General Aviation Joint Steering Committee (GAJSC) & GA ASIAS

Corey Stephens
GA JSC SAT Gov Co-Chair
3 August 2017
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
AVS Safety Performance
GA Fatal Accident Rate
(Fatal Accidents/100,000 Hours)

1.12 3-Year Baseline

- 3-Yr Baseline
- NTE Target - 10% Reduction by FY18
- Actual Rate
- Actual Baseline
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

Memorandum
Date: February 5, 2014
To: See Distribution List
From: David W. Hempe, Manager, Aircraft Engineering Division, AIR-100
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
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 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

ATIS Frequency for Manassas is 125.175

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.
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

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

- 1300+ Jets/Twins
- 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

Data Sources

Pilot Tools

NGAFID

ASIAS

AHRS (Opt.)
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?