Earl F. Weener, Ph.D.
Member, NTSB

NTSB National Transportation Safety Board

General Aviation and the NTSB Most Wanted List

AASF & NTSB Fall Aviation Safety Seminar

Anchorage, Alaska

November 5, 2016

N6529R - B36TC Bonanza

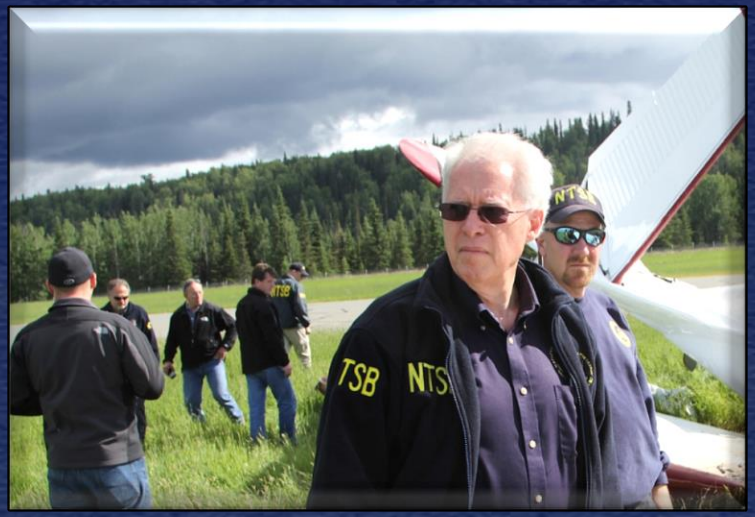
NTSB Mission

The NTSB is an independent U.S. Federal agency charged with:

- Determining the probable cause(s) of transportation accidents (aviation, highway, marine, rail, pipeline and hazardous material)
- Making recommendations to prevent their recurrence
- Conducting special studies and investigations
- Coordinating resources to assist victims and their families after an accident

NTSB's Multi-Modal Mandate

- Maintain congressionally mandated independence
- Conduct objective accident investigations and safety studies
- Perform fair & objective airman/mariner certification appeals
- Advocate safety – NTSB Most Wanted List, recommendations



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NTSB 2016 Most Wanted List

- Disconnect from Deadly Distractions
- End Substance Impairment in Transportation
- Expand Use of Recorders to Enhance Transportation Safety
- Improve Rail Transit Safety Oversight
- Prevent Loss of Control in Flight in General Aviation
- Promote Availability of Collision Avoidance Technologies in Highway Vehicles
- Promote the Completion of Rail Safety Initiatives
- Reduce Fatigue-Related Accidents
- Require Medical Fitness for Duty
- Strengthen Occupant Protection

Gray Summit, MO – Bus/Truck/Tractor Crash

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Distraction

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Distraction

NTSB

Distraction

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2016 MWL - *Disconnect from Deadly Distractions*

A factor in all modes of transportation:

- Motor vehicle emphasis
  - Electronic devices within the vehicle
- Aviation emphasis
  - Sterile Cockpit
  - Appropriate use of PEDs
  - Manage distractions

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End Substance Impairment

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2016 MWL - *End Substance Impairment in Transportation*

A factor in all modes:

- Fatally injured pilots - potentially impairing drugs
  - 11% average 1990 - 1997
  - 23% average 2008 - 2012

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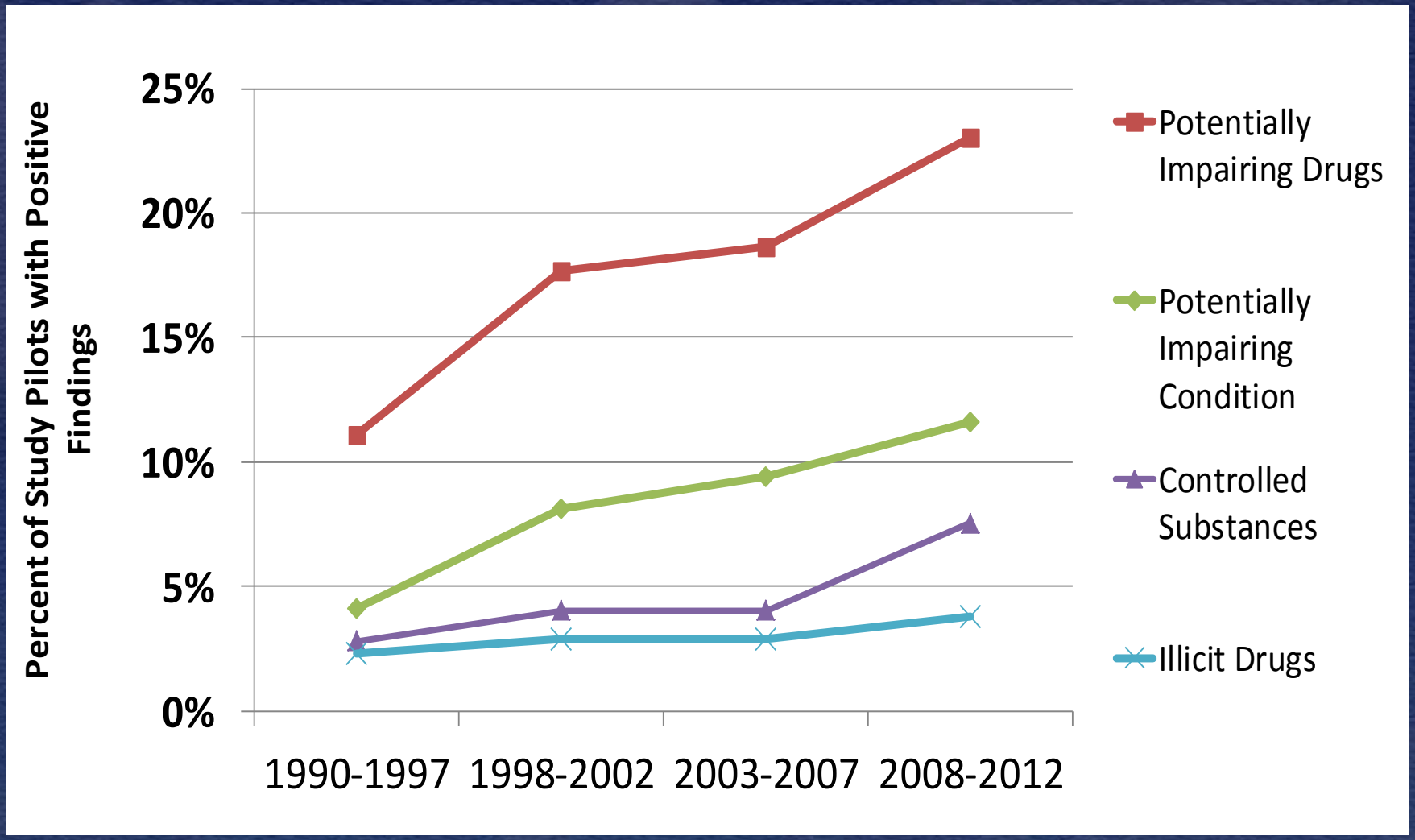
Toxicology Findings by Category, 1990-2012



