National Transportation Safety Board

General Aviation Safety and the NTSB Most Wanted List

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Member, NTSB

Textron Aviation Customer Conference, Wichita

April 26, 2017

N6529R - B36TC Bonanza

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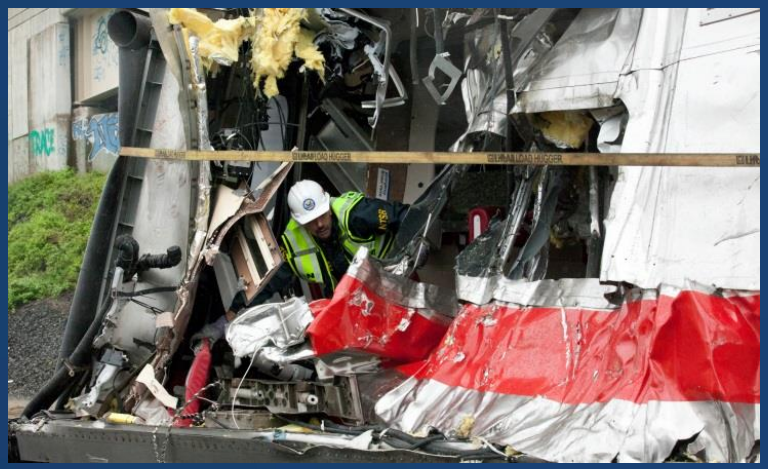
YESTERDAY ★ TODAY ★ TOMORROW

NTSB Mission

The National Transportation Safety Board (NTSB) is an independent Federal agency created by the U.S. Congress to investigate every civil aviation accident in the United States and significant accidents in the other modes of transportation, namely – marine, highway, railroad and pipeline.

What We Do



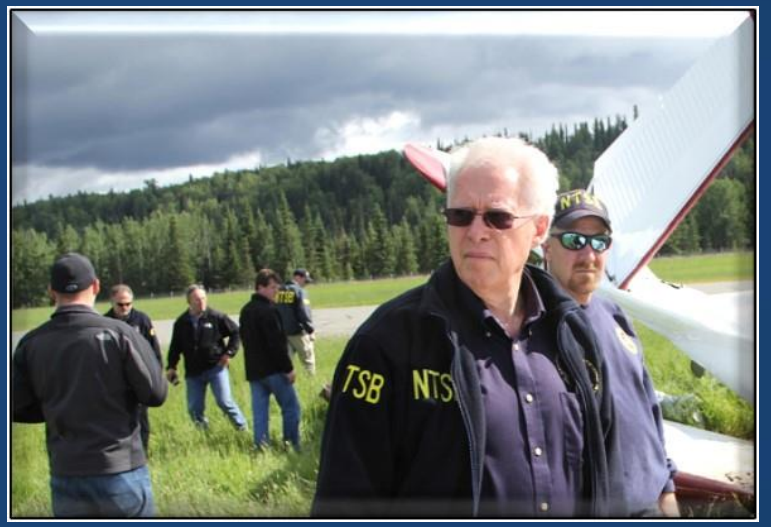
- Investigate the accident.
- Determine the probable cause of the accident.
- Propose corrective action to reduce the likelihood of a recurrence of the accident - through formal “recommendations”.

The Investigative Process – Major Investigations

- Decision to launch a “Go-Team”
- Arrival On-Scene
- Organizational Meeting
- Briefings and on-scene activities (i.e. fact gathering)
- Post on-scene fact gathering
- Analysis
- Report preparation – recommendation development
- Board Approval
- Advocacy

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



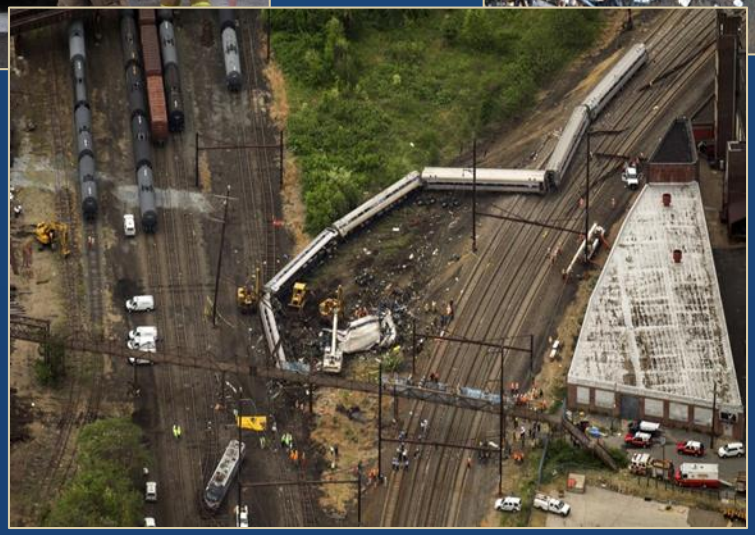
NTSB 2017 Most Wanted List

- Eliminate Distractions
- End Alcohol and Other Drug Impairment in Transportation
- Ensure the Safe Shipment of Hazardous Materials
- Expand Recorder Use to Enhance Safety
- Improve Rail Transit Safety Oversight
- Increase Implementation of Collision
- Avoidance Technologies
- Prevent Loss of Control in Flight in General Aviation
- Reduce Fatigue-Related Accidents
- Require Medical Fitness
- Strengthen Occupant Protection

