Improving Cabin Safety via Turbulence Planning and Communication

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Problem Statement

- Turbulence remains the number one culprit of injuries for flight attendants and passengers.
- Advancements in turbulence forecasting, data uplink/downlink, EFB applications, and onboard radar detection have led to improvements.
- Improved communication of threats and information to the cabin has yet to occur: when, how severe, how long?


<table>
<thead>
<tr>
<th>Year</th>
<th>PAX</th>
<th>Crew</th>
<th>Total</th>
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<td>8</td>
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<td>2010</td>
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<td>2015</td>
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General Aviation (part 91, 135)

- Turbulence incident reporting not published by FAA and NTSB for continuous safety improvement (only Part 121)

- Incident reports concerning corporate aircraft turbulence events are usually published from oversees aviation agencies (EASA, Spanish Civil Aviation and Incident Investigation Commission, Civil Aviation Authority of China)

- Most operators prefer avoidance of the risk of turbulence in flight planning i.e. willingness to burn fuel for comfort vs. airlines with flight efficiency is the baseline for flight plans

- Flight attendants not required on any size aircraft with 19 seats or less (per FAA)
Current State

Dispatch perspective

• 121.601 states how the aircraft dispatcher must provide available information pertaining to turbulence during planning and flight following.
  ➢ 135 and 91 do not have such mandates. Why shouldn’t business aviation maintain this standard, regardless of regulation?

• The word “turbulence” is rarely mentioned in corporate aviation audit manuals/protocols

• Dispatchers and schedulers are in a position to serve as an excellent source of information as the “hub” of most flight departments.
Current State

Crew perspective

• Part 91 and Part 135 - flight attendants not required nor recognized by the FAA. (FAR 91.533)

• Passengers have a tendency to ignore seatbelt signs
  ➢ “It can’t happen to me” mentality
  ➢ Most annoyed by multiple seatbelt chimes enroute.

• Even in Part 121, FA’s are not always included in weather briefings.

• Emphasize FA personal safety - Secure cabin and galley items to minimize injury risk - turbulence will win
Advancements for Enroute

...not yet leveraged in the cabin

Turbulence Forecast Advancements
• EDR Turbulence guidance
• Public: NCAR’s Graphical Turbulence Guidance
• Private: WSI, Schneider Elec, Meteostar

Downlink/Uplink Information
• Aircraft observation assimilation into models and monitoring tools
• Push notifications to cockpit

EFB/Tablet Applications
• Business Aviation: ARINCDirect, WSI Pilotbrief, Jeppesen, ForeFlight, etc.
• Commercial: Panasonic 4dAero, Honeywell Wx Info Service, WSI, or in-house solutions

Cabin communication
• Pilot audio notification (tone, seatbelt sign, phone)

Sources: Rockwell Collins - Commercial Systems and ARINCDirect
Proposed Changes

Improved pre-flight briefings with crew, pax

• Inclusion of entire crew in pre-flight briefings
  ➢ Pre-Departure Risk Assessment with all crew members
  ➢ Share relevant information with pax

• Utilize the talent and tools already in place. Dispatchers and schedulers have varying backgrounds.

Flight Briefing Example:

IMPORTANT NOTES
WEATHER ALERT FOR . . . . A LOW LEVEL VOLCANIC ERUPTION IS TAKING PLACE FOR MT. YASUR IN VANUATU. NO IMPACT EXPECTED. MODERATE TURBULENCE IS EXPECTED WEST AND SOUTHWEST OF CALIFORNIA DUE TO A STRONG JET AND TROUGH MOVING IN.

PLEASE NOTE RUNWAY CLOSURES AT YSSV, YBBN, PHTO & KLAX. ALSO SEE CLOSURE TIMES AT KOAK. SEE NOTAMS FOR DETAILS.

Sources: ARINCDirect ITS flight brief
Proposed Changes

Education and Training

- Improve crew performance thru better crew communication - CRM
- Develop training program to address turbulence - establish best practices in SMS and SOP’s - risk assessment form
- Training of crew members, schedulers, and dispatchers for utilization of graphical weather resources and situational awareness tools
  - Public resources: e.g. GTG over US airspace
  - Private subscriptions: weather apps, flight planning services (w/ weather integrated), etc.

Sources:
- NOAA’s aviationweather.gov GTG product
- ARINCDirect.com
Proposed Changes

Encourage inflight tool usage

- Flight attendant access to enroute graphical weather applications for situational awareness
  - Short Legs (<2hrs): data downloaded pre-flight relevant, useful
  - Longer legs (>2hrs): Ability to download recent data would be ideal
- Push notifications received by both cockpit and cabin, or at a minimum share information with cabin
- Training for utilization of new tools

Sources:  - NOAA's aviationweather.gov GTG product on iPad display
  - ARINCDirect iPad App
Proposed Changes

Expanded NBAA Guidelines

- Address in NBAA Management Guide and SMS programs.
- Work closely with other NBAA Committee’s promoting better communication of weather risks.

Sources: enter sources here