



Associate Professor Patrick Murray
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Evidence Based



Training



Evidence Based



Training

Dakota DC-3 Rand Airport South Africa



Evidence Based



Training



Evidence Based



Training

Ilyushin IL-18 Moscow



Evidence Based



Training



Evidence Based



Training

Sud SE-210 Caravelle III Zurich July 1961



Evidence Based



Training



Evidence Based



Training

Continental Airlines Boeing 757-200



Evidence Based



Training



Evidence Based



Training

Qantas A380



Evidence Based



Training



Evidence Based



Training

Boeing 787



Evidence Based



Training





Are existing prescriptions evidence based?

JAR-FCL Mandatory Items

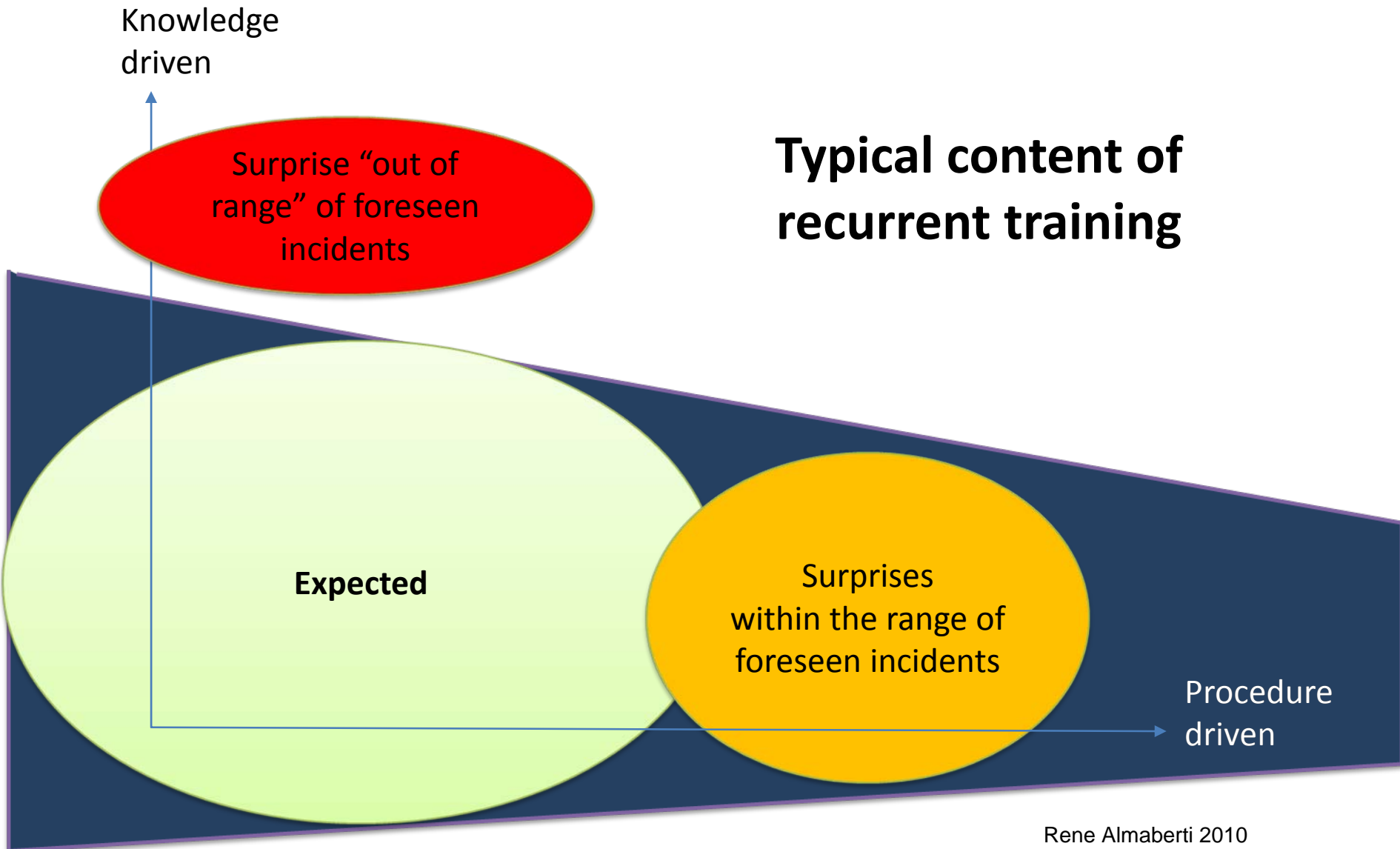
- Flight Preparation
- Before take-off checklist
- Engine failure between V1 and V2
- Rejected take-off before reaching V1
- Instrument departure and arrival procedures
- Engine-out Precision Approach to minima
- NDB/VOR/LOC approach to MDA
- Go-Around engine-out
- Landing critical engine inoperative



The Problem

- Regulatory prescriptions for flight crew member training and checking are based on events, some of which are 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
- Actual events in modern aircraft indicate some new & quite different risks

Resilience : Coping with the unexpected in unstable systems





**Is our training
as good as it
can be?**

Is this a risk?





