General Aviation Joint Steering Committee (GAJSC) & GA ASIAS

Corey Stephens
GA JSC SAT Gov Co-Chair
3 August 2017

GAJSC
General Aviation
Joint Steering Committee

asias

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)

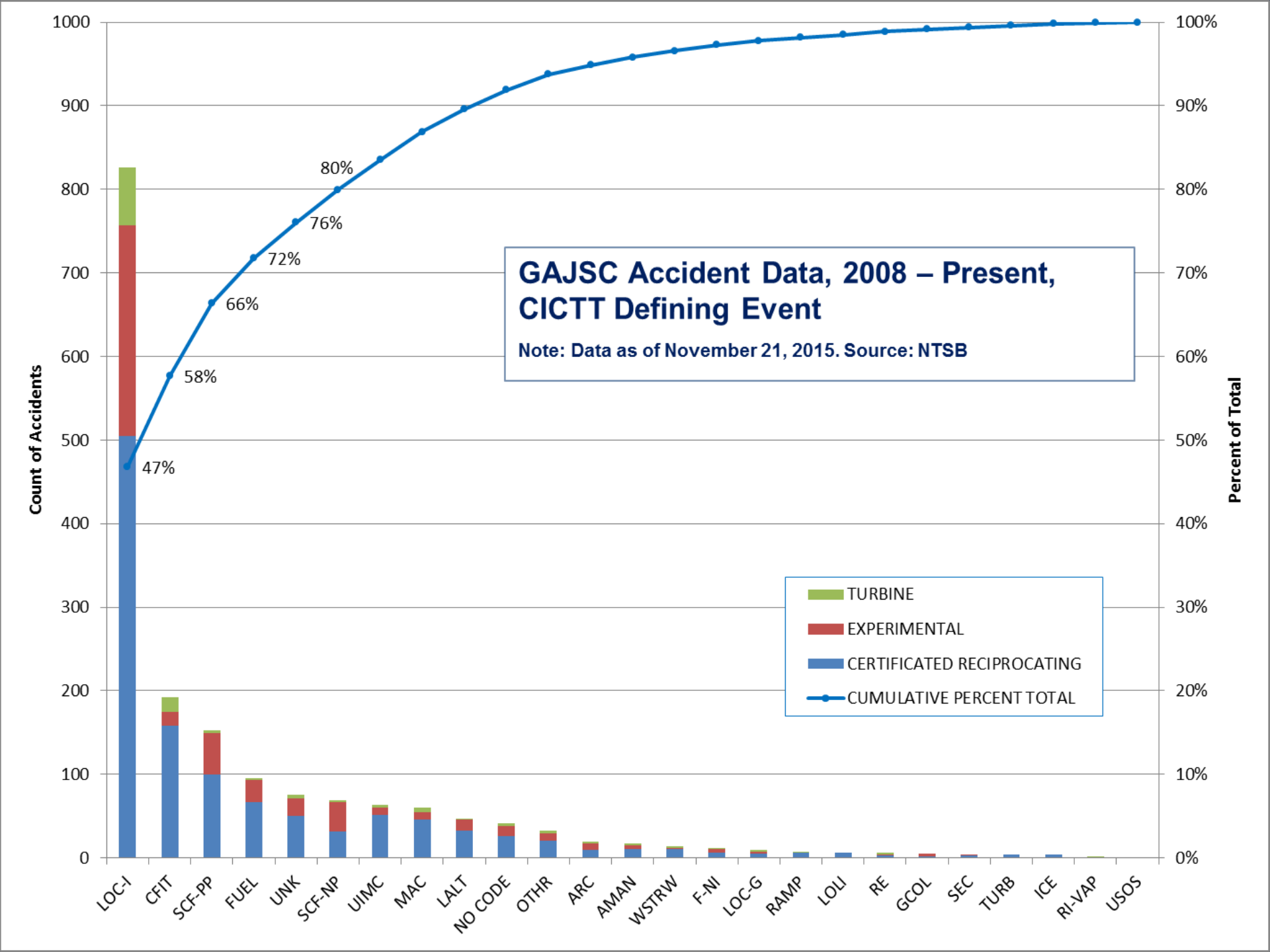
Members: FAA, AOPA, EAA, GAMA, UAA, MFGs, FAAST, NAFI, Insurance, Academia, SAFE, CAP

