



IATA Training & Qualification Initiative (ITQI)

Evidence-Based Training

Captain Mike Varney

Project Leader – Evidence-based Training

ICAO NGAP Symposium 1-4 March 2010, Montreal



Dakota DC-3 Rand Airport South Africa 2003





Ilyushin IL-18 Moscow 2005





Sud SE-210 Caravelle III Zurich July 1961





Continental Airlines Boeing 757-200 August 2005





Airbus A380





Boeing 787





JAR-FCL Mandatory Items

- Flight Preparation
- Before take-off checklist
- Engine failure between V1 and V2
- Rejected take-off before reaching V1
- Instrument departure and arrival procedures
- Engine-out Precision Approach to minima
- NDB/VOR/LOC approach to MDA Outlook
- Go-Around engine-out
- Landing critical engine inoperative

The Airline Burden

Crowding of training requirements

- Existing framework
 - Mandatory items – licensing and operations
 - Low Visibility mandatory items
 - Special airport operations
 - ETOPS, RNP SAAAR, RNAV
- Very little scope for effective additional training within existing cost structure
- Too much focus on abnormal procedures
- Much more needed in approach & landing

The Problem

- Regulatory prescriptions for flight crewmember training and checking are based on events, which may be highly improbable in aeroplanes designed to meet modern standards.
- Training programmes are consequently saturated with items that may not necessarily mitigate the real risks, or enhance the safety of modern air transport operations.

Objective

Develop a new paradigm for competency based training and evaluation of airline pilots based on evidence



Working Group



Flight Operations Areas

Evidence-based Type-Rating and Recurrent Training (EBT) - ICAO Doc 9868 + ICAO Manual EBT	Q3 2011
Multi-Crew Pilot licensing (MPL) - Harmonisation of implementation	Q4 2010
Instructor & Evaluator Qualification (IEQ) - ICAO Doc 9868 Qualification standards	Q3 2011
Selection Criteria - IATA guidance material	Q2 2010
Flight Simulator Training Devices (FSTD) - ICAO Doc 9625 + Data document	Aug 2009