2017 MWL – Eliminate Distractions

Gray Summit, MO - August 2010

Chatsworth, CA Sep. 12, 2008



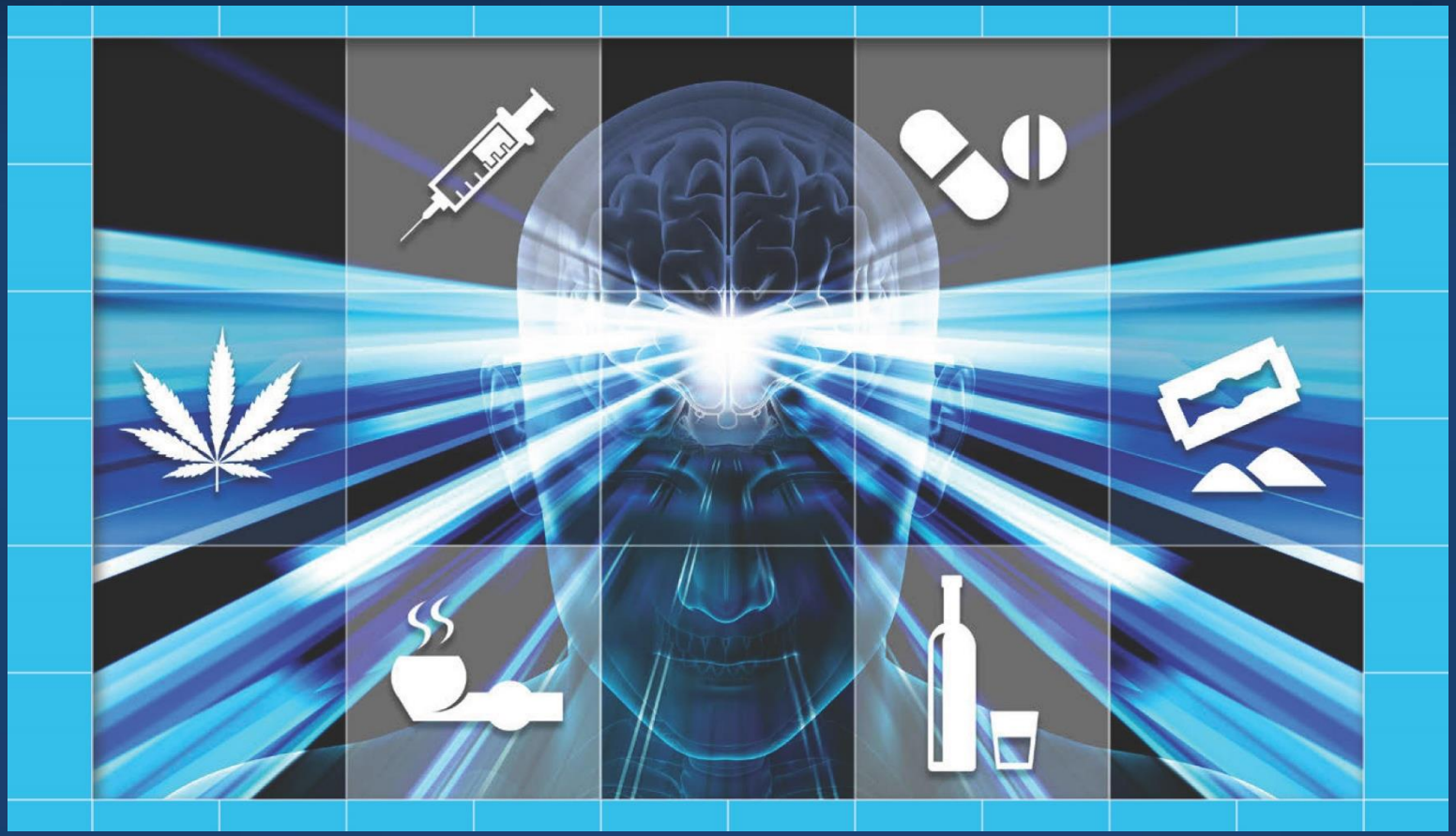
Amtrak 188, May 12, 2015 Philadelphia, PA

2017 MWL – Eliminate 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

2017 MWL – End Alcohol and Other Drug Impairment



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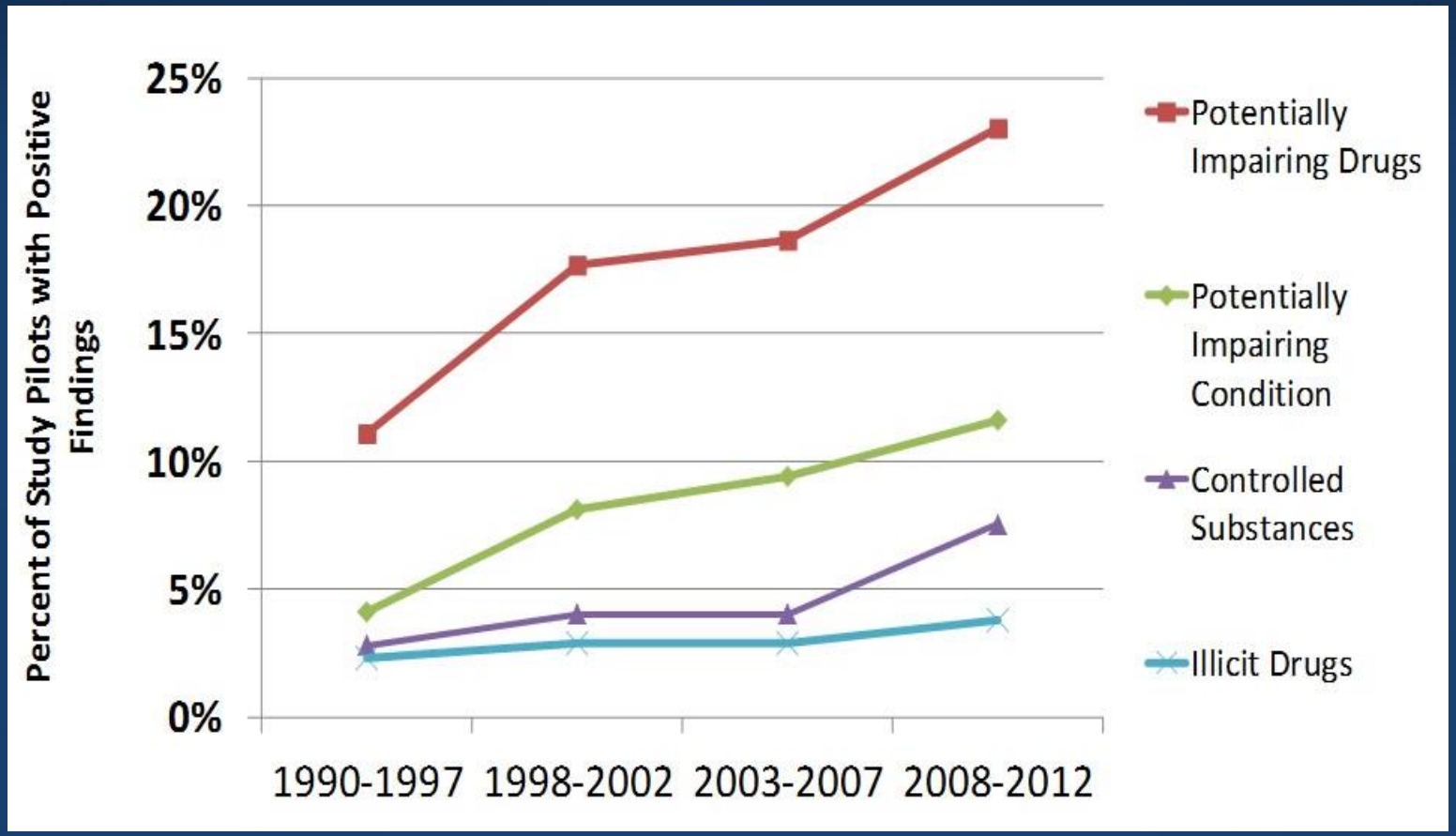
2017 MWL – End Alcohol and Other Drug Impairment

A factor in all modes:

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

Toxicology Findings by Category, 1990-2012



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St. Lucie, FL

Diphenhydramine
+
Doxylamine

April 14, 2013

Most Common Drugs

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

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2017 MWL – Require Medical Fitness

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Red Oak, IA/April 17, 2011

Chesterfield, NJ/ February 16, 2012

2017 MWL – Require Medical Fitness

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

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2017 MWL – Reduce Fatigue - Related Accidents

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Birmingham, AL/ August 14, 2013

Cranbury, NJ/ June 7, 2014

Doswell, VA/ May 31, 2011

Port Arthur, TX/ January 23, 2010

Bronx, NY/ December 1, 2013

Bronx Bus Crash, March 12, 2011

15 KILLED **17 INJURED**

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2017 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
  - Fatigue risk management systems
  - Medical treatment of sleep disorders

2017 MWL – Strengthen Occupant Protection

San Francisco, CA / July 6, 2013

Anaheim, CA / April 24, 2014

Philadelphia, PA/ May 12, 2015

2017 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

2017 MWL – Expand Recorder Use to Enhance Safety

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SpaceShipTwo
Oct. 31, 2014

Embraer EMB-500, N100EQ
Gaithersburg, Maryland /
Dec. 8, 2014

FedEx Freight truck-tractor double trailers and Silverado motorcoach / Orland, CA / Apr. 10, 2014