Most Common Drugs

- Sedating antihistamines
  - Most common category
- Diphenhydramine
  - Most common individual drug
  - Most common potentially impairing drug
  - Use INCREASING

Medical Fitness for Duty

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Medical Fitness for Duty

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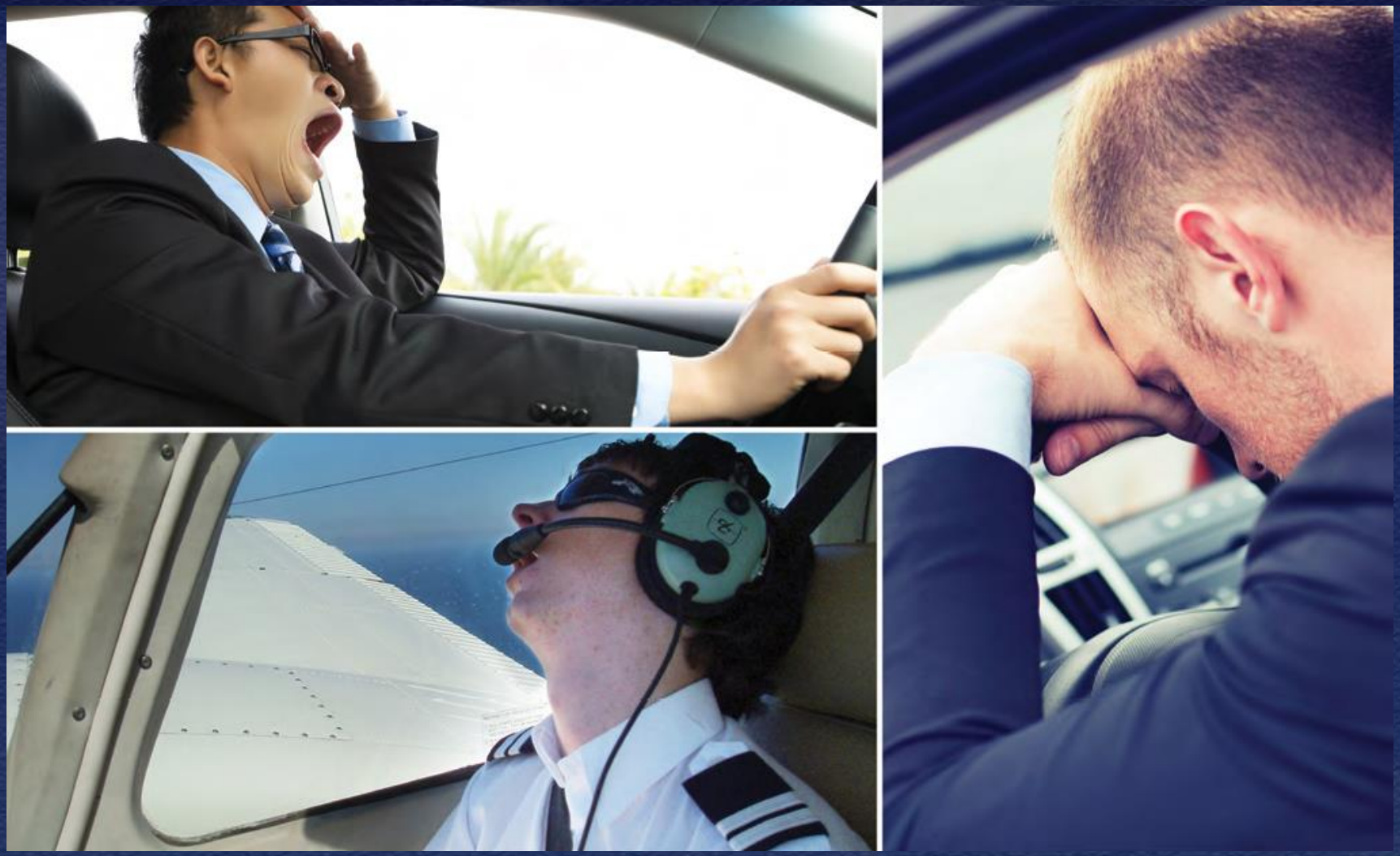
2016 MWL – *Require Medical Fitness for Duty*

A factor in all modes:

- Airman Medical – fitness at exam point
  - Pilots must self-assess fitness
- Undiagnosed or unreported medical conditions pose threats
  - Obstructive Sleep Apnea
  - Diabetes
  - High Blood Pressure

Fatigue



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Bronx Bus Crash, March 12, 2011

15 KILLED

17 INJURED

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Cranbury, New Jersey, June 7, 2014

6 Vehicles
21 People
5 Received Minor injuries
4 Received Serious Injuries
1 Person killed

2016 MWL - Reduce Fatigue - Related Accidents

A factor in all modes:

- 182 Major investigations (2001 – 2012)
  - 20% involved fatigue
- Need
  - Research, education, training
  - Technology development
  - Hours of service, on/off duty policies
  - Medical treatment of sleep disorders

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2016 MWL – Strengthen Occupant Protection

A factor in all modes:

- Numerous investigations showed potential for reduced injuries & fatalities
- Need
  - Enhance survival space & ease of evacuation
  - Increased use of existing restraint systems
  - Shoulder harnesses for GA aircraft

Recorders

FLIGHT
RECORDER
DO NOT OPEN
Honeywell
FLIGHT
RECORDER
DO NOT OPEN
VOYAGE DATA RECORDER
DO NOT OPEN
REPORT TO AUTHORITIES
FURUNO ELECTRIC CO., LTD.
NTSB

2016 MWL- Expand use of Recorders

A factor in all modes:

- Critical in accident investigation
  - Install crash resistant image recorders in smaller turbine powered aircraft
  - Install flight recorders in transport category and HEMS aircraft
  - Install inward & outward video cameras in trucks, busses, & trains
  - Use PED memory when available

Loss of Control

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Loss of Control

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2016 MWL – Prevent Loss of Control in Flight in General Aviation

- More than 40% fatal GA accidents were LOC during 2004 – 2014

- Most deadly flight phases
  - Approach to landing
  - Maneuvering
  - Takeoff and Climb