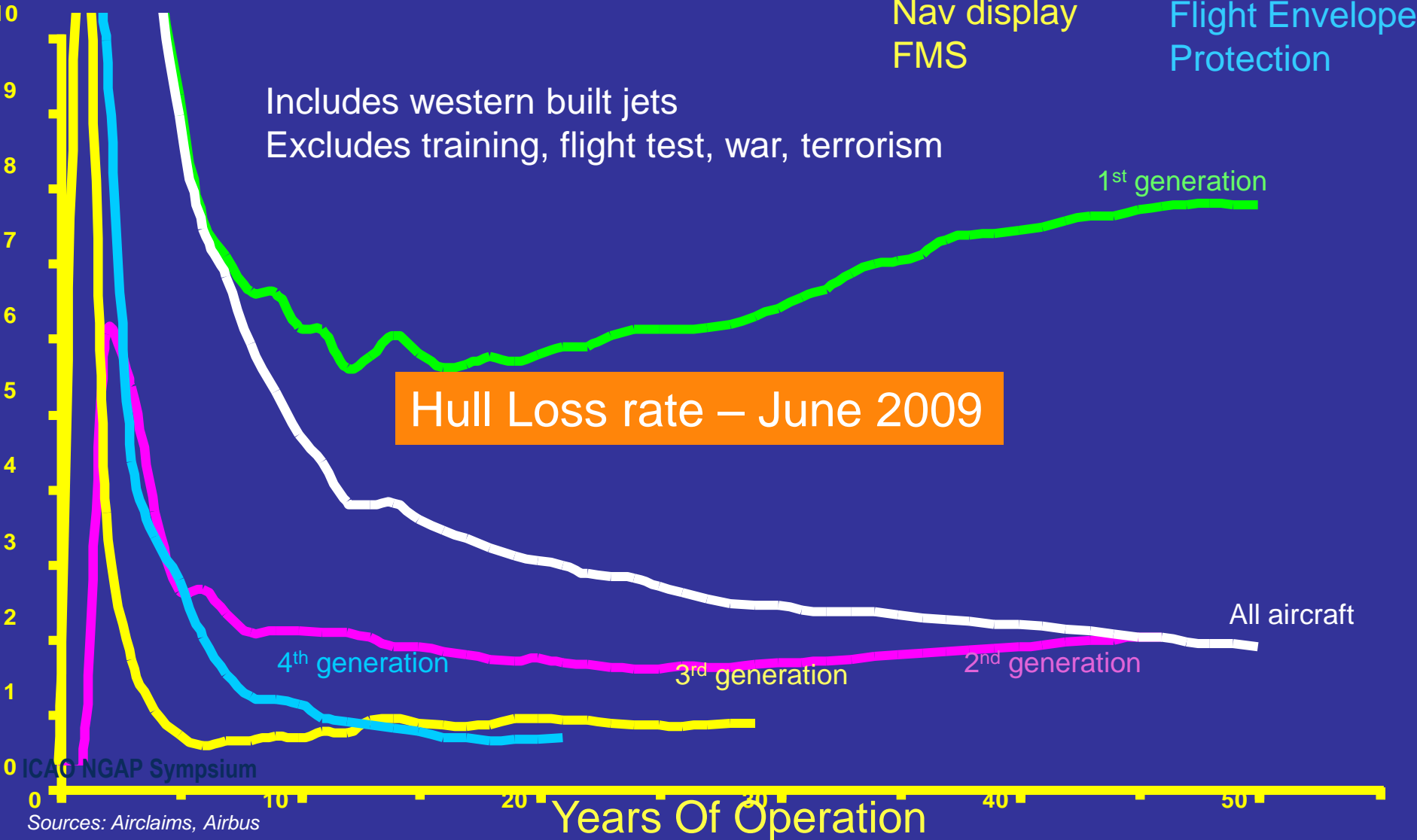
Hull Loss per million departures

1st generation:
Early jet

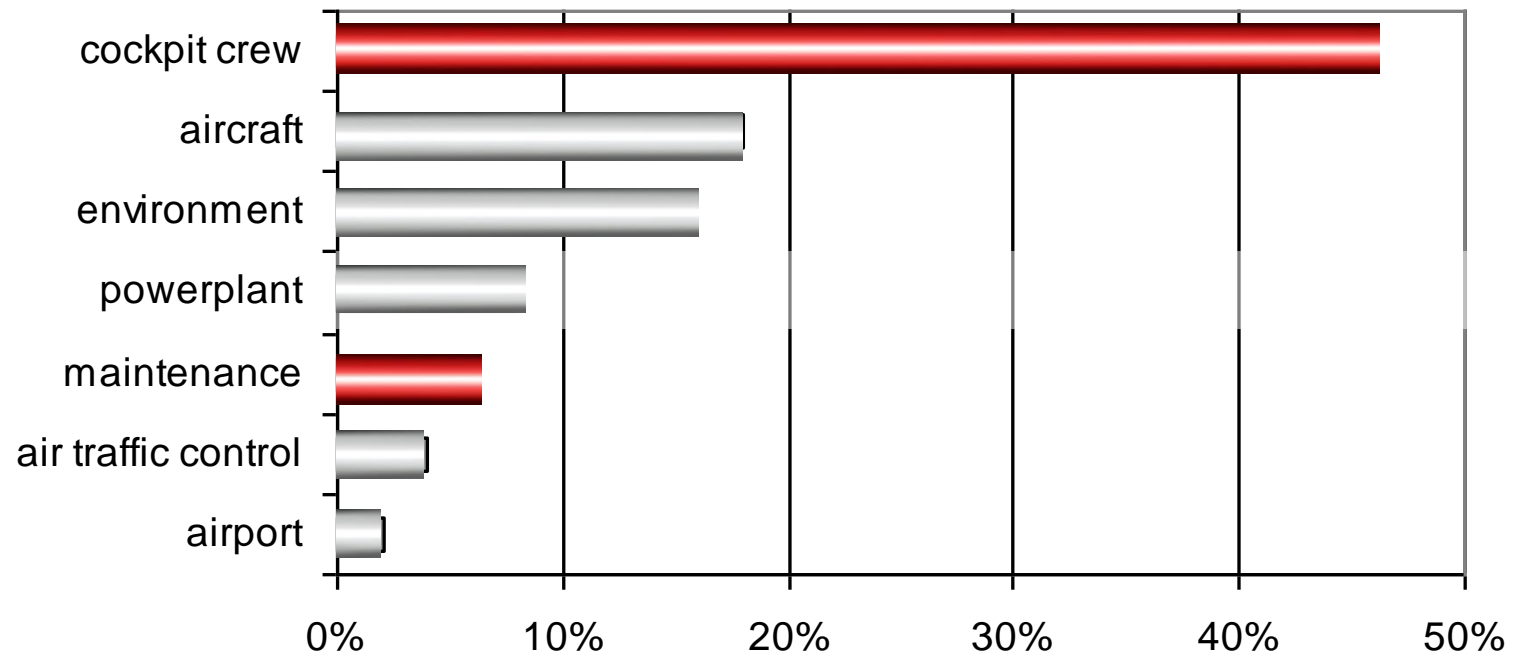
2nd generation:
2nd jet generation

3rd generation:
Glass-cockpit
Nav display
FMS

4th generation:
FBW
Flight Envelope Protection



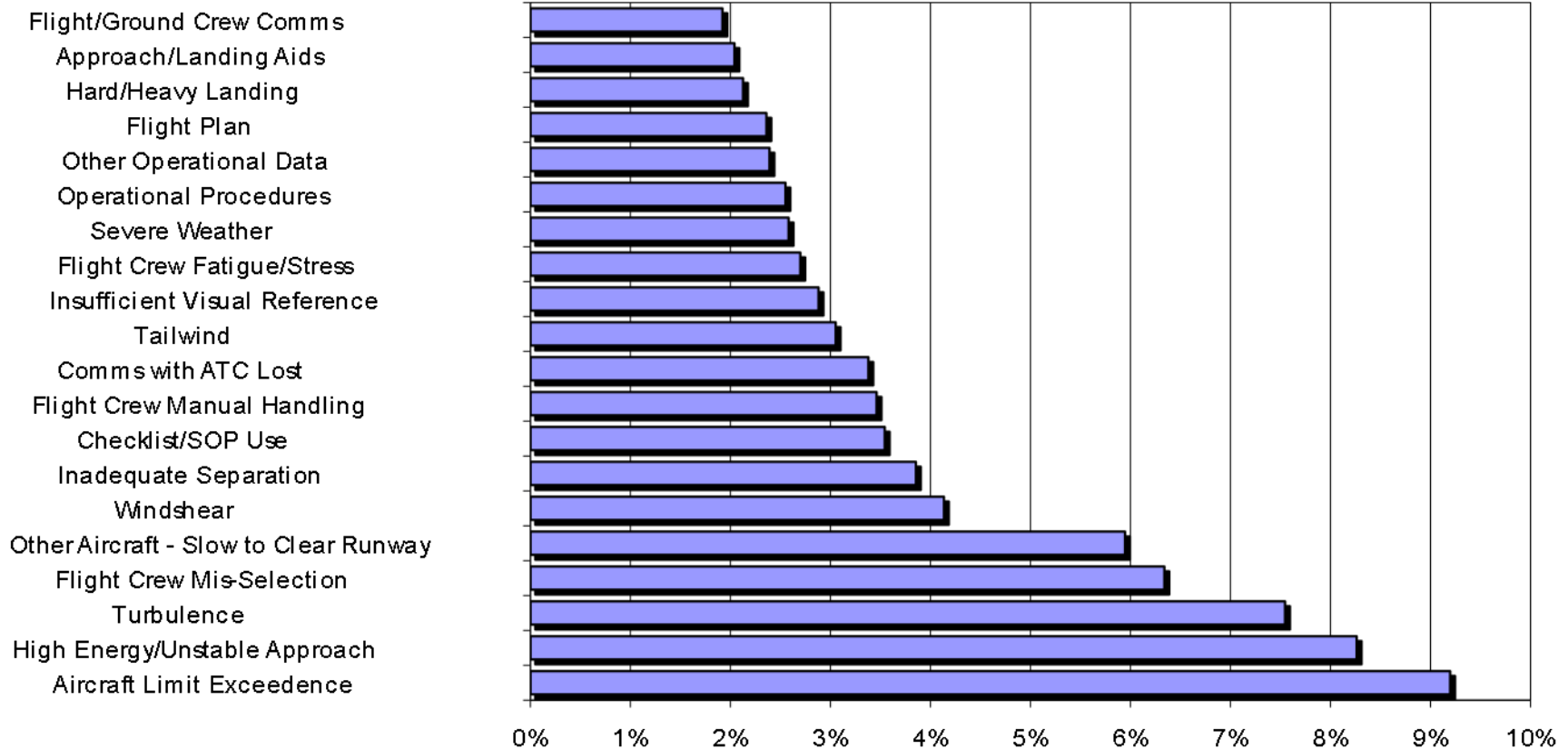
Relative Importance of contributing factors in fatal accidents