Commercial Vehicle Onboard Video Systems - 2015

2017 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

2017 MWL – Prevent Loss of Control in Flight

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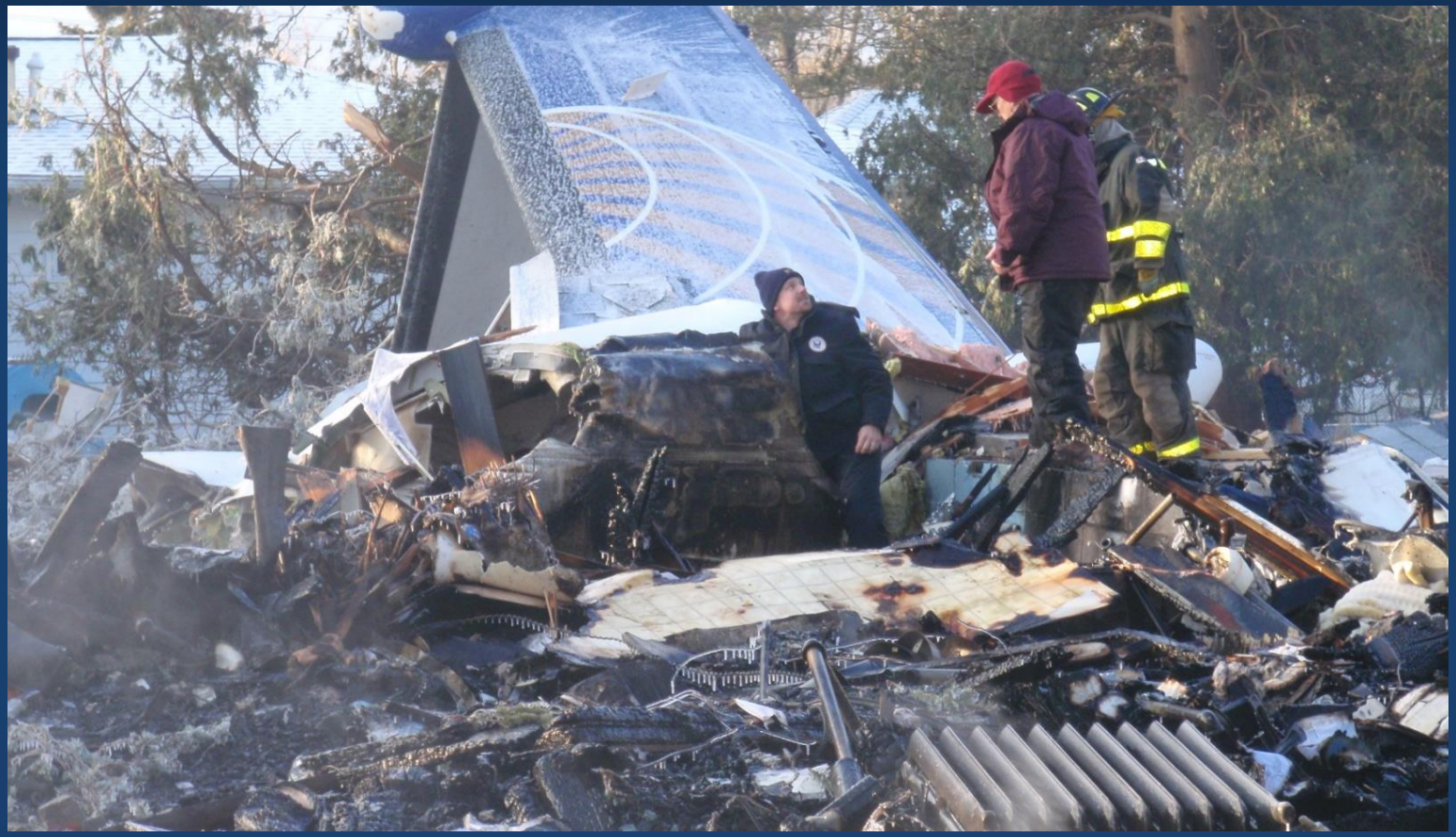
Loss of Control



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Loss of Control

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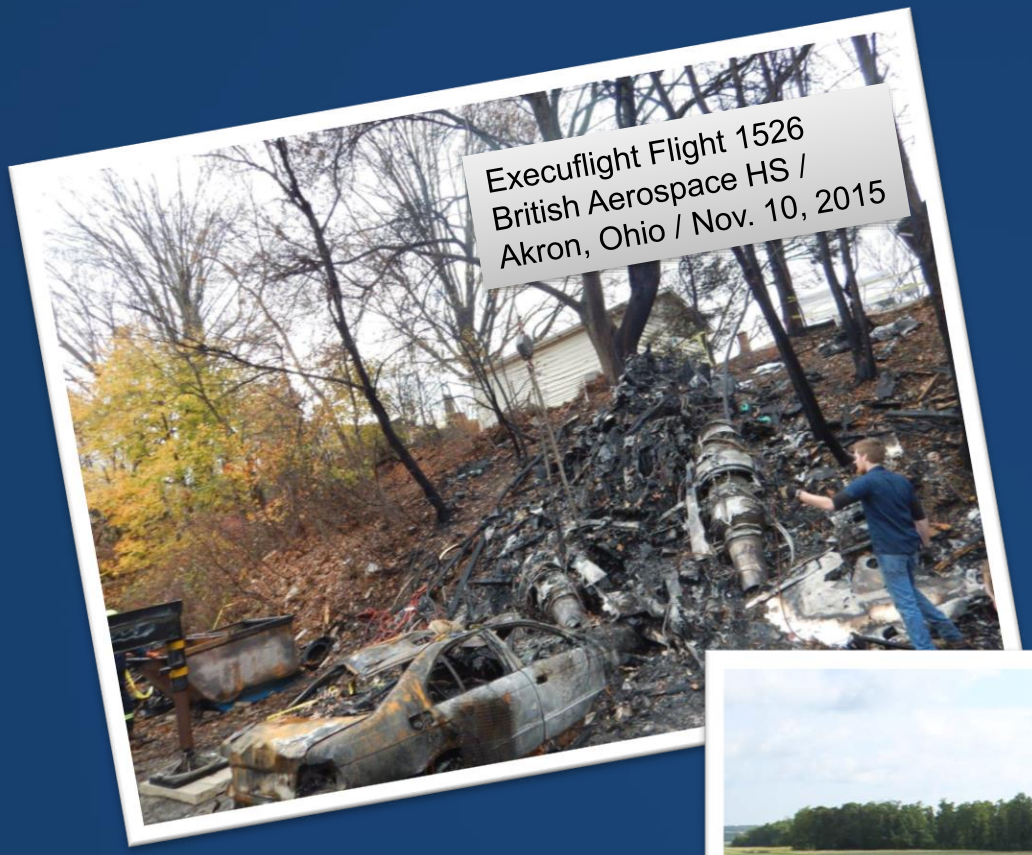

