



Flight Data Monitoring
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FLIGHT DATA MONITORING

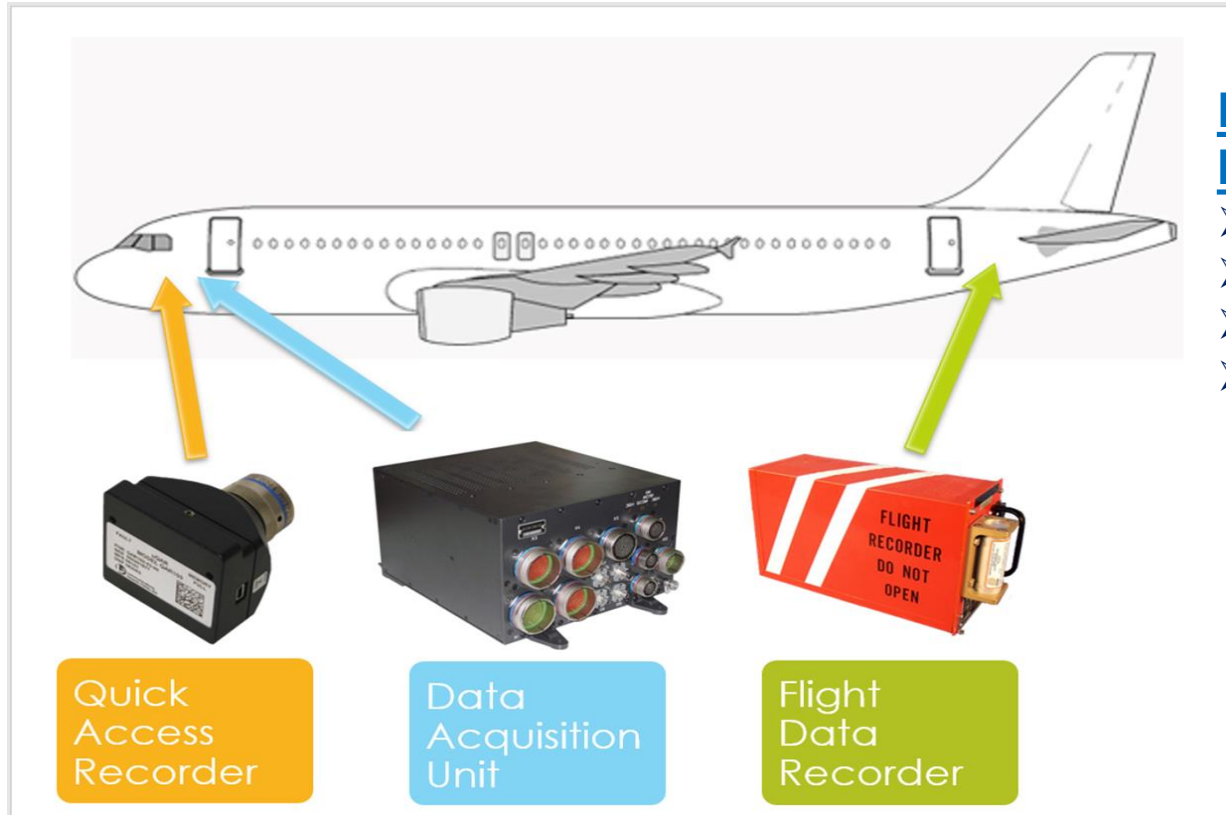
- What is FDM.
- Data Flow
- Benefits of FDM
- Innovative uses of FDM
- Advantages of outsource FDM programs
- Safety Issues
- Case Study



Flight Data Monitoring (FDM) Program or Flight Operations Quality Assurance (FOQA) Program

- *“A proactive and non-punitive program for gathering and analyzing data recorded during routine flights to improve flight crew performance, operating procedures (SOP’s), aircraft maintenance, fuel monitoring, ATC procedures.”*
- *FDM - records data on every aircraft on every flight.*
- *FOQA - records data on only some aircraft. Sample data is primarily used for statistical trending.*
- **ICAO mandated 2005 (TOW 27 tons), EASA required, The FAA, CAA’s and NBAA strongly recommends** all operators to have FDM.
- FDM is an important component of an SMS. FDM is reviewed as part of an IOSA audit.

FDM Data Hardware



Recorder Media

- Optical Disks
- PCMCIA card
- Flash Card
- Wireless

FDM benefits



- 1. Standardization of SOP's:** With a large diverse fleet and diverse pilot group FDM can ensure that all crews are operating to the same safety standards. High Pilot demand- Decreasing experience levels. (Estimates indicate Bizav will require 96,000 new pilots by 2038. source AERO SPACE FRAeS magazine Nov. 2018)
- 2. Maintenance:** All aircraft are monitored for structural exceedances (flap overspeed, hard landings, engine). Maintenance can monitor engine trends to determine component failure and be proactive to schedule convenient maintenance. Save money due to reduced down time.
- 3. Fuel:** Fuel use monitoring. Efficient use of fuel will save money. Monitor high Engine fuel burn (engine or airframe problem).