(Source: Civil Aviation Safety Data, 1989-2003)

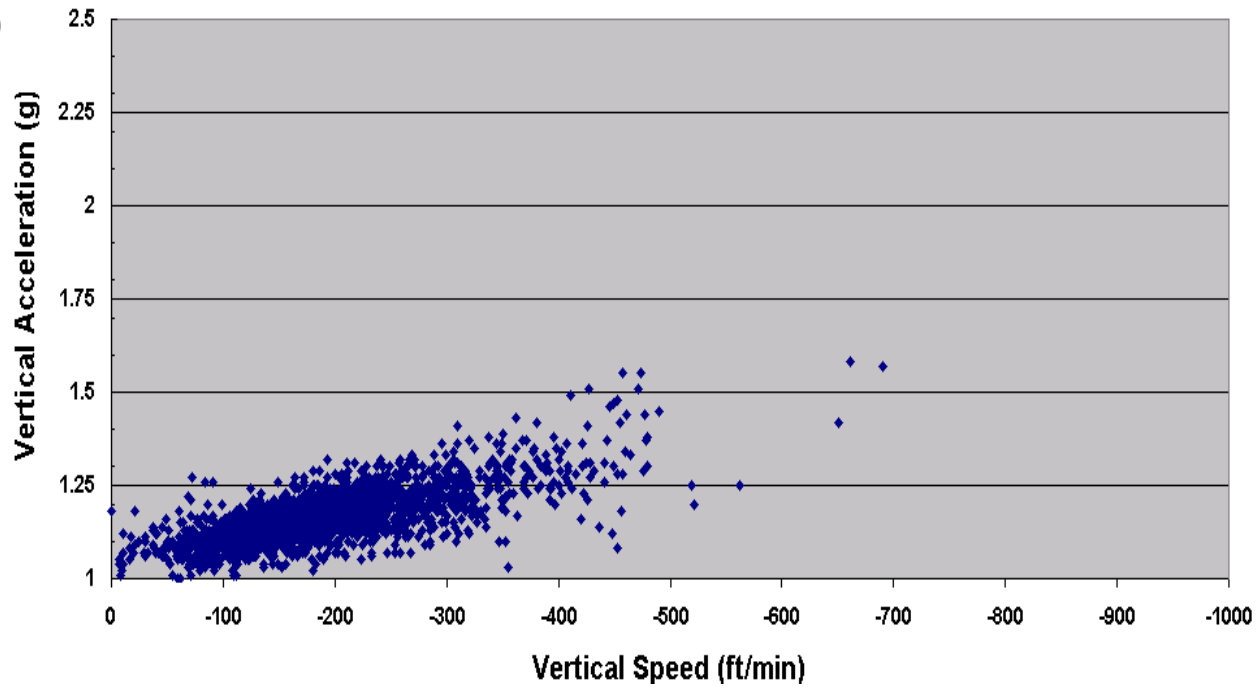
STEADES

Top 20 FLT OPS ASRs



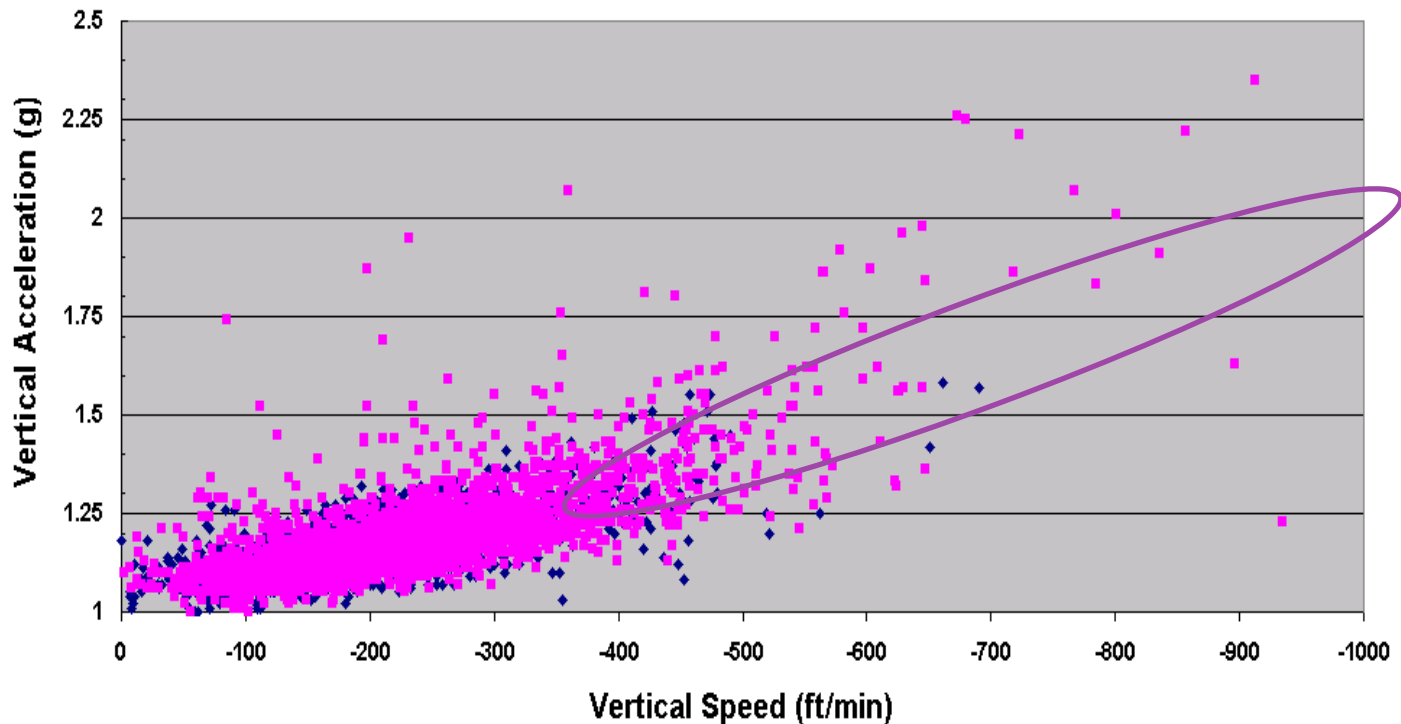
Max vertical acceleration and vertical speed (at touchdown)