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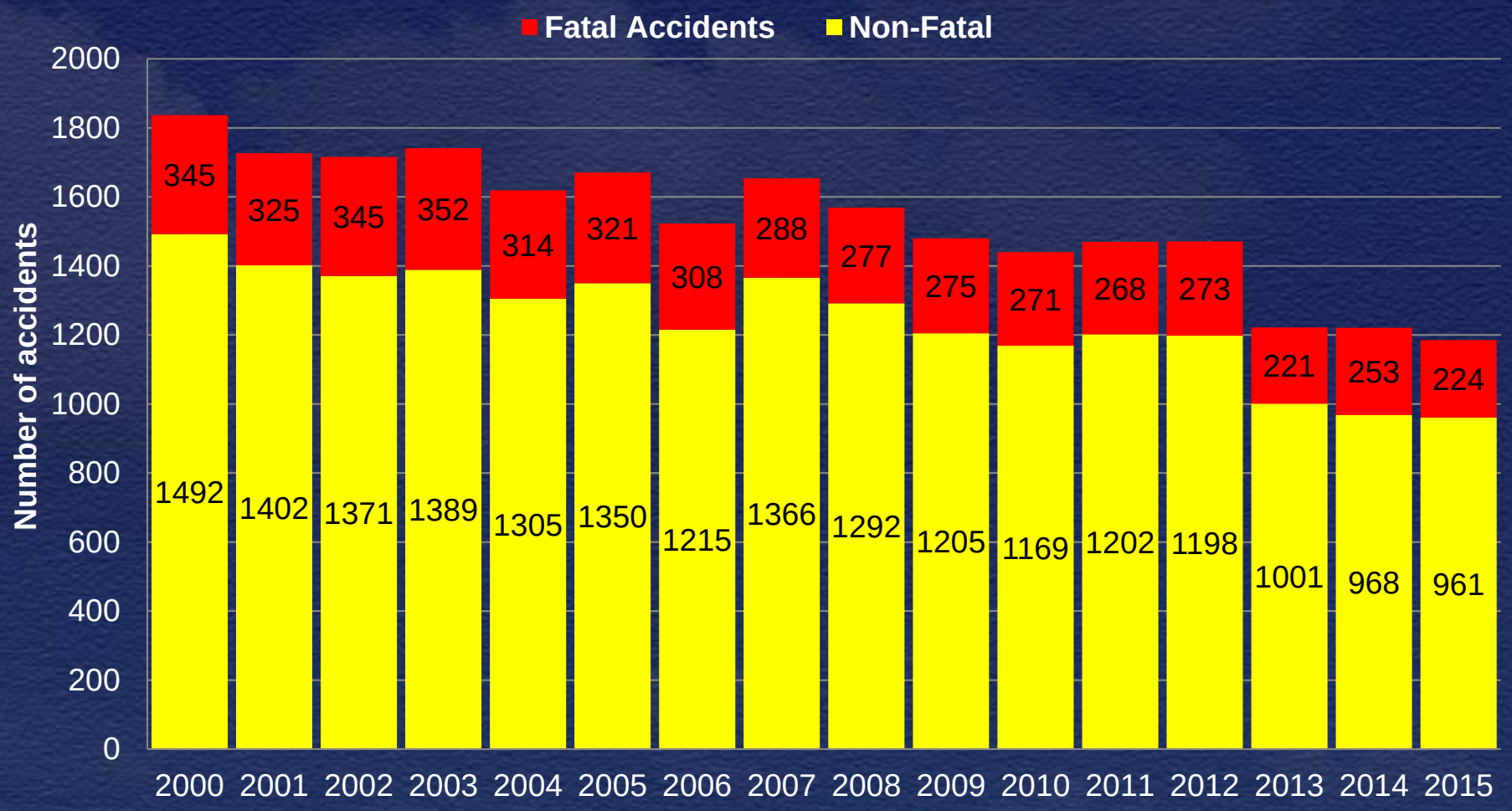
All GA Accidents



*2015 Preliminary numbers

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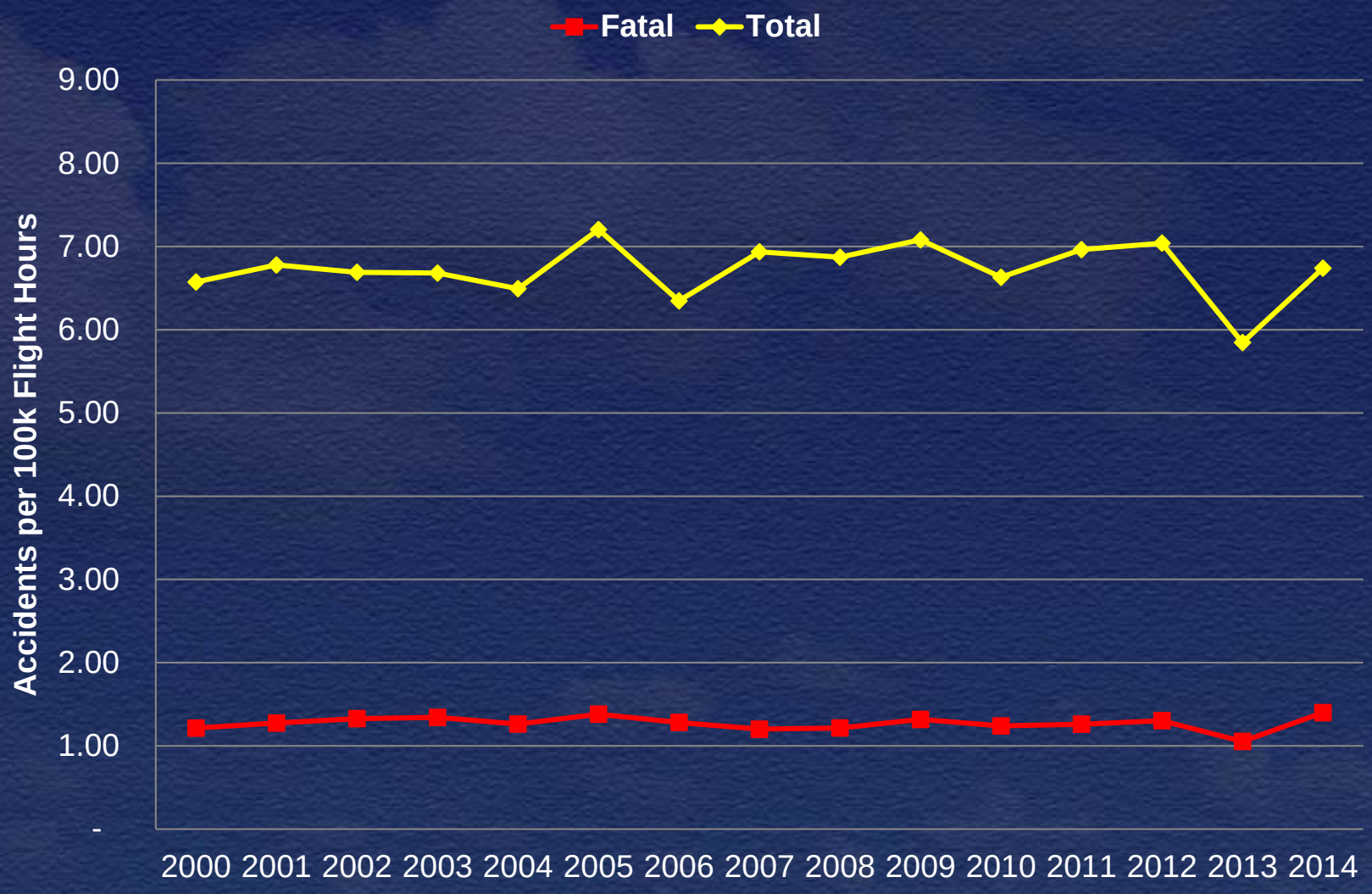
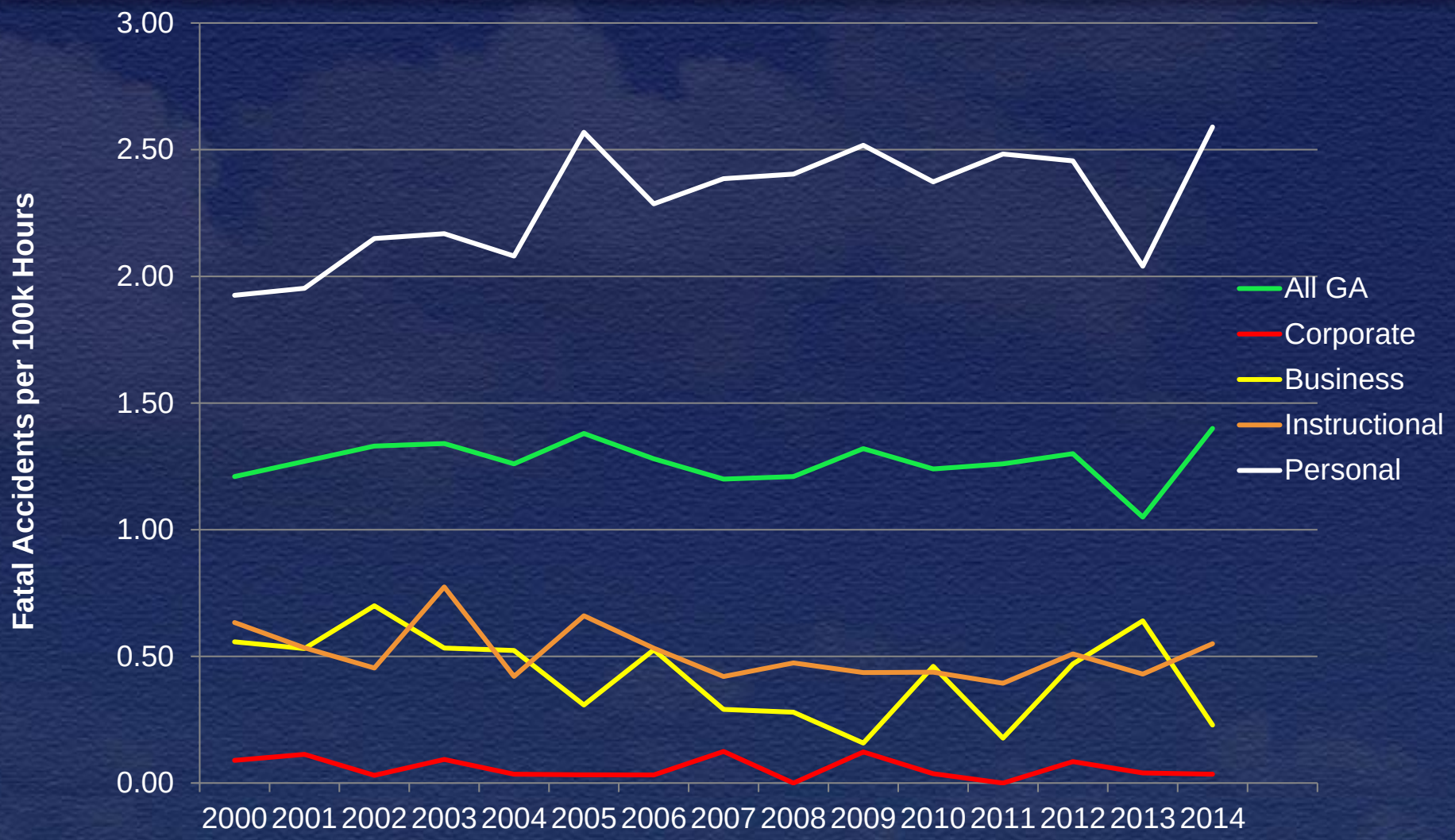
GA Accident Rates