EBT Project Objective

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



Phase 1
Recurrent



Outputs
ICAO Doc 9868 PANS-TRG
ICAO Manual of EBT

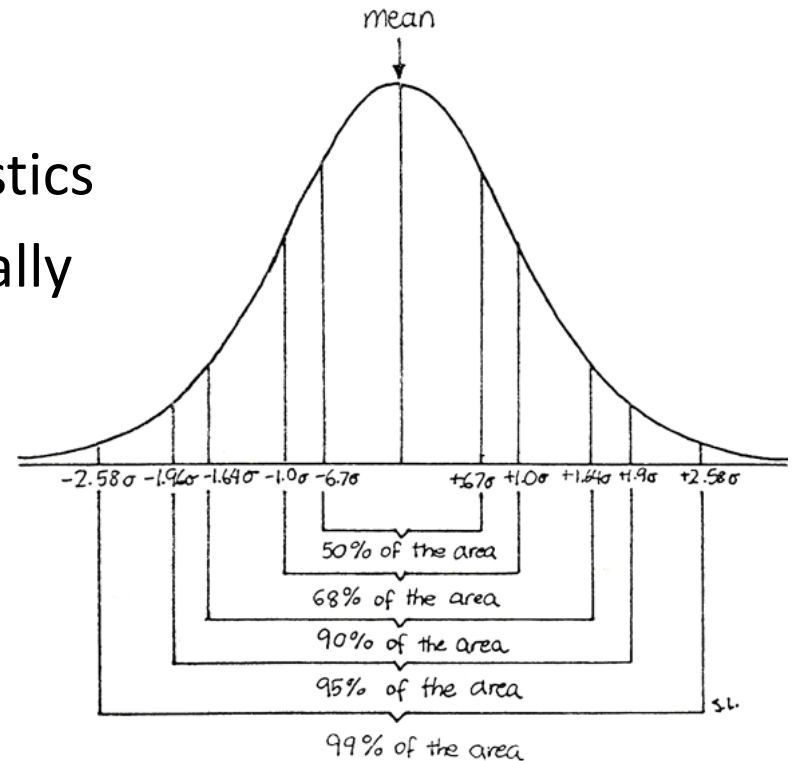


Phase 2
Type Rating



Data can mislead

- Risk management based on statistics
- “We should train for the statistically likely...”?
- We can anticipate 95% of events
- The BIG problem is the other 5%





Some Issues “Black Swans”

- The majority of data are reactive
- Accidents are difficult to predict
- Pilot behaviour is difficult to predict

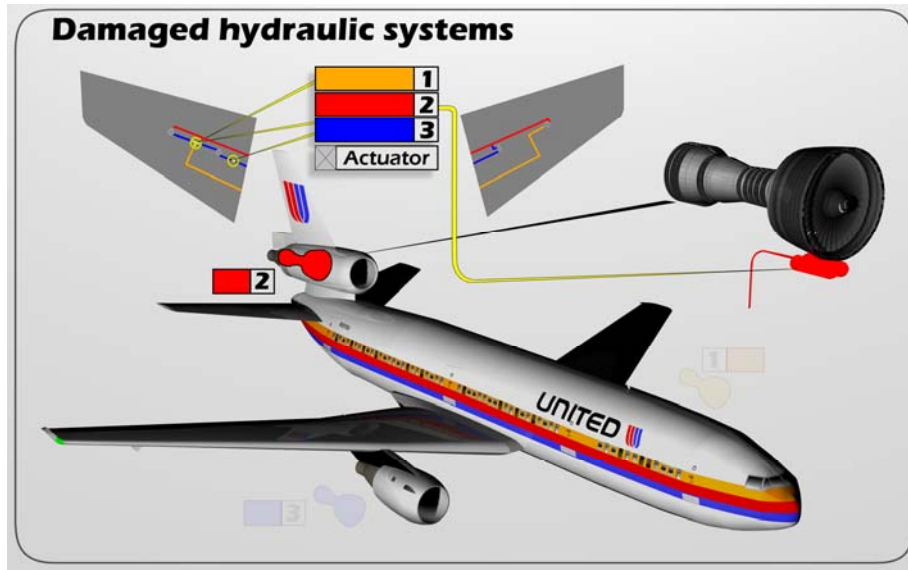


When people and complex systems interact, there will always be an infinite number of possible outcomes



Sioux City – “Black Swan”

If every failure can be predicted – we can design them out of the system!





