

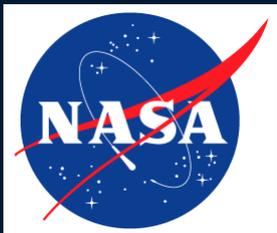
Aviation Safety Reporting System

NTSB General Aviation Safety Forum

Washington DC

June 19-20, 2012

ASRS General Aviation Reports



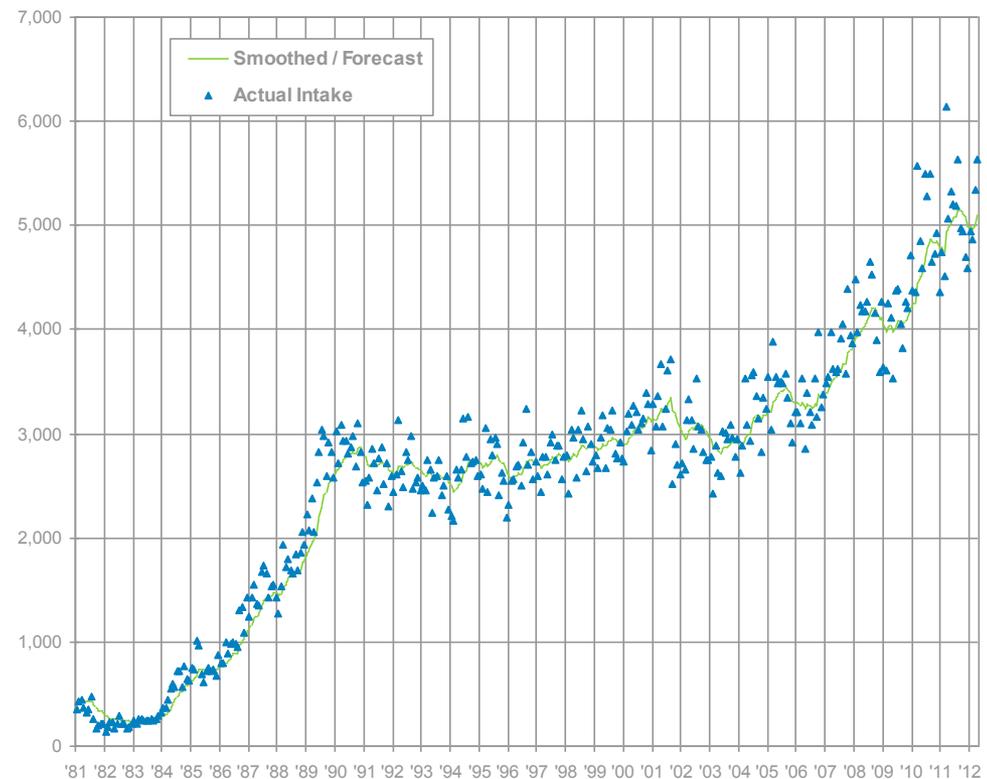
Linda Connell
NASA ASRS – Program Director



ASRS Overview

- ▶ 36 years of confidential safety reporting
- ▶ Over 1,000,000 reports received
- ▶ Searchable Database Available Online (DBOL)
- ▶ 168 total ASAP airline programs reporting to ASRS (in addition to ATSAP)