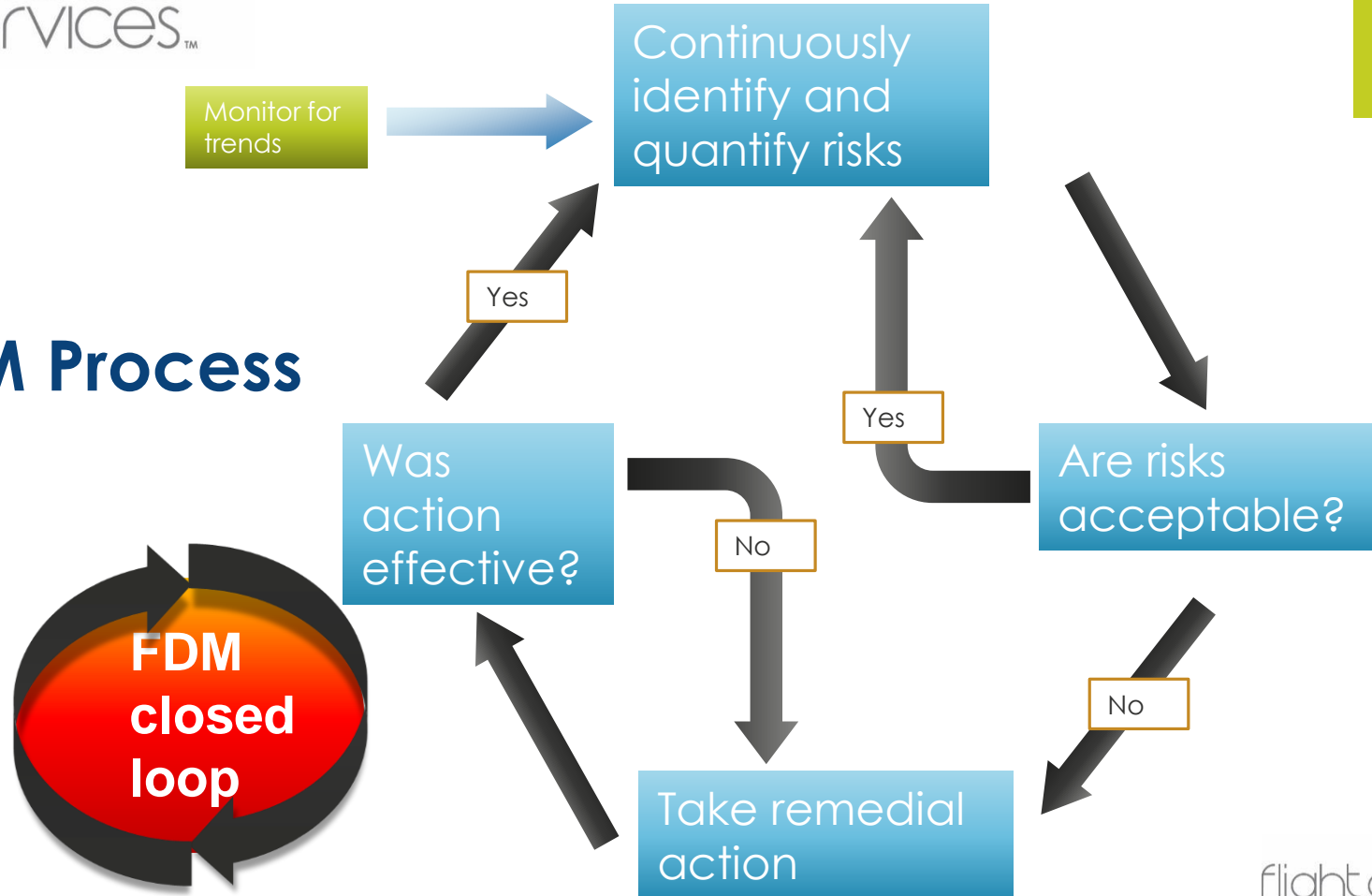
FDM benefits continued



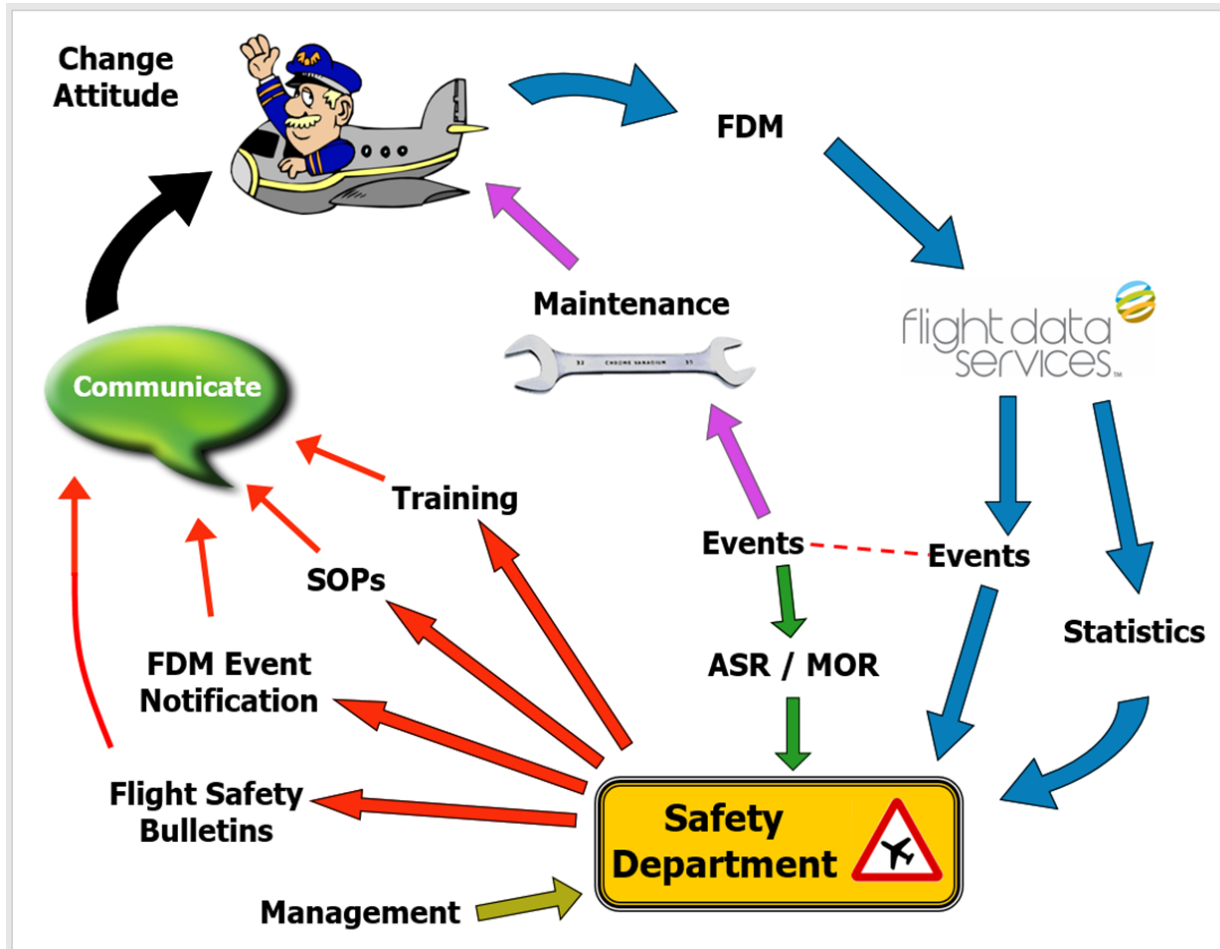
- 4. Fatigue:** Preliminary studies indicate that FDM will be a useful tool for monitoring pilot fatigue and thereby helping to manage efficient crew rostering.
- 5. Statistical trending** of crews, aircraft, airports **for the entire operation** and comparative analysis with other similar aircraft and operators, IATA FDX program.
- 6. Insurance** companies offer reduced cost for FDM programs