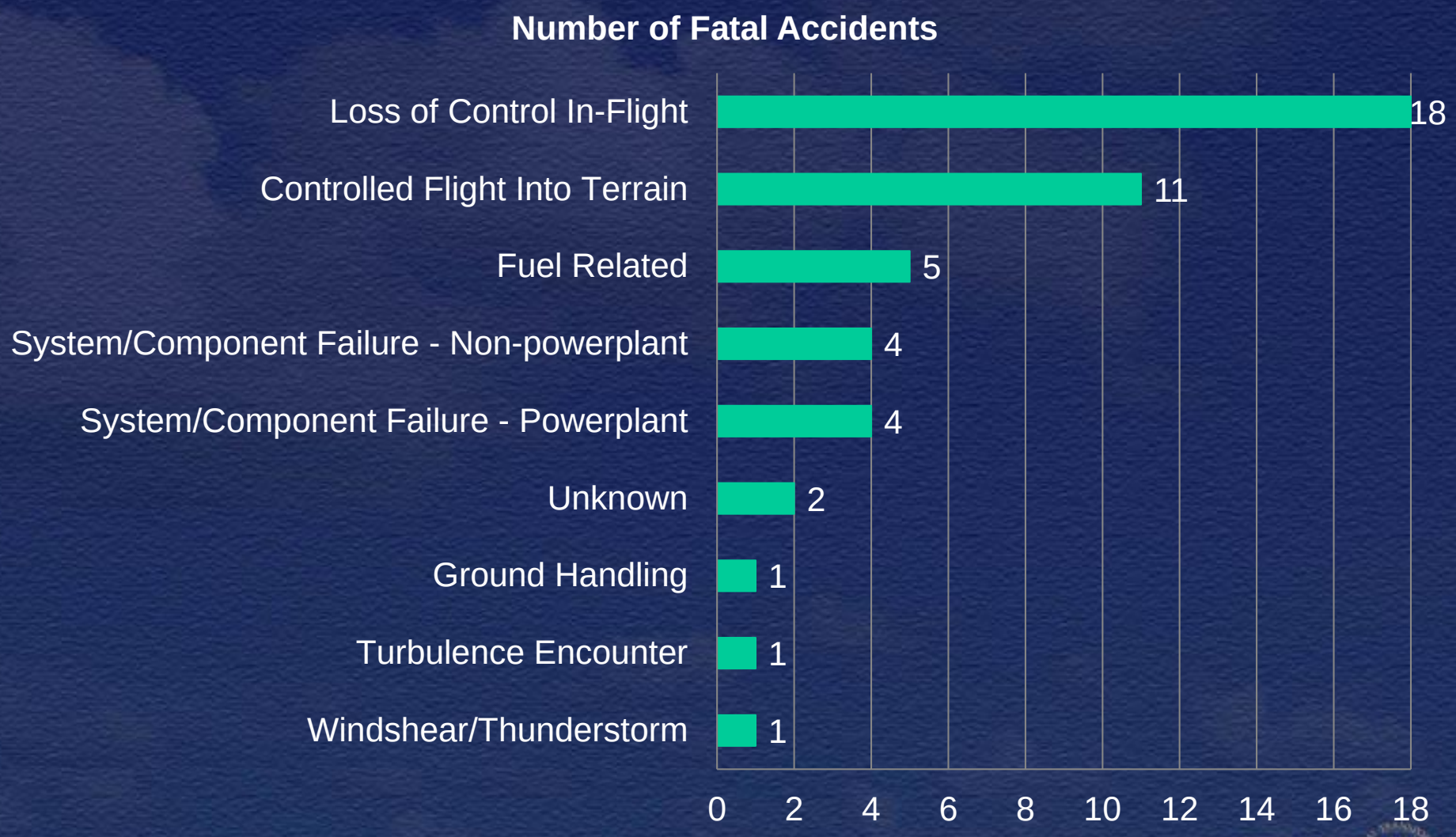
*The 2011 GA Survey is currently not available. FAA is actively engaged in re-calibration efforts and expect to have validated 2011 data published at a later date.

