NTSB National Transportation Safety Board

General Aviation and the NTSB Most Wanted List

NBAA Safety Committee

2016 Business Risk Assessment Meeting

January 26 & 27, 2016

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

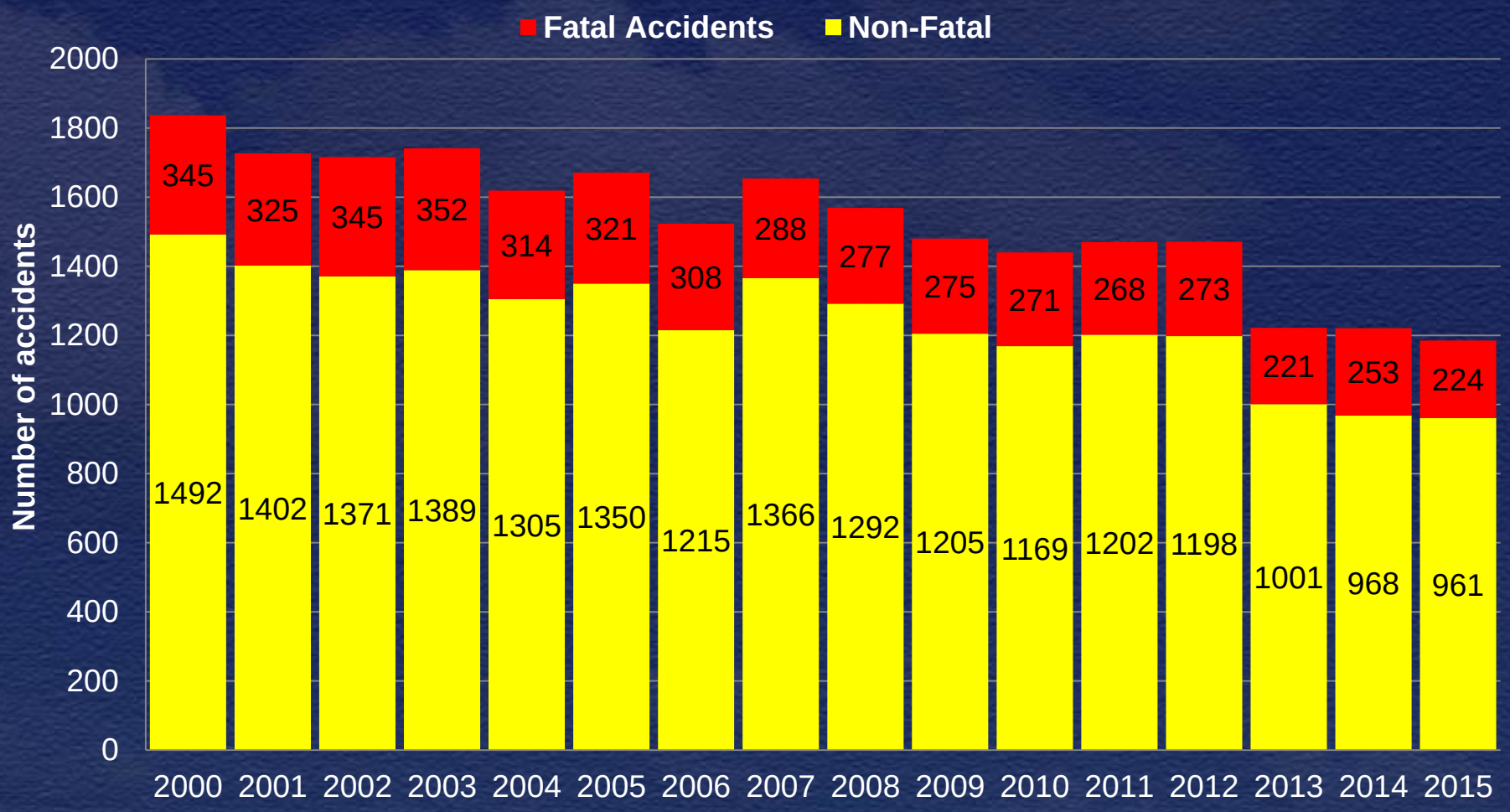
NTSB Mission

The NTSB is an independent US federal agency charged with determining the probable cause(s) of transportation accidents, making recommendations to prevent their recurrence, conducting special studies and investigations, and coordinating resources to assist victims and their families after an accident.

Topics

- General Aviation Accident Trends
- Most Wanted List – 2016
  - Distraction
  - Substance Impairment
  - Medical Fitness for Duty
  - Fatigue
  - Occupant Protection
  - Recorders
  - Loss of Control