FDM Process

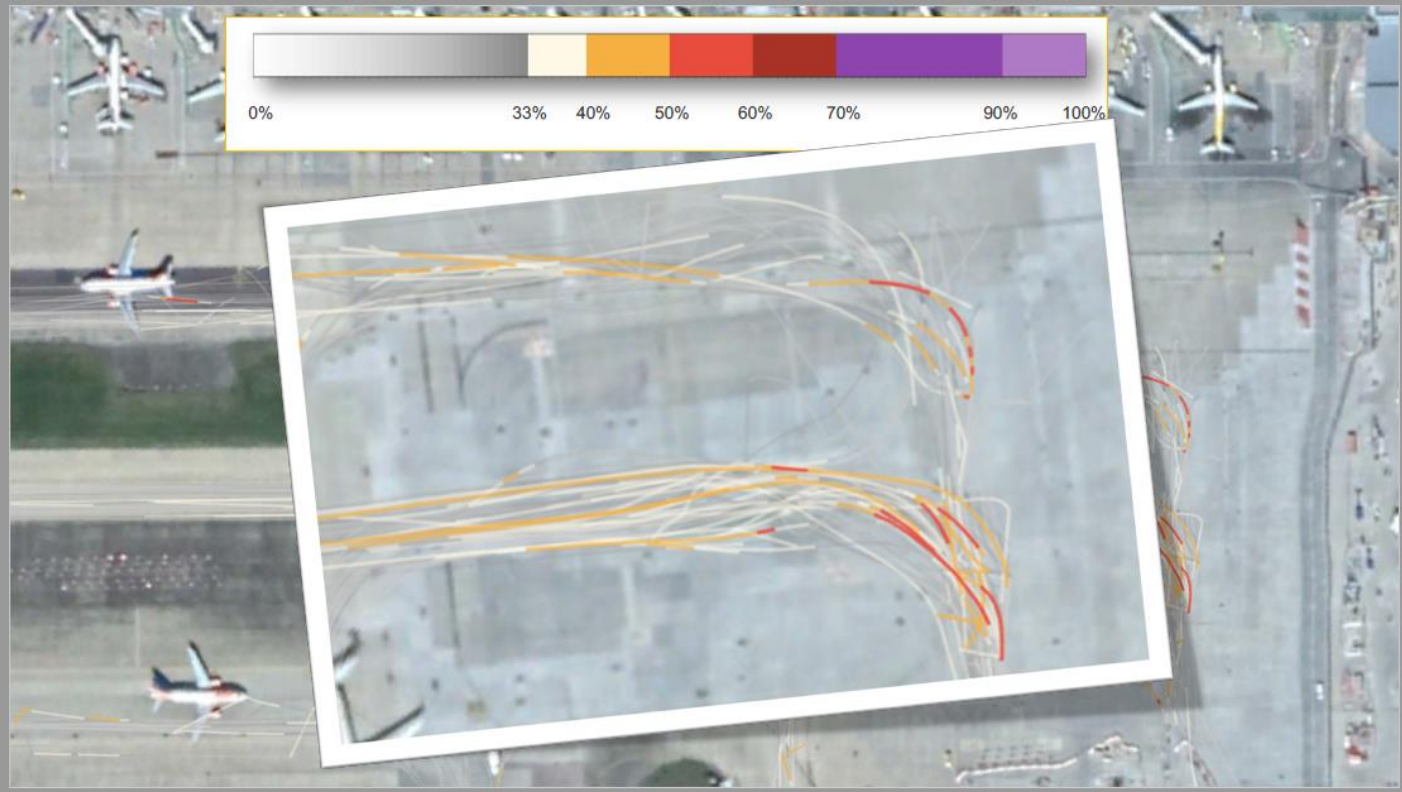


Continuous Cycle of Inputs and Outputs

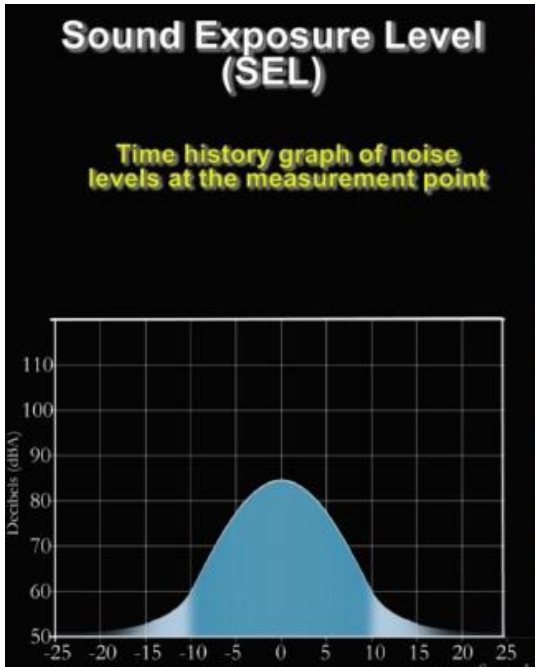


Innovative uses of Flight Data

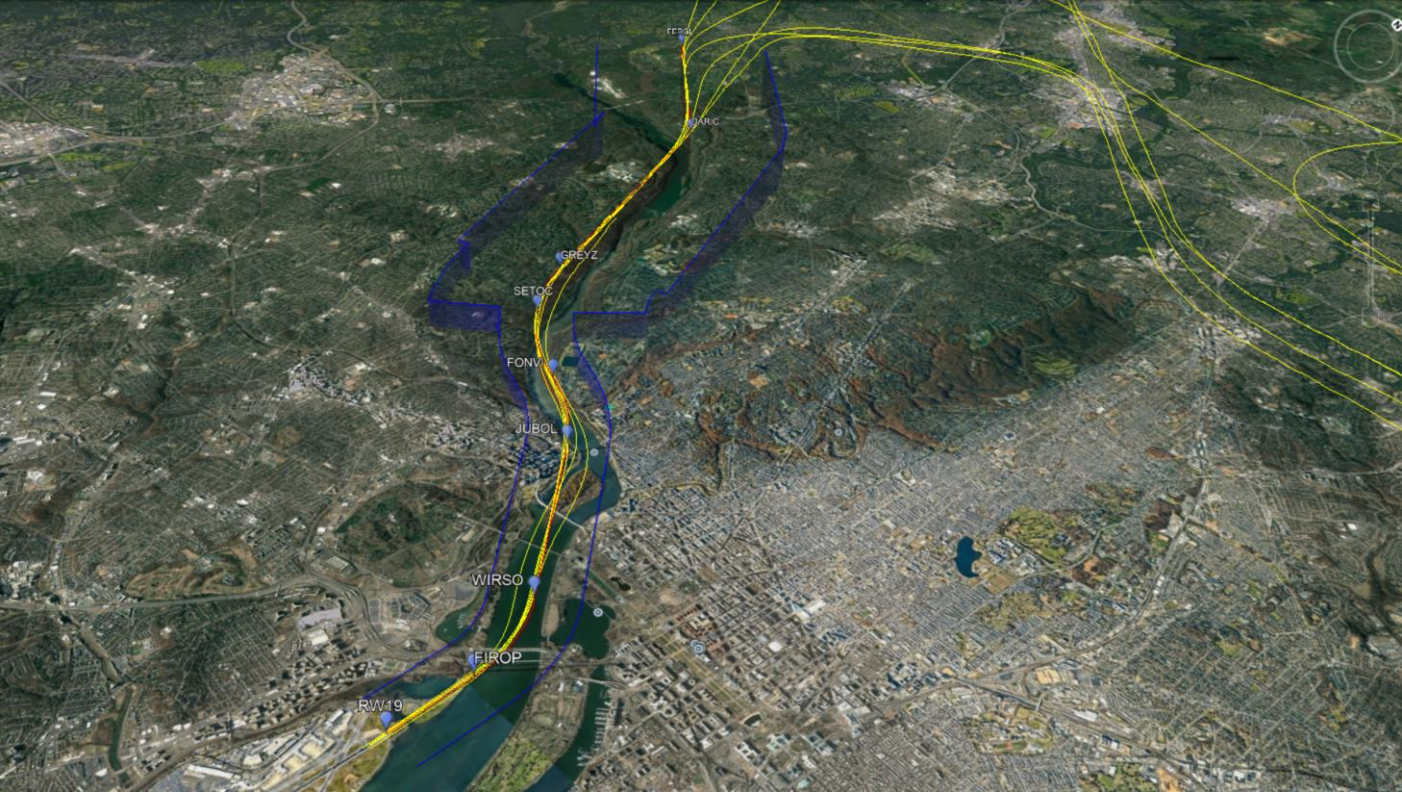
Monitor N1 power during taxi



Modelling aircraft sound exposure



ARINC 424 Data RNP adherence, cross-track error, missed approach adherence



