

# *Review of Incidents and Accident of Aircraft with Inflatable Restraints*



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# Agenda

- *AAIR Applications*
- *AAIR Versions in Service*
- *In Service Metrics*
- *Incidents*
- *Accidents*
  - *Minor*
  - *Major*



# Transport Applications (Part 25)

- *Over 27 Commercial Airlines Worldwide*
- *Top Users: Virgin Atlantic; Air Canada  
Singapore; Cathay Pacific*
- *Airbus: A380; A340; A330  
A319 / 320 / 321*
- *Boeing: B747; B777*
- *Bombardier CRJ 700 / 900*
- *BAE Systems Jetstream 41*



# *General Aviation and Light Sport*

*Adam Aircraft A 500 / 700*

*American Legend Cub*

*Aviat Husky*

*Cessna 172 / 182 / 206*

*Cirrus SR 20 / 22*

*Cub Crafters Sport Cub*

*Diamond DA40*

*Lancair IVP*

*Mooney GX / Bravo Dx / GX*

*Piper PA 28 / 32 / 34 / 44*

*Sport Air*

*Zenair CH 601 / 2000*



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# *AAIR Design Versions in Service*

- *V1.0 February 2001 (updated to V23 in 2005)*

- *Front Row Econ.*
- *TC for J-41 Fleet*
- *6 Airlines Worldwide*



- *V1.5 February 2002*

- *Front Row Econ.*
- *Special Economy*
- *Selected Airbus, Boeing, Bombardier*

## *AAIR Design Versions in Service (continued)*

- *V25 October 2003*
  - *Premium Class (all)*
  - *Side Facing "Nested" Seats*
  - *B/C Pod Seats*



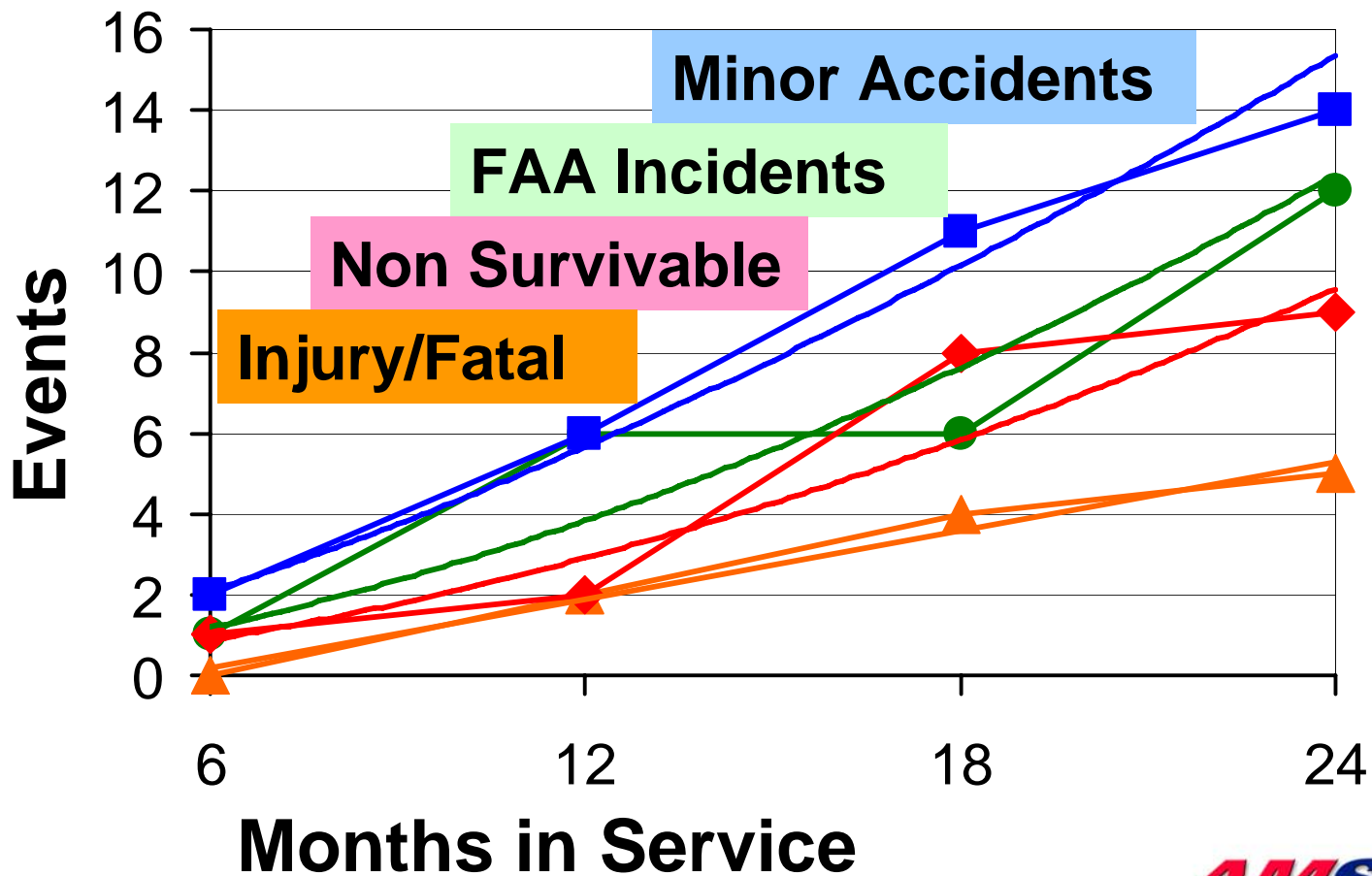
- *V23 Fall 2004*
  - *Single Engine GA*
  - *3 and 4 point restraints*
  - *Supplemental (not req. to meet 23.562)*