- 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

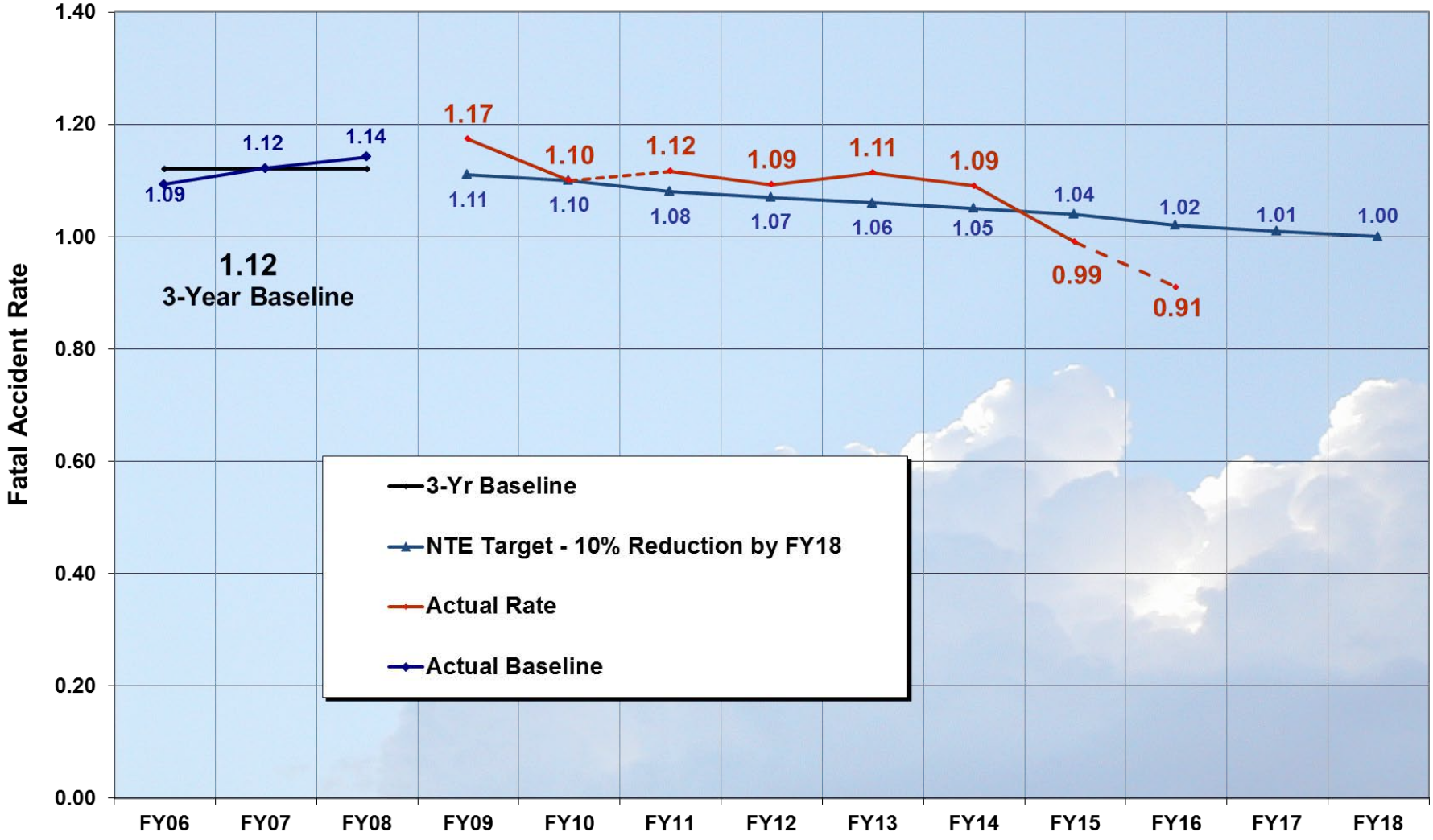
Working Groups