- ◆ A340-300
- ◆ A340-600



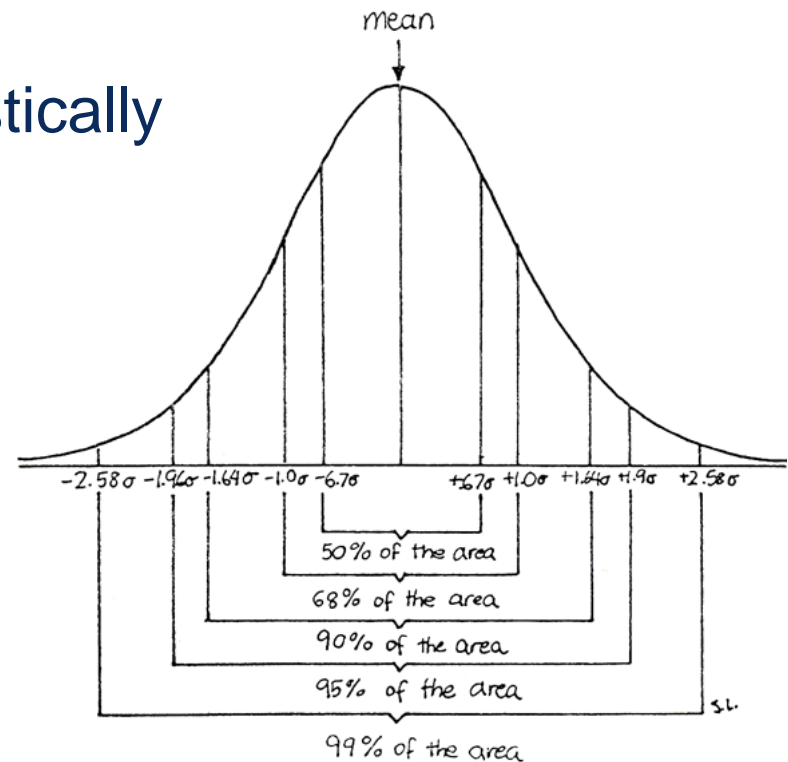
Max vertical acceleration and vertical speed (at touchdown)

- ◆ A340-300
- A340-600



Data can mislead

- Should we train for the statistically likely?
- We can anticipate 95% of events
- The BIG problem is the other 5%



Black Swans

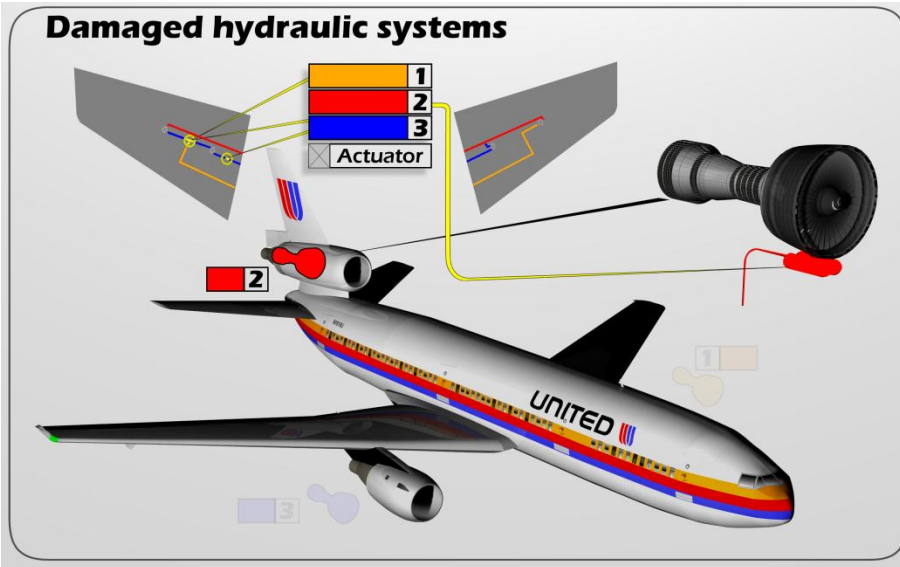
- Data is reactive
- Accidents are difficult to predict
- Pilot behaviour is difficult to predict