FDM used for Landing Distance Analysis

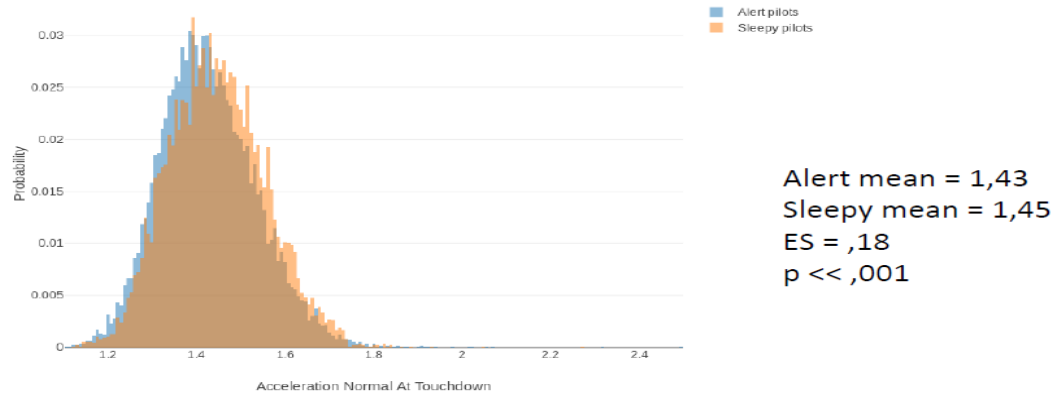


Fatigue Monitoring

Why do hard landings often happen at the end of the day

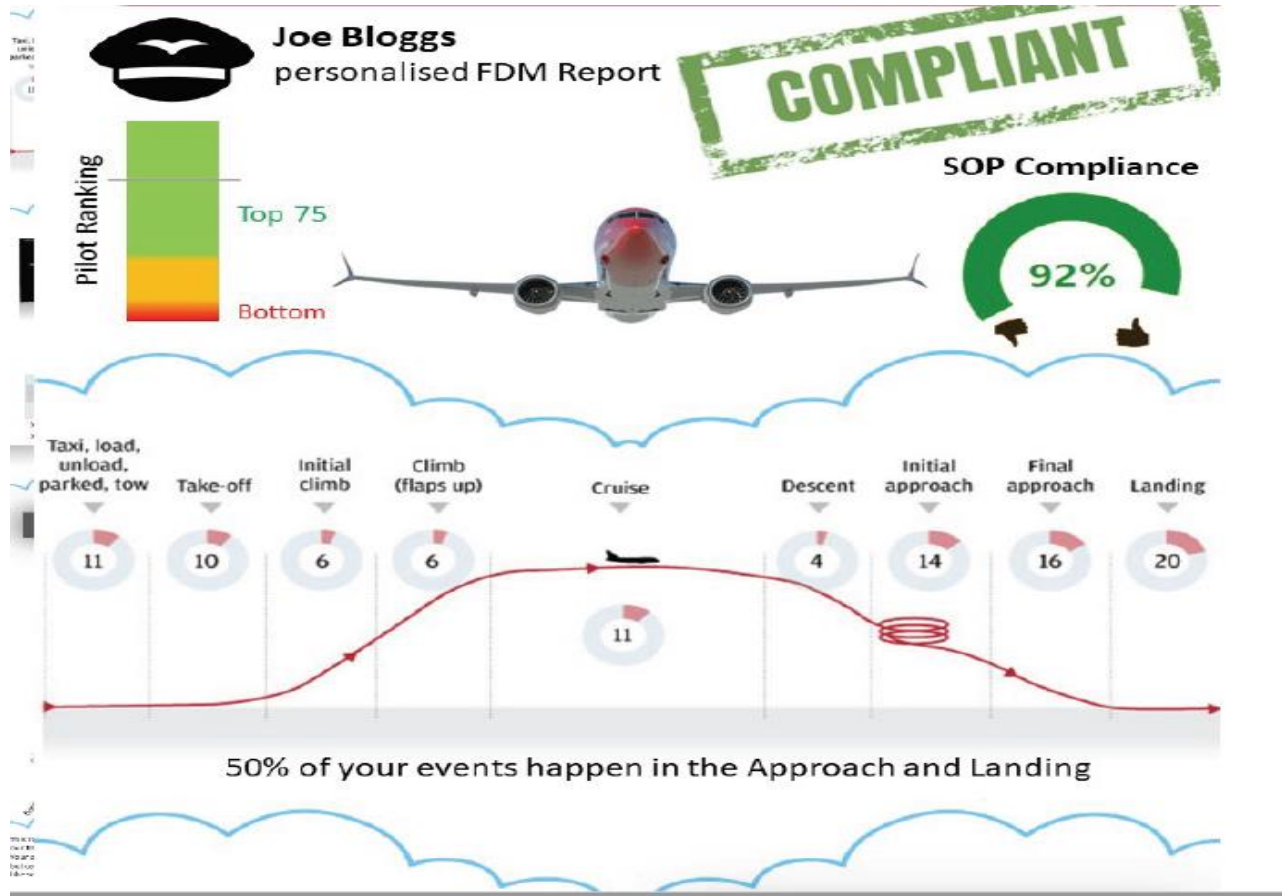


Hard landings



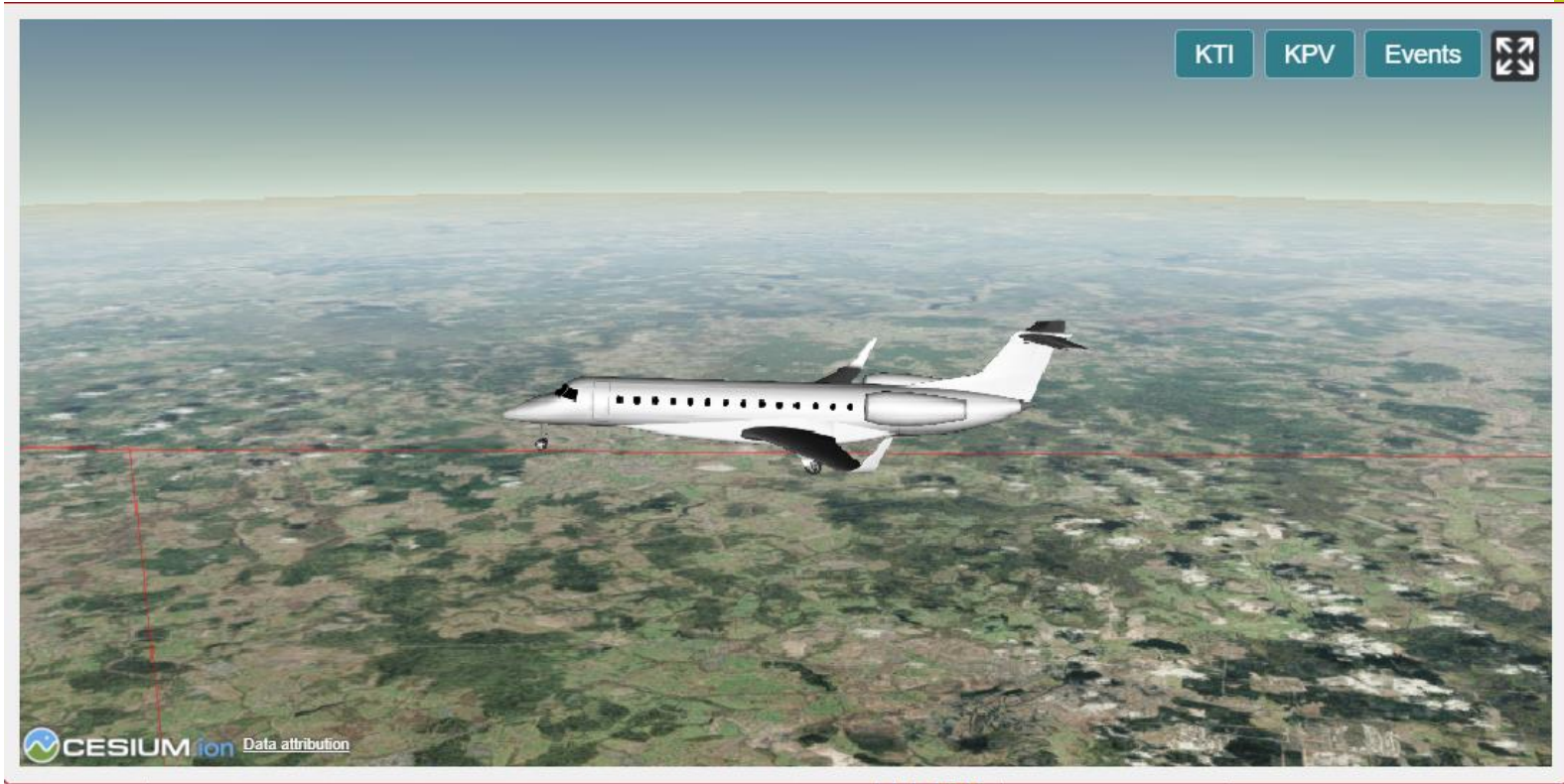
FDM and Personalised Pilot Statistics

