



**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

*A United Nations Specialized Agency*

# **Evidence-Based Training from a Regulator's Perspective**

**Marcelo Ureña**

Regional Officer, Flight Safety

ICAO South American Office

**Evidence-Based Training and Advanced Qualification Programme Workshop**

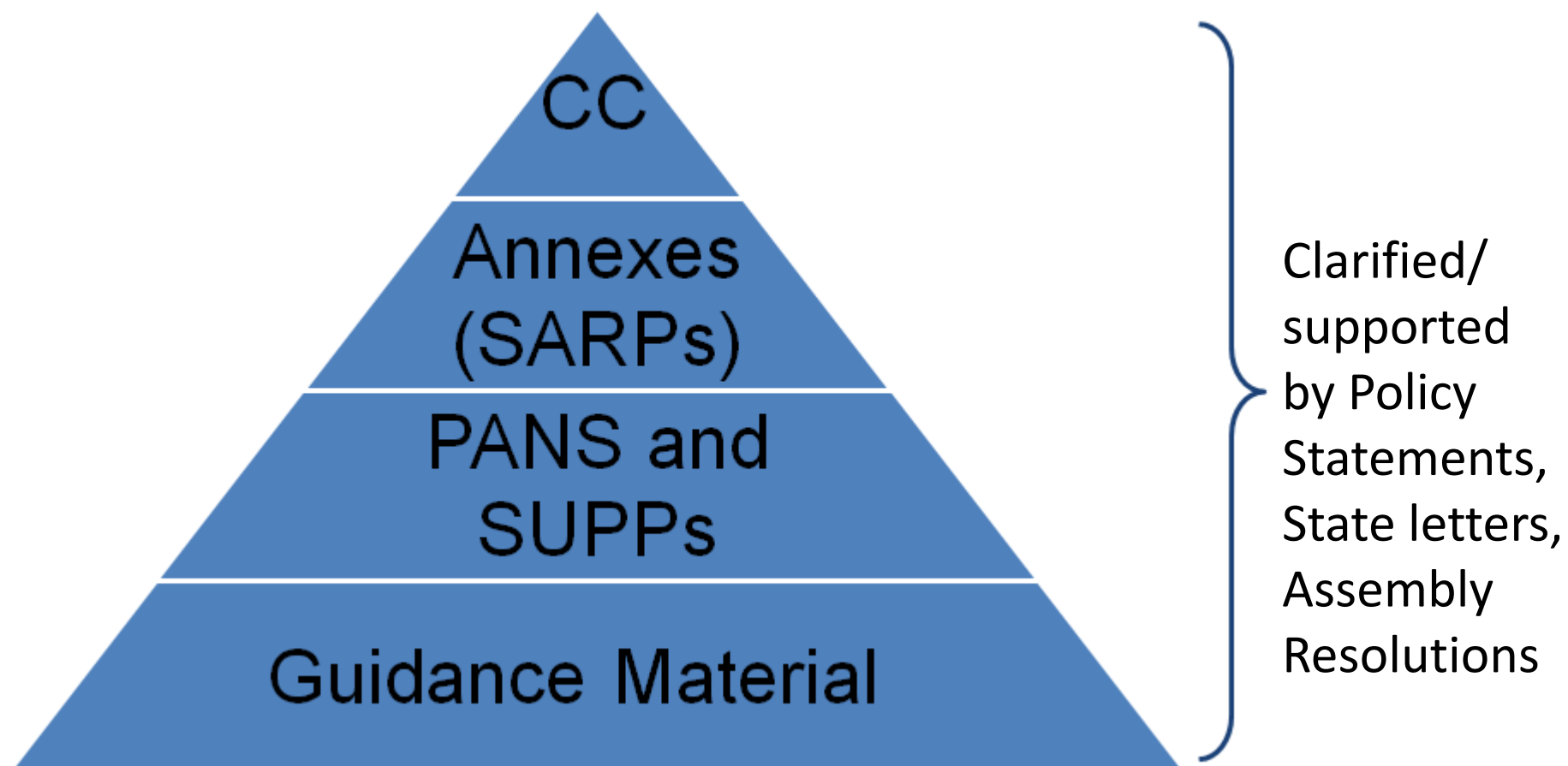
**Lima, 16-17 July 2014**

# Plan of the presentation



- ICAO documentation
  - Overview and development of EBT
  - EBT Pilot Core Competencies
  - EBT & Upset prevention and recovery training
  - EBT Options for the future
  - Conclusions
- 
- What are the EBT challenges for regulators? - Afternoon

# Hierarchy of ICAO Documentation



# ICAO Documents



International Standards  
and Recommended Practices



Doc. 9995  
AN/497



## Manual of Evidence-based Training

Approved by the Secretary General  
and published under his authority

First Edition — 2013

International Civil Aviation Organization

- **Annexes**

- **Standards:** ... *recognized as **necessary** for the safety or regularity of international air navigation*
- **Recommended Practices:** ...*recognized as **desirable** ...*