Fatal Accident Rates per 100k Flight Hours



*The 2011 GA Survey is currently not available. FAA is actively engaged in re-calibration efforts and expect to have validated 2011 data published at a later date.

Business Flying, 2008-2014



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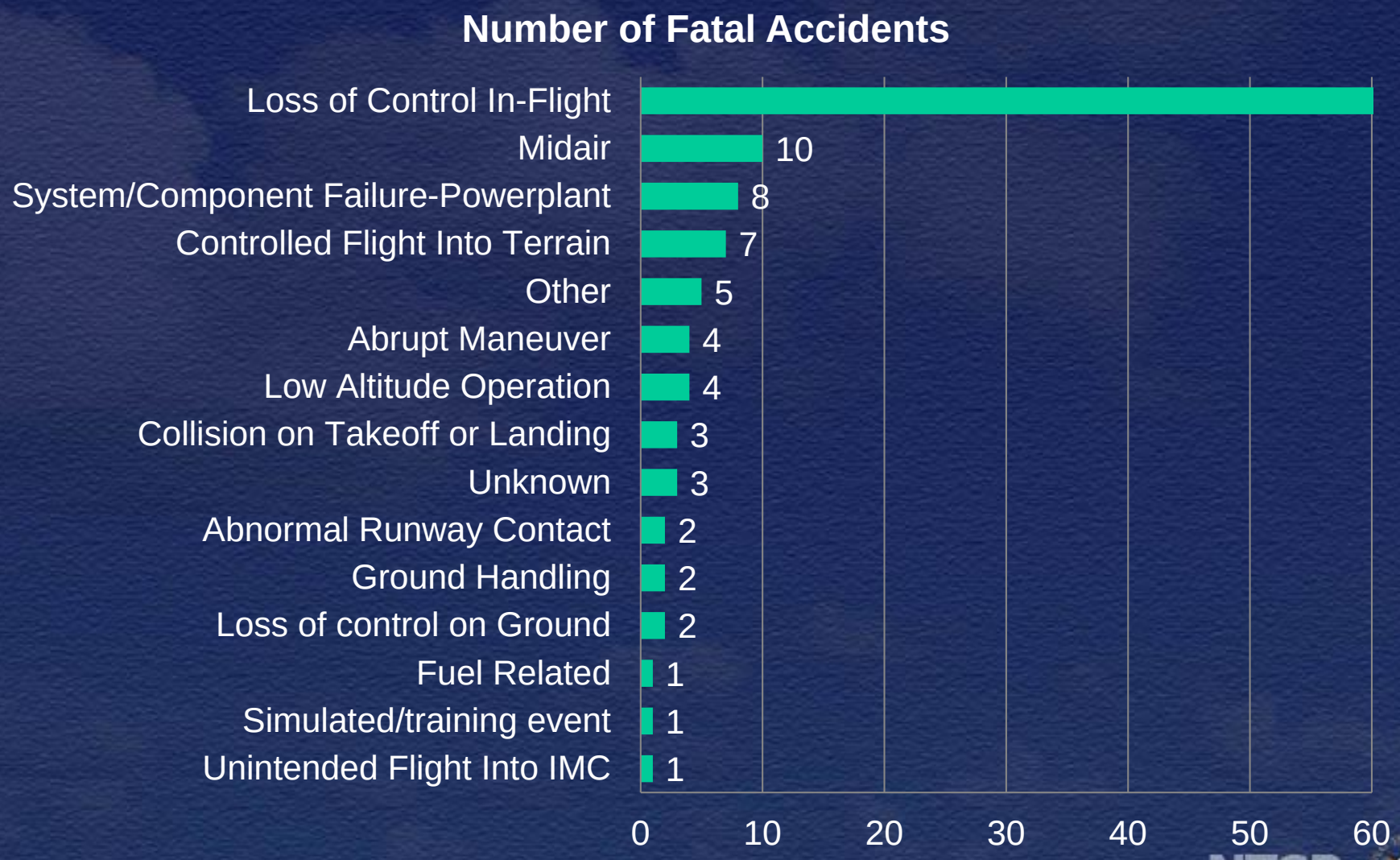
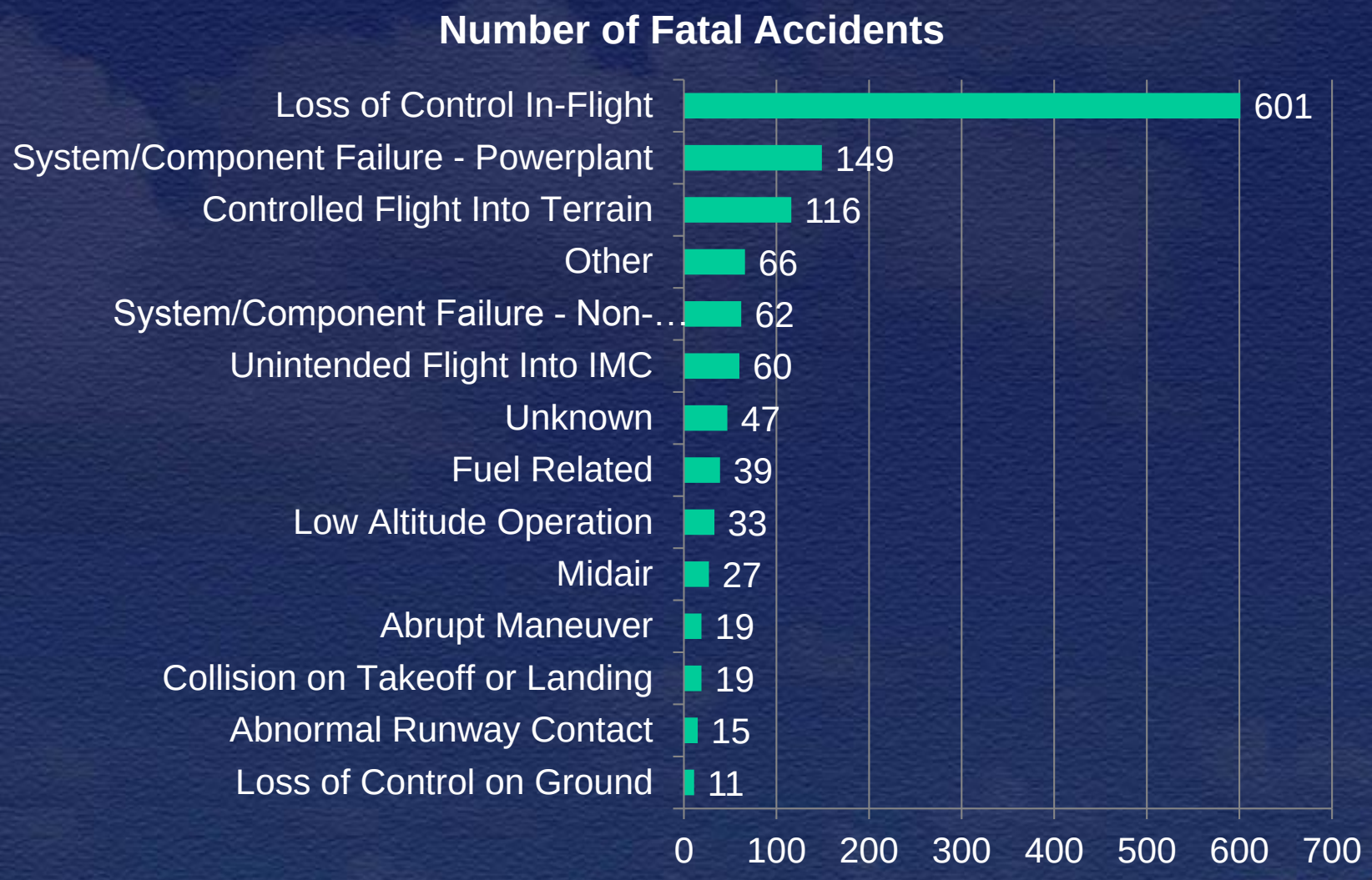
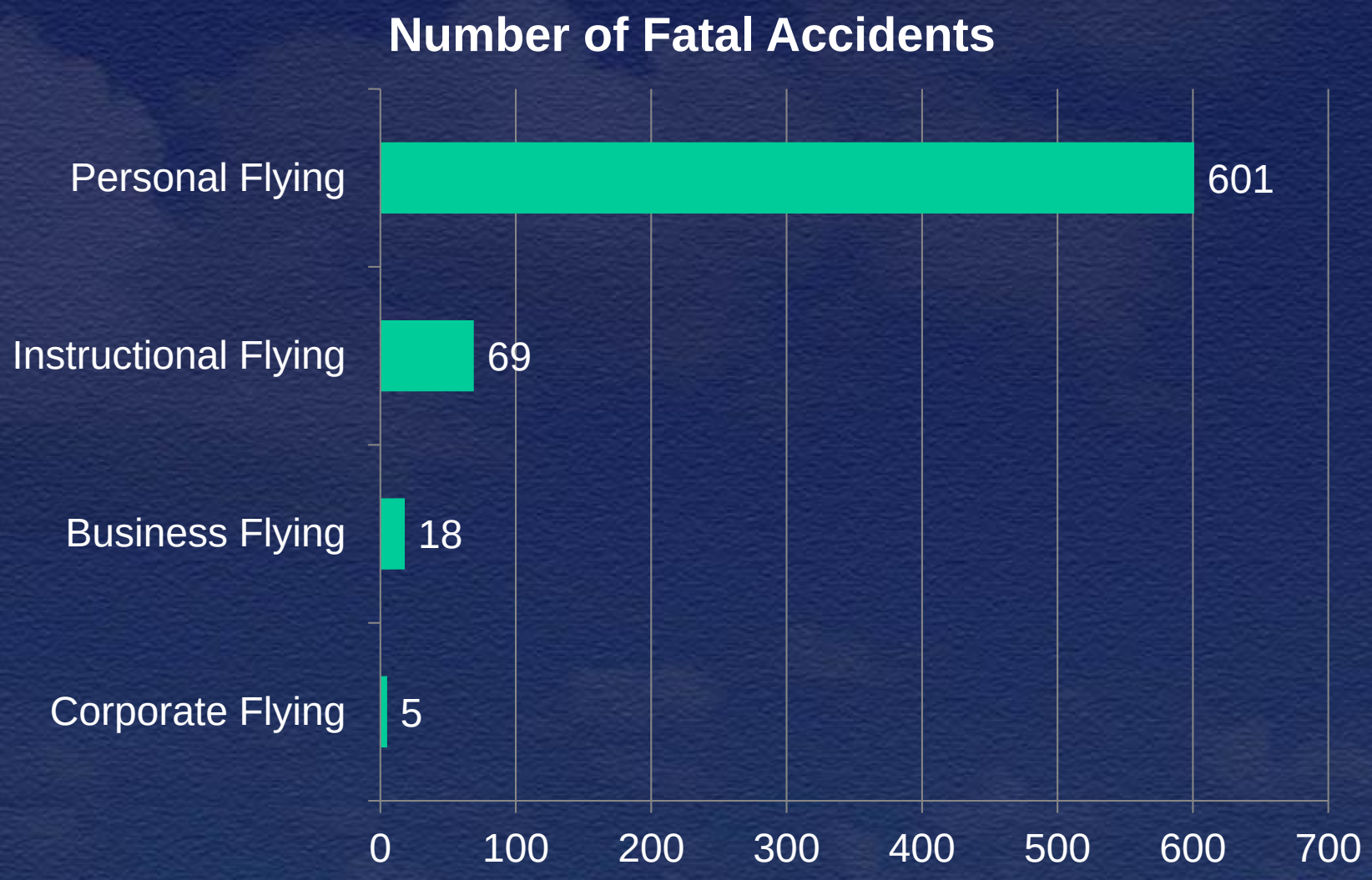
Instructional Flying, 2008-2014