Execuflight Flight 1526
British Aerospace HS /
Akron, Ohio / Nov. 10, 2015

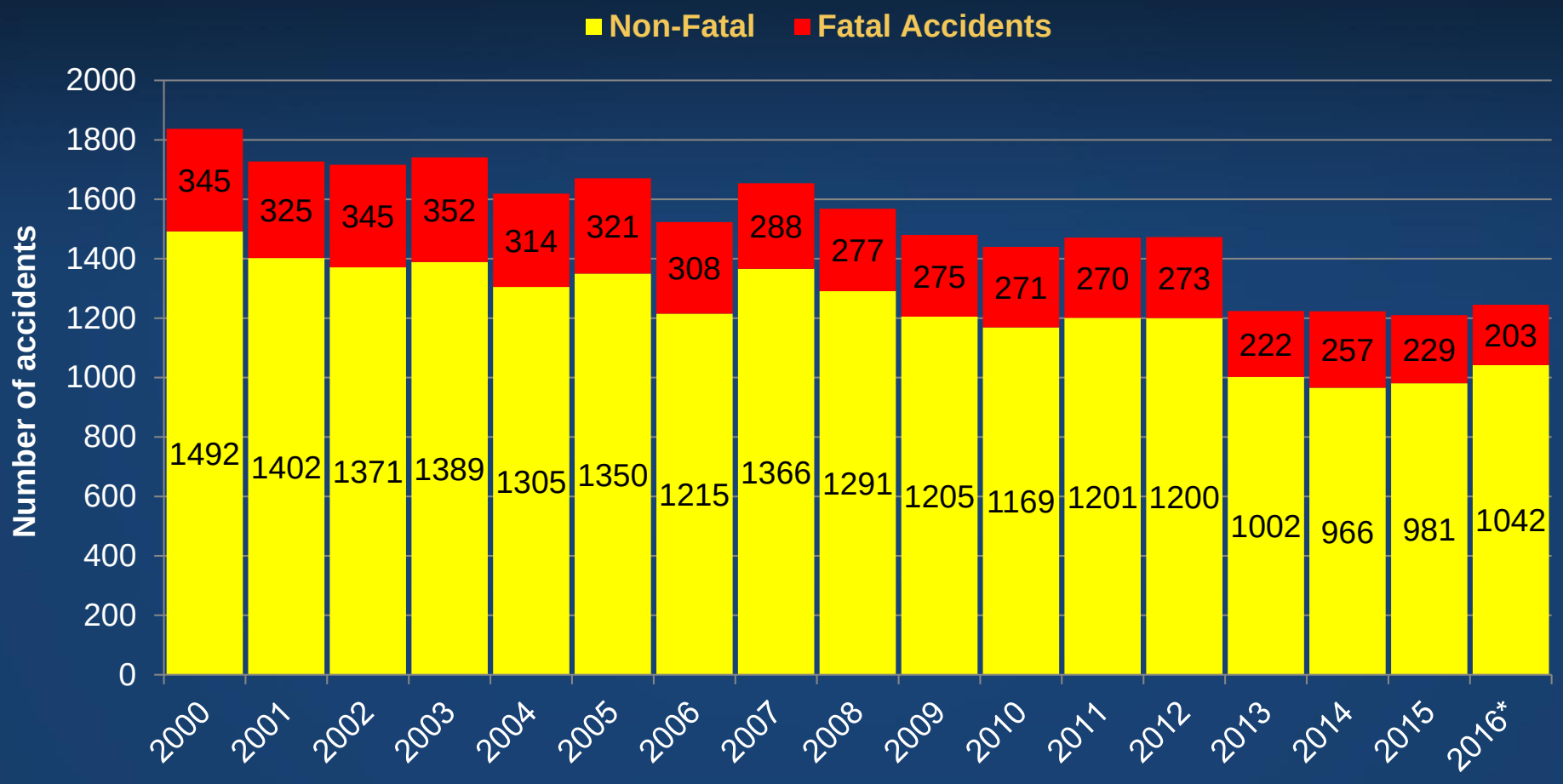
Beech A36 / Huggins, MO
/ June 12, 2015

2017 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
  - Climb

All GA Accidents



*** 2016 Preliminary numbers**

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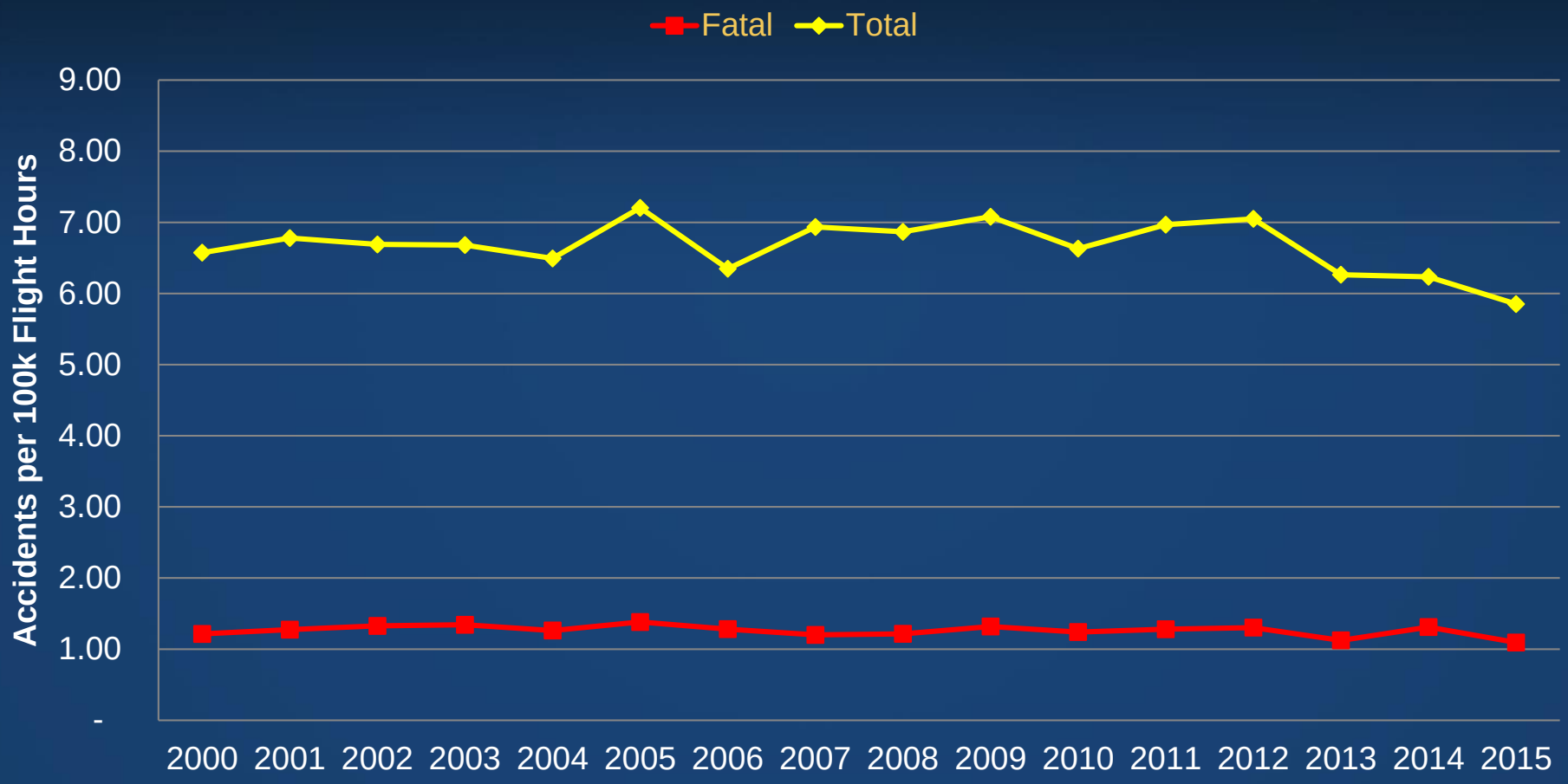
GA Accident Rates



*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.