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

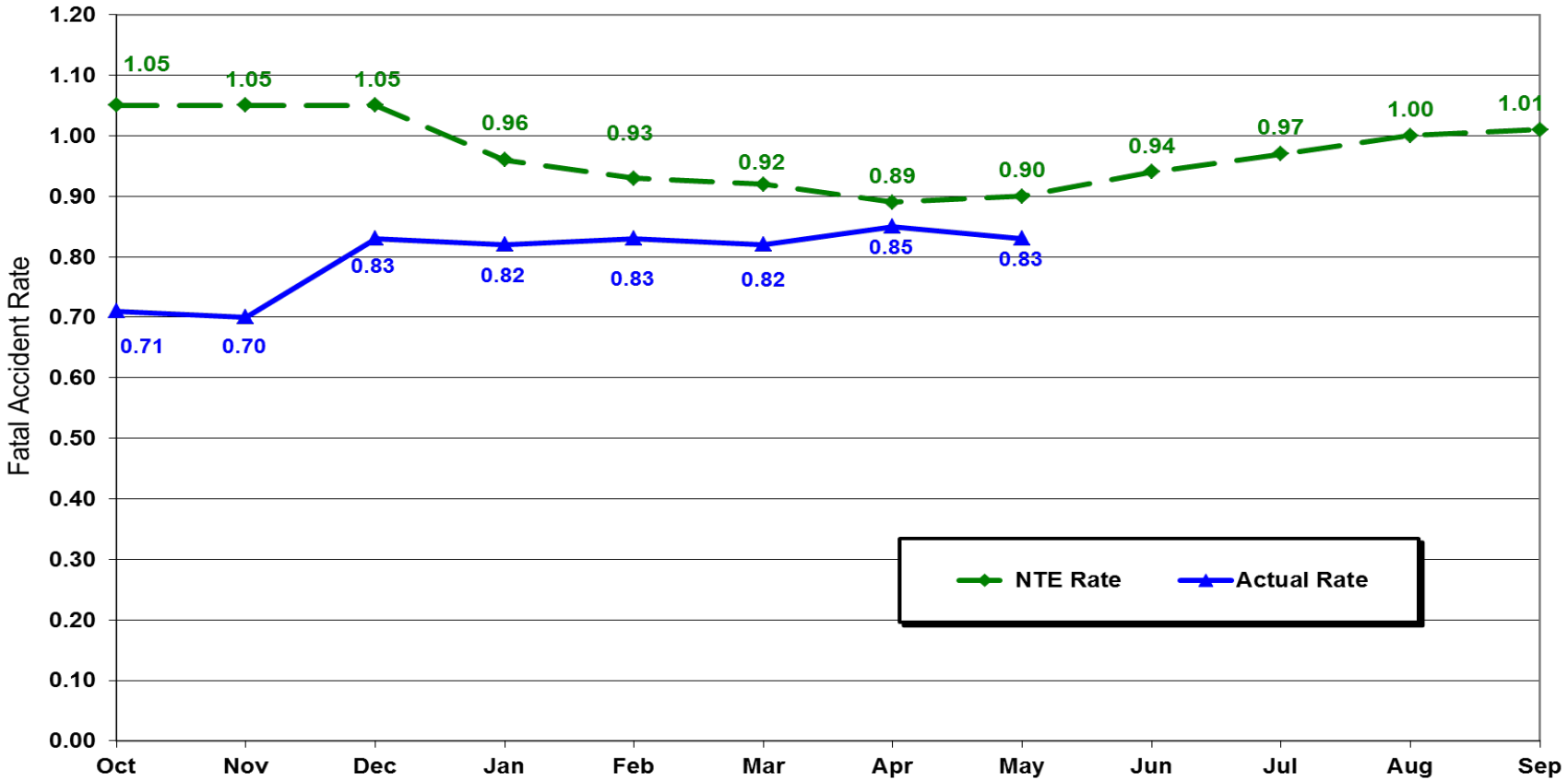
- Data analyses
- Safety enhancement
- Mitigation development