Personal Flying, 2008-2014



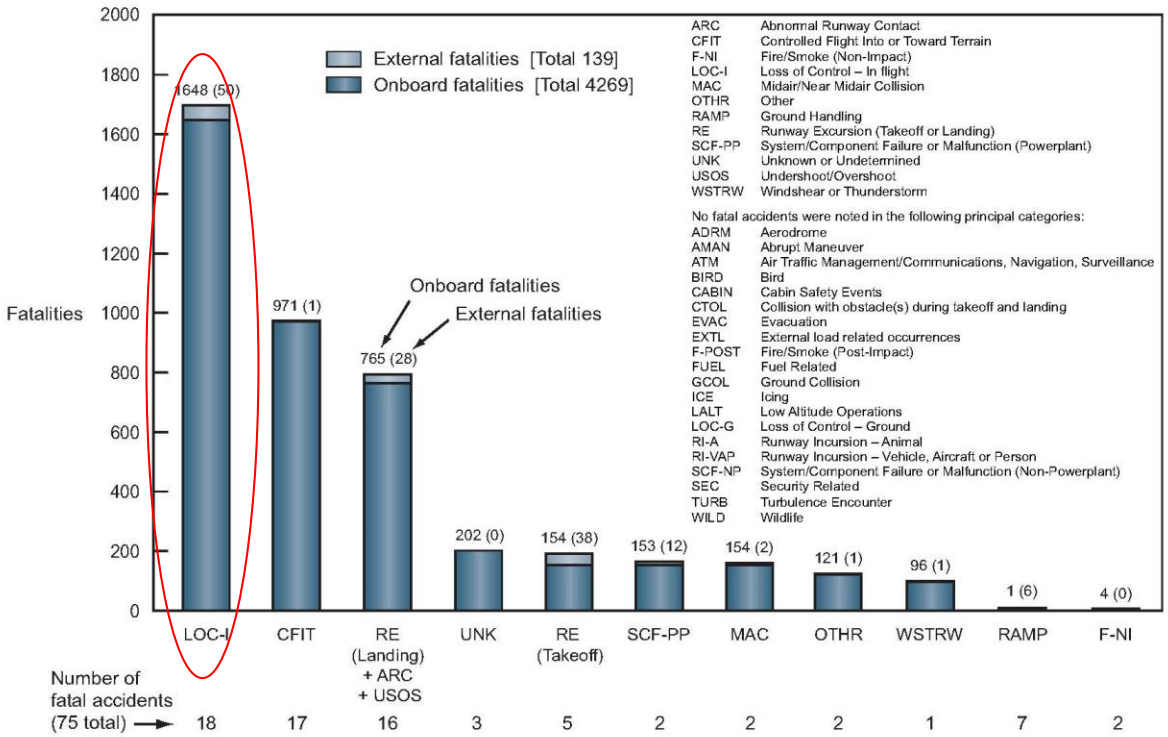
Loss of Control In-Flight, 2008-2014



Boeing Annual Statistical Summery

Fatalities by CAST/ICAO Common Taxonomy Team (CICTT) Aviation Occurrence Categories

Fatal Accidents – Worldwide Commercial Jet Fleet – 2003 Through 2012



ARC	Abnormal Runway Contact
CFIT	Controlled Flight Into or Toward Terrain
F-NI	Fire/Smoke (Non-Impact)
LOC-I	Loss of Control – In flight
MAC	Midair/Near Midair Collision
OTHR	Other
RAMP	Ground Handling
RE	Runway Excursion (Takeoff or Landing)
SCF-PP	System/Component Failure or Malfunction (Powerplant)
UNK	Unknown or Undetermined
USOS	Undershoot/Overshoot
WSTRW	Windshear or Thunderstorm

No fatal accidents were noted in the following principal categories:

ADRM	Aerodrome
AMAN	Abrupt Maneuver
ATM	Air Traffic Management/Communications, Navigation, Surveillance
BIRD	Bird
CABIN	Cabin Safety Events
CTOL	Collision with obstacle(s) during takeoff and landing
EVAC	Evacuation
EXTL	External load related occurrences
F-POST	Fire/Smoke (Post-Impact)
FUEL	Fuel Related
GCOL	Ground Collision
ICE	Icing
LALT	Low Altitude Operations
LOC-G	Loss of Control – Ground
RI-A	Runway Incursion – Animal
RI-VAP	Runway Incursion – Vehicle, Aircraft or Person
SCF-NP	System/Component Failure or Malfunction (Non-Powerplant)
SEC	Security Related
TURB	Turbulence Encounter
WILD	Wildlife

Note: Principal categories as assigned by CAST.

For a complete description of CICTT Aviation Occurrence Categories, go to: http://www.intlaviationstandards.org/

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GA Joint Steering Committee

Steering Committee

Co-chairs – Steve Gottlieb (FAA/AVP)
Bruce Landsberg (AOPA/ASF)

Government – FAA (AFS, AIR, ATO, AAM & ARP)
– NASA (Research),
– NTSB (Observer)

Industry – GAMA, EAA, NBAA, NATA, SAFE, LAMA & Insurance

- Strategic guidance
- Management/Approval of Safety Plan
- Provide direction
- Membership Outreach
- Provides linkage to ASIAS

Safety Analysis Team

Co-chairs: Corey Stephens (FAA)
Jens Hennig (GAMA)

Members: FAA, AOPA, EAA, GAMA, UAA, MFGs, FAAST, NAFI, Insurance, Academia, SAFE

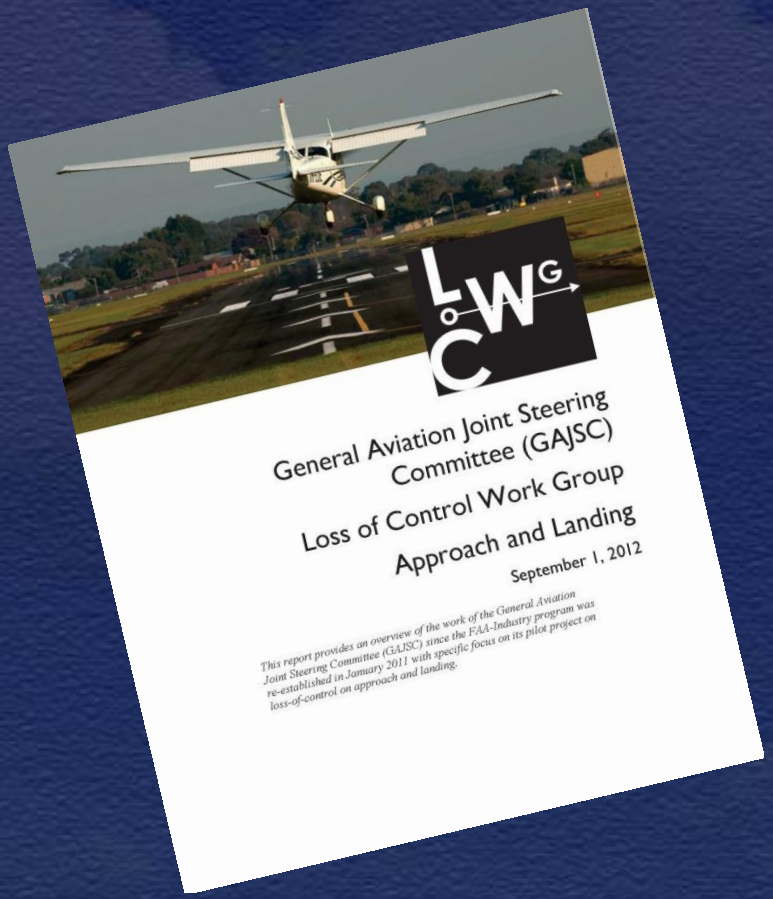
- Identify future areas of study/risk
- Charter safety studies
- Provide guidance and direction
- Draw data from various areas
- Develop a prioritized Safety Plan
- Develop metrics to measure effectiveness of safety solutions

Working Groups

(To include SMEs from various general aviation segments, depending on study)

- Data analyses
- Safety enhancement
- Mitigation development

Loss-Of-Control Working Group



Safety Enhancements Identified

- AOA – New, Current, Retrofit
- Aeronautical Decision Making
- Stabilized Approach
- Single Pilot CRM
- Medication effects
- Weather Technologies
- Etc…