QF 32 A380 “Black Swan”

“The pilots were inundated with **54 computer messages** alerting them of system failures or impending failures” during the two-hour airborne drama with more than 450 passengers aboard, said Capt Richard Woodward of the Australian and International Pilots Association



Capt Woodward said

“I don't think any crew in the world would have been trained to deal with the amount of different issues this crew faced”

www.news.com.au/travel/qantas





Evidence

- LOSA
- AQP (Advanced Qualification Program) ATQP
- Accidents & Serious Incidents
- Flight Data Monitoring (FOQA, FDA, FODA etc.)
- STEADES





Statistics are split into four generations of aircraft:

1st generation = early jet airplanes

Comet*, Caravelle*, CV880*, CV990*, B707, B720*, DC8, Trident*, VC10*

• *No longer in commercial service*

2nd generation = 2nd jet generation

A300, BAC111, B727, B737-100/200, B747-1/2/3, DC9, DC10, F28, L1011, Mercure

3rd generation = glass cockpit / FMS equipped A/C

A310/A300-600, B737-300/400/500, B737-600/700/800 (NG), B757, B767, B747-400, B717, BAE 146, MD11, MD80, MD90, F70, F100

4th generation = fly-by-wire, flight envelope protected airplanes

A318/A319/A320/A321, A330, A340-200/300, A340-500/600, B777, A380

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

Includes western built jets
Excludes training, flight test, war, terrorism

1st generation

Hull Loss rate – June 2009

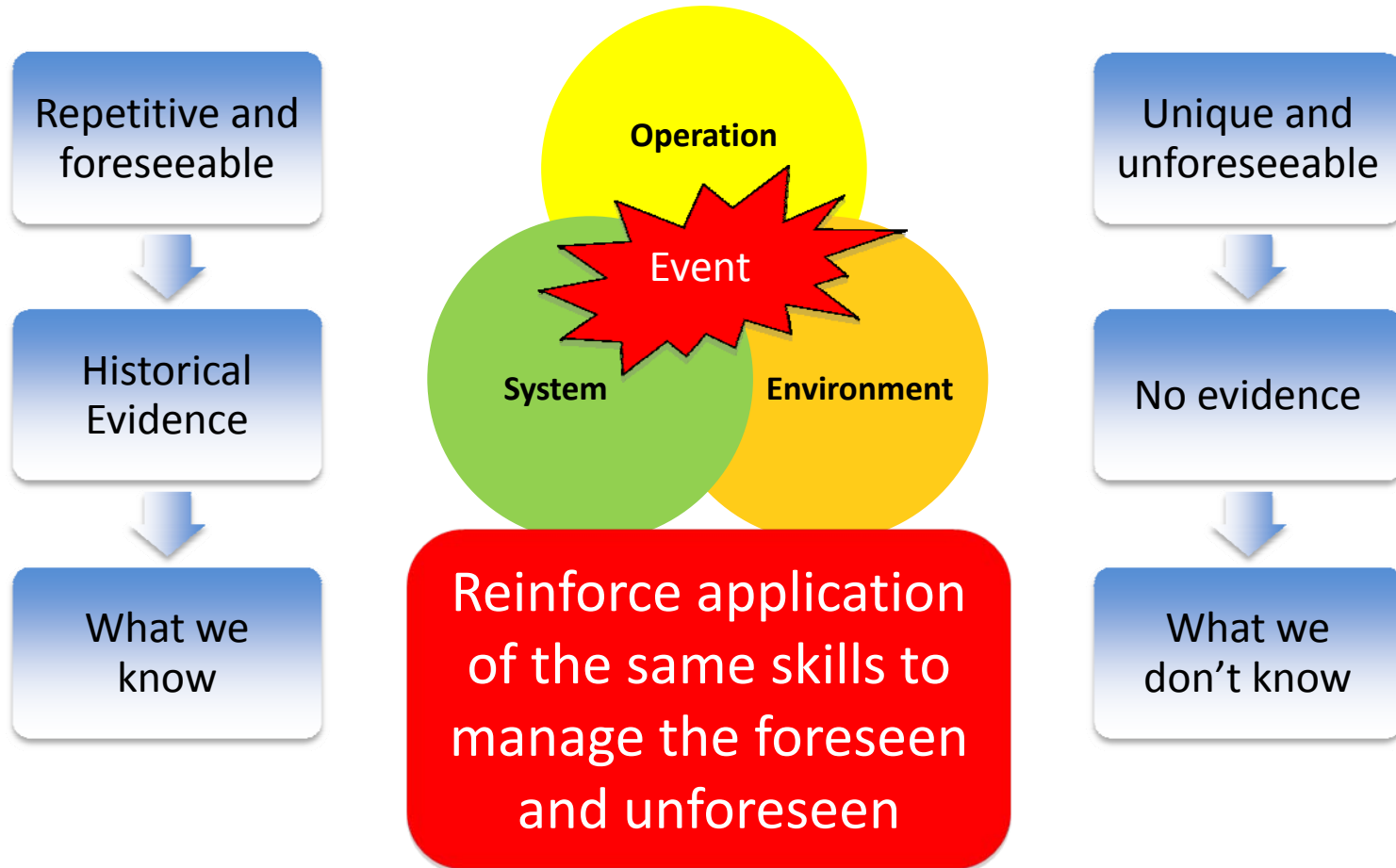
All aircraft

4th generation

3rd generation

2nd generation

Years Of Operation



Phew... glad
that's over
for another
6 months

**What does the
present system of
recurrent training
& check rides
achieve?**



**That
wonderful
post – check
feeling!!!**

**Comfort?
Complacency?
Safety?**

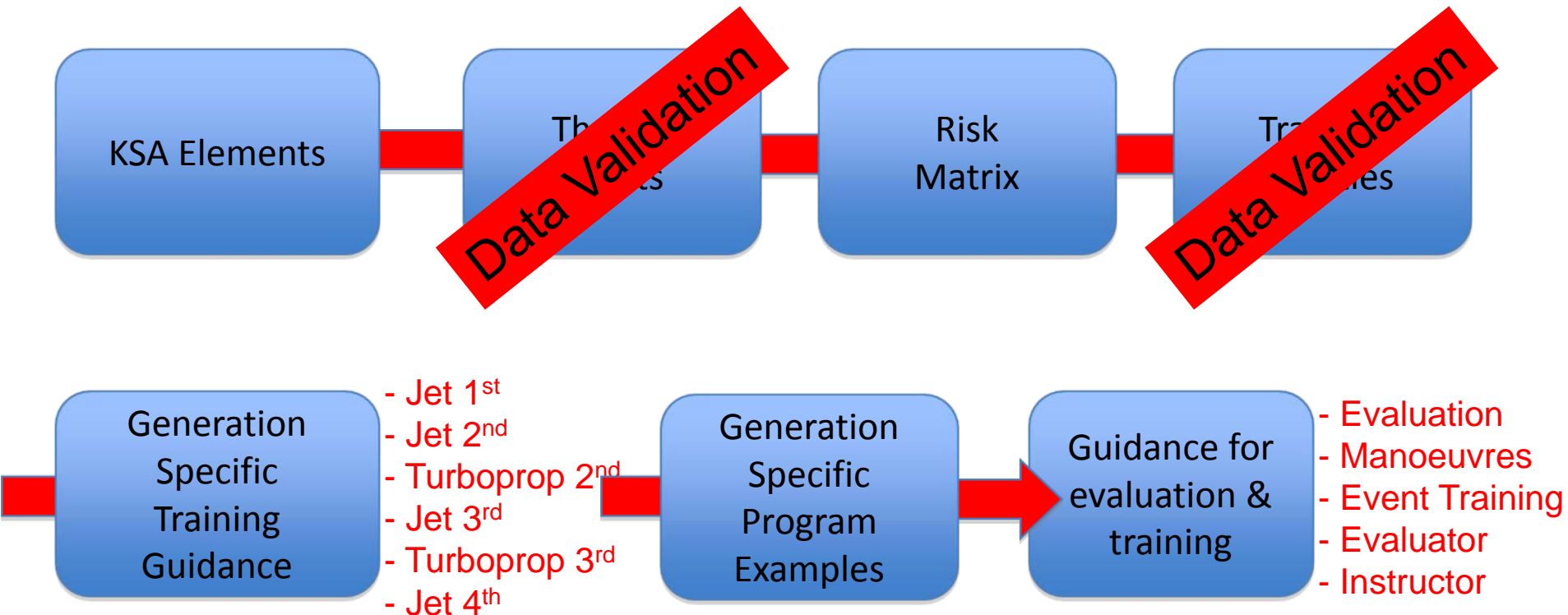
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Training