All GA Accidents



*2015 Preliminary numbers

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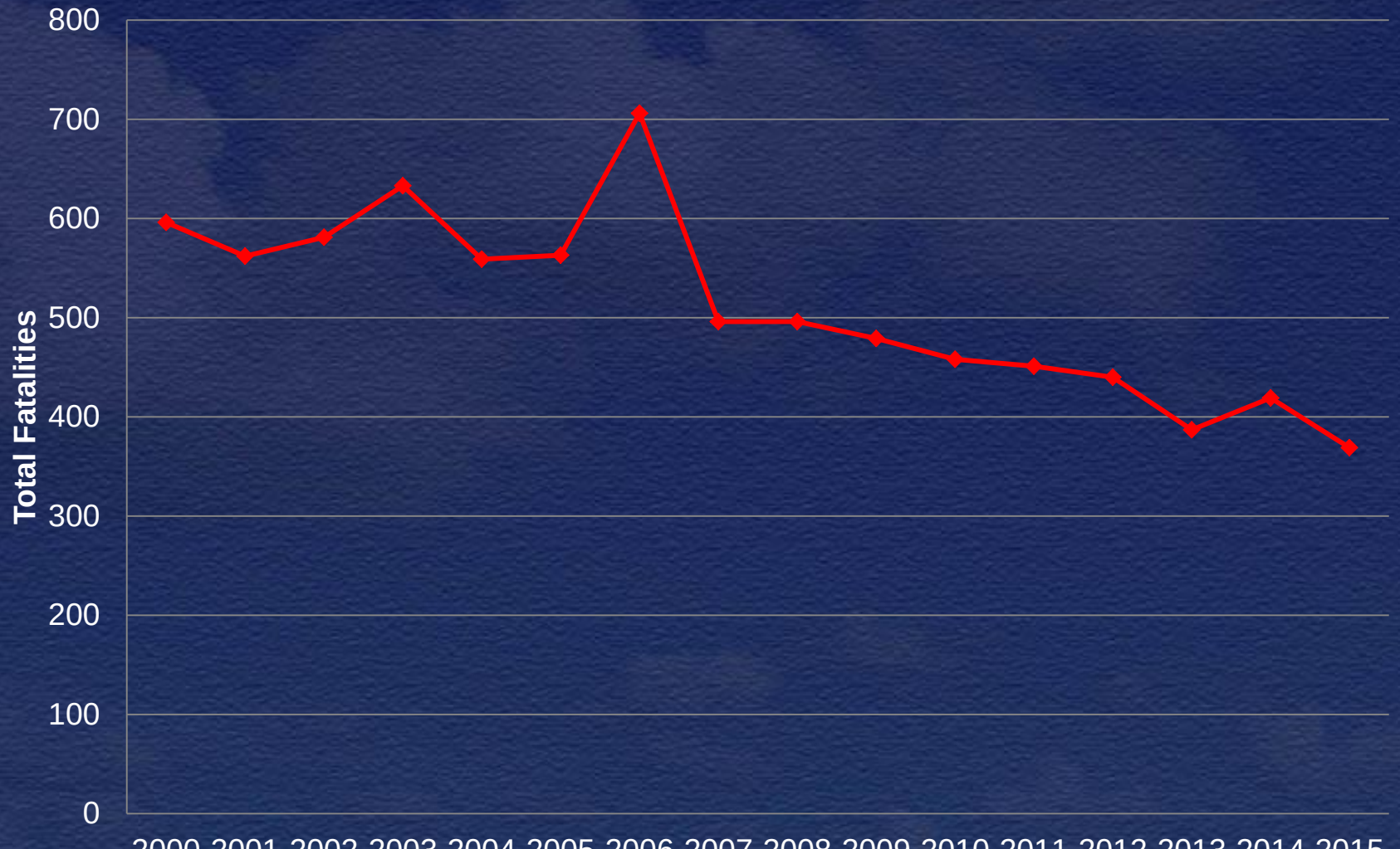
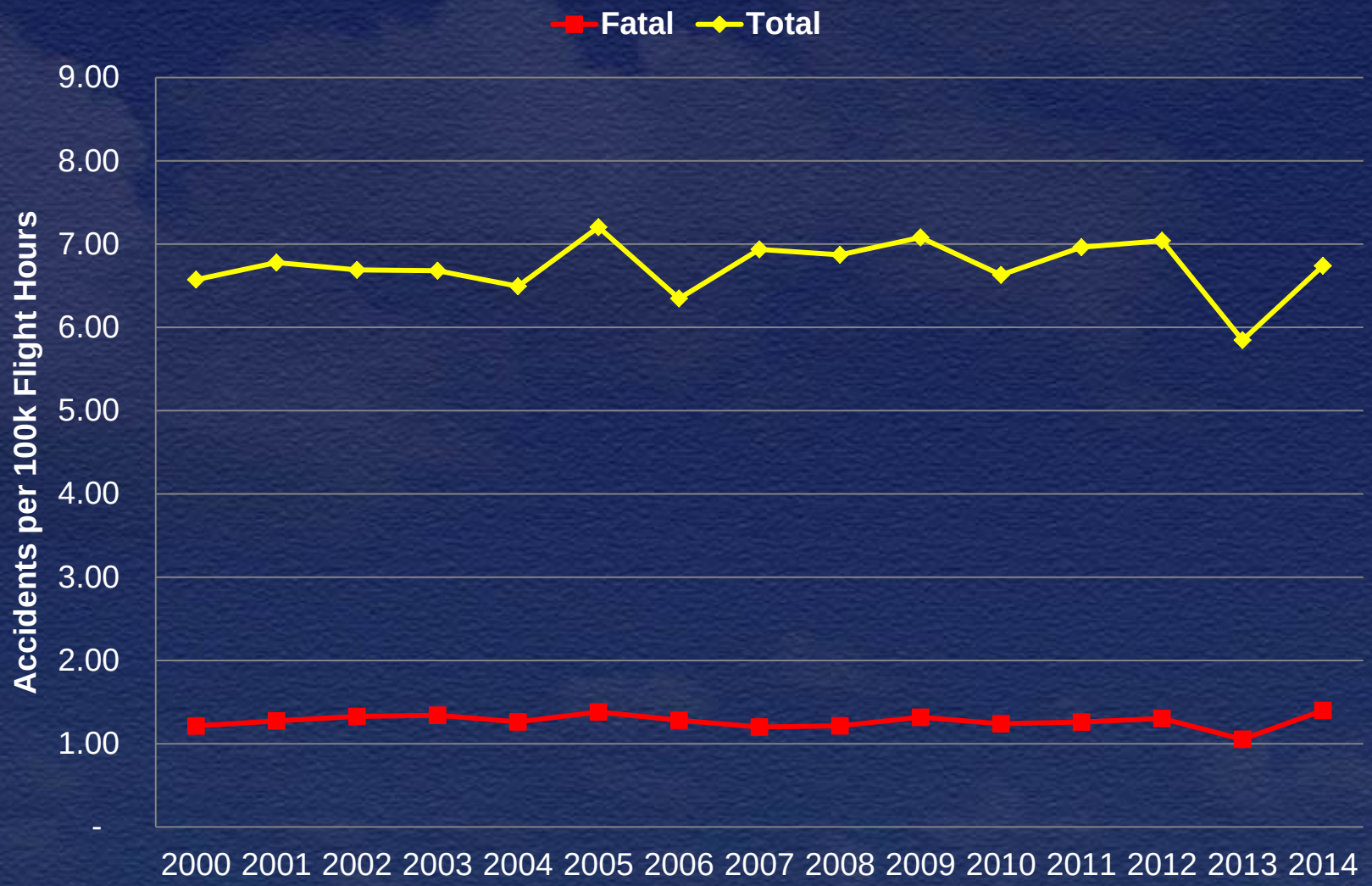
GA Accident-involved Fatalities



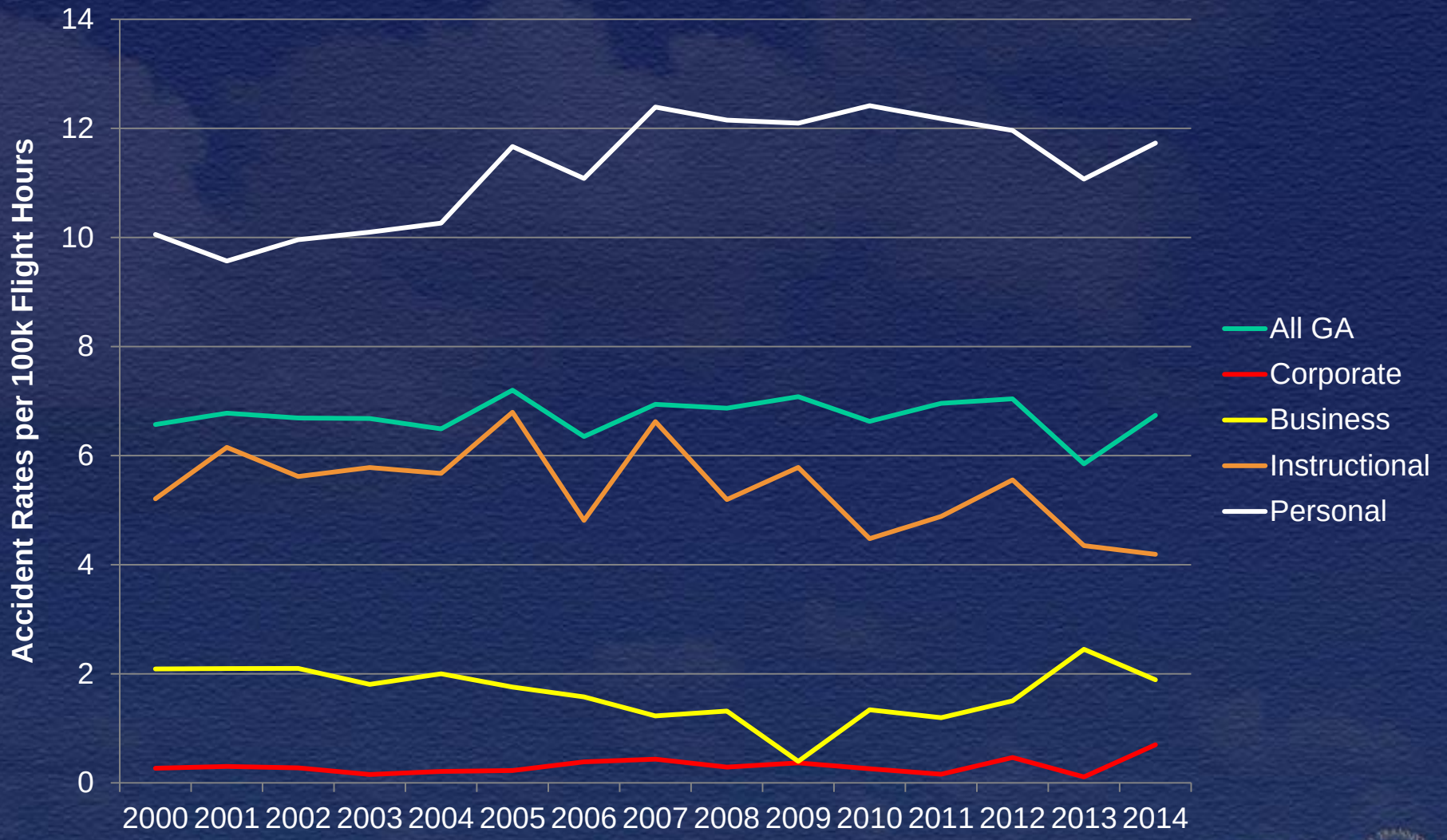
*2015 Preliminary numbers

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.