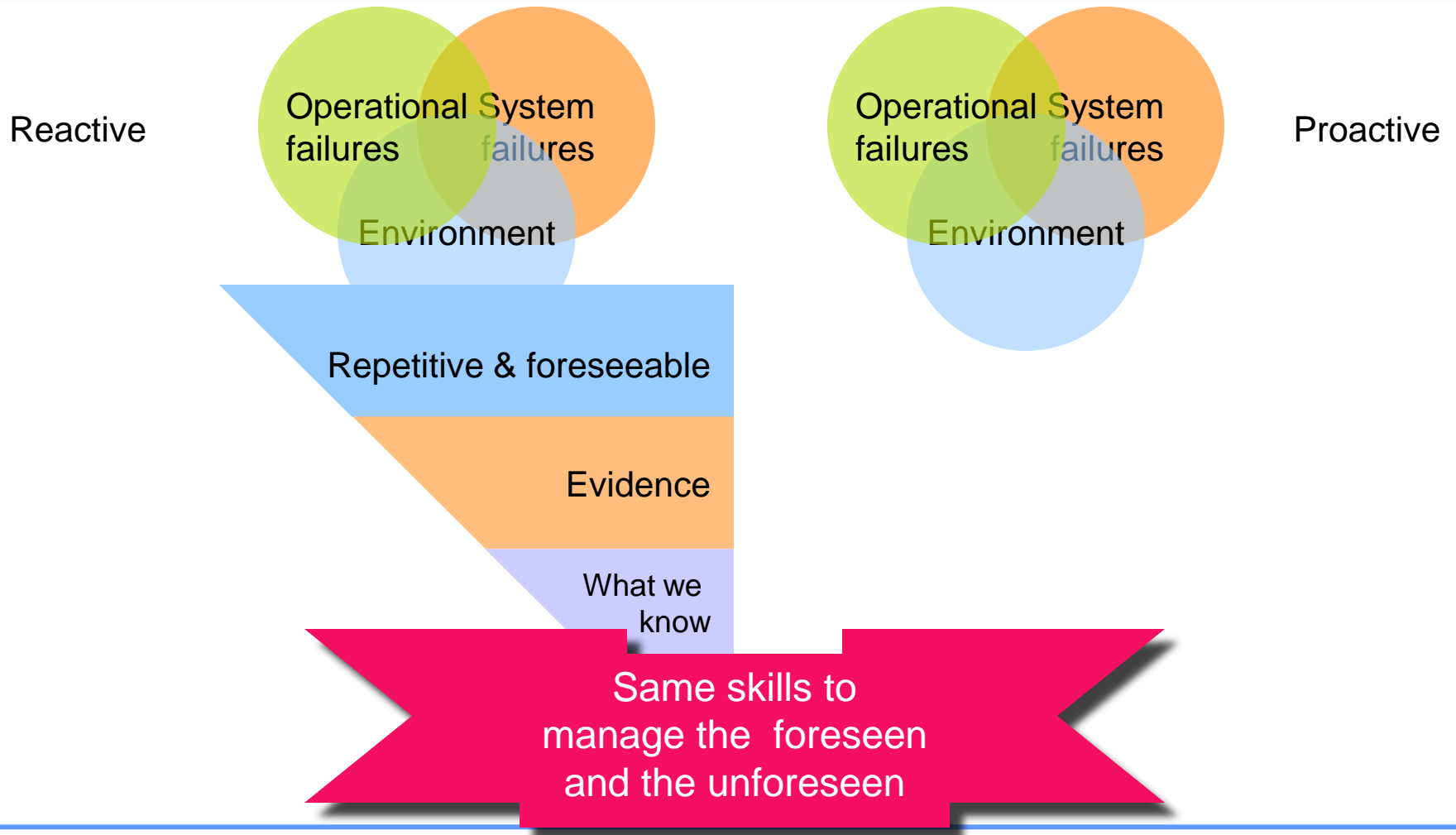


When people and complex systems interact, there will always be an infinite number of possible outcomes

The Unforeseen, a “typical” Black Swan!

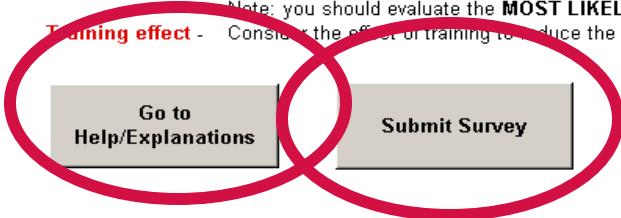
If we could anticipate all, failures should be designed out (Sioux City)







- Likelihood -** The probability that over a defined period of time a pilot will experience the defined event, requiring intervention to ensure a safe outcome.
Note: you should evaluate how often a pilot has to **INTERVENE TO ENSURE A SAFE OUTCOME**, not just the likelihood of the occurrence itself.
E.g. likelihood of a windshear where a pilot has to intervene for a safe outcome will be much lower than of experiencing windshear itself.
- Severity -** You should evaluate the most likely outcome, given that the event has occurred for a pilot not trained to manage that defined event.
Note: you should evaluate the **MOST LIKELY** outcome, not the worst possible.
- Training effect -** Consider the effect of training to reduce the severity **BY AT LEAST ONE LEVEL COMPARED TO OTHER MEANS.**



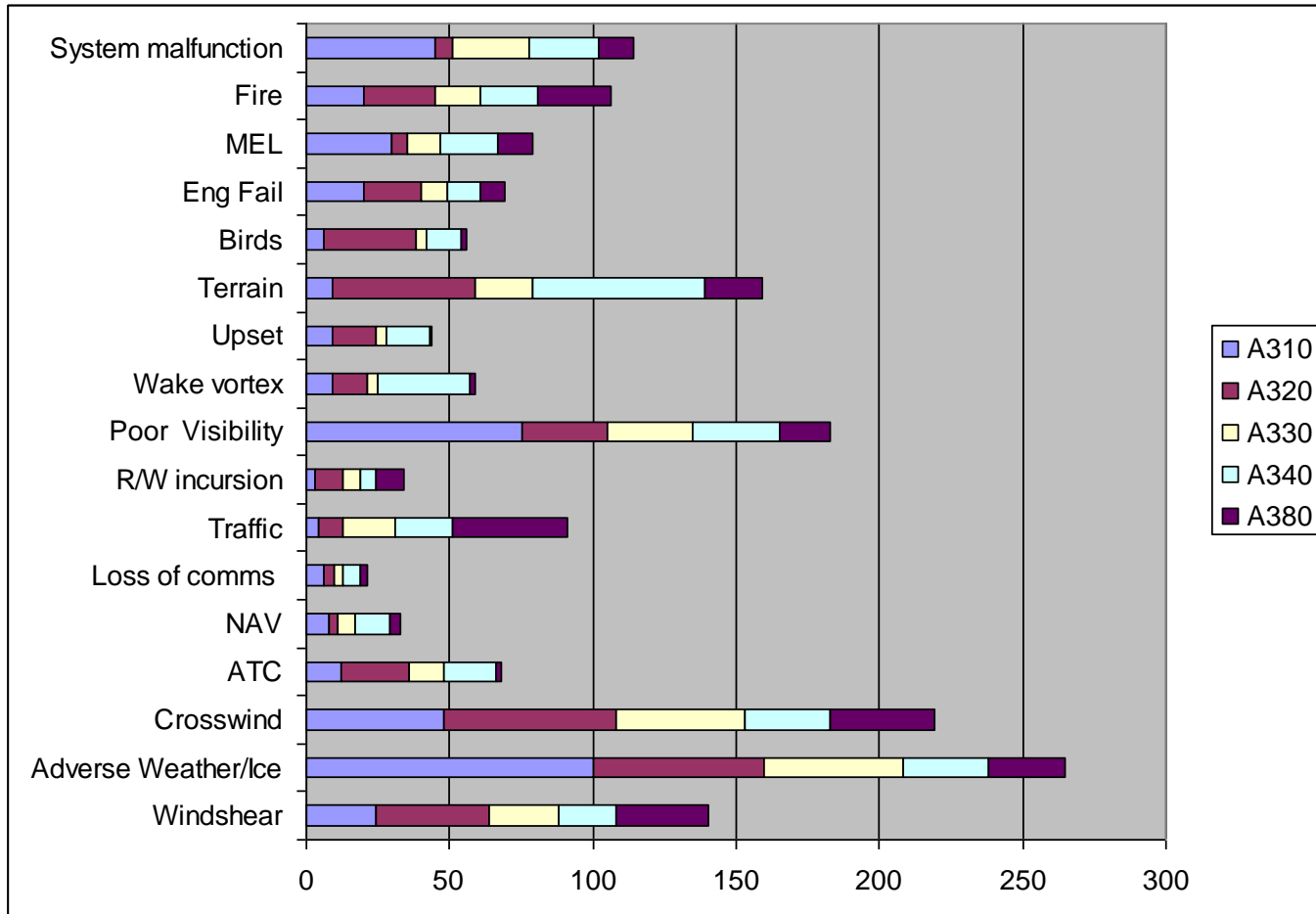
- | | | |
|---|--|--|
| 1. Rare - once in a pilots career or less
2. Unlikely - few times in a career
3. Moderate - once every 3-5 years
4. Likely - probably once a year
5. Almost Certain - more than once a year | 1. Negligible – insignificant effect not compromising safety
2. Minor – reduction in safety margin
3. Moderate – safety compromise
4. Major – aircraft damage and/or personal injury
5. Catastrophic - significant damage or hull loss | 1. Unimportant
2. Minor
3. Moderate
4. Significant
5. Critical |
|---|--|--|