- **Procedures for Air Navigation Services (PANS)**

- *Procedures to be applied to implement SARPs*

- **Manuals and circulars**

- *Guidance to implement SARPs and PANS (in most cases)*

# Annexes



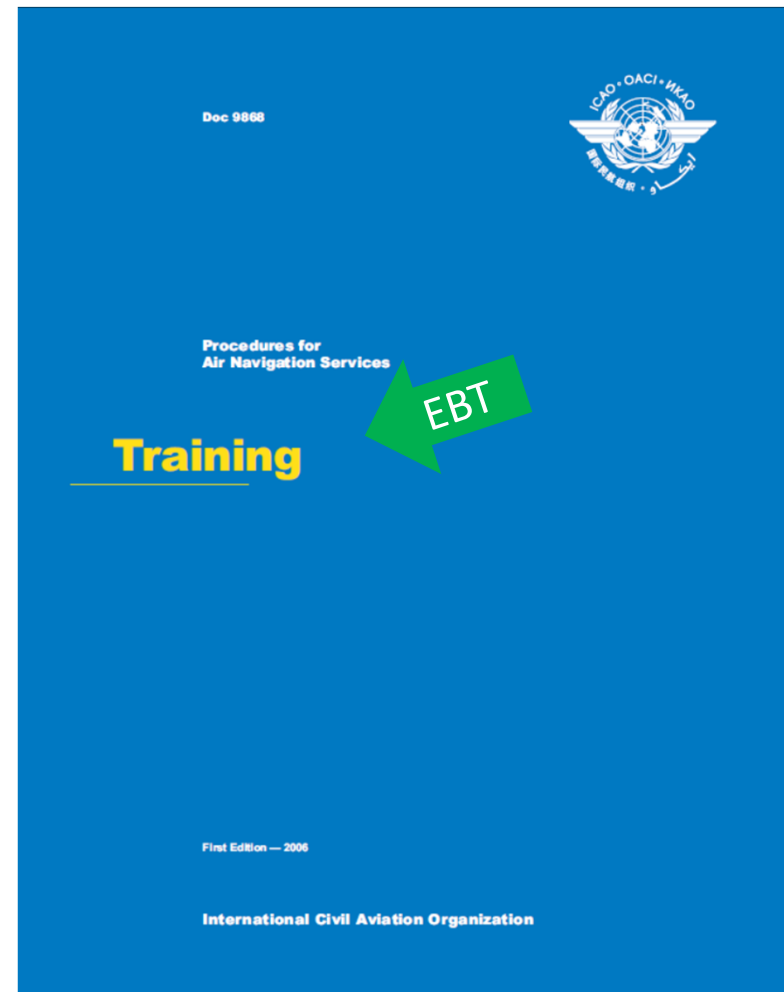
- Annex 1 — *Personnel Licensing*
- Annex 2 — *Rules of the Air*
- Annex 3 — *Meteorological Service for International Air Navigation*
- Annex 4 — *Aeronautical Charts*
- Annex 5 — *Units of Measurement to be Used in Air and Ground Operations*
- **Annex 6 — *Operation of Aircraft*** 
- Annex 7 — *Aircraft Nationality and Registration Marks*
- Annex 8 — *Airworthiness of Aircraft*
- Annex 9 — *Facilitation*
- Annex 10 — *Aeronautical Telecommunications*
- Annex 11 — *Air Traffic Services*
- Annex 12 — *Search and Rescue*
- Annex 13 — *Aircraft Accident and Incident Investigation*
- Annex 14 — *Aerodromes*
- Annex 15 — *Aeronautical Information Services*
- Annex 16 — *Environmental Protection*
- Annex 17 — *Security*
- Annex 18 — *The Safe Transport of Dangerous Goods by Air*
- Annex 19 — *Safety Management*