Accident Rates per 100k Flight Hours



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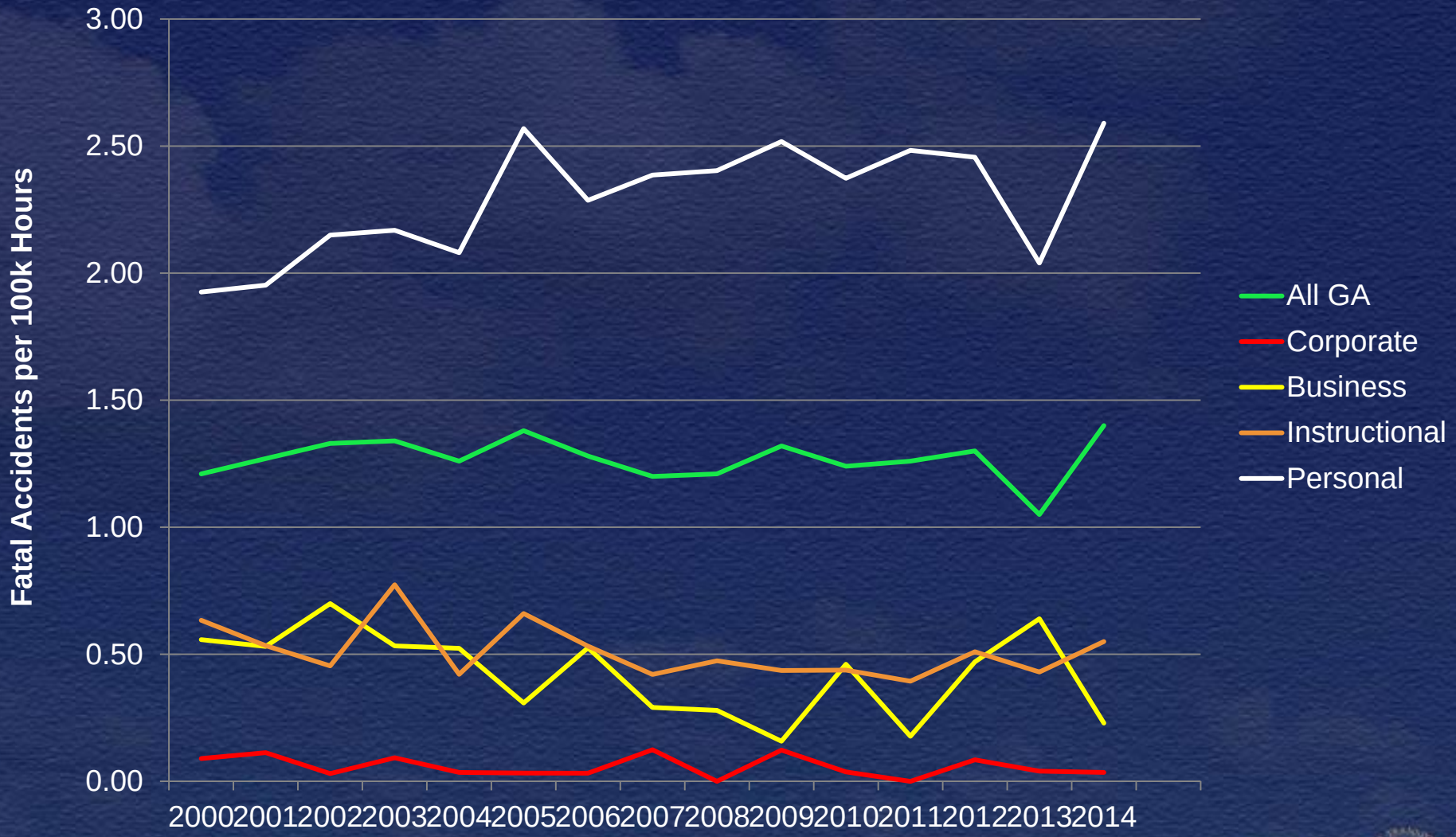
Fatal Accident Rates per 100k Flight Hours



*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..

Defining Events – Part 91 Ops

Business	Instruction	Personal
1. Loss of Control	1. Loss of Control	1. Loss of Control
2. CFIT	2. Midair	2. Powerplant Fail
3. Fuel	3. Powerplant Fail	3. CFIT
4. Component Fail	4. CFIT	4. Other
5. Powerplant Fail	5. Other	5. Component Fail

Why GA on the Most Wanted List?

- NTSB investigates approximately 1500 GA accidents per year over the last decade
- Overall GA accident rate flat
  - Has improved little over the last decade
  - Airline accident rate decreased more than 80%
- Personal flying accident rate
  - Increased 13% over last 10 years
  - Greater than 15% increase in fatals over that period

- ***GA safety needs attention***

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/vehicle/truck crash

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Distraction

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Distraction

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Distraction

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2016 MWL - Distractions

- ***Disconnect from Deadly Distractions***
  - A factor in all modes of transportation
- Aviation emphasis
  - Sterile Cockpit
  - Appropriate use of PEDs
  - Manage distractions