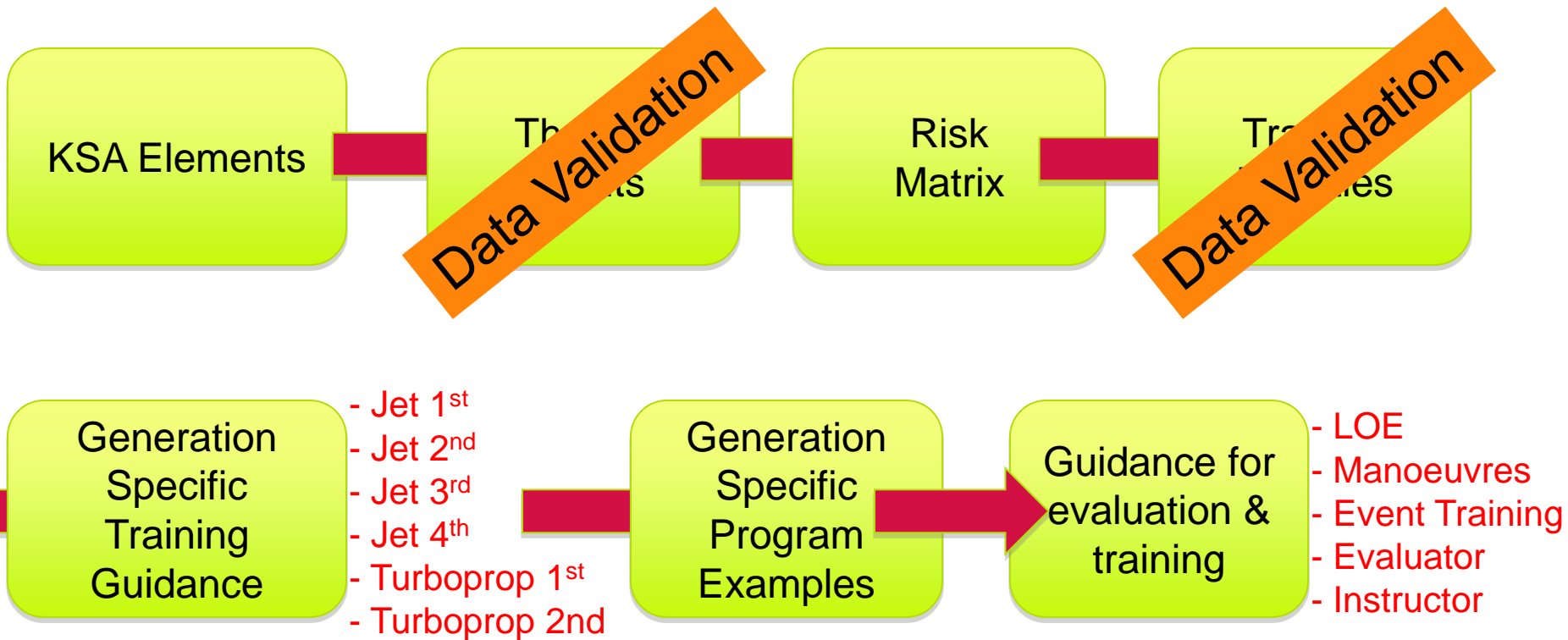
Your organisation: Aircraft... Type of Operation Region... Likelihood Severity Training Effect

TAKE OFF

3 TAKE OFF

3.1	Windshear	With or without warnings including predictive				0
3.2	Adverse Weather/Ice	Thunderstorm, heavy rain, turbulence, ice build up to include de-icing issues, as well as high temperature conditions				0
3.3	Runway/Taxi condition	Contamination or surface quality of the runway, taxiway, or tarmac including FOD				0
3.4	Wind	Adverse winds/Crosswind. This includes tail wind but not ATC miss-reporting of actual wind				0
3.5	ATC	ATC Error, Omission, mis-communication, garbled, poor quality transmission, etc.				0
3.6	NAV	External NAV failure. Loss of GPS satellite, ANP exceedance of RNP, loss of external NAV source(s).				0
3.7	Loss of comms	Lost Comm or difficult comms. Either through pilot miss-selection or failure external to the aircraft. This could be for a few seconds or total.				0
3.8	Traffic	Traffic Conflict, TCAS RA or TA/ACAS, or visual observation of conflict, or traffic compression which requires evasive manoeuvring				0
3.9	R/W incursion	Conflict with other aircraft approaching the runway in flight, on the runway, or entering runway from taxiway				0
3.10	Poor Visibility	Any situation where visibility becomes a threat				0
3.11	Wake vortex	That does not lead to an Upset				0
3.12	Upset	An airplane upset is defined as an airplane in flight unintentionally exceeding the parameters normally experienced in line operations or training.				0
3.13	Terrain	Alert, Warning, or Conflict				0
3.14	Birds					0
3.15	Eng Fail	Any engine failure, malfunction, which causes loss or degradation of thrust that impacts performance				0
3.16	MEL	Dispatched MEL. Any item cleared by the MEL but having an impact upon flight operations. E.g. Thrust Reverser locked				0
3.17	Fire	This includes electric, pneumatic, cargo, smoke, or fumes including engine				0
3.18	System malfunction	Any internal failure(s) apparent or not apparent to the crew				0





EBT Development Process

ICAO Doc 9868 PANS-TRG

Evidence Based
Training

Instructor
Qualification

Evaluator
Qualification



ICAO Manual – EBT

Comprehensive

Includes Example
Programs

Link to available
data

KSA Elements

- Situation awareness
- Communication
- Manual aircraft control
- Workload management
- Flight management, guidance and automation
- Knowledge
- Application of procedures and knowledge
- Problem solving & decision making
- Leadership & teamwork

Emirates - GCAA

- Dubai Meetings 15th -16th Nov 2009
 - Emirates – Airbus – Boeing – IATA
 - Preliminary Discussions
 - Emirates – GCAA – Airbus – Boeing
- Joint Letter to GCAA EK+IATA
- GCAA Agreement 21st Dec 2009
- EK adopt EBT – EU OPS 1.978 (ATQP)
- Airbus, Boeing, IATA support



Risk of doing nothing

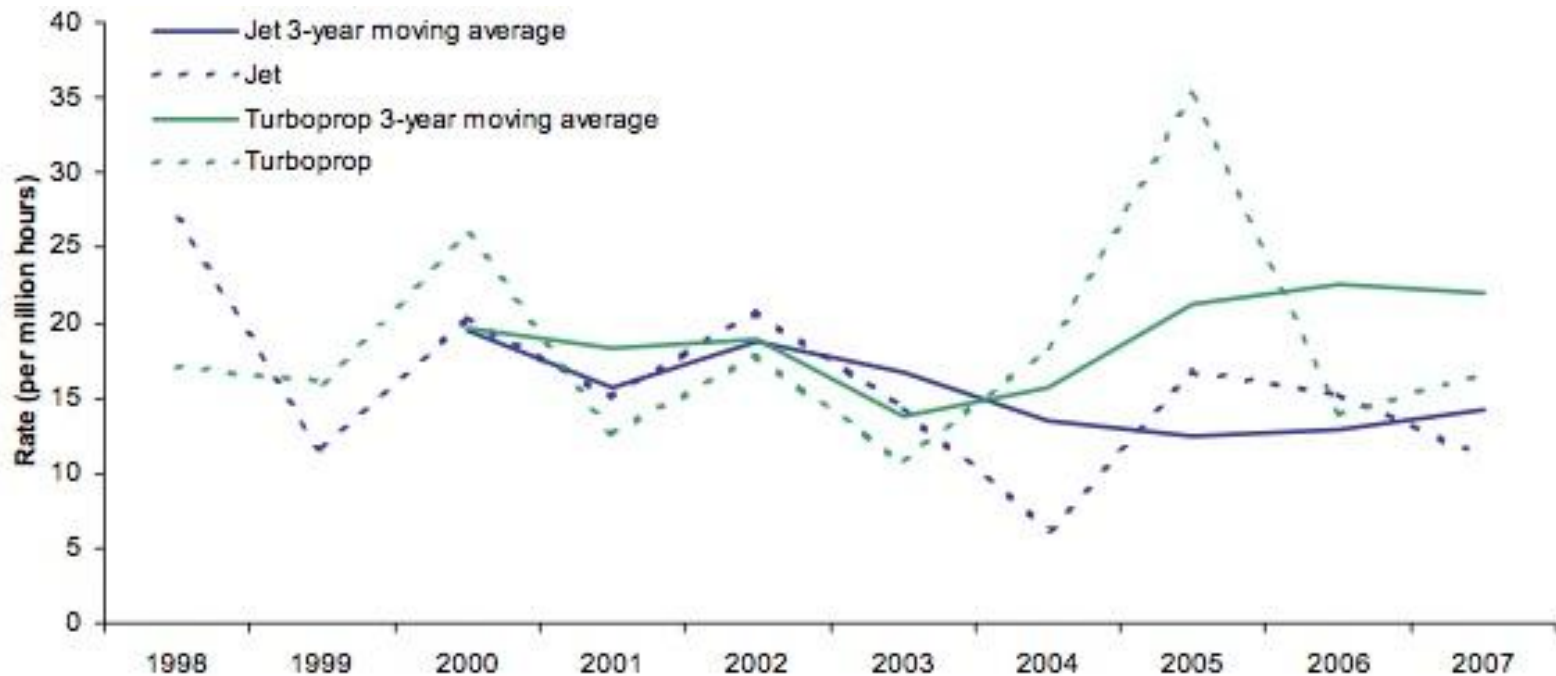


Figure 8 Worldwide fatality rate (per million hours) by class of aircraft

Benefits

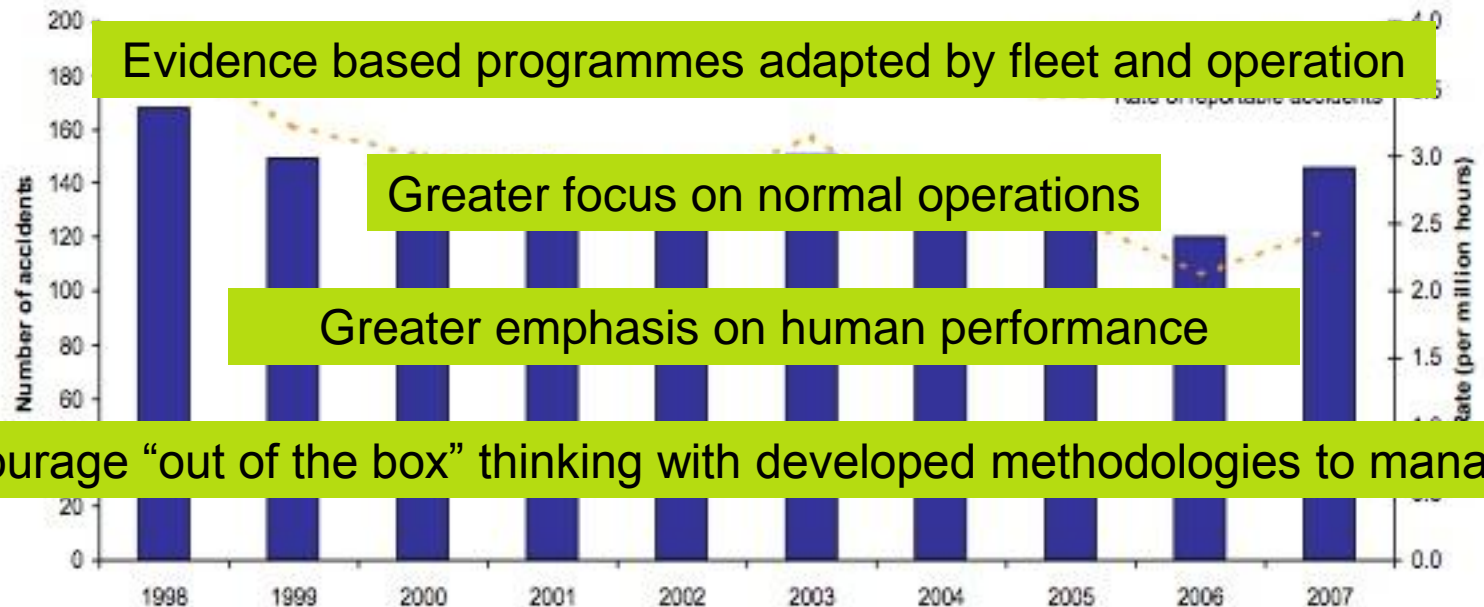
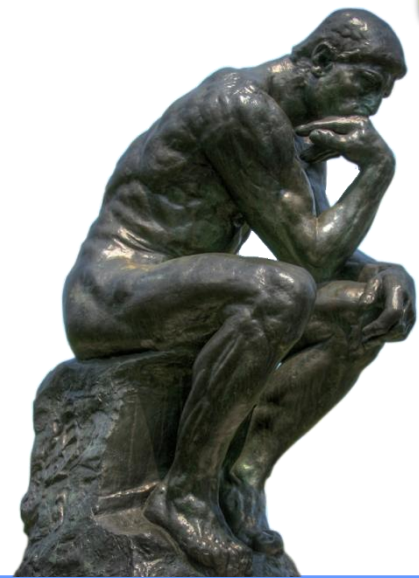
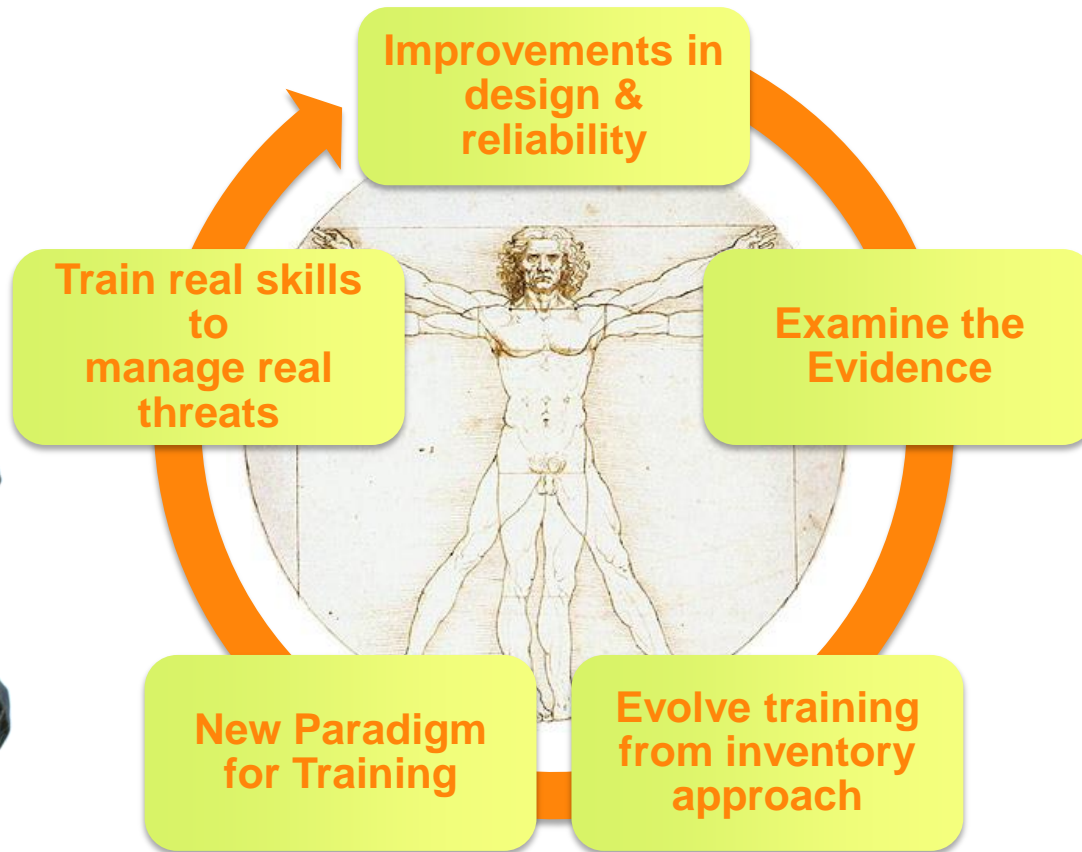


Figure 1 Worldwide reportable accidents involving large transport aircraft





Thank you

itqi@iata.org



to represent, lead and serve the airline industry