# Procedures for Air Navigation Services (PANS)



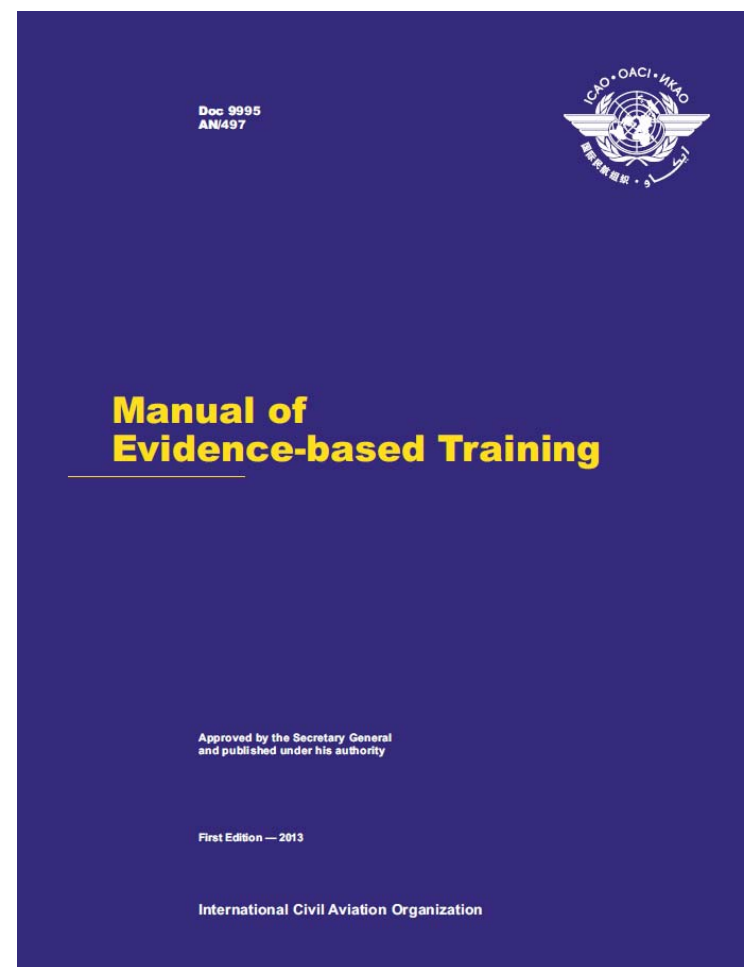
- Complementary to SARPs
- Comprise material too detailed for SARPs
- Do not have the same status as SARPs
  - Significant differences to be published in the AIP
- Recommended to Contracting States for worldwide application



# Guidance Material

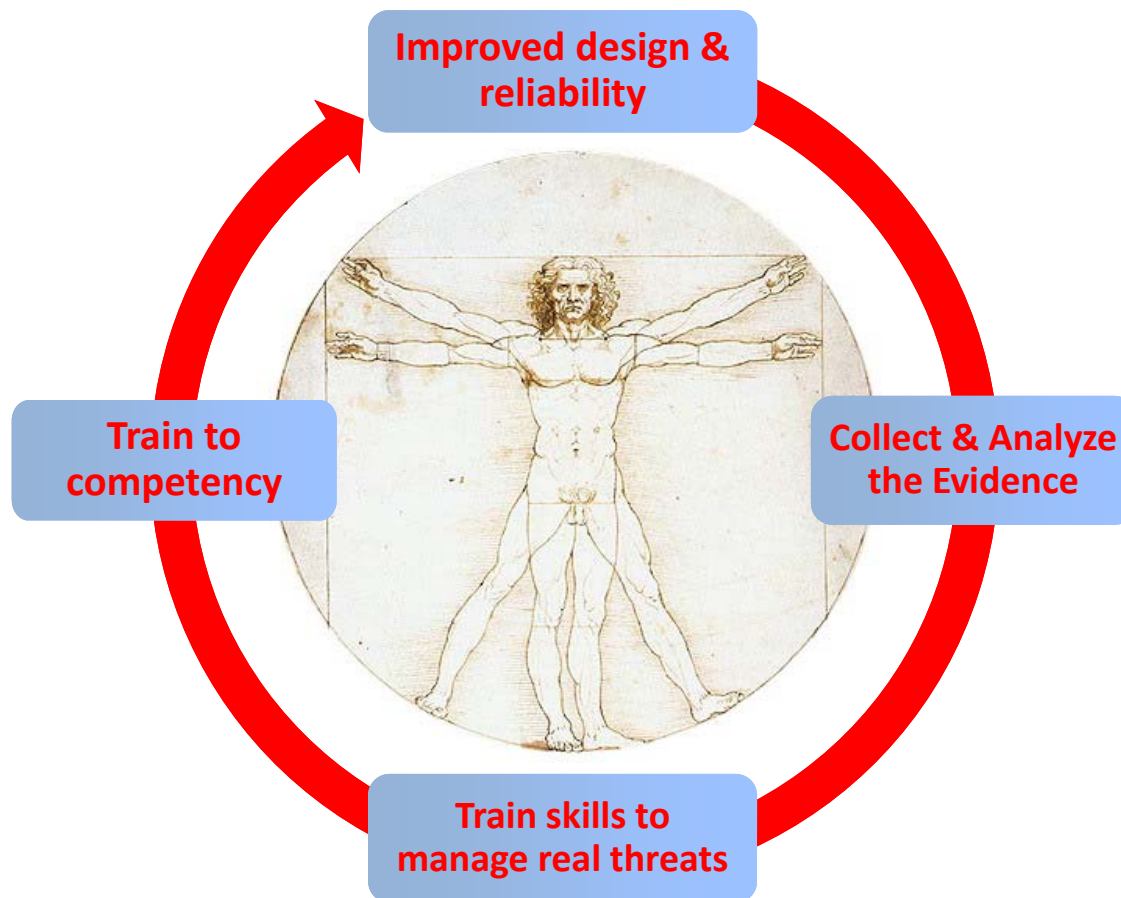


- ICAO manuals and circulars provide guidance and information to facilitate the uniform application of SARPs and PANS





# Overview of Evidence-based Training