Impairment

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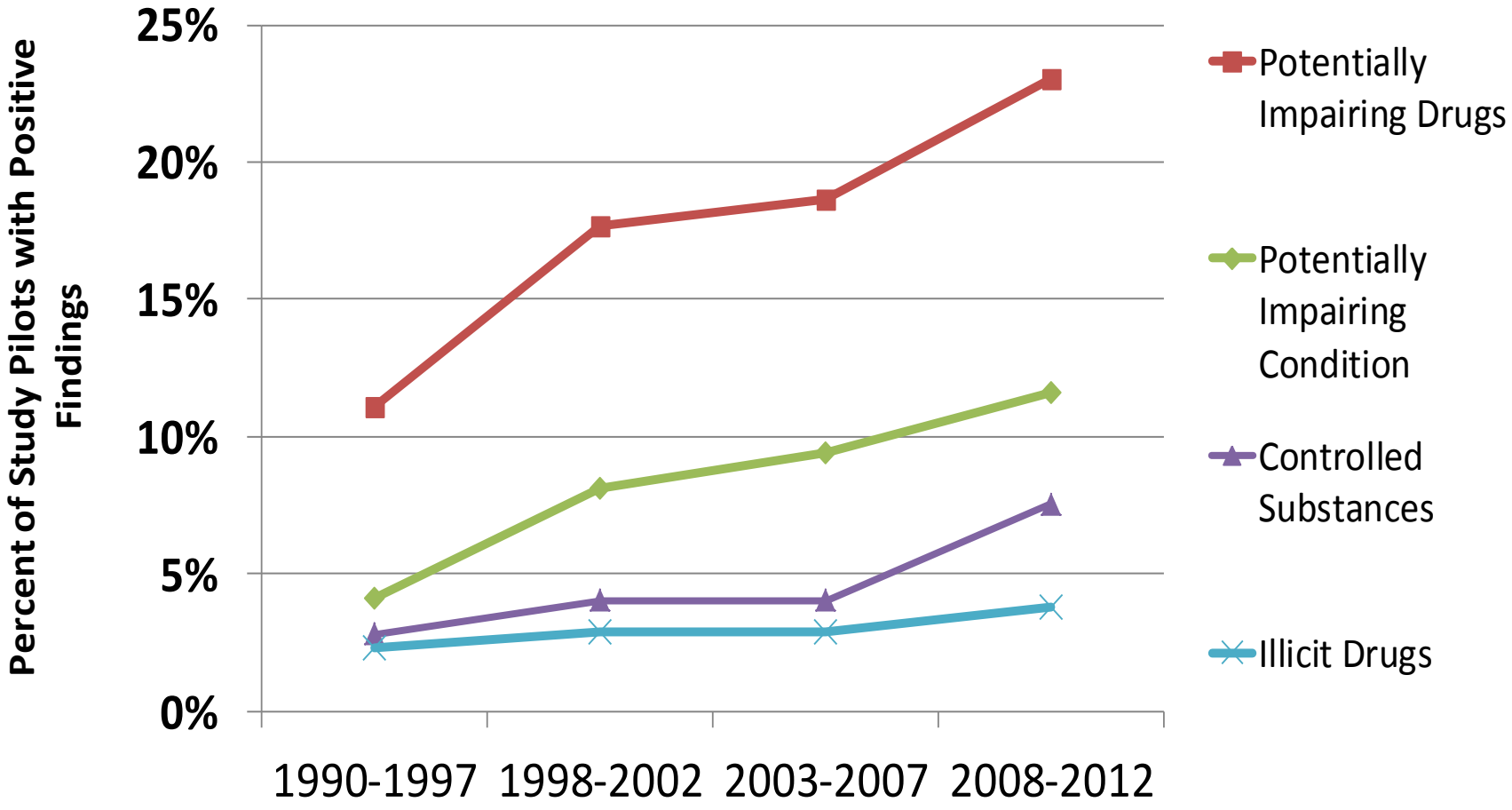
2016 MWL - Impairment

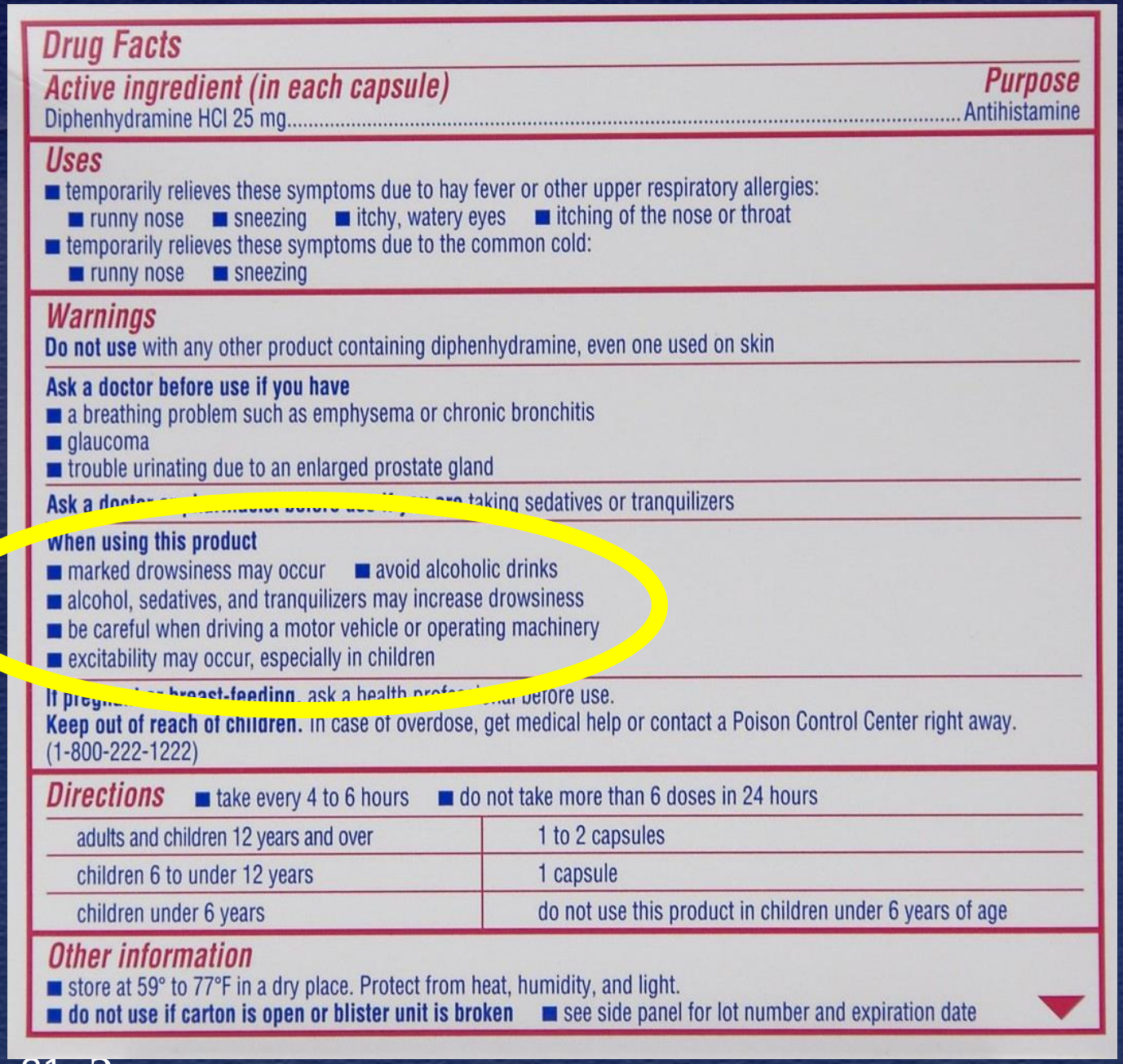
- ***End Substance Impairment in Transportation***
  - A factor in all modes
- Fatally injured pilots - potentially impairing drugs
  - 11% average 1990 - 1997
  - 23% average 2008 - 2012

Toxicology Findings by Category, 1990-2012



Most Common Drugs

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



Drug Facts

Active ingredient (in each capsule) — **Purpose**

Diphenhydramine HCl 25 mg ..... Antihistamine

Uses

- temporarily relieves these symptoms due to hay fever or other upper respiratory allergies:
  - runny nose
  - sneezing
  - itchy, watery eyes
  - itching of the nose or throat
- temporarily relieves these symptoms due to the common cold:
  - runny nose
  - sneezing

Warnings

Do not use with any other product containing diphenhydramine, even one used on skin

Ask a doctor before use if you have

- a breathing problem such as emphysema or chronic bronchitis
- glaucoma
- trouble urinating due to an enlarged prostate gland

Ask a doctor ... taking sedatives or tranquilizers

When using this product

- marked drowsiness may occur
- avoid alcoholic drinks
- alcohol, sedatives, and tranquilizers may increase drowsiness
- be careful when driving a motor vehicle or operating machinery
- excitability may occur, especially in children

If pregnant or breast-feeding, ask a health professional before use.

