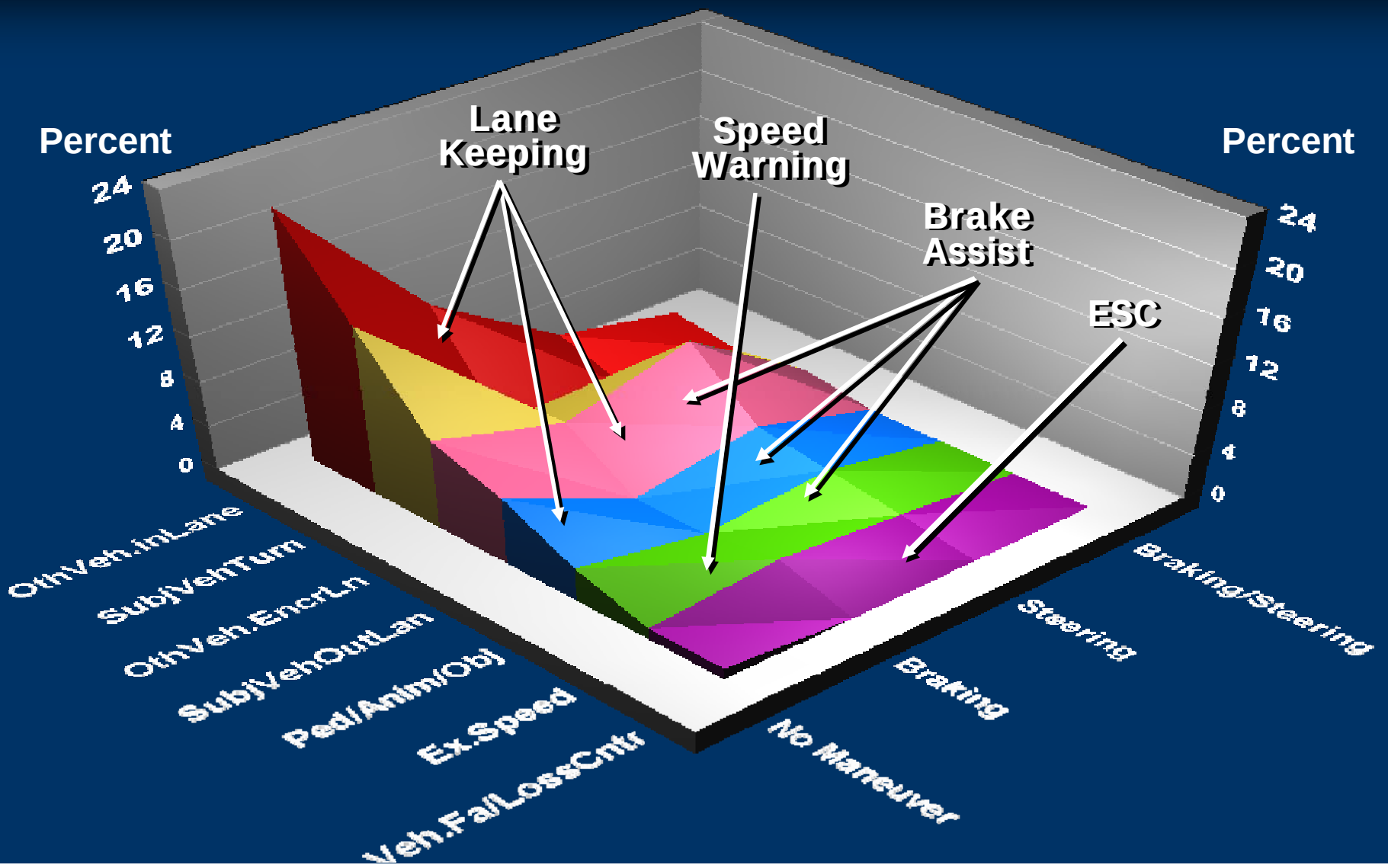
Excessive Speed



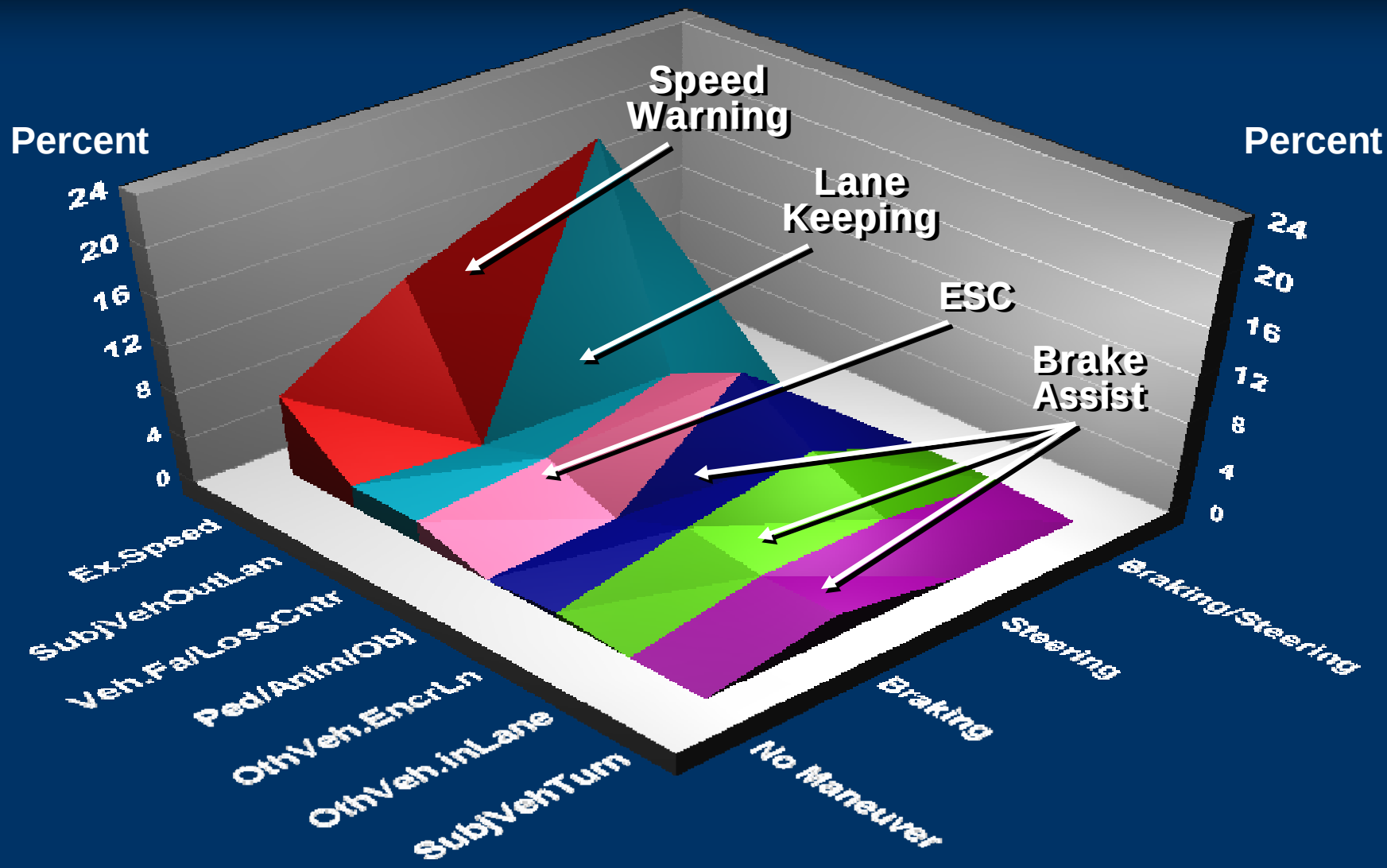
Subject Vehicle Out of Lane