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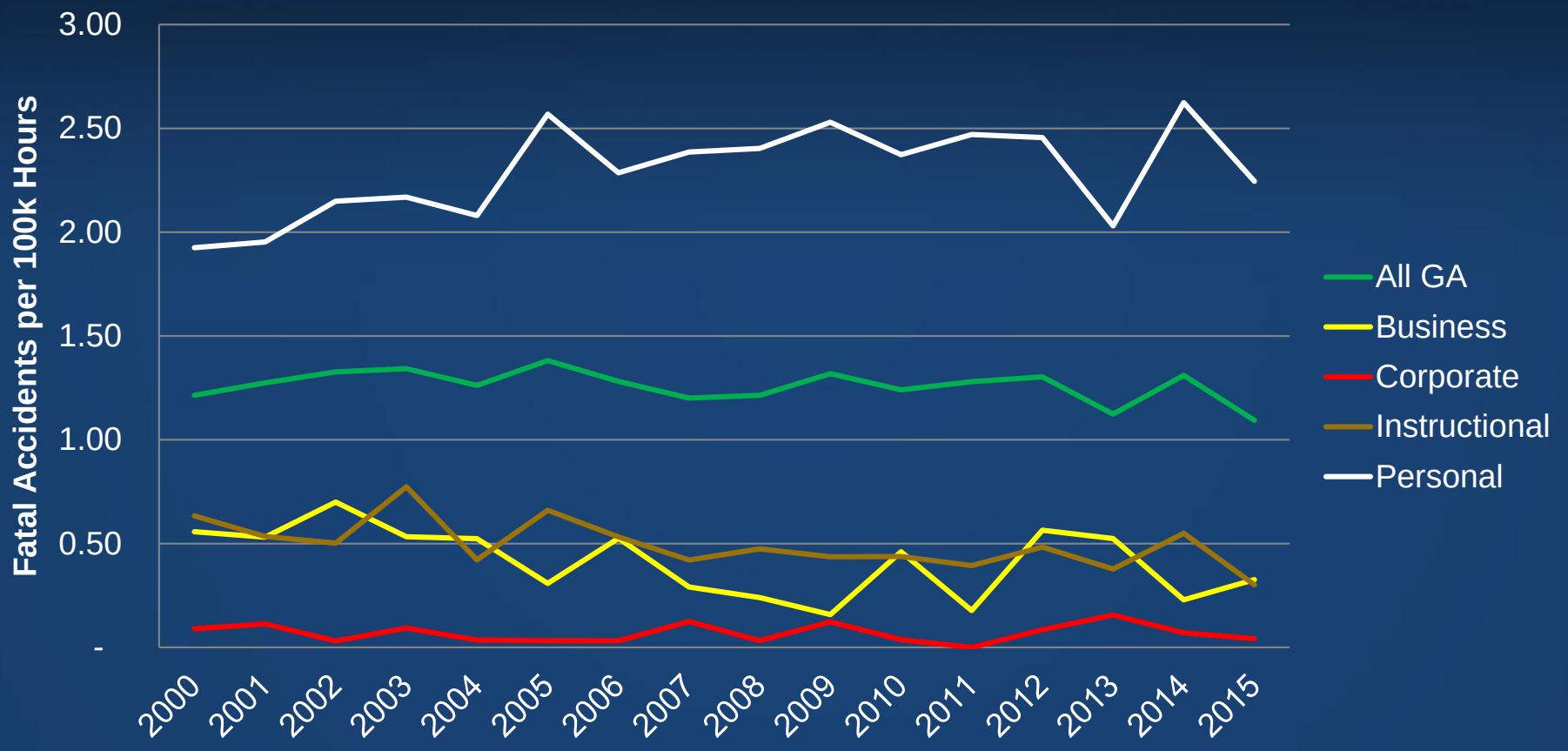
Fatal Accident Rates per 100k Flight Hours



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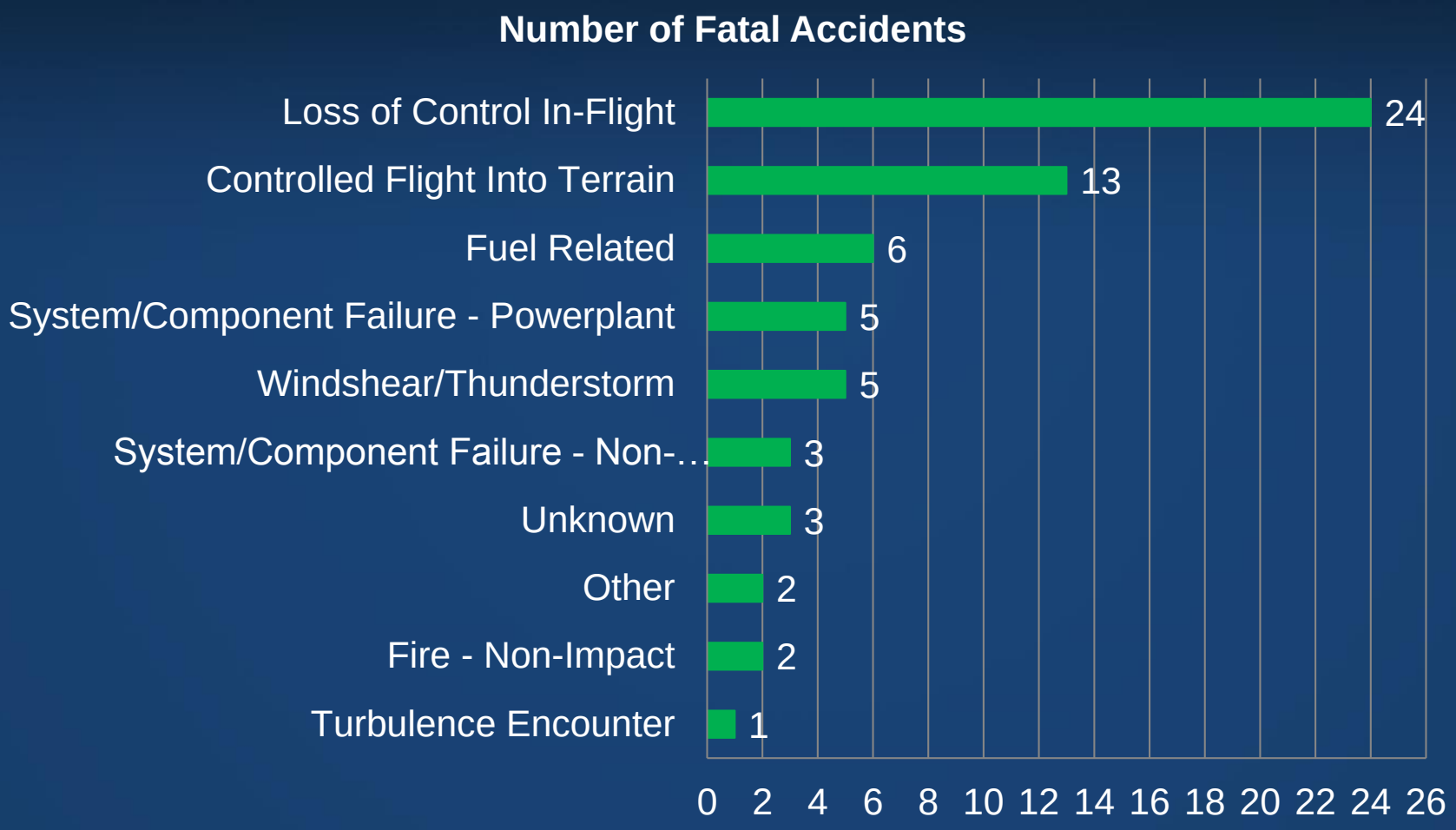
Business Flying, 2008-2016