Keep out of reach of children. In case of overdose, get medical help or contact a Poison Control Center right away. (1-800-222-1222)

Directions

- take every 4 to 6 hours
- do not take more than 6 doses in 24 hours

adults and children 12 years and over	1 to 2 capsules
children 6 to under 12 years	1 capsule
children under 6 years	do not use this product in children under 6 years of age

Other information

- store at 59° to 77°F in a dry place. Protect from heat, humidity, and light.
- **do not use if carton is open or blister unit is broken**
- see side panel for lot number and expiration date

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Medical Resources for Pilots

- General Aviation Joint Steering Committee (GAJSC)
  - 2013 Letter to pilots
  - 2014 Initiatives
    - Drug database
    - Training course

Medical Resources for Pilots

- FAA Publications
  - *Medications and Flying*
  - *Guide for Aviation Medical Examiners*
- Aircraft Owners and Pilots Association (AOPA)
  - Member resources

Medical Fitness for Duty

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Fitness for Duty

2016 MWL – Fitness for Duty

- ***Require Medical Fitness for Duty***
  - A factor in all modes
- Airman Medical – fitness at exam time
- Pilots must self-assess fitness
  - Need for appropriate flight preparations
- Focus on medical conditions
  - Example – Obstructive Sleep Apnea
- Enhance medical knowledge

Fatigue

2016 MWL - Fatigue

- ***Reduce Fatigue - Related Accidents***
  - A factor in all modes
  - 182 Major investigations (2001 – 2012)
    - 20% involved fatigue
  - Need
    - Research, education, training
    - Technologies
    - Hours of service, on/off duty policies
    - Medical treatment of sleep disorders

BE A36 – 2 fatalities/2 survivors

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2016 MWL – Occupant Protection

- ***Strengthen Occupant Protection***
  - A factor in all modes
  - Numerous investigations showed potential for reduced injuries & fatalities
  - Need
    - Increased use of existing restraint systems
    - Designs that enhance survival space
    - Enhance ease of evacuation
    - Shoulder harnesses for GA aircraft

Recorders

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Recorders

- Expand use of recorders to enhance transportation safety
  - 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

Loss of Control

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Loss of Control

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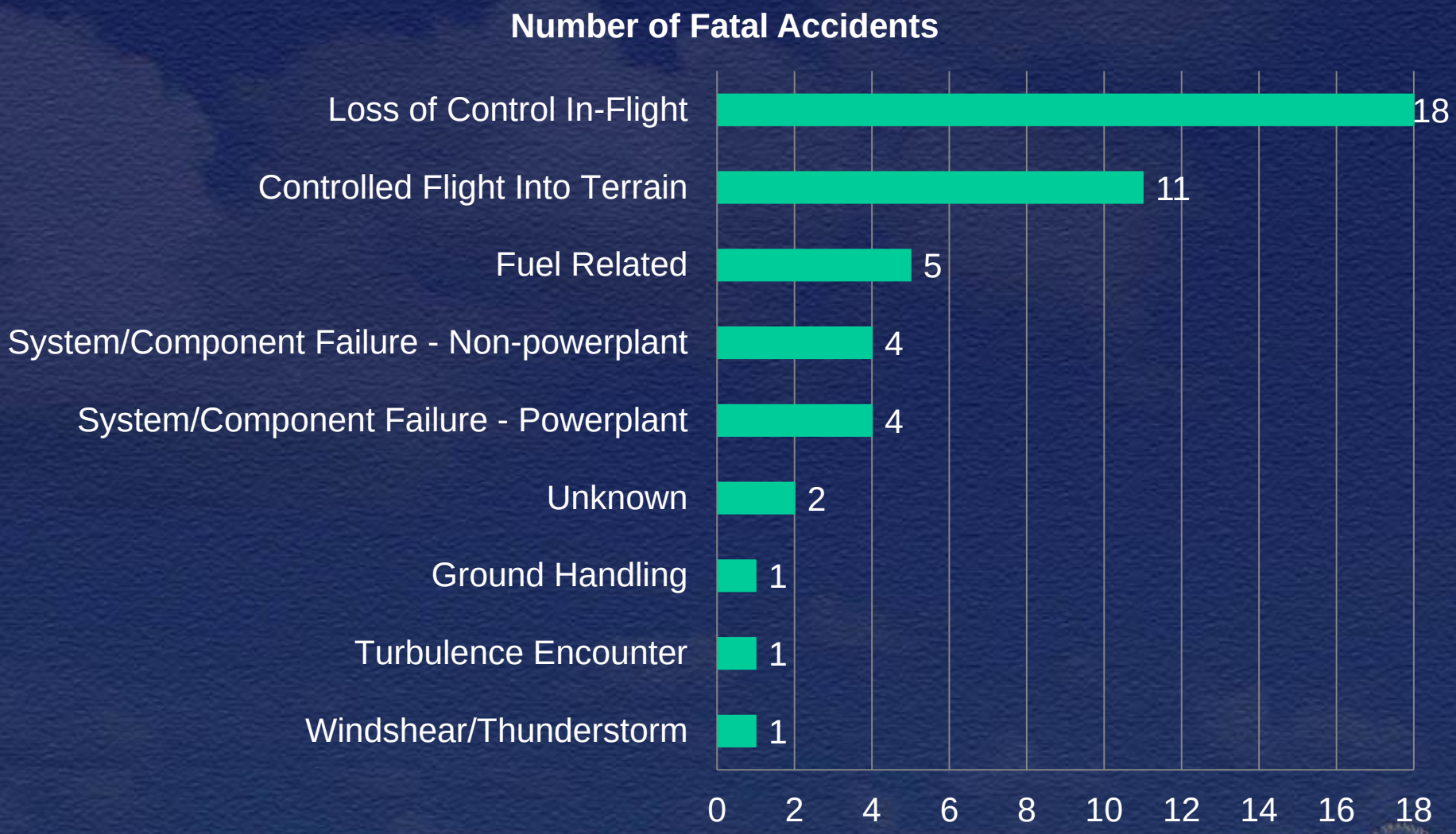
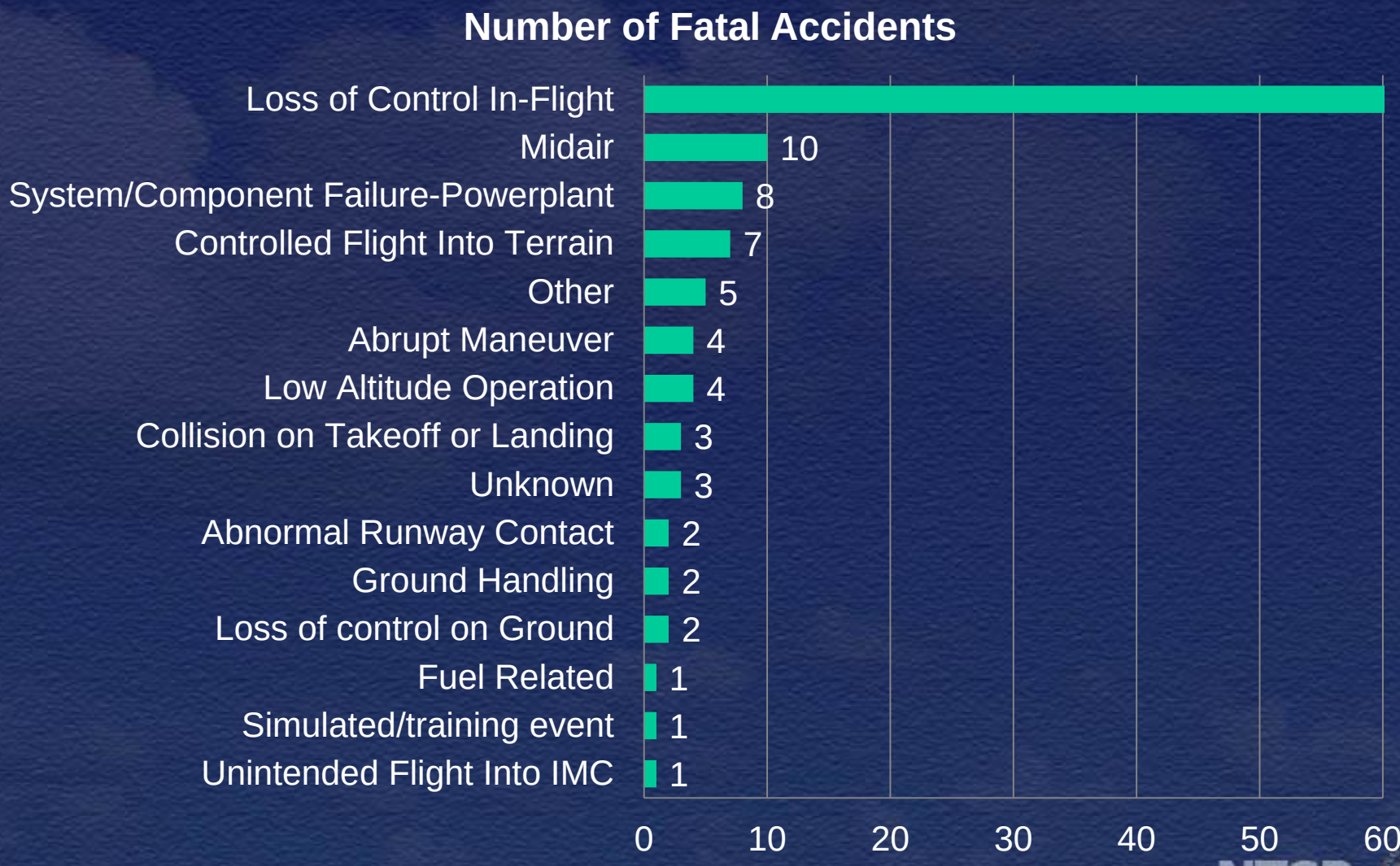
2016 MWL – Loss of Control