may be used to monitor the quality of training and provide feedback.

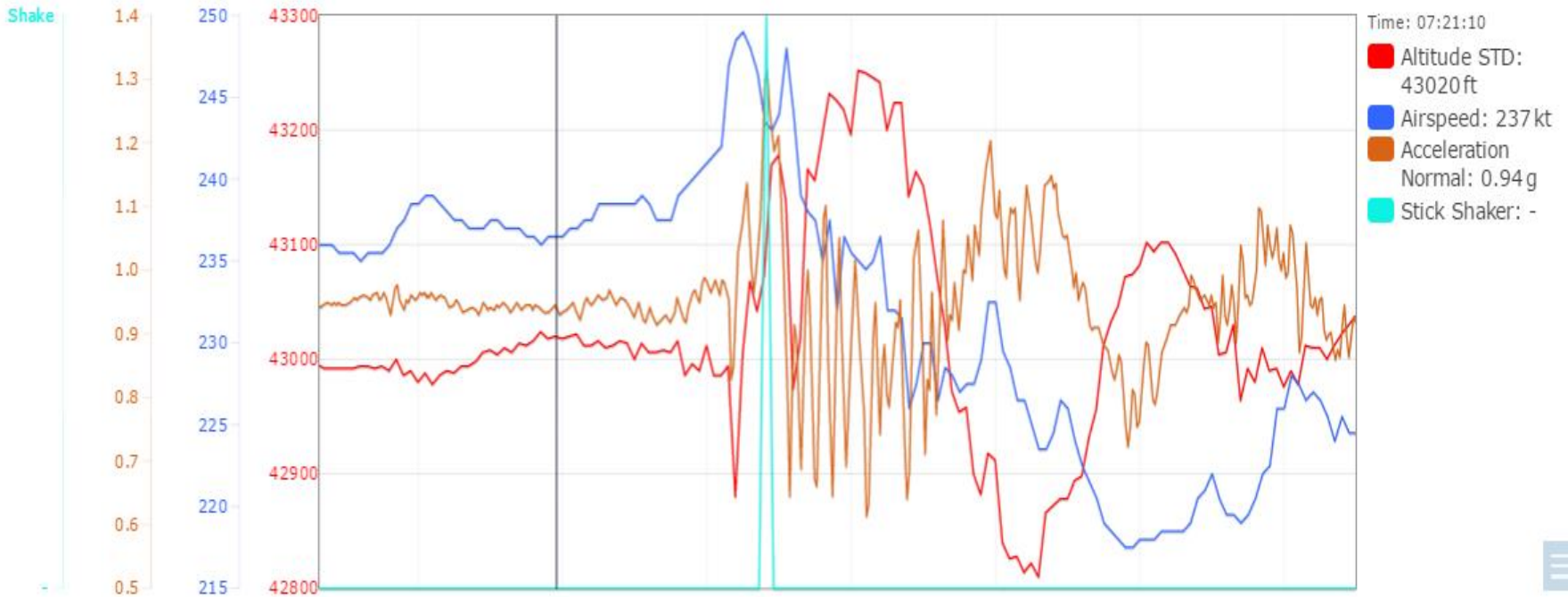


Visualization is a Powerful Analysis Tool.

Caution always use in conjunction with actual flight data



Bombardier Global Express Stick shaker – stall FL430



Benefits of Visualisation

normally included as an in-browser function

- Provides a Virtual 3D view of any segment of flight.
- Provides Critical Analysis to Crews and Investigators
- Establishes Situational Awareness
- Helps Verify Basic facts and Flight Parameters.
- Excellent as a Training and Feedback tool
- Can highlight focal points for further study of data.