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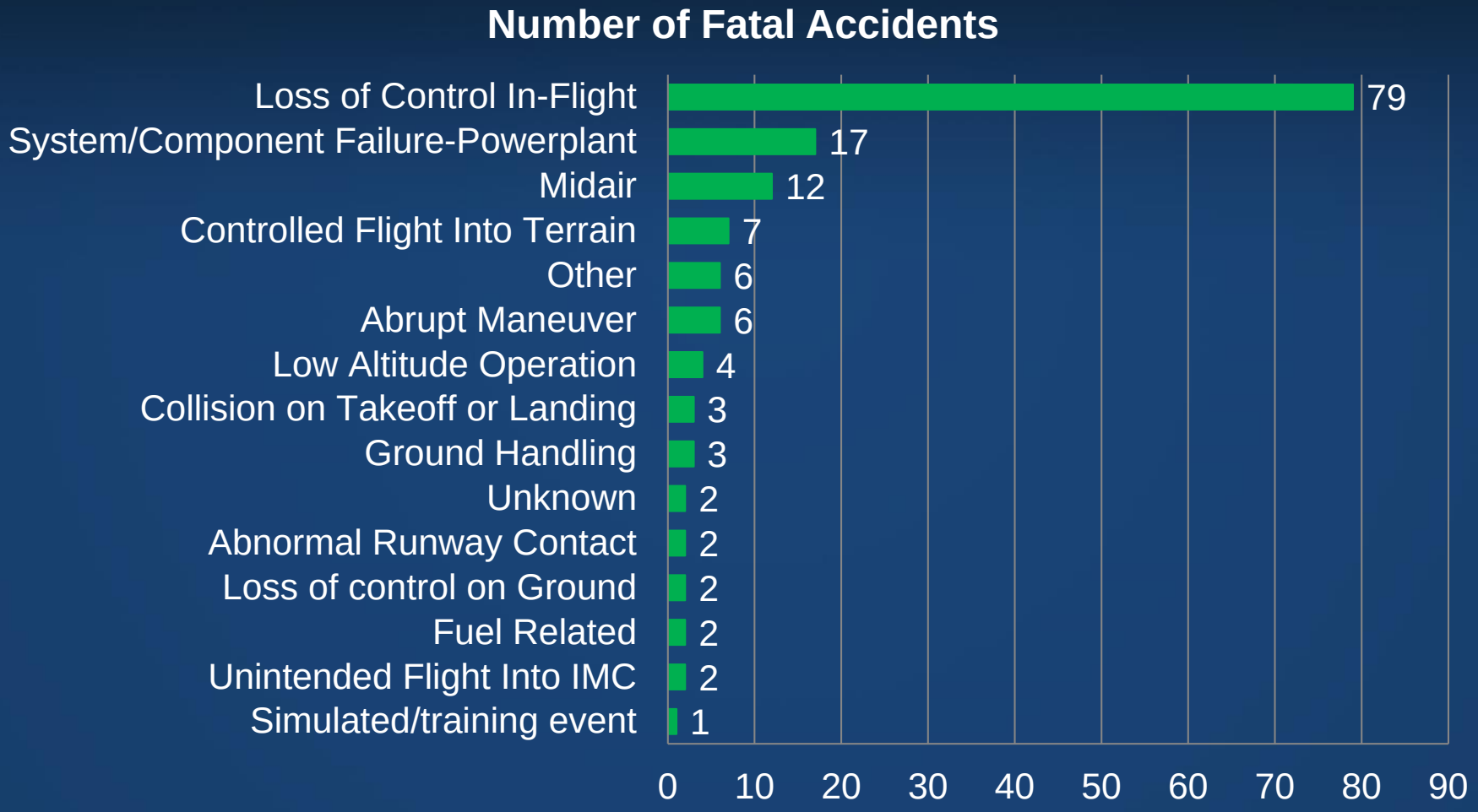
Instructional Flying, 2008-2016



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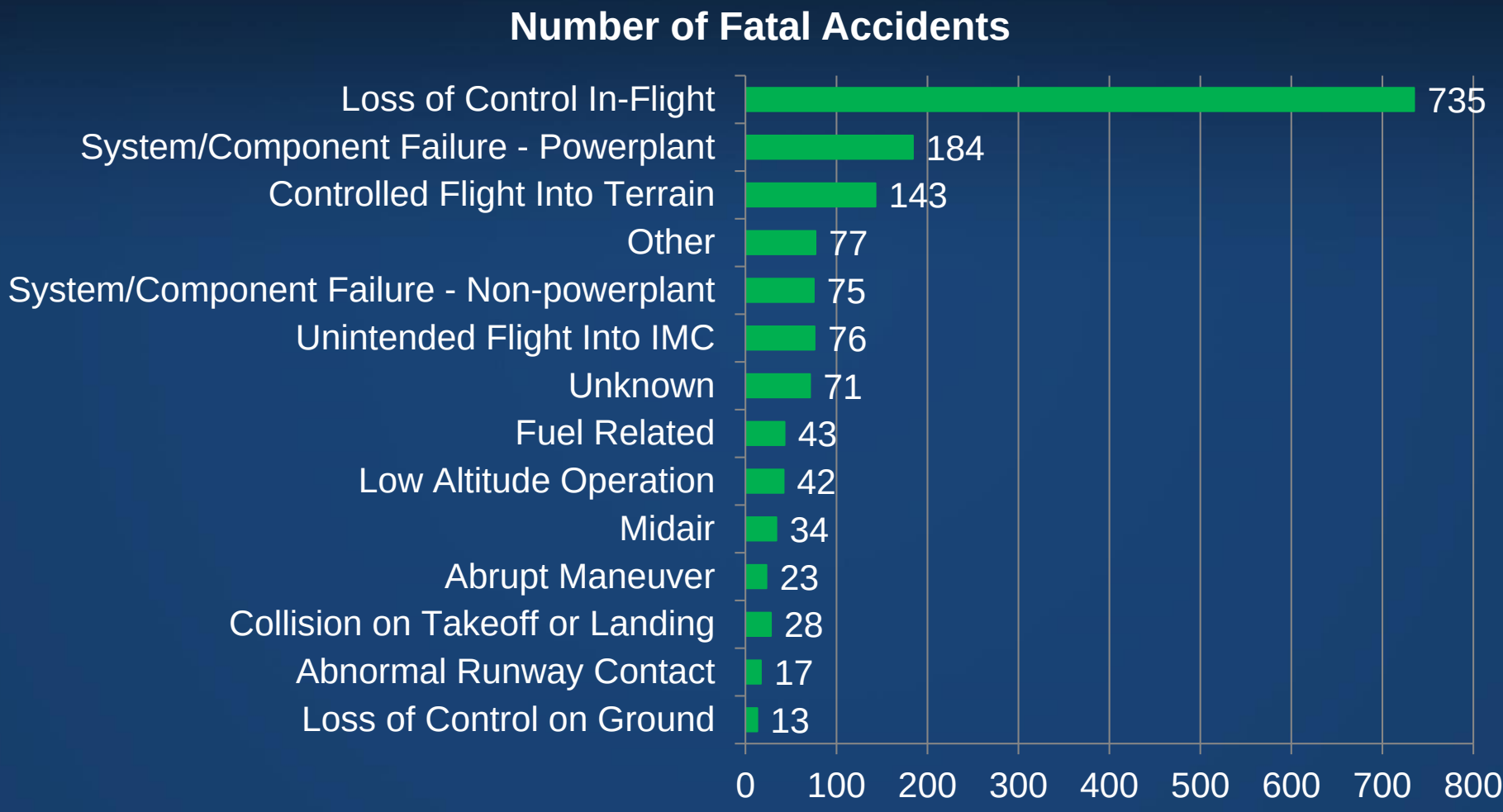
Personal Flying, 2008-2016