- ***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

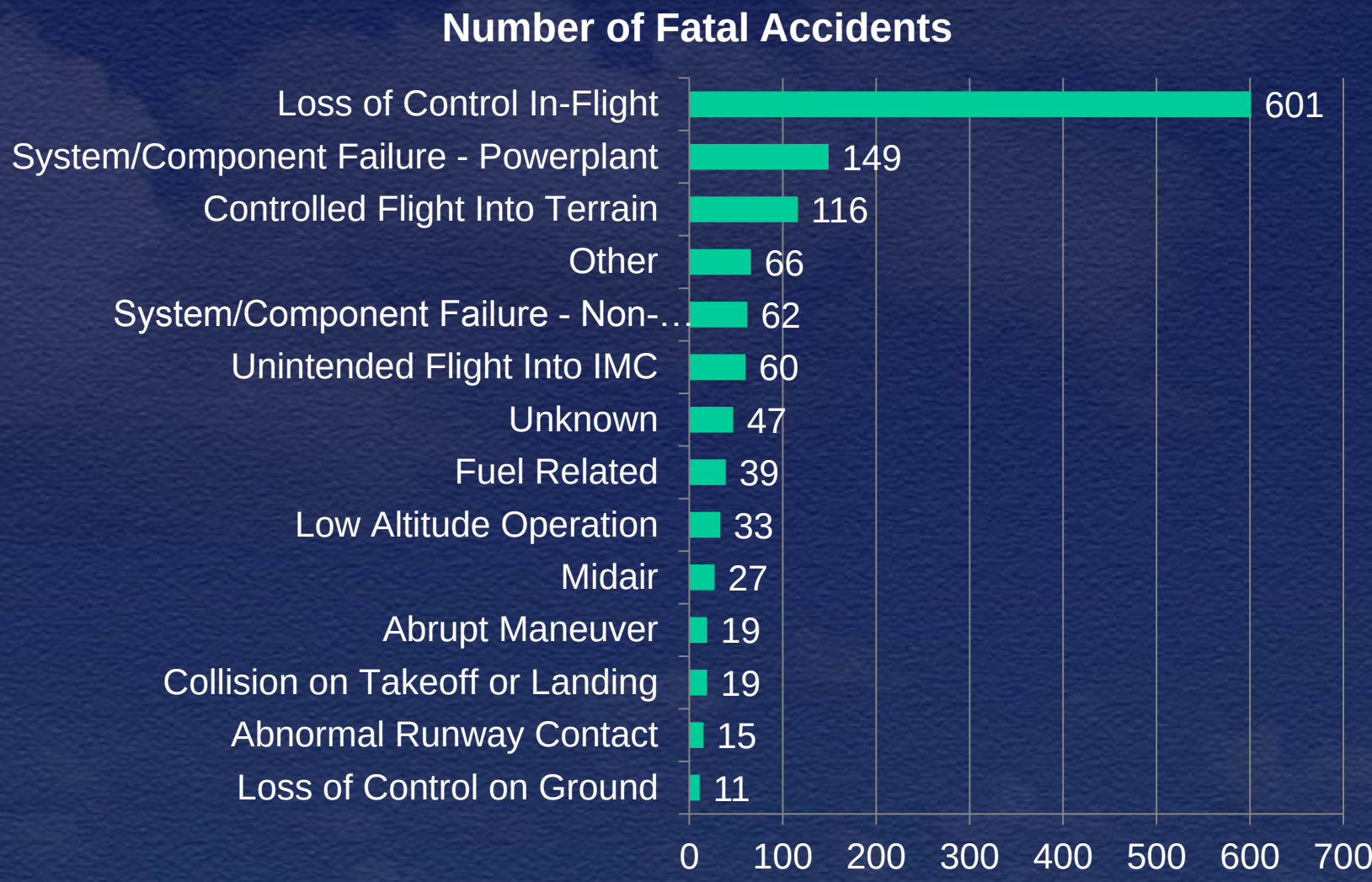
Business Flying, 2008-2014



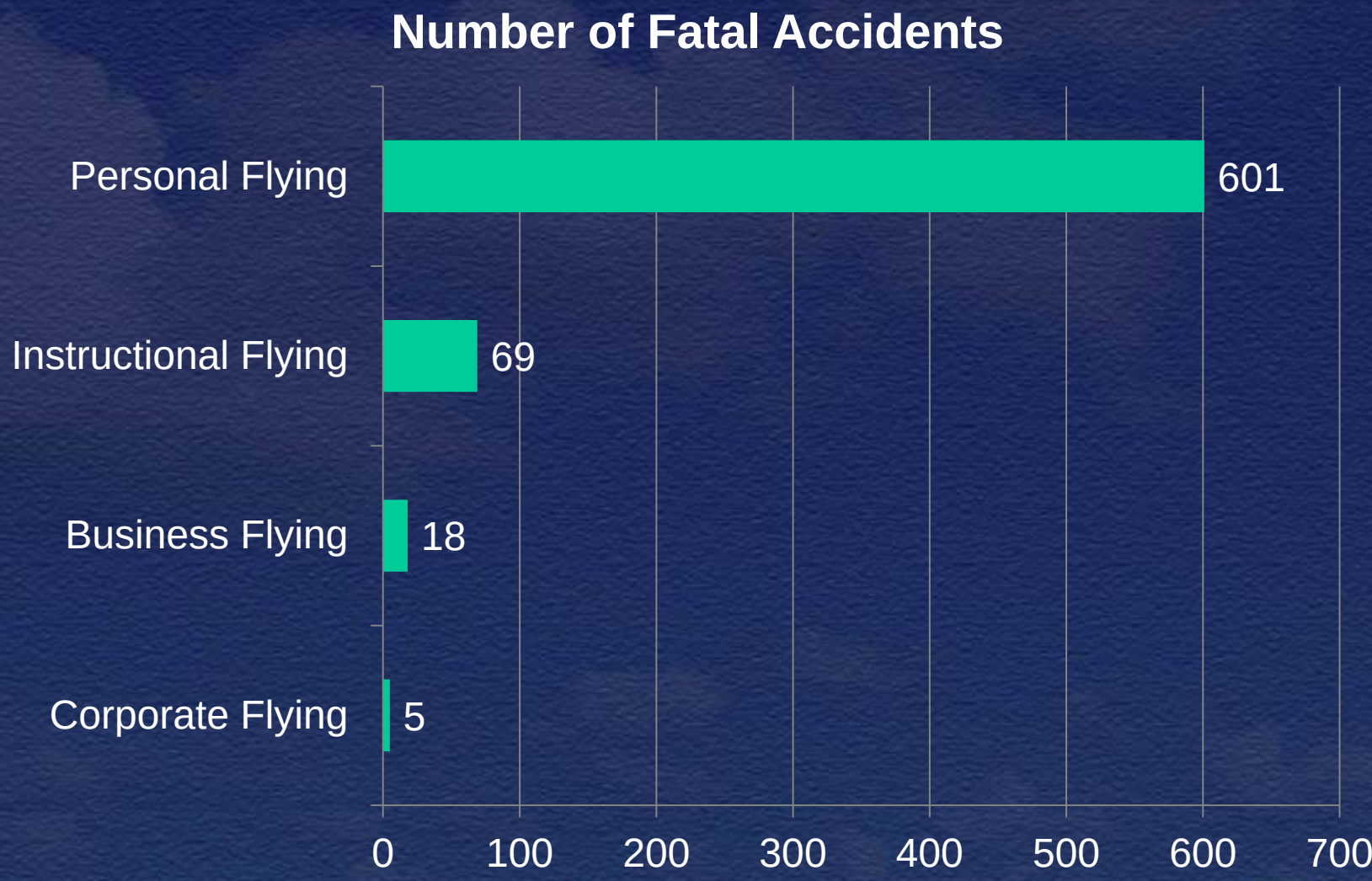
Instructional Flying, 2008-2014



Personal Flying, 2008-2014



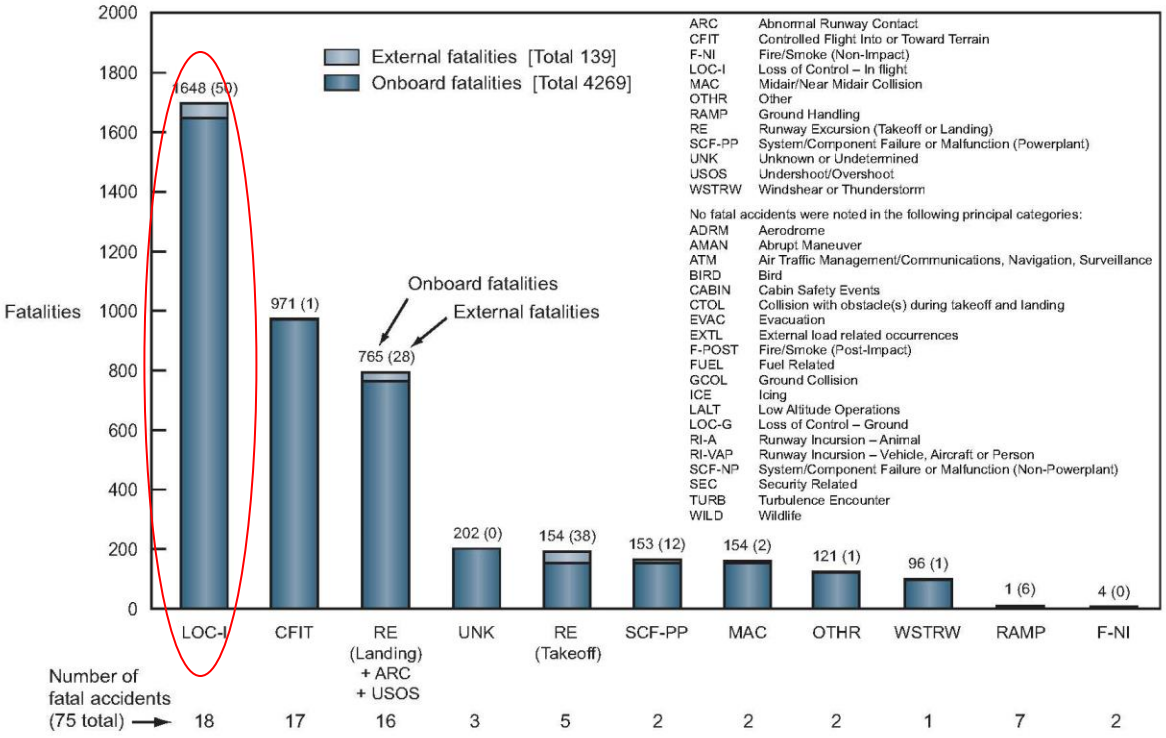
Loss of Control In-Flight, 2008-2014



Boeing Annual Statistical Summery

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