GAJSC Accident Data, 2008 – Present, CICTT Defining Event
Note: Data as of November 21, 2015. Source: NTSB
Count of Accidents
Percent of Total
1000
900
800
700
600
500
400
300
200
100
0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
47%
58%
66%
72%
76%
80%
TURBINE
EXPERIMENTAL
CERTIFICATED RECIPROCATING
CUMULATIVE PERCENT TOTAL
LOC-I
CFIT
SCF-PP
FUEL
UNK
SCF-NP
UIMC
MAC
LALT
NO CODE
OTHR
ARC
AMAN
WSTRW
F-NI
LOC-G
RAMP
LOLI
RE
GCOL
SEC
TURB
ICE
RI-VAP
USOS

AVS Safety Performance
GA Fatal Accident Rate
(Fatal Accidents/100,000 Hours)



AVS FY17 Safety Performance
GA Fatal Accident Rate
(Fatal Accidents/100,000 Hours)



* Based on Projected Hours

GAJSC – Accident Studies to Date

- **39 Safety Enhancements Developed to Date**
  - *20 completed and 18 underway*
- **LOC – Approach & Landing – First Test**
  - Finished Fall 2012
  - 23 SEs approved
- **LOC – All Other Phases of Flight**
  - Finished Fall 2013
  - 6 new SEs were approved
- **SCF–PP – System Component Failure – Powerplant**
  - Work began January 2014
  - Team finished January 2015
  - 10 SEs approved by the GAJSC

38 Data-Driven Risk Mitigations Developed So Far…

- SE-1 & 2 – AOA – New Type Designs & Existing Fleet
- SE-3 – ADM
- SE-4 – Automation
- SE-5 – Transition Training
- SE-6 – LODA
- SE-7 – Simple Procedures
- SE-8 – Training (SE-4 & 8)
- SE-9 – SOP Part 91 positioning legs, FRAT & SMS
- SE-10 – Stab App & Landing Training & Guidance
- SE-12 – Remote Airfield Cameras
- SE-13 – Weather Technologies
- SE-14 – Engine Monitoring
- SE-15 – RX Medication Effects
- SE-16 – Medical Records

38 Data Driven Risk Mitigations Developed So Far…

- SE-17 – Improve Communication between AMEs and Pilots
- SE-21 – Risk Based Review
- SE-22 – GA FOQA
- SE-23 – EAB Flight Test
- SE-24 – Single Pilot CRM
- SE-25 – Reducing Regulatory Roadblocks for New Technologies
- SE-26 – Part 23 Re-org
- SE-27 – Part 21 Review
- SE-28 – Pilot Response to Unexpected Events
- SE-30 – Med List for Pilots
- SE-31 – Test Pilot Utilization and E-AB Pilot Proficiency
- SE-32 – Airman Certification Standards
- SE-33 – GA Safety Culture
- SE-34 – LOC-I Outreach

SCF-PP Safety Enhancements

- SE-35 Direct Tension Indicators
- SE-36 Vmc Training
- SE-37 Multi Engine Cockpit Technology
- SE-39 Smart Cockpit Technology
- SE-41 Survivability
- SE-44 Maintenance Data Exchange
- SE-45 Maintenance Placard
- SE-47 A&P Education
- SE-48 Ignition Systems
- SE-49 Outreach

GA SAFETY ENHANCEMENT EXAMPLES

Use of Angle of Attack in Small Airplanes

SE-1 & SE-2

SE-1 & SE-2 – Angle of Attack Indicators

- **Angle of Attack (AoA) Equipment in Use Primarily in Turbine Airplanes**
- **Small Airplanes Rely on Other Information for Primary Aircraft State Awareness**
- **GAJSC, in Coordination with the Part 23 ARC, Places Emphasis on Enhance Aircraft State Awareness for Small Airplanes:**
  - SE-1: AoA for New Airplanes
  - SE-2: AoA for Existing Fleet

Angle of Attack Indicators

Federal Aviation Administration

Memorandum

Date: February 5, 2014

To: See Distribution List

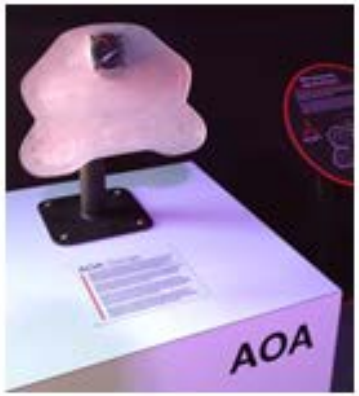
From: David W. Hempe, Manager, Aircraft Engineering Division, AIR-100 D. Hempe
James D. Seipel, Manager, Production and Airworthiness Division, AIR-200