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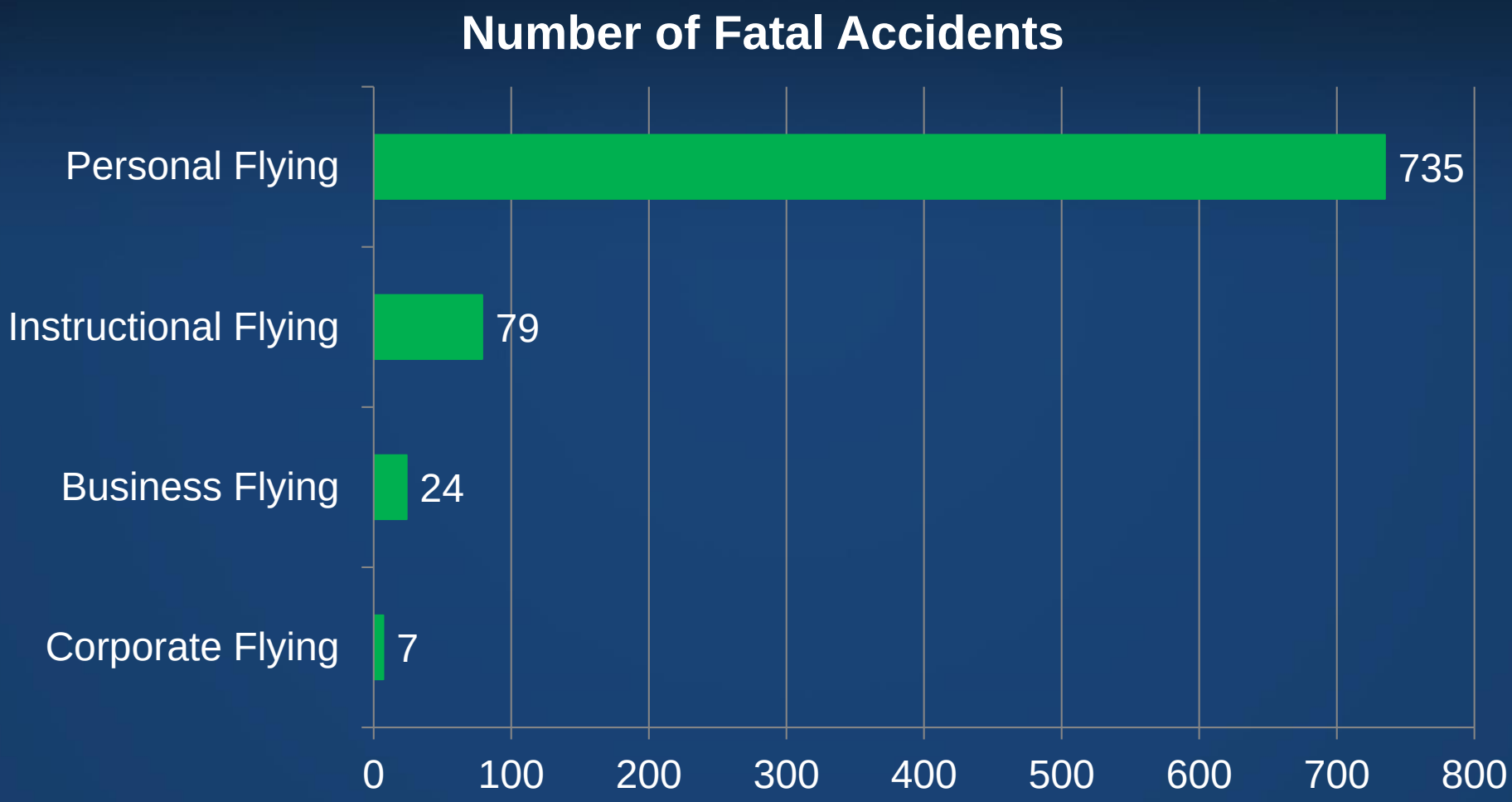
Loss of Control In-Flight, 2008-2016



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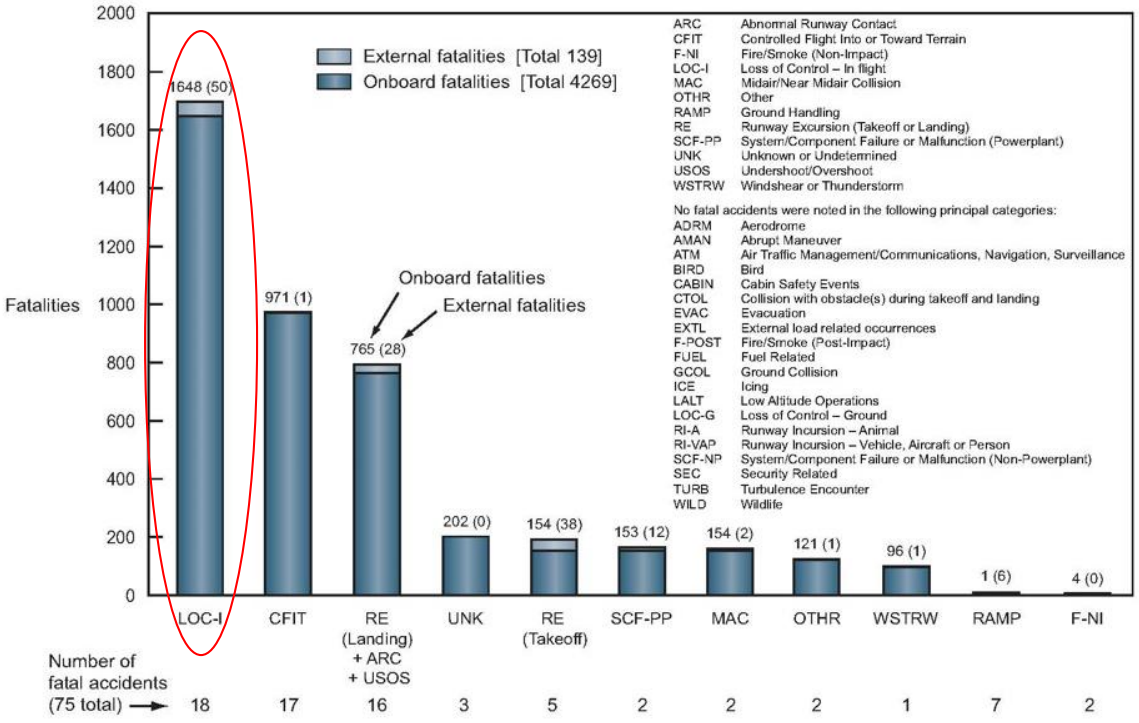
Boeing Annual Statistical Summery