Fatal Accidents – Worldwide Commercial Jet Fleet – 2003 Through 2012



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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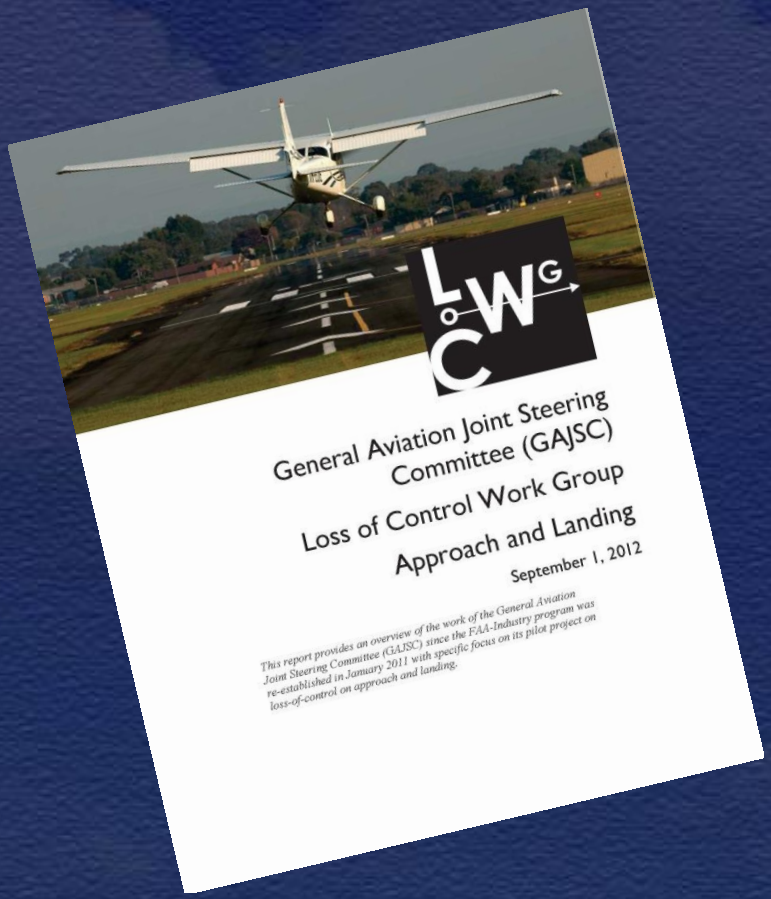
Primary category of accidents

Personal flying	–	LOC
Instructional flying	–	LOC
Business flying	–	LOC
Corporate flying	–	LOC
Airline flying	–	LOC

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

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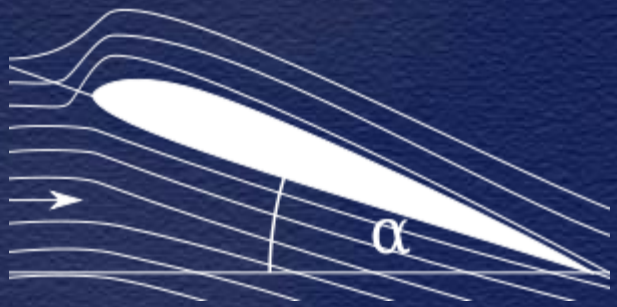
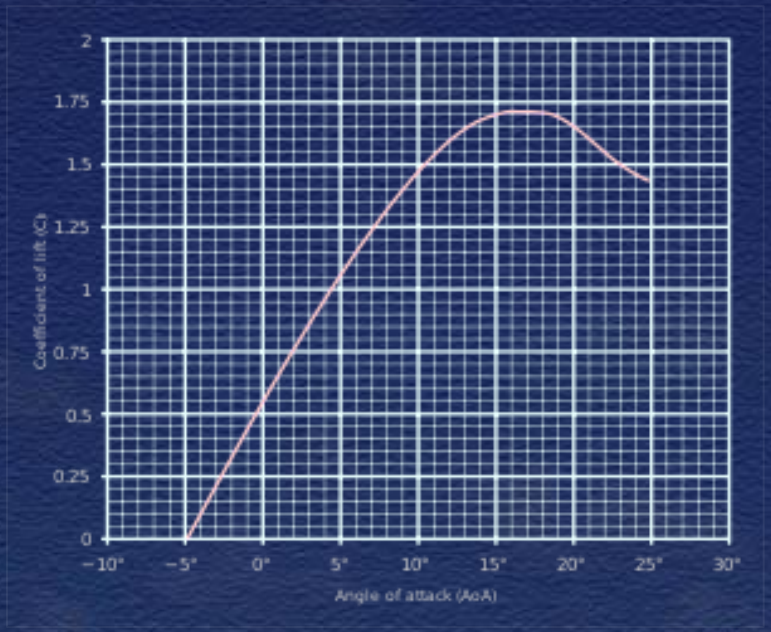
Lower Cost AOA Displays

- 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



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NTSB LOC Forum – Oct 14, 2015

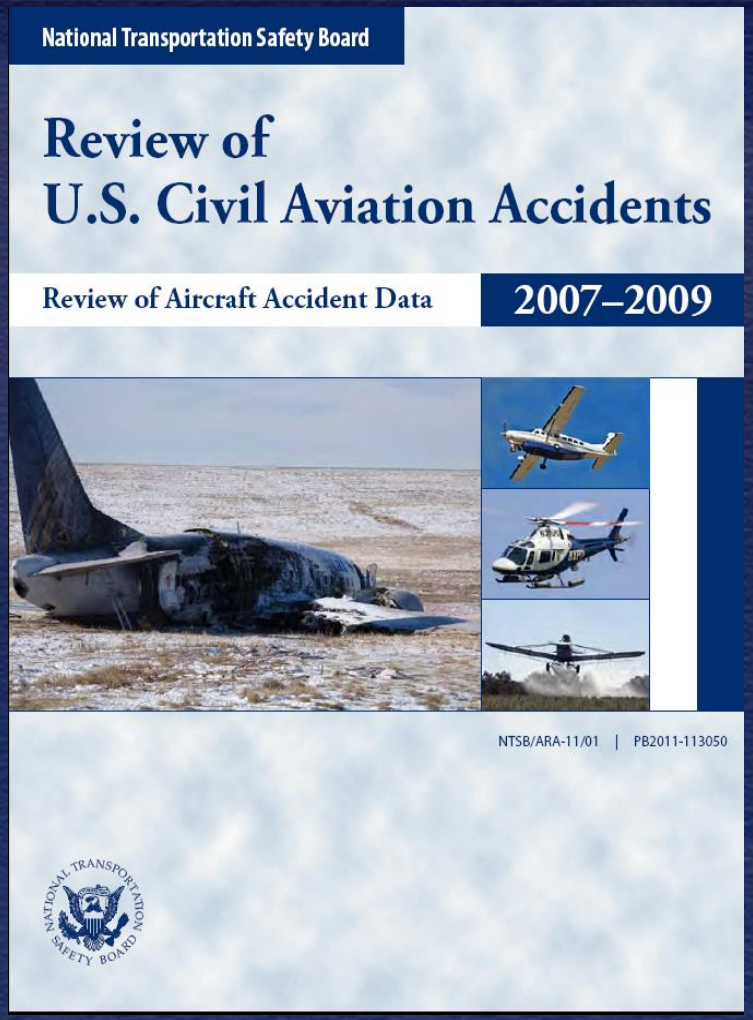
Humans and Hardware: Preventing General Aviation Inflight Loss of Control

- Search “NTSB Loss of Control Forum” and look for Capitol Connection web site.
- Also on YouTube.
- Forum Docket contains 38 documents

Alfred Sheinwold

"Learn all you can from the mistakes of others. You won't have time to make them all yourself"

Accident Investigations



- NTSB accident files are on-line
- Many recent accident Dockets are on-line
  - Factual reports,
  - Interviews
  - Photographs
- www.ntsb.gov

http://www.ntsb.gov/doclib/reports/2011/ARA1101.pdf

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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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Stall Recovery

- Reduce the angle-of-attack below stall AOA (Max CL)
  - Push over to eliminate stall warning
- Level wings
- Adjust thrust
  - Avoid overspeed and high G levels
- Pitch back to level flight
- Don't try to "***Power out of a stall***"

Four Panels - Roundtable

- What's the Problem? (Where are we and what have we done thus far?)
- Human Factors Issues
- Human Solutions
- Hardware Solutions

Takeaways

- We’re just in the beginning of a long process.
- Technology will help.
  - Cost
  - Simplicity to install/use
  - Simulators to train to surprise
- Practical standards/flight reviews inadequate.

NTSB Safety Alerts

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Preventing Rote Callouts

Confirm Cockpit Indications Before Making Callouts

The problem

- Recent National Transportation Safety Board investigations have identified several instances in which pilots made callouts without first verifying the cockpit indication that corresponded with the callout.
- In these cases, the pilots acted out of habit and made callouts based on what they expected to see regarding the cockpit indication but did not take the time to verify it.
- Examples of accident investigations include the following:
  - A Boeing 757 overran the end of the runway while landing in Jackson Hole, Wyoming. The captain called out "deployed" even though the speedbrakes were not deployed and "two in reverse" even though the speedbrakes were fully deployed. Both the speedbrakes and the thrust reversers had mechanical defects, and the captain did not manually deploy the speedbrakes when they failed to deploy automatically because, based on his rote callout, he did not recognize that they did not deploy.[1]
  - A Hawker 800 crashed after a late go-around attempt in Owatonna, Minnesota. After touchdown, the copilot called out "we're dumped," but the flaps were not all the way in the lift dump position and the airplane did not slow down as expected, leading the pilot to attempt to go around.[2]

[1] Runway Overrun, American Airlines Flight 2253, Boeing 757-200, N668AA, Jackson Hole, Wyoming, December 29, 2010, Aircraft Accident Report NTSB/AAB-12/01 (Washington, DC: National Transportation Safety Board, 2012).
[2] Crash During Attempted Go-Around After Landing, East Coast Jets Flight 81, Hawker Beechcraft Corporation 125-800A, N818MV, Owatonna, Minnesota, July 31, 2008, Aircraft Accident Report NTSB/AAR-11/01 (Washington, DC: National Transportation Safety Board, 2011).

- Preventing Aerodynamic Stalls
- Reduced Visual References
- Is Your Aircraft Talking to You
- Risk Management for Pilots
- Risk Management for Mechanics

Available on www.NTSB.gov

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Fatal Airport LOC 2008-2014

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