Subject: Approval of Non-Required Angle of Attack (AoA) Indicator Systems

Memo No.: AIR100-14-110-PM01

Regulatory Reference: Title 14 of the Code of Federal Regulations 21.8(d)

AoA Success Stories



DYNON AVIONICS

BendixKing
by Honeywell

GARMIN

AoA Success Stories

- **Initial results last August indicated that GA aircraft equipped with AoA experienced greater pitch reductions during the turn-to-final portion of the their approach**
  - ***A crucial indicator of a stable approach***
  - ***Improper pitch on turn-to-final is an identified risk in loss of control accidents***
- **Subsequent research using much larger and longer-term data has continued to demonstrate this same pitch-reduction relationship**
- **A full-scale research project is now underway at the University of North Dakota to further study this (and other) AoA effects**

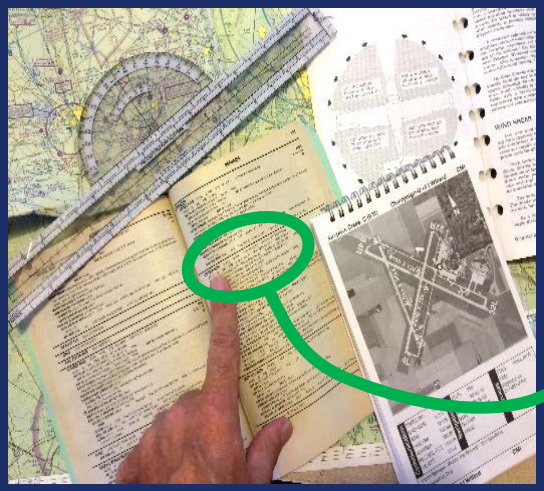
GA SAFETY ENHANCEMENT EXAMPLES

System Component Failure - Powerplant

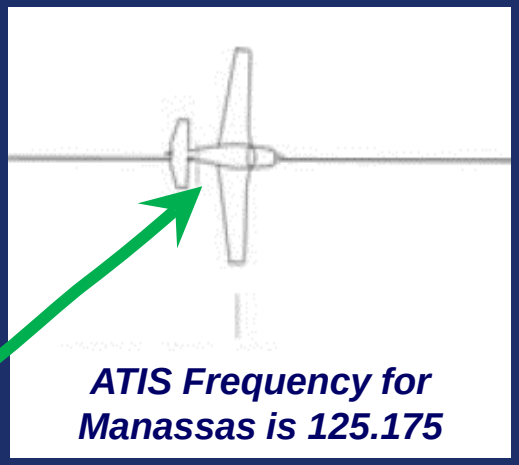
Smart Cockpit Technology

SE-39

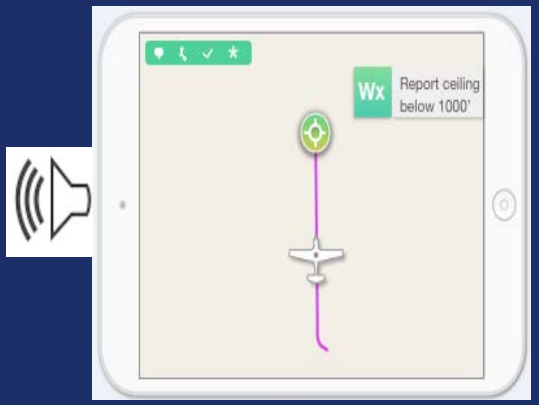
Digital Co-Pilot



Right Information



Right Time



Right Format

Digital Co-Pilot

- Several EFB suppliers are evaluating the digital co-pilot to incorporate this functionality into their products
- GA JSC and SAT have been giving input on possible additional features and capabilities
- Outreach conducted at NBAA BACE, EAA Oshkosh and other industry venues
- Response has been very positive