Total Intake
January 1981 – April 2012

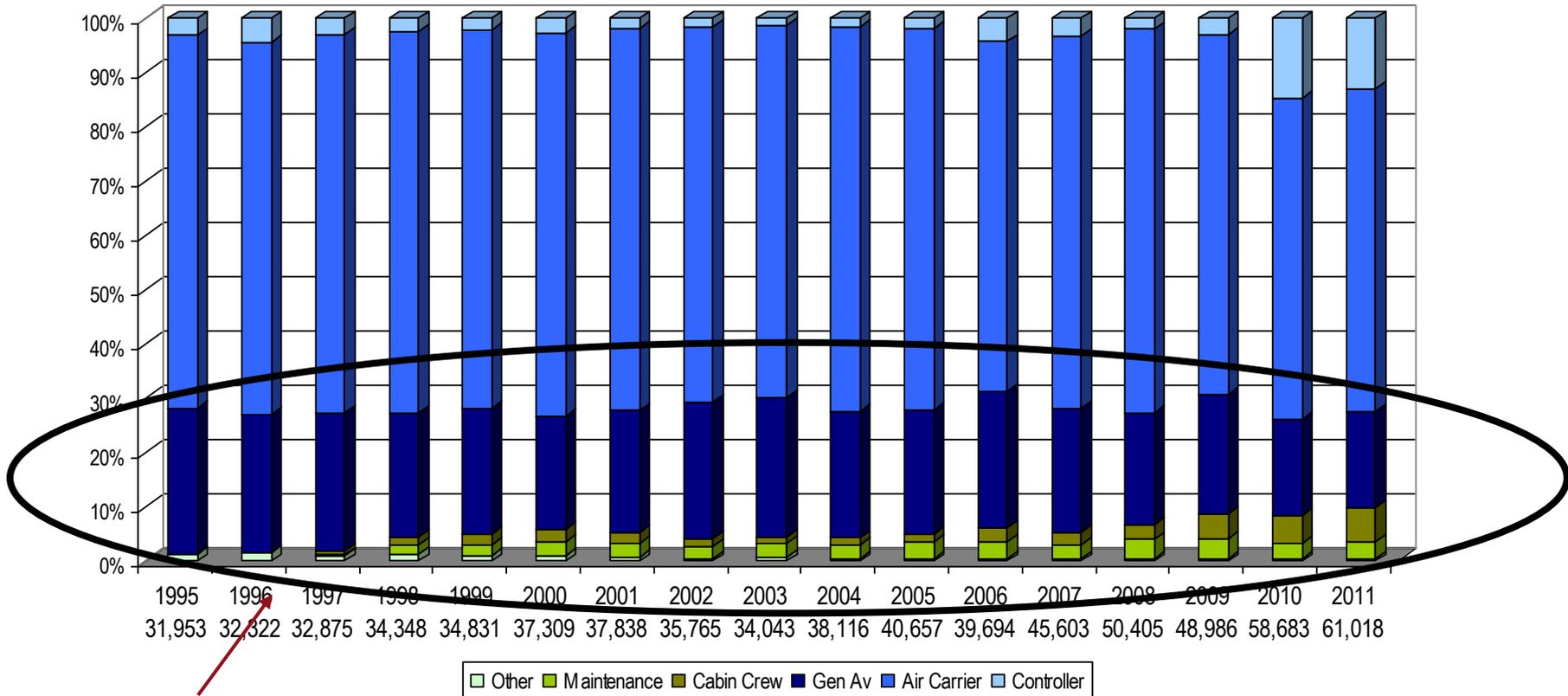


Over 5,550 alert messages issued



Incident Reporter Distribution

January 1995 – December 2011



General Aviation Reporting

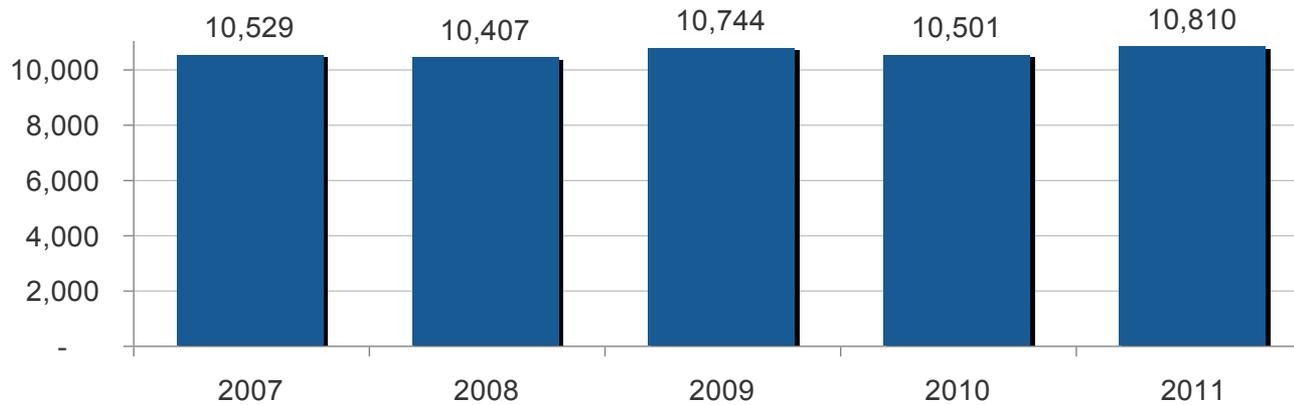


Aviation Safety Reporting System



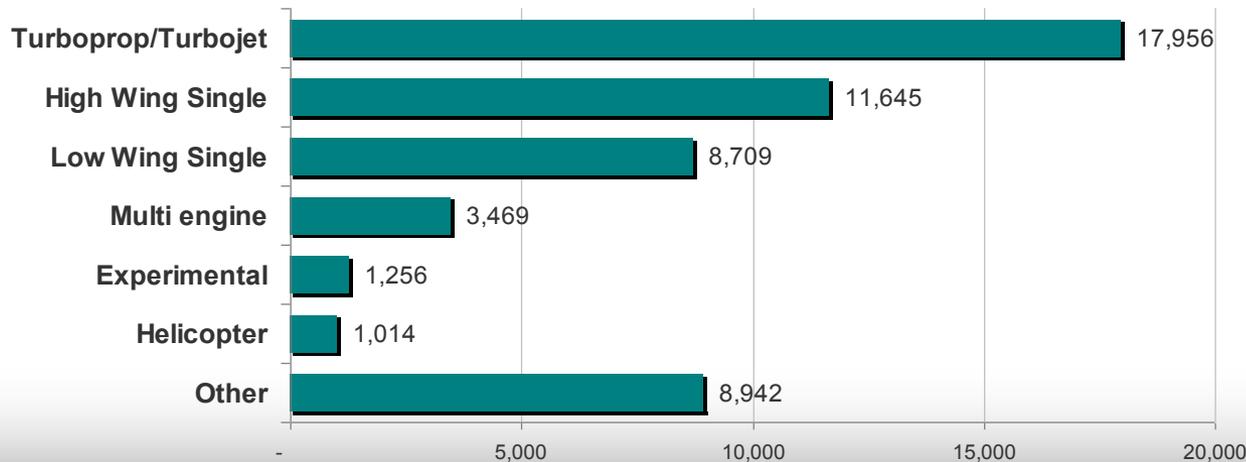
General Aviation Total Intake

2007 - 2011



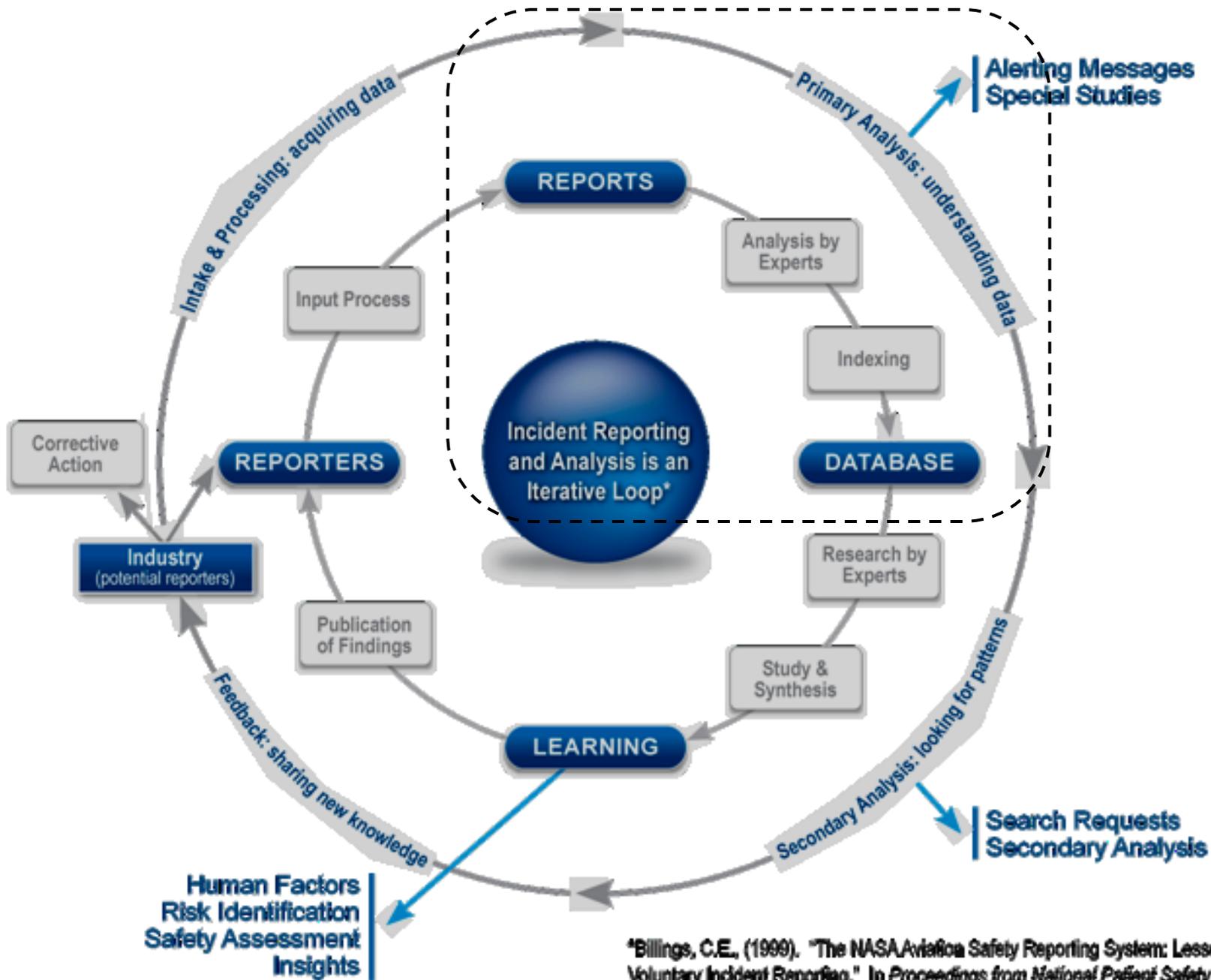
n = 52,991

Aircraft Type



Data references ASRS reports that have received full-form analysis and include the reporters' narrative.