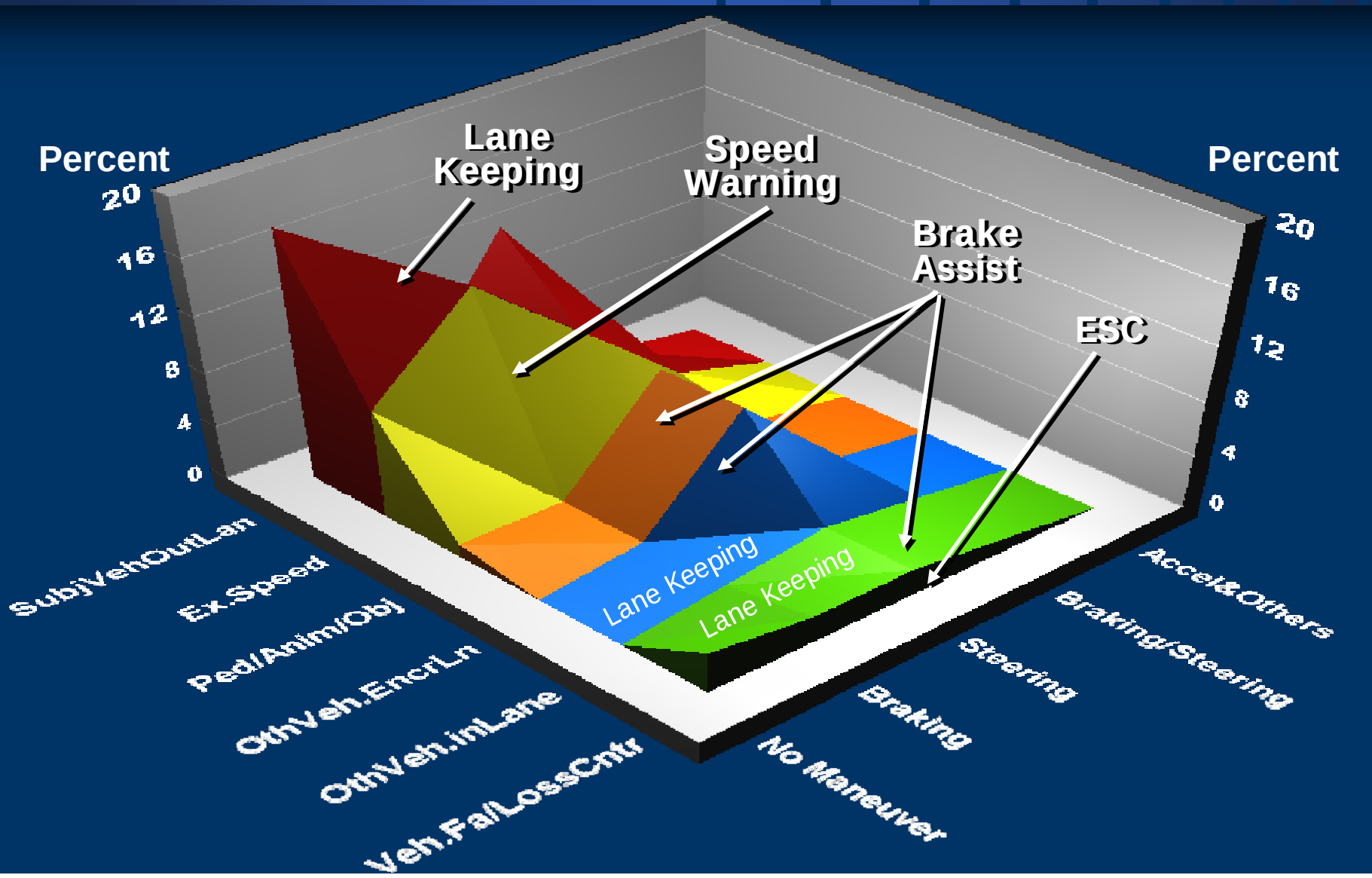
First Harmful Events - Combined



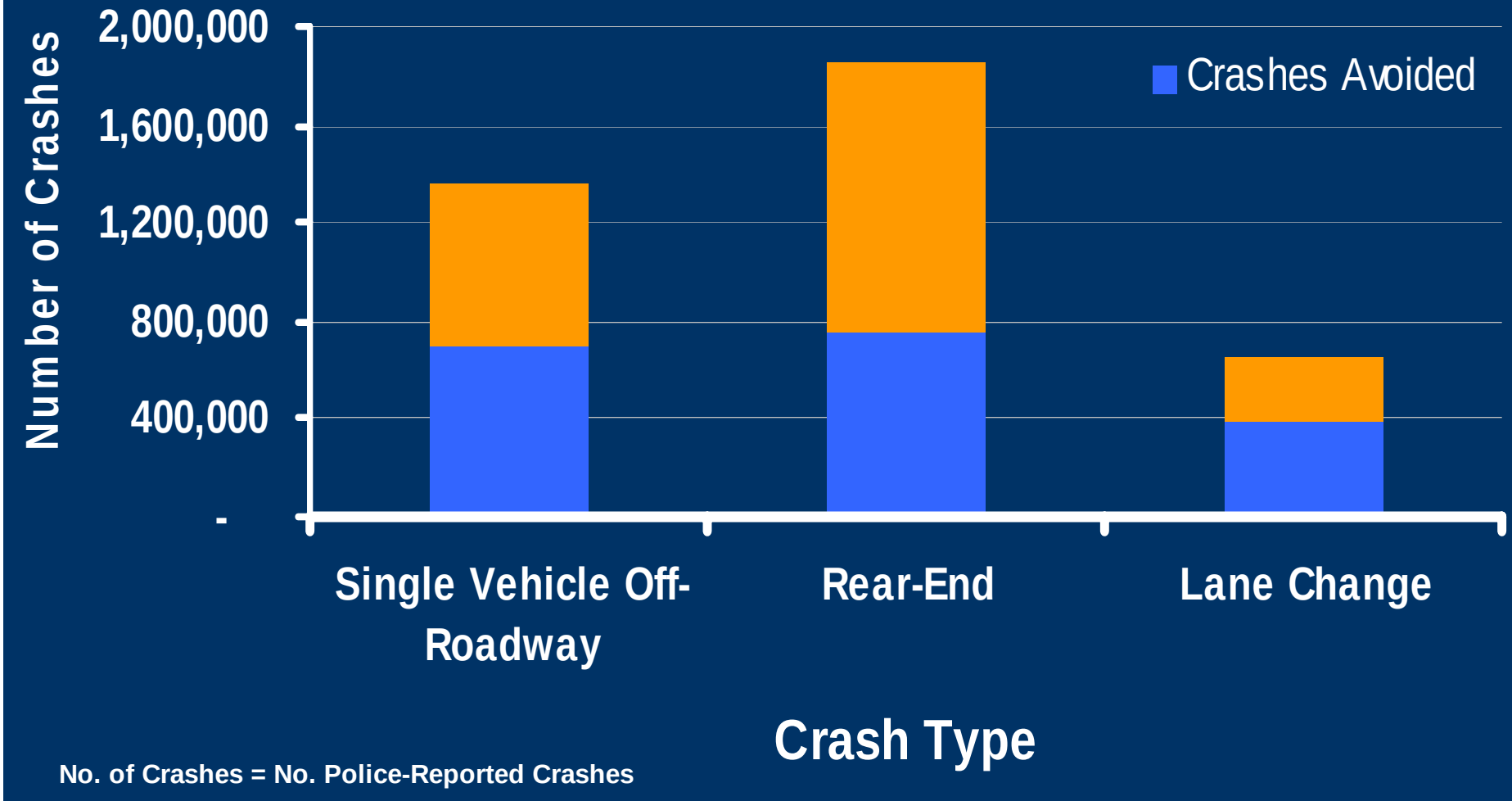
Rollover


Percent
24
20
16
12
8
4
0
Speed Warning
Lane Keeping
ESC
Brake Assist
Percent
24
20
16
12
8
4
0
Ex.Speed
SubjVehOutLan
Veh.FalLossCntr
Ped/Anim/Obj
OthVeh.EncrLn
OthVeh.inLane
SubjVehTurn
No Maneuver
Braking
Steering
Braking/Steering