GA SAFETY ENHANCEMENT EXAMPLES

GA Flight Data Monitoring

SE-22

Two Paths Toward Improving Safety…

REACTIVE

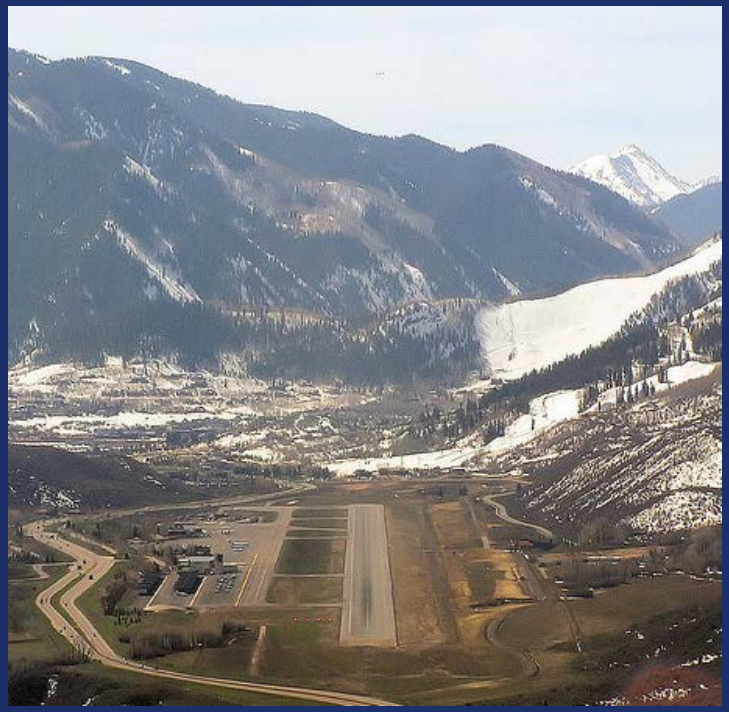
- Accident Investigation
- Historical Accident Analysis/Review

PROACTIVE

- Flight Data Monitoring (FDM/FOQA)
- Pilot Reporting
- SMS

ASIAS moves from REACTIVE Analysis to PROACTIVE Analysis

From “What WENT wrong?”



To “What COULD go wrong?”

ASIAS Is a Key Component of Continuous Improvement in Aviation Safety

Aviation Safety Information Analysis and Sharing (ASIAS)

A collaborative government and industry initiative on data sharing and analysis to proactively discover safety concerns before accidents or incidents occur, leading to timely mitigation and prevention

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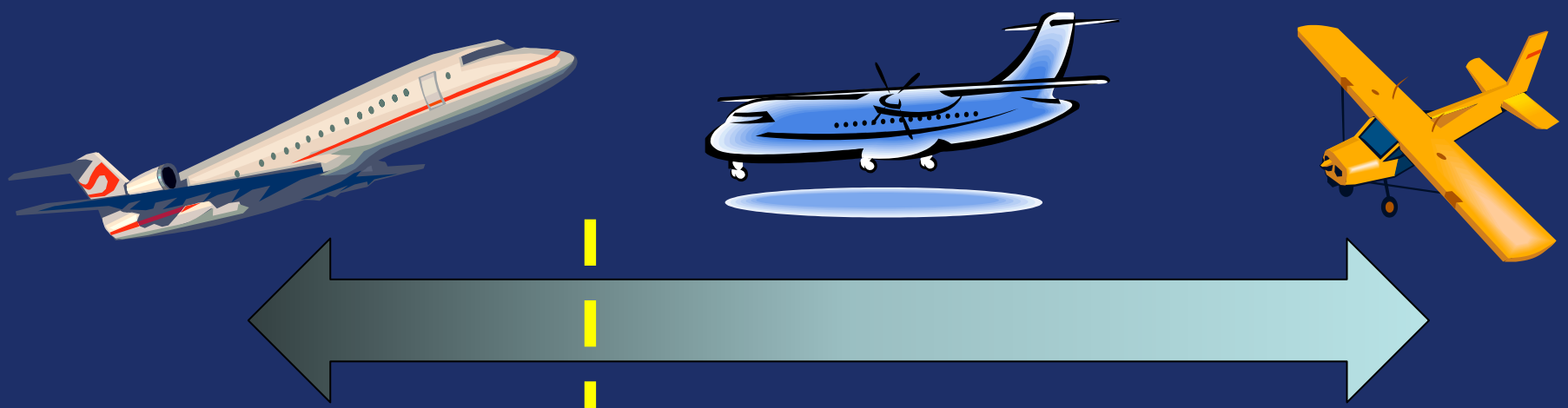
Two Paths for GA Flight Data…