## *AAIR Field Status (as of June 2007)*

- *Total Seat Placements Shipped:* 17,779
  - *Commercial (Part 25):* 6,953
  - *General Aviation (Part 23):* 10,826
- *GA Seat Placements Reported in Service:* 9,416
- *GA Aircraft Reported in Service:* 3,568
- *Additional Aircraft Enter Service at Rate ~134 / month  
(14 month average, June '06 to Aug. '07)*

# Event Statistics





## *Example - Impact Tests with and without AAIR*

Videos Deleted

## *Event Distribution (from July '07 data)*

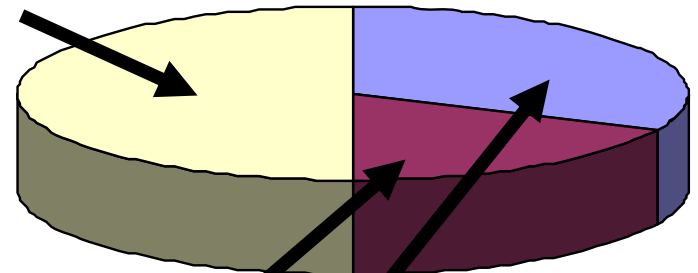
Incident Rate = 40 incidents / 3568 aircraft in service (1.1 %)

Serious/Fatal Accident Rate = 14 accidents / 3568 aircraft in service (0.39 %)

No Injury Accidents: 50 %

Injurious/Fatal accidents: 18 %

Non Survivable Accidents: 32 %



# *FAA Incidents and Very Minor Accidents*

- *Minor Aircraft Damage*
- *No Injuries*
- *Typical Scenarios:*
  - *Hit Fence*
  - *Strike Propeller*
  - *Veer Off Runway*



- *No AAIR Deployments*



# *Minor Accidents with Major Damage*

- *Very Minor Injuries*
- *Scenarios:*
  - *Run Through Ditch*
  - *Strike Trees, Burned*
  - *Flip Over at Low Speed*
- *No AAIR Deployments*



Inflator Auto-Ignition Functioned Perfectly





# *Injurious Accidents*

- *Flight into Terrain*
  - *Seat not Locked in Place*
  - *Insufficient Elevation*





# *Injurious Accidents (continued)*

## The Dunn County News

"Occupants Lucky to Survive Plane Crash" by Joel Becker.

*" According to Charles' brother, Rick McGuire, who is a 36-year pilot, licensed instructor, former airline pilot, and attorney, said, "My brother's doing real well. They put his foot back on. He can wiggle his toes." Rick said it is fortunate the plane had a number of safety features, adding that the inflatable shoulder harness airbag probably saved his brother's life. "*



## Concluding Remarks

- *Non-Survivable Accidents are most often caused by Icing. One mid-air collision has occurred. AAIR deploys on these events, but impact is beyond human tolerance or occupant space is compromised.*
- *NTSB is conducting a Safety Study of airbag performance in survivable accidents. AmSafe is cooperating with this study.*
- *No performance or benefit conclusions are made regarding injurious accidents as the NTSB study is in progress and the Factual Reports for several accidents are pending.*
- *Regarding minor incidents, crash sensor threshold appears appropriate. The AAIR has not deployed in minor longitudinal impacts.*