Collision with Fixed Object

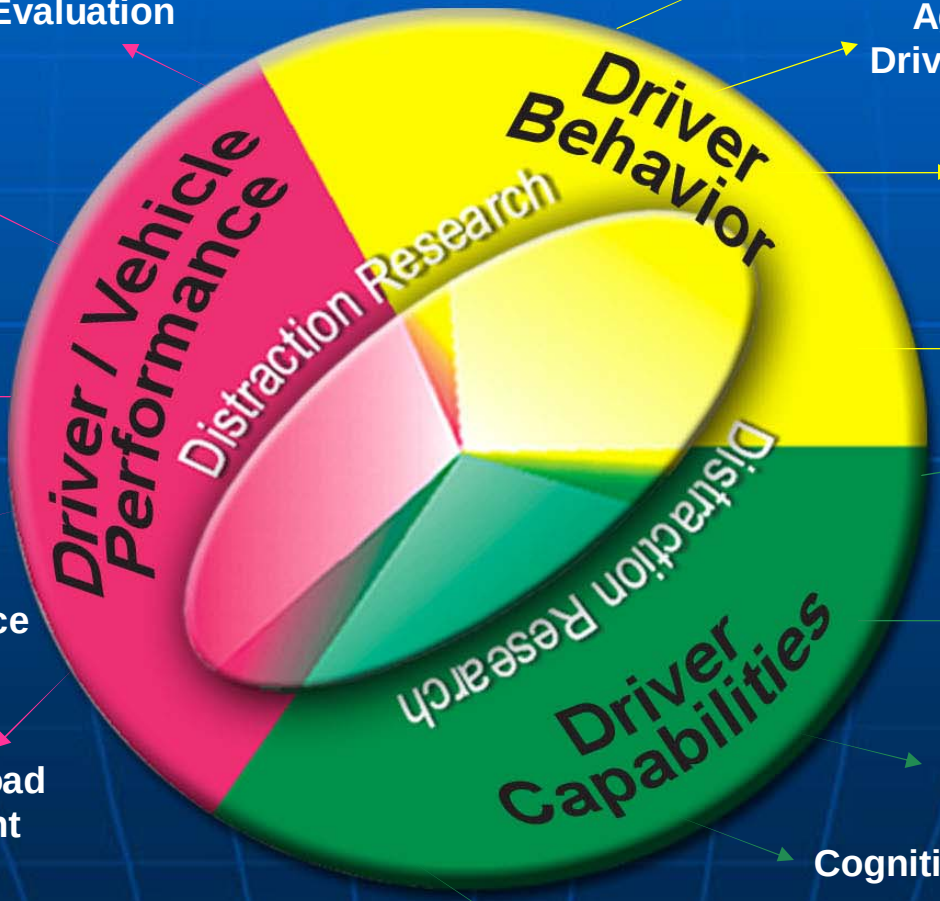


Safety Benefits Estimation of Crash Avoidance Systems Based on Experimental Data



No. of Crashes = No. Police-Reported Crashes

Driver Vehicle Safety Research



Safety Impacting & Safety Critical In-Vehicle Technology Evaluation

Countermeasure Development

User Acceptance

System Integration for Optimum Performance

Driver Workload Management

Driver Training

Aggressive Driver Research

Behavior Modification Research

Demographic & Social Factors Research

Information Processing Research

Physical & Mental Capacity Assessment

Driving Task Demands

Cognitive & Attention Demand

Situation Awareness Capacity

Developed by: Joseph N. Kanianthra

Acceleration of Safety Technologies

- **Safety Needs Novel Approaches**
  - Use market forces
  - Innovative regulatory approaches
  - Consumer information and education
  - Closer cooperation between Government and Industry