FOQA

NGAFID

- Avionics (G1000, etc.)
- Installed Recorders
- Apps – iOS & Android (AHRS & ADS-B)
- Portable Devices (GPS units)

National General Aviation Flight Information Data Base (NGAFID)

- **Vehicle for GA community to contribute their data into ASIAS**
- **Benefits to the community:**
  - Provides the capability for the individual contributor to analyze their specific flight data
    - Flight playback capability
    - Identification of potential risks discovered in their own flight data
    - Ability to view yourself against the greater GA community
    - Free of cost
- ***De-identified data is regularly uploaded to ASIAS***

General Aviation Contributors

Operators

56 Corporate/Business

10 Universities

~170 Individuals

Fleet

1300+

Jets/Twins

- **Size ranges from one to several hundred**
- **50+ airframe models**
- **All major GA airframe manufacturers**
- **Operating under Parts 91, 91K, 135 and 141**

300+

Piston

General Aviation Data

- **Safety reports**
  - 17,000+ events
- **FOQA**
  - 44,000+ flights
- **National General Aviation Flight Information Database (NGAFID)**
  - 420,000+ flights
  - 715,000+ flight hours

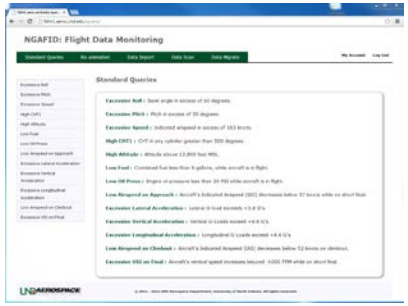
Flight Recording Devices

- **Glass Panel (G1000, etc.)**
  - Able to record to SD card or USB
  - Can upload data directly to NGAFID

- **Traditional Instruments**
  - Apps – iOS & Android
    - Can Include AHRS & ADS-B
  - Portable Devices (GPS units)
  - Installed Recorders