Advantages of FDM Outsourcing



- Assistance in setting up therefore sooner start time
- Much less time consuming for day to day analysis and program development
- Greater expertise in analysis
- Fewer IT concerns particularly in software, ongoing IT support
- Benchmark and Comparison to other operators
- Assistance in completing specific studies
- Software development cost are expensive and time consuming to maintain and tailor to your needs.
- Less pressure on internal staff resources

Data Exchange Programs



- IATA and FDX
- MITRE and ASIAs (USA)
- EASA and Data4Safety
- Outsourced Service provider
- Rule of Three. 3 operators and at least 3 flights to any given destination.

EBAA - Top Safety Issues for 2018



1. Loss of control
2. Runway excursion
3. Controlled flight into terrain
4. Runway incursion
5. Airborne conflict
6. Ground-handling accidents
7. Crew mental health and fitness for duty

NBAA - Top Safety Issues for 2018

www.nbaa.org/safety-focus.



- Loss of Control Inflight (LOC-I)
- Runway Excursions
- Single-Pilot Operations Safety
- Procedural compliance
- Ground Handling and Taxi
- Distraction Management
- Scenario and Risk-Based Training and Checking
- Positive Safety culture Promotion
- Inflight Aircraft Collision Risk
- Workforce Competency and Staffing
- Safety Data Sharing and Utilization

Case Study

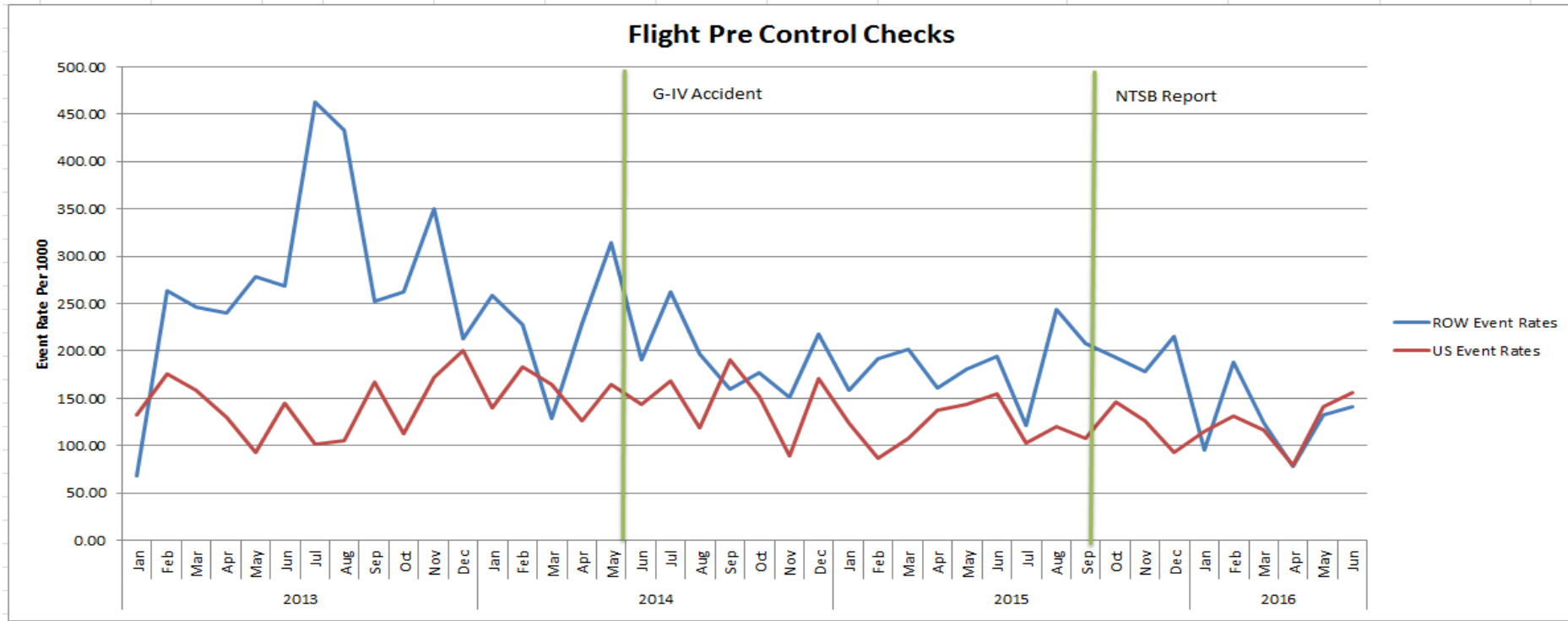
Gulfstream IV Accident 31 May 2014 Bedford MA



- Crew failed to complete an SOP required pre-flight control check.
- The recorder on board indicated that they failed to complete this check on 98 of the previous 100 flights.
- No FDM program
- FDS supported a Flight Control Study directed by the NTSB to the NBAA
- 17% non-compliance rate

Flight Data Services Study for the NBAA

Trend Data Comparison US and ROW Jan 2013-Jun 2016





Questions