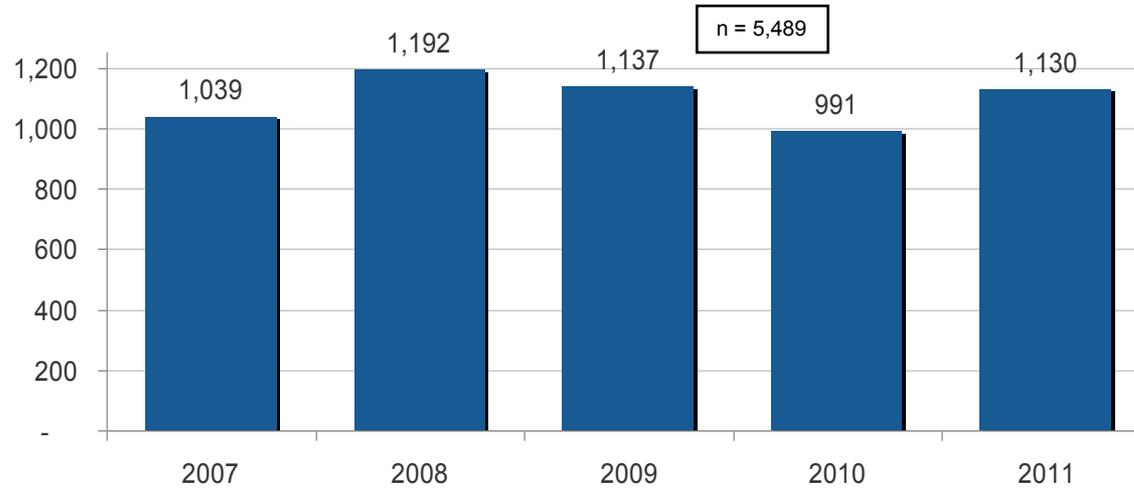
*Billings, C.E., (1999). "The NASA Aviation Safety Reporting System: Lessons Learned from Voluntary Incident Reporting." In *Proceedings from National Patient Safety Foundation Conference Enhancing Patient Safety and Reducing Errors in Health Care.*

Overview of General Aviation Incidents 2007 - 2011

n = 5,489 (Detailed Reports - Primary Analysis)

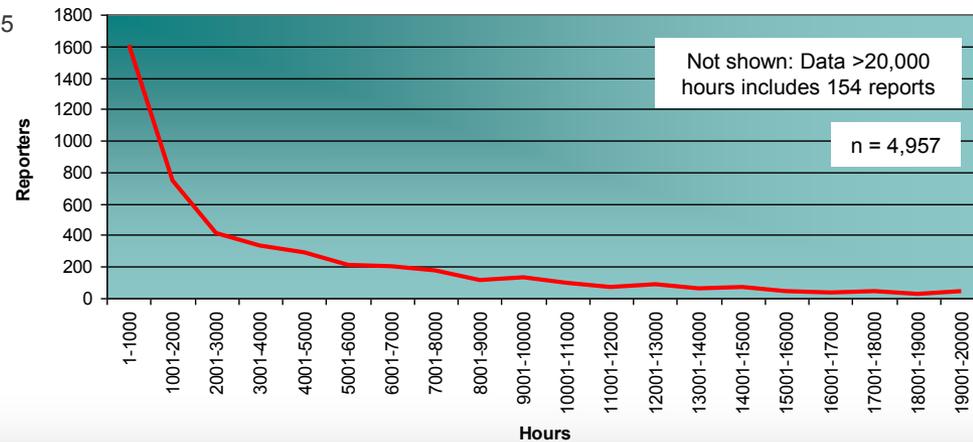
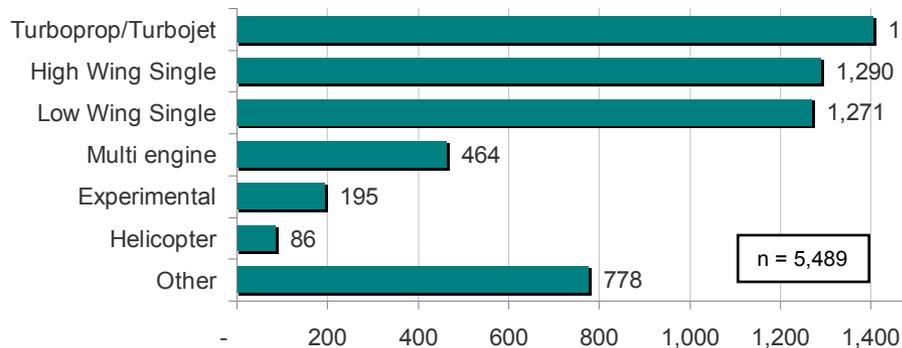
General Aviation Incidents Selected for ASRS Database

2007 - 2011



Aircraft Type

Flight Time



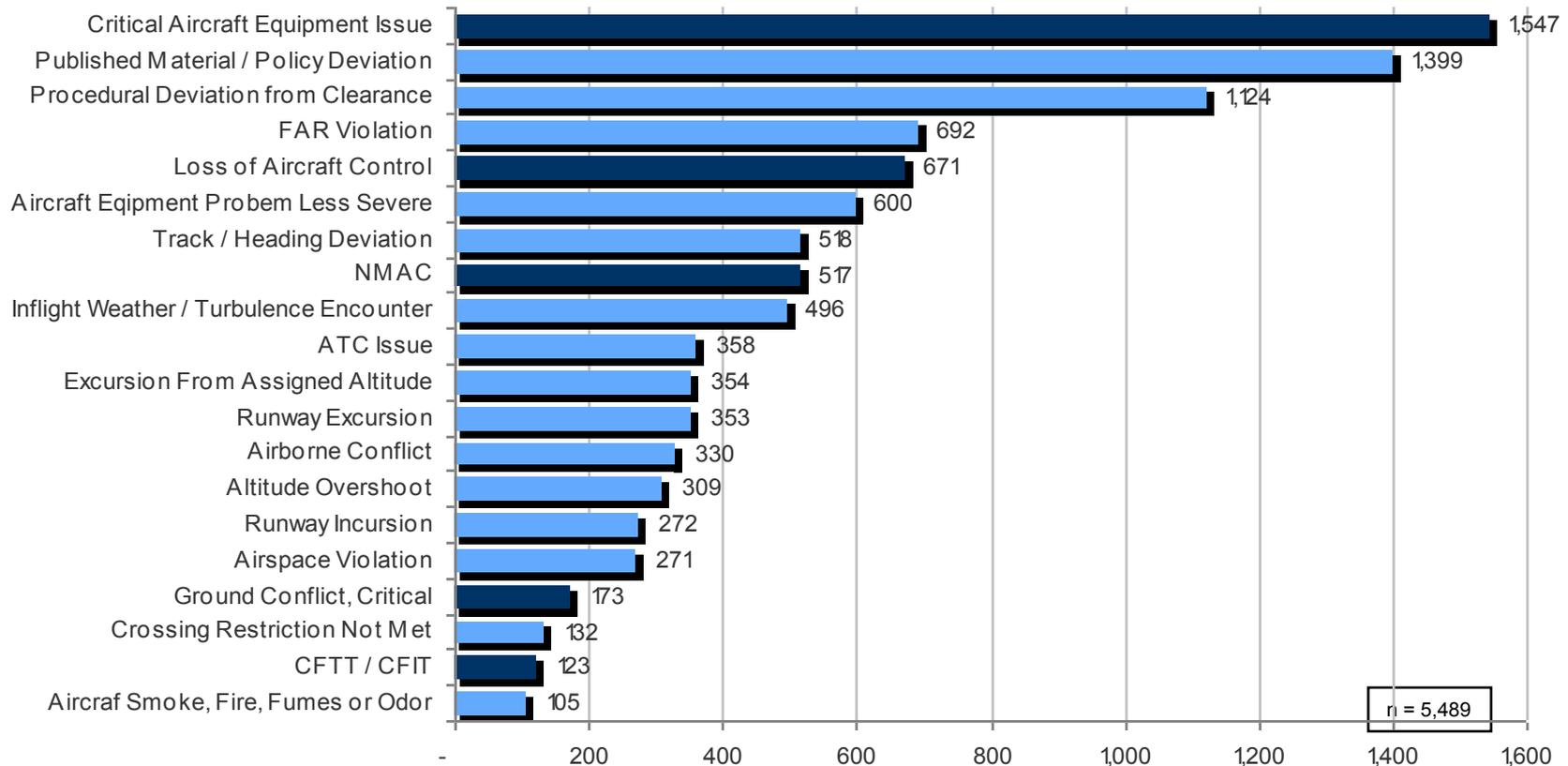
Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



General Aviation Incidents Selected for ASRS Database

2007 - 2011

Reported Anomalies*



■ 100% Primary Analysis

■ Selected for Primary Analysis



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one anomaly.
Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