EBT Working Group





EBT Development Process



EBT Recurrent Phase

- Evaluation
- Manoeuvres Proficiency Training
- Event Management Training

Evaluation

Training to Competency



Regulatory Activity

Active Participation in ITQI and EBT



Ongoing discussions - proof of concept activity



香港特別行政區政府
民航處

Civil Aviation Department

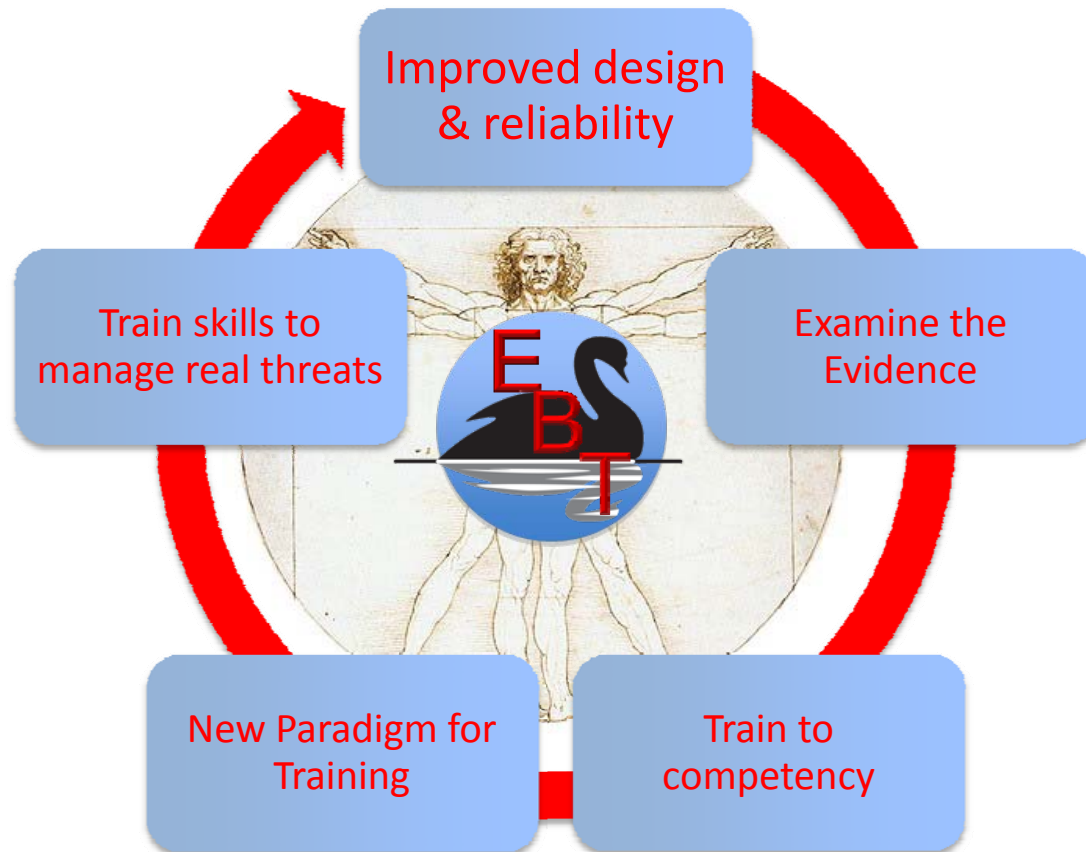
The Government of the Hong Kong Special Administrative Region





Proof of Concept Phase

- Adoption of EBT principles – Step 1 (existing rules)
- Airbus, Boeing, FAA, EASA, ICAO, IATA support to develop specific EBT programmes
- Data fed to validate EBT
- Airline partners
 - Emirates
 - Qantas
 - Cathay Pacific
 - Dragonair
 - British Airways





"When anyone asks me how I can best describe my experience in nearly forty years at sea, I merely say, uneventful".

"Of course there have been winter gales, and storms and fog and the like. But in all my experience, I have never been in any accident or incident of any sort worth speaking about"

"I have never been wrecked nor was I ever in any predicament that threatened to end in disaster of any sort."



*Edward John Smith, 1907,
Captain of the RMS Titanic*

**DOES OUR CURRENT TRAINING
ADDRESS CURRENT RISKS?**

Thank You

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