28 Safety Enhancements
plus
8 more with second study

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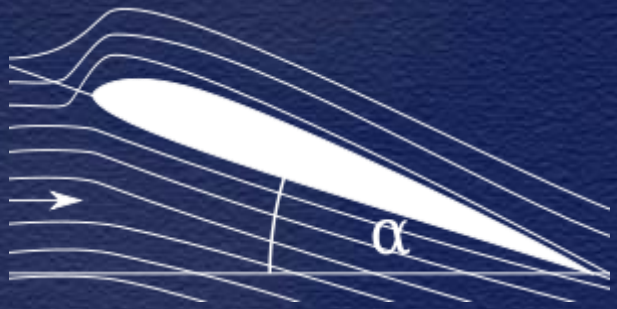
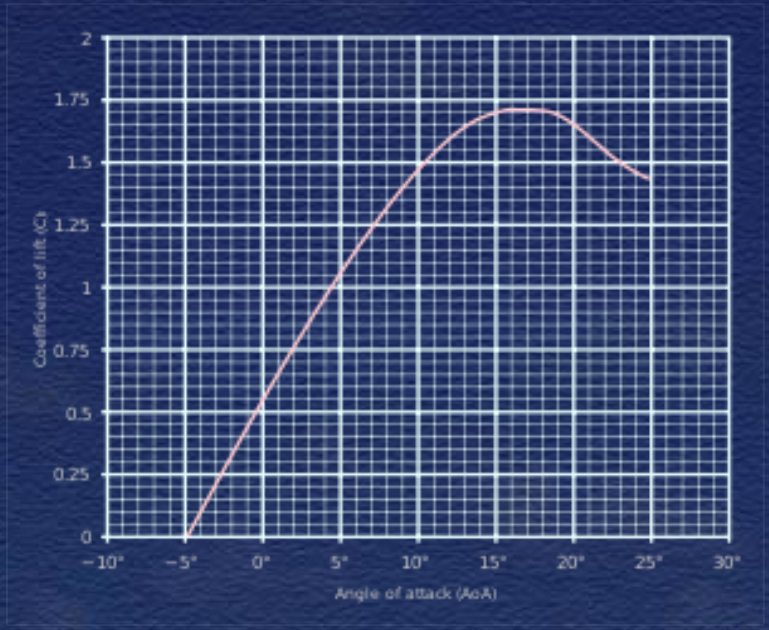
Lower Cost AOA Displays

- Stall occurs at a specific Angle-of-Attack
  - But not necessarily at the same airspeed



First of AOA indicators built to ASTM stds and installed as a minor mod



FAA installation policy changed

CAST brings key stakeholders to cooperatively develop & implement a prioritized safety agenda

Industry

Government

Commercial Aviation Safety Team (CAST)

AIA
Airbus
ALPA
APA
A4A
IFALPA
NACA
Boeing
GE*
RAA
FSF

IATA**
AAPA**
ATAC**
APFA**
ACI-NA**

DOD
FAA
- Aircraft Certification
- Flight Standards
- Accident Investigation
- Air Traffic Operations
- Airports

NASA
ICAO**
EASA
TCCA
NATCA**
NTSB**

* Representing P&W and RR
** Observer

ASIAS Members

Commercial Air Carriers (46)

ABX Air
Aerodynamics, Inc.
Air Transport Intl.
Air Wisconsin Airlines
Alaska Airlines
Allegiant Air
Aloha Air Cargo
American Airlines
Atlas Air
Cape Air
CommutAir
Compass Airlines
Delta Air Lines
Empire Airlines
Endeavor Air
Envoy Air
ExpressJet
FedEx Express
Frontier Airlines
GoJet Airlines
Hawaiian Airlines
Horizon Air
JetBlue Airways
Kalitta Air
Mesa Airlines
Miami Air Intl.
Mountain Air Cargo
National Airlines
Northern Air Cargo
Omni Air Intl.
Piedmont Airlines
Polar Air Cargo
PSA Airlines
Republic Airlines
Shuttle America
Silver Airways
SkyWest Airlines
Southern Air
Southwest Airlines
Spirit Airlines
Sun Country Airlines
Swift Air
Trans States Airlines
United Airlines
United Parcel Service
Virgin America

Industry

A4A—Airlines for America
AIA—Aerospace Industries Association
Airbus
ALPA—Air Line Pilots Association
APA—Allied Pilots Association representing Coalition of Airline Pilots Associations (CAPA)
Boeing
NACA—National Air Carrier Association
NATCA—National Air Traffic Controllers Association
RAA—Regional Airline Association
SAPA—SkyWest Airlines Pilot Association
SWAPA—Southwest Airlines Pilots' Association

General Aviation Operators (30)

Costco Wholesale*
Eli Lilly
Embraer Executive Jets
Flexjet
Flight Options
Gama Aviation
Johnson & Johnson
NetJets
Northeastern Aviation Corp
REVA
Vulcan, Inc.
XOJET
18 additional Operators*

Industry

ACSF—Air Charter Safety Foundation
Embraer
GAMA—General Aviation Manufacturers Association
Gulfstream Aerospace
NBAA—National Business Aviation Association
NJASAP—NetJets Association of Shared Aircraft Pilots

Maintenance, Repair & Overhaul

AAR Aircraft Services
HAECO Americas

Government

AMC—Air Mobility Command
FAA
NASA
Naval Air Force Atlantic
USAF Safety Center
NTSB

Academia

University of North Dakota

*Newest Member

As of 22 August 2016

Safety Management System

- Safety Policy
- Safety Risk Management
- Safety Assurance
- Safety Promotion

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Changes to Safety Culture

Reactive & forensic		Risk-based & predictive
• Whack-a-mole management	→	• Risk management
• Crisis safety management	→	• Change management
• Silos of knowledge	→	• Data analysis and information sharing
• Data is collected	→	• Data answers questions

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Changes to Safety Culture

Reactive & forensic	Risk-based & predictive
• "Off with their heads"	• Just culture
• Safety organization responsible for safety	• Everyone responsible for safety
• Regulator is dictatorial and despised	• Regulator is collaborative and respected
• Safety expected by regulations	• Safety enhanced via voluntary initiatives

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Douglas Adams

"Human beings, who are almost unique in having ability to learn from the experience of others, are also remarkable for their apparent disinclination to do so."

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NATIONAL TRANSPORTATION SAFETY BOARD

E PLURIBUS UNUM

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QUESTIONS OR COMMENTS?

2016 MWL – Promote Collison Avoidance Technologies (CAT) in Highway Vehicles

- Addresses human performance issues
  - Impairment
  - Fatigue
  - Medical conditions
  - **D**istraction
- Introduces new set of issues
  - False alerts
  - Over-dependence

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Types of Crash Avoidance Technologies

- Alerts
  - Lane Departure Warning
  - Stationary Object Alert
  - Following Distance Alert
- Interventions
  - Automatic Emergency Braking
  - Active Steering Assist

Lessons Learned from Aviation

- Behavior can never fully be controlled
- Training often requires refreshing
- Technology may provide safeguard against human error

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