Recurring GA Safety Issues Highlighted by ASRS Expert Analysts*

- ▶ **Airspace Violation Issues**
- ▶ **Gear-Up Landings**
- ▶ **Fuel Starvation**
- ▶ **Non-Towered Airport Incidents**
- ▶ **Pre-flight Issues**
- ▶ **Radio Communication Issues**
- ▶ **Technically Advanced Aircraft (TAA)**
- ▶ **Training Issues**
- ▶ **VFR in IMC**
- ▶ **Weather Briefing Issues**



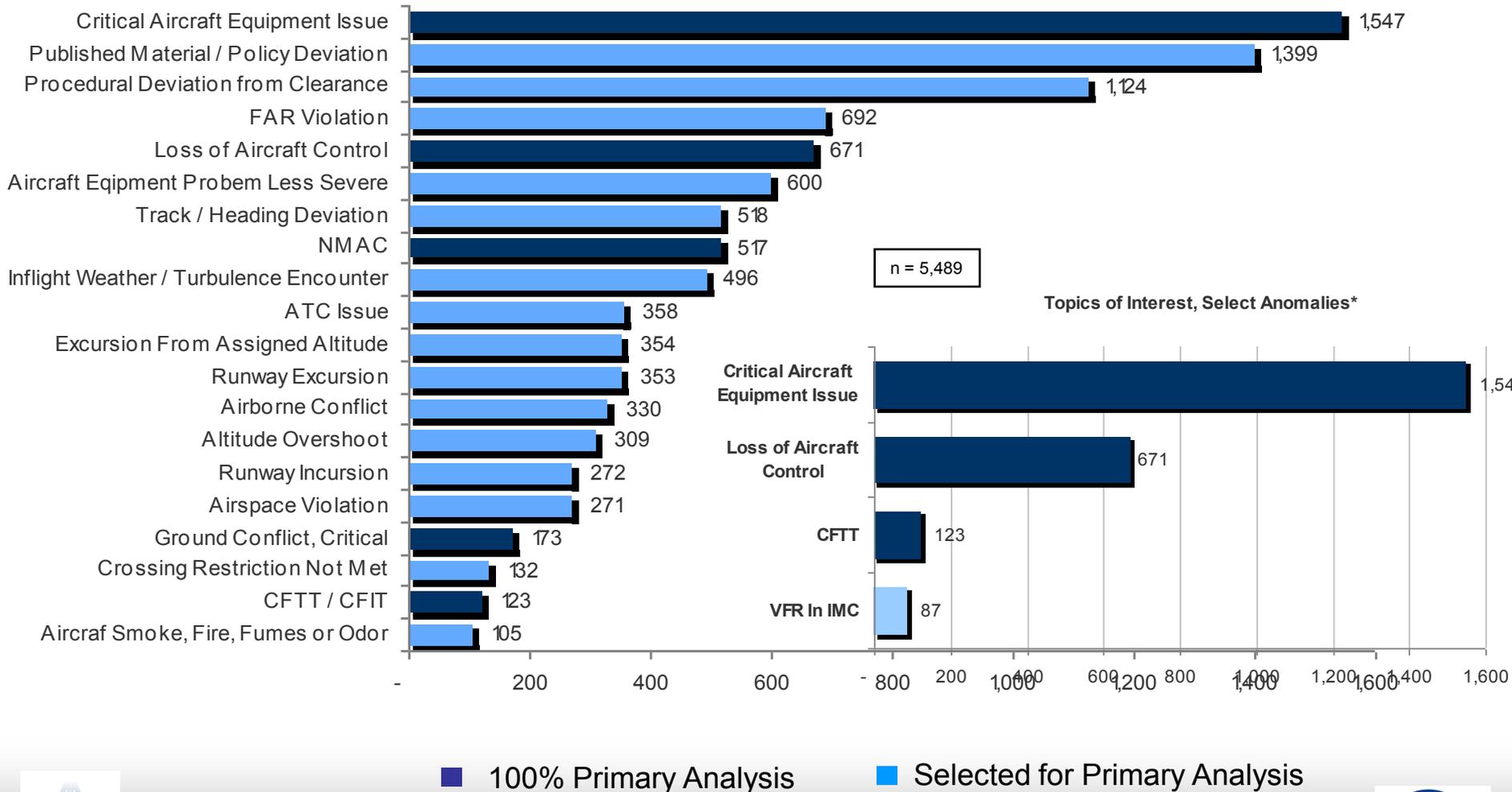
* Not in any order of priority



General Aviation Incidents - Topics of NTSB Interest

2007 - 2011

Reported Anomalies*

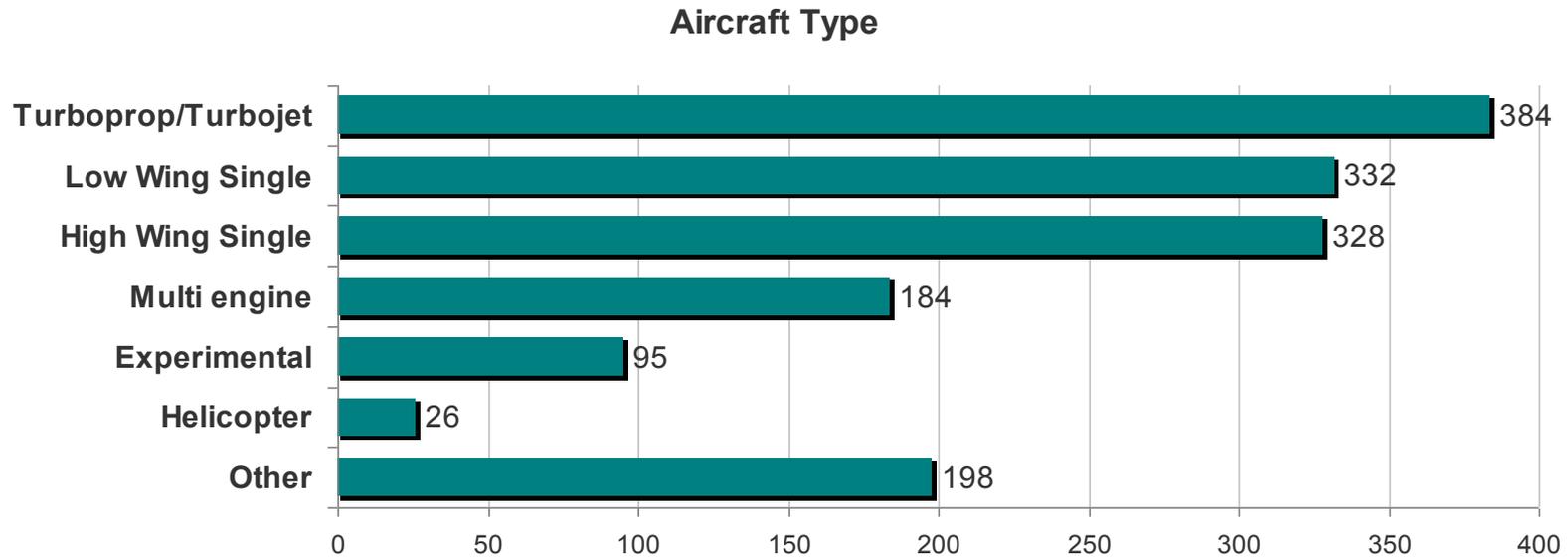


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Critical Aircraft Equipment Issue

2007 - 2011



Components Involved*

n = 1,547

Powerplant	333
Landing Gear	165
Electrical Equipment	142
Fuel System	132
Flight Controls	60

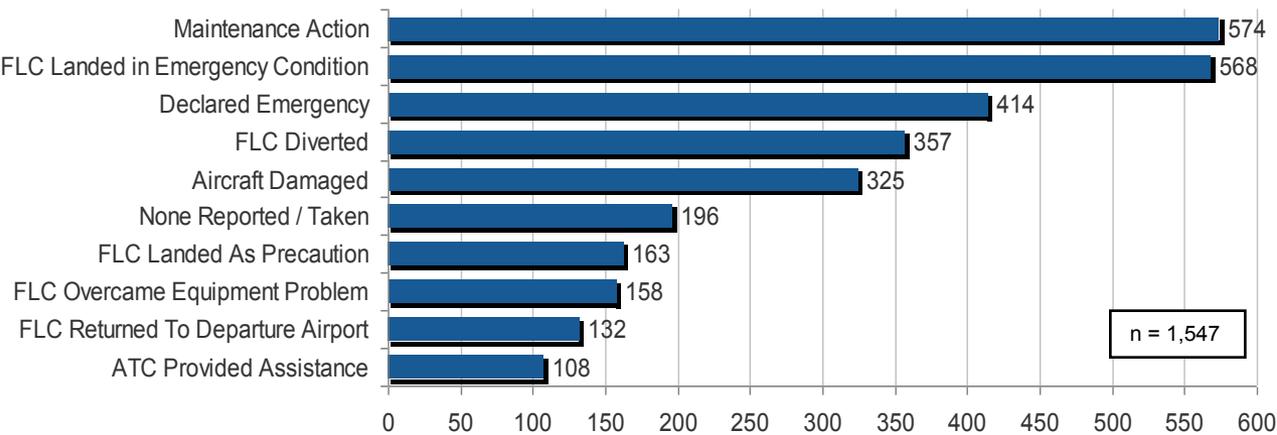
*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one component. Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



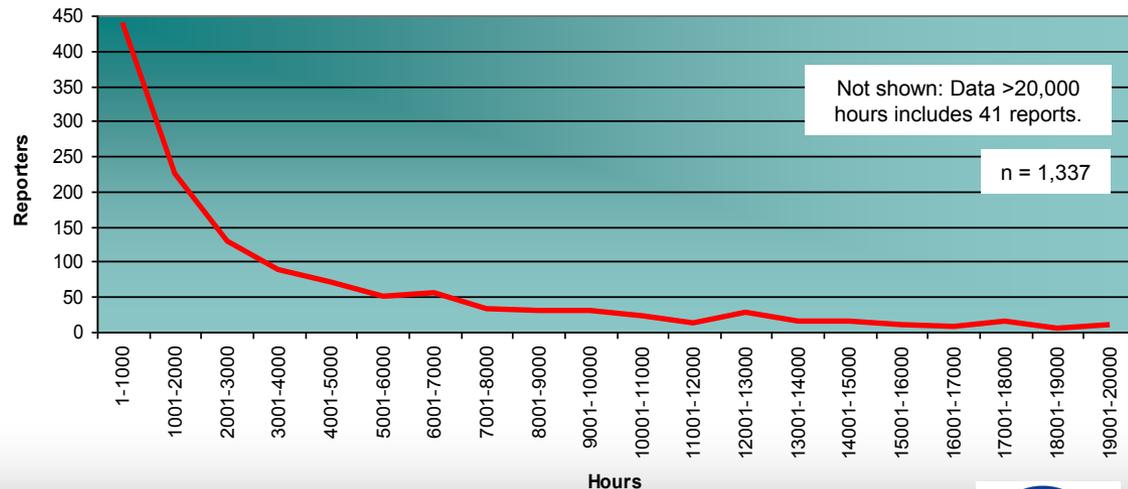
Critical Aircraft Equipment Issue

2007 - 2011

Results of Event*



Flight Time



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one result .

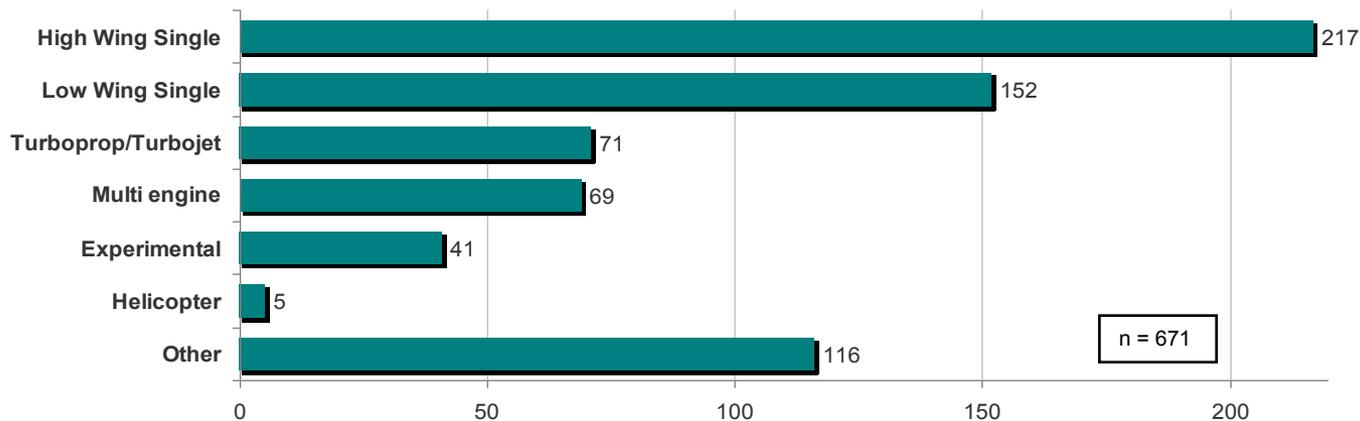
Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



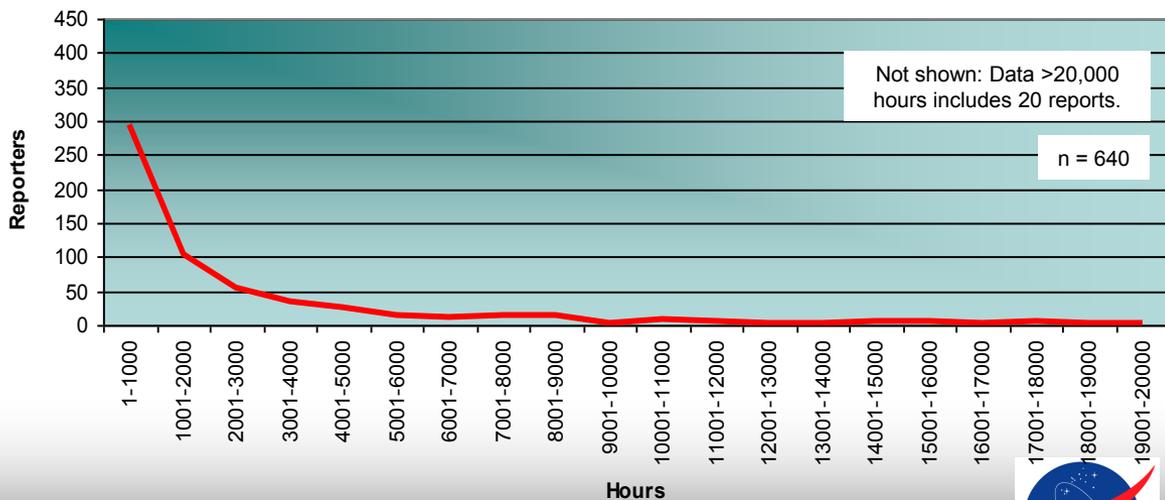
Loss of Aircraft Control

2007 - 2011

Aircraft Type



Flight Time

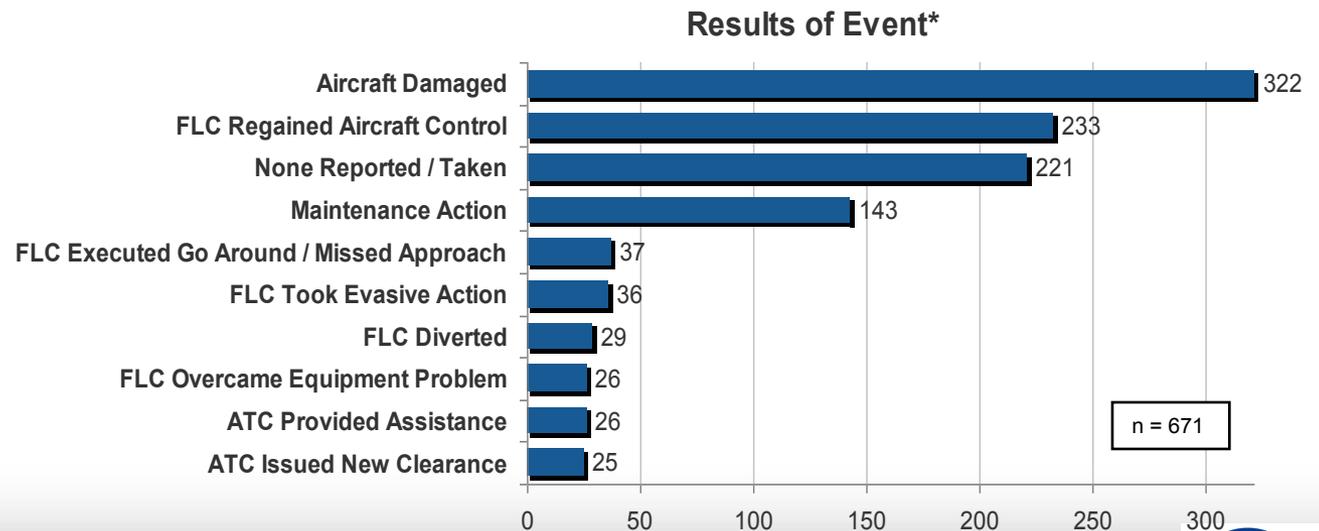
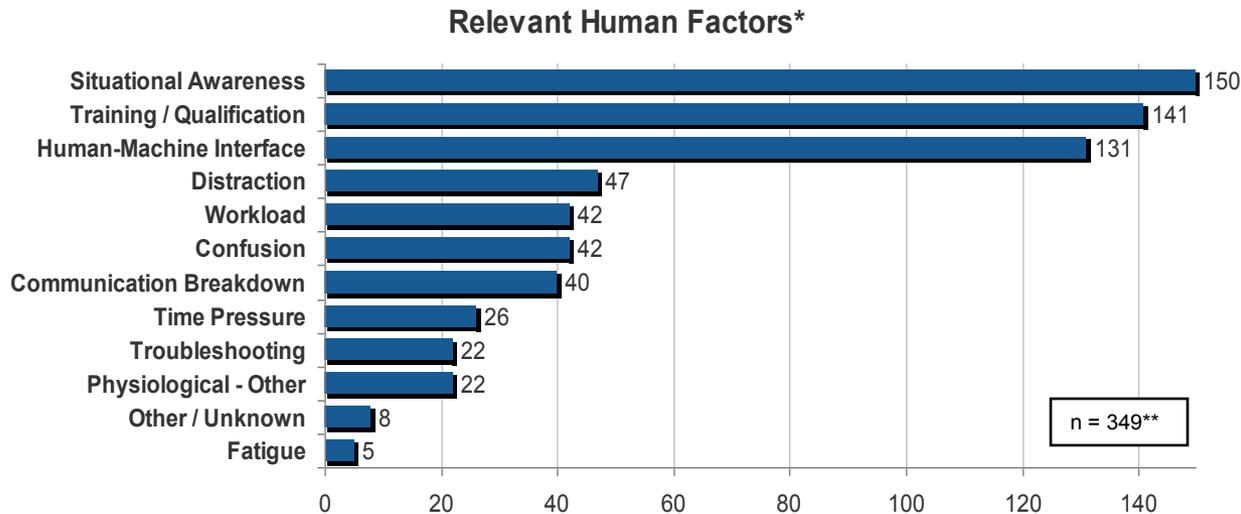


Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



Loss of Aircraft Control

2007 - 2011



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one factor or result.

**NOTE: ASRS expanded coding for specific human factors in May 2009.

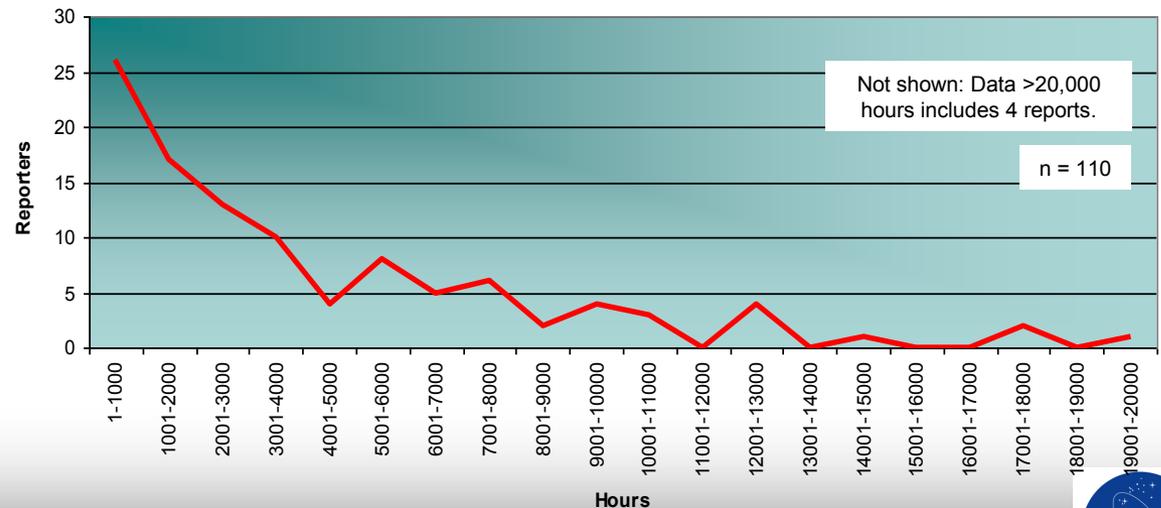
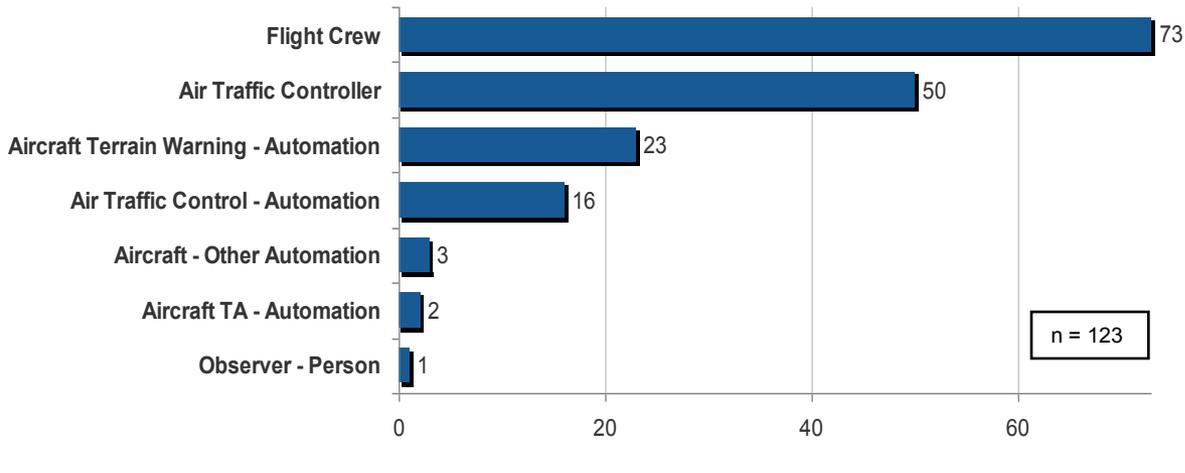
Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



Controlled Flight Toward Terrain (CFTT)

2007 - 2011

Person or Technology Detecting CFTT*



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one detector.

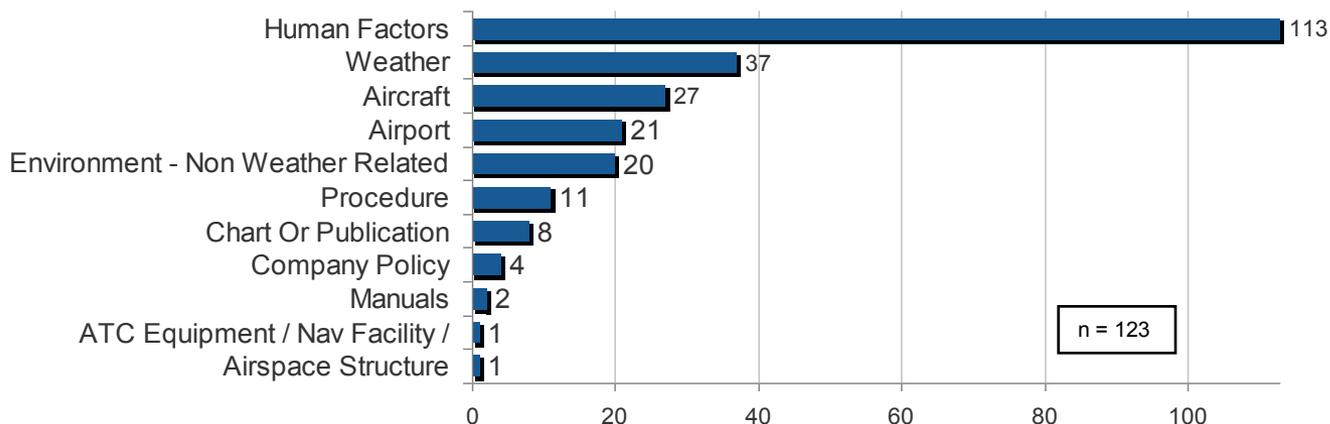
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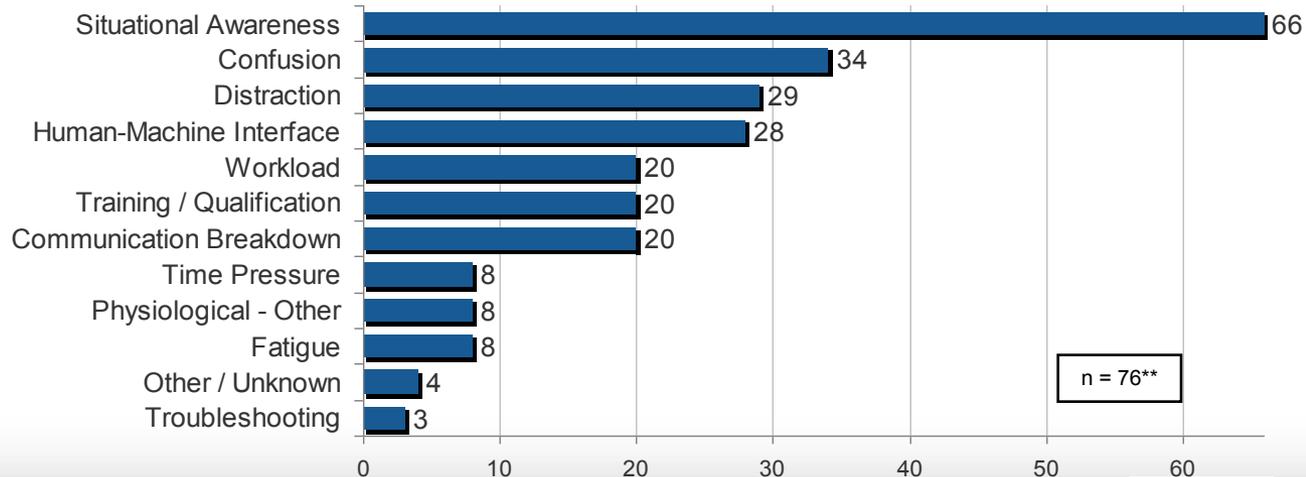
Controlled Flight Toward Terrain (CFTT)

2007 - 2011

Contributing Factors*



Relevant Human Factors*



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one factor.

**NOTE: ASRS expanded coding for specific human factors in May 2009.

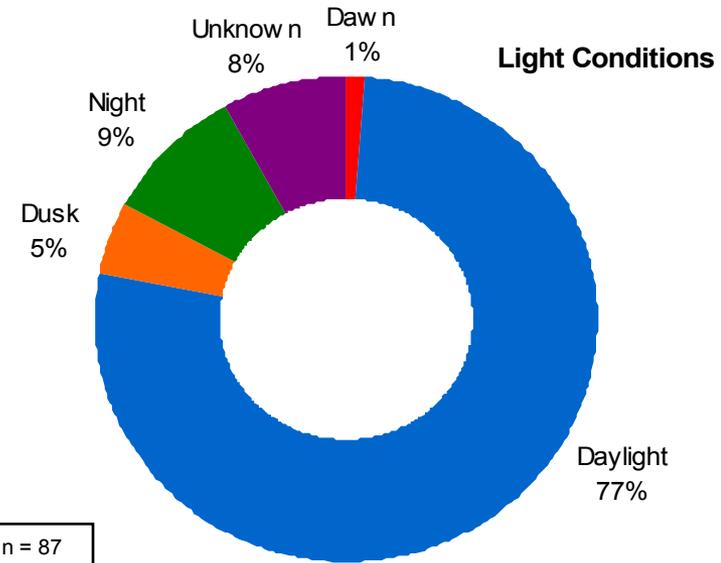
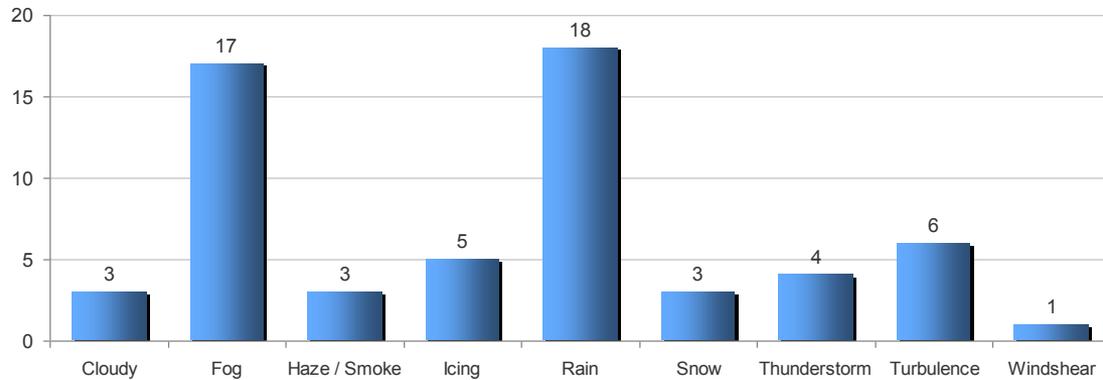
Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



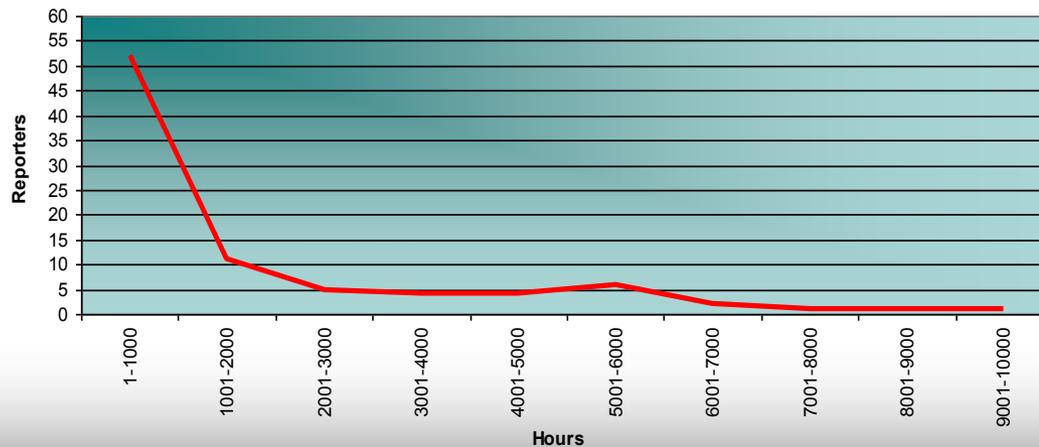
VFR in IMC

2007 - 2011

Weather Elements Reported*



Flight Time



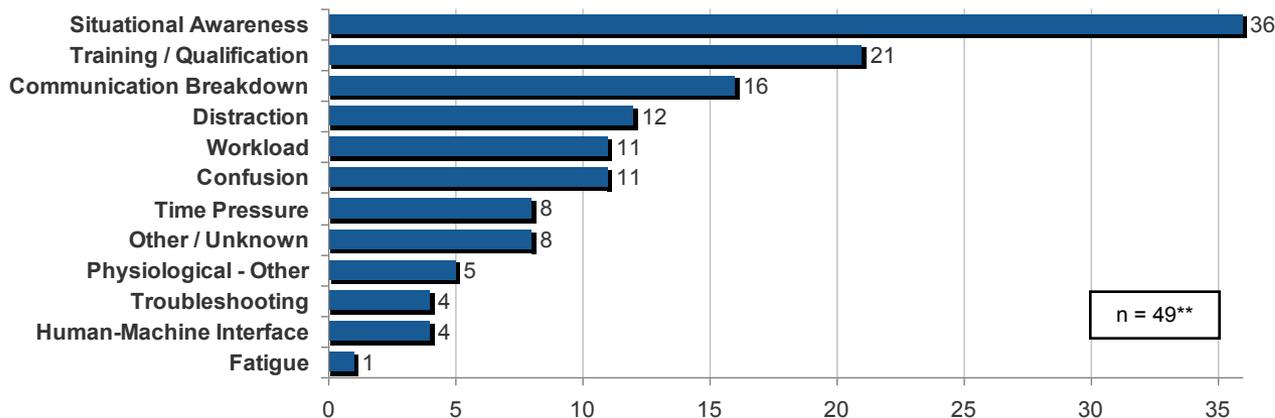
*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one weather element. Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



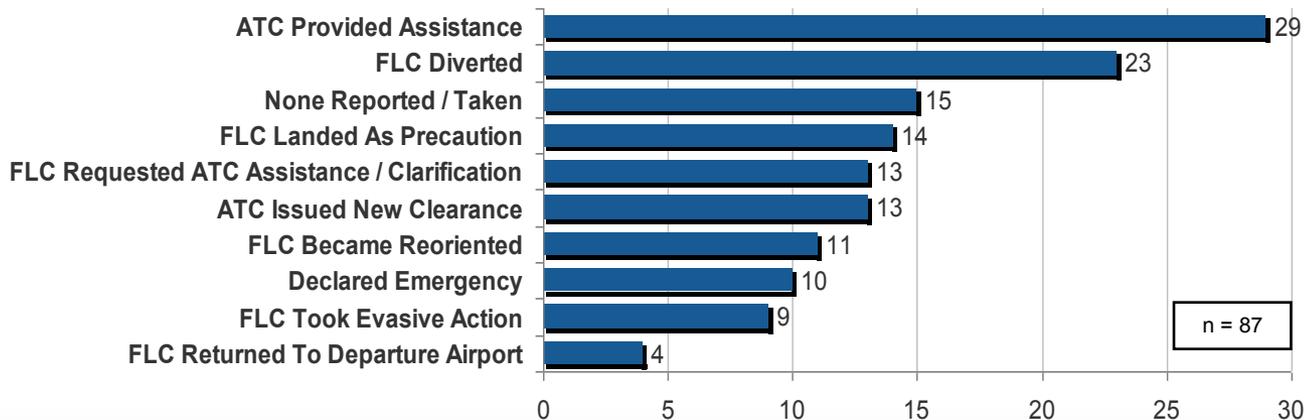
VFR in IMC

2007 - 2011

Relevant Human Factors*



Results of Event*



*Categories are not mutually exclusive. Therefore, a single incident may be coded by ASRS analysts as involving more than one factor or result.

**NOTE: ASRS expanded coding of specific human factors in May 2009.

Data references ASRS reports that have received full-form analysis and include the reporters' narrative.



Summary of Descriptive ASRS Information Concerning GA Reports

- ▶ GA Reports contribute approximately 26% of total ASRS intake.
- ▶ 100% of reports are captured at high level descriptive categorizations (7 fields).
- ▶ High hazard event categories are 100% processed through primary full analysis by ASRS Expert Analysts.
- ▶ Of all GA reports, approx. 10-12% receive primary full analysis to ASRS Database (public access online).
- ▶ Range of flight time experience in GA data shows low to mid levels for pilots.
- ▶ Critical Aircraft Equipment Issue, Loss of Control, and Controlled Flight Toward Terrain events are fully analyzed at 100% since beginning of ASRS.
- ▶ VFR in IMC events are fully analyzed only when high hazard consequences are described.



Summary of NTSB Selected Events

NTSB events of interest: Critical Aircraft Equipment Problems, Loss of Aircraft Control, Controlled Flight Toward Terrain, and VFR in IMC were specifically addressed.

- ▶ **Critical Aircraft Equipment Problems** included top 3 aircraft types - Turboprop/jet, Single Engine (high and low wing) that required maintenance action and/or landed in emergency condition.
 - Most common components involved in event were:
 - Powerplant, landing gear, electrical, fuel system, and flight controls
 - Profile of flight time experience mirrored that of total GA ASRS data
- ▶ **Loss of Aircraft Control** included higher frequency of single-engine aircraft incurring some aircraft damage.
 - Profile of flight time indicated experience in lower range
 - Human factor contributions were situation awareness, training/qualifications, and human-machine interface issues.
 - Distraction, workload, confusion and communication breakdown issues were also prominent.
- ▶ **CFTT** events were most often detected by humans (flight crew and/or ATC) vs. technology either in aircraft or ATC
 - Flight time experience was variable across profile
 - Human factor contributions were mainly issues of situation awareness, confusion, distraction, and human-machine interface.
- ▶ **VFR in IMC** events most frequently involved Rain and Fog in Daylight Conditions.
 - Flight time profile illustrates more low time ranges, but mid-range also indicated.
 - Human factor contributions included situation awareness, training/qualifications, communication breakdown, distraction, workload, and confusion.
 - Most common result of this event was ATC assistance and/or flight crew diversion.



Sample General Aviation Related Alerts



May 2011 – May 2012

Sample General Aviation Related Alerts

(7 out of 46)

- ▶ **BE-400 Horizontal Stabilizer De-Ice System Failure**
- ▶ **CE560XLS Rudder Frozen In Place**
- ▶ **P-180 Directional Control Issue**
- ▶ **C208 Wing Fuel Tank Sump**
- ▶ **TEB RUUDY 2 RNAV Departure Procedure Confusion**
- ▶ **CAE Runway 29 Hold Line Confusion**
- ▶ **VVS Airport Taxiway FOD Hazard on Taxiway Foxtrot**



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