GA ASIAS

Pilot Tools



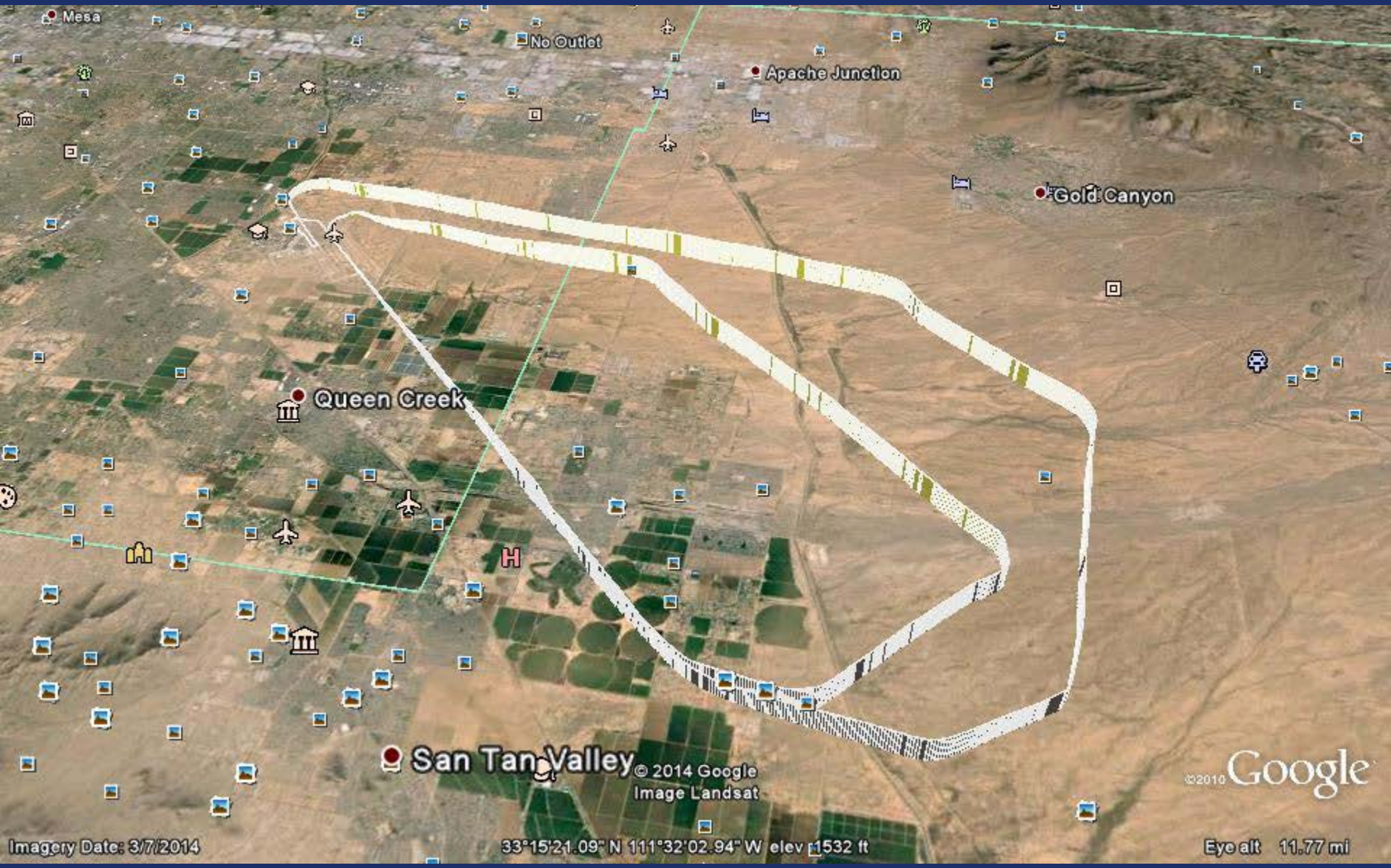
Data Sources

AHRS (Opt.)

NGAFID

ASIAS


53:21.03
MANEUVERING SPEED
110 KIAS
WARNING
N12345
ANN TEST
ALT BAT
AVIONICS
NAV
HDG
ALT
GARMIN
TAS 104 KTS
GS 000 KTS
29.82
287
001/000
010 NM
HDG BUG
ALT BUG
VSI BUG
BARO SET
CENTER
HDG SYNC
COM
CRS BARO
RANGE
PAN
FMS
FUEL PUMP
BEACON
NAV LIGHT
PITOT HEAT
LAND LIGHT
TAXI LIGHT
STROBE LIGHT
FLIGHT DIR
INSTR BRT
CABIN FLOOD
OPEN
CLOSE
DOORS
BRAKES
NAV 109
RPM
EGT c
FUEL GAL
VACUUM
ALTIMETER


Mesa
No Outlet
Apache Junction
Gold Canyon
Queen Creek
San Tan Valley
© 2014 Google
Image Landsat
©2010 Google
Imagery Date: 3/7/2014
33°15'21.09" N 111°32'02.94" W elev 1532 ft
Eye alt 11.77 mi


© 2014 Google
©2010 Google
Imagery Date: 3/7/2014
33°18'45.57" N 111°40'07.67" W elev 1347 ft
Eye alt 4329 ft

Additional Work Accomplished

- **“Exceedances” have been developed for the Cessna 172 , 182, Piper Archer fleets – In process for the King Air fleet**
- **Tools are being developed to make it easier to look at trends across a fleet**
- **Reanimation tools have been built to utilize X-Plane or reanimate in a web browser**
- **Looking at lessons-learned sharing activities for the broader GA pilot community, GA fleet operators and flight training providers – *University/Flight Training Info Share in September***
- **Meeting later this month to develop exceedances for several additional fleet types – *Embraer, Piper, Cessna, Beech, Cirrus***

Additional Work Accomplished

- **Conducted outreach last week at EAA Airventure in Oshkosh, WI**
- **Avionics in the experimental and amateur built (EAB) community are very capable and can record data**
- **Identified additional fleets that are interested in participating – *Including Diamond aircraft, several Van's RV models***
- **Interest from additional avionics manufacturers and EFB suppliers**
- **Looking at ADS-B data input and what possible future could be possible**

Questions?