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

Fatal Accidents – Worldwide Commercial Jet Fleet – 2003 Through 2012



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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GAJSC — Who We Are…

Steering Committee

Co-chairs – Mike O'Donnell (FAA/AVP)
Sean Elliott (EAA)

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

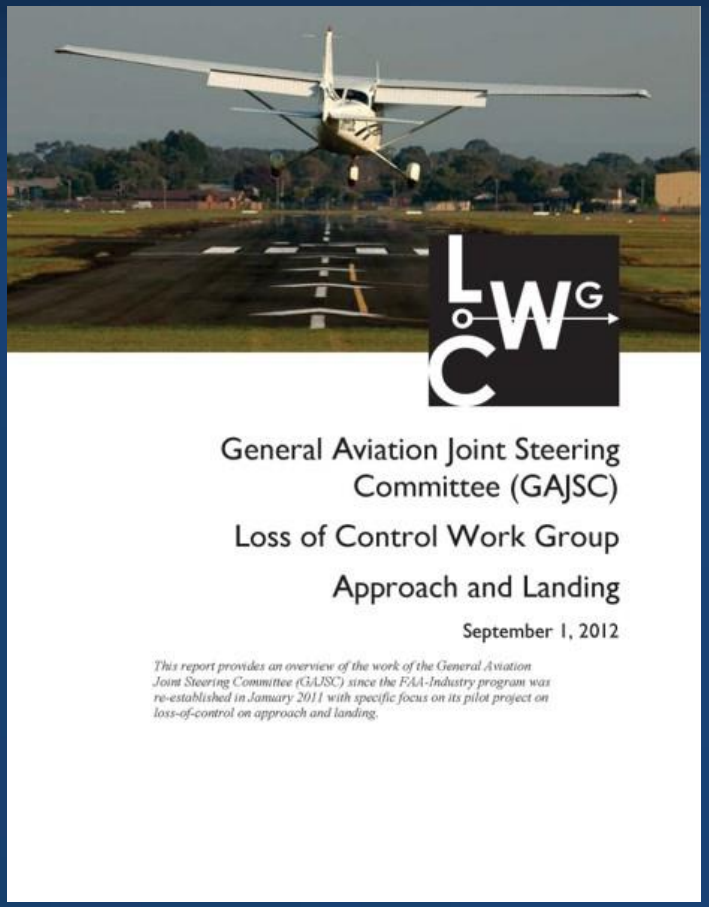
- Identify future areas of study/risk
- Charter safety studies
- Provide guidance and direction
- Draw data from various areas
- Develop a prioritized Safety Plan
- Develop metrics to measure effectiveness of safety solutions

Working Groups

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

- Data analyses
- Safety enhancement
- Mitigation development

Loss-Of-Control Working Group



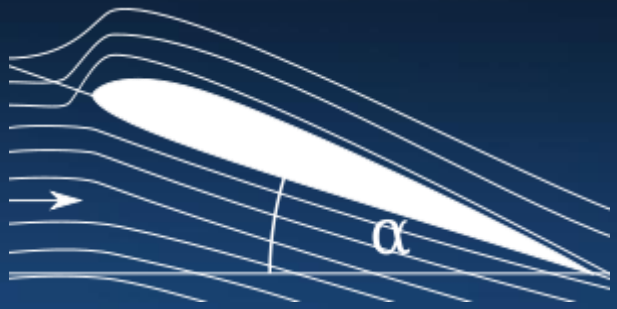
Safety Enhancements Identified

- 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

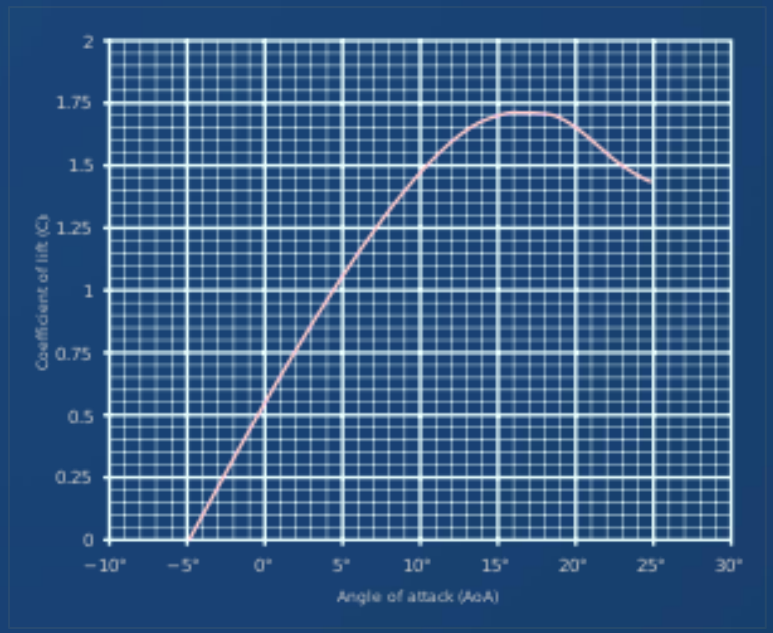
Lower Cost AOA Displays

- 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 policy changed on Non-Required Safety Equipment



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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

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

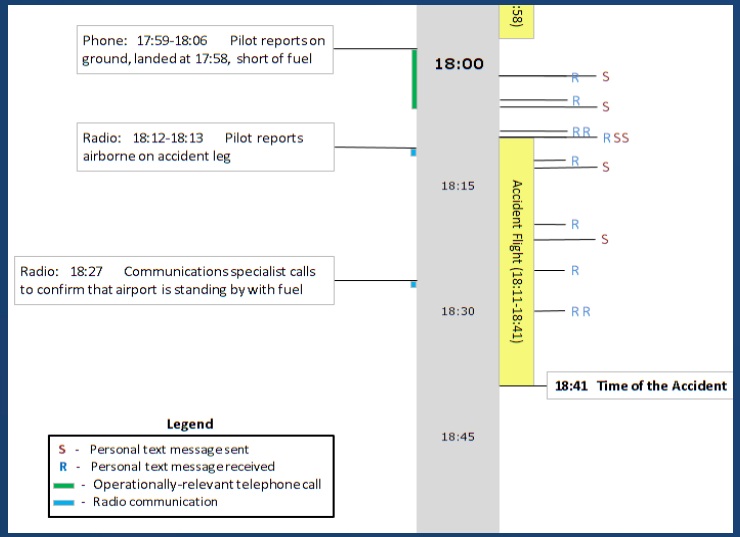
Douglas Adams

"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."

MAKING TRANSPORTATION SAFER
NATIONAL TRANSPORTATION SAFETY BOARD
E PLURIBUS UNUM
1967
2017
YESTERDAY ★ TODAY ★ TOMORROW

Mosby, MO August 26, 2011

Photo 2: Main wreckage and initial impact point.



Probable Cause:

"…the pilot's failure to confirm that the helicopter had adequate fuel on board to complete the mission before making the first departure, his improper decision to continue the mission and make a second departure after he became aware of a critically low fuel level…

Contributing to the accident… the pilot's distracted attention due to personal texting during safety-critical ground and flight operations…"

Collision of Tugboat/Barge with Duck boat Philadelphia, PA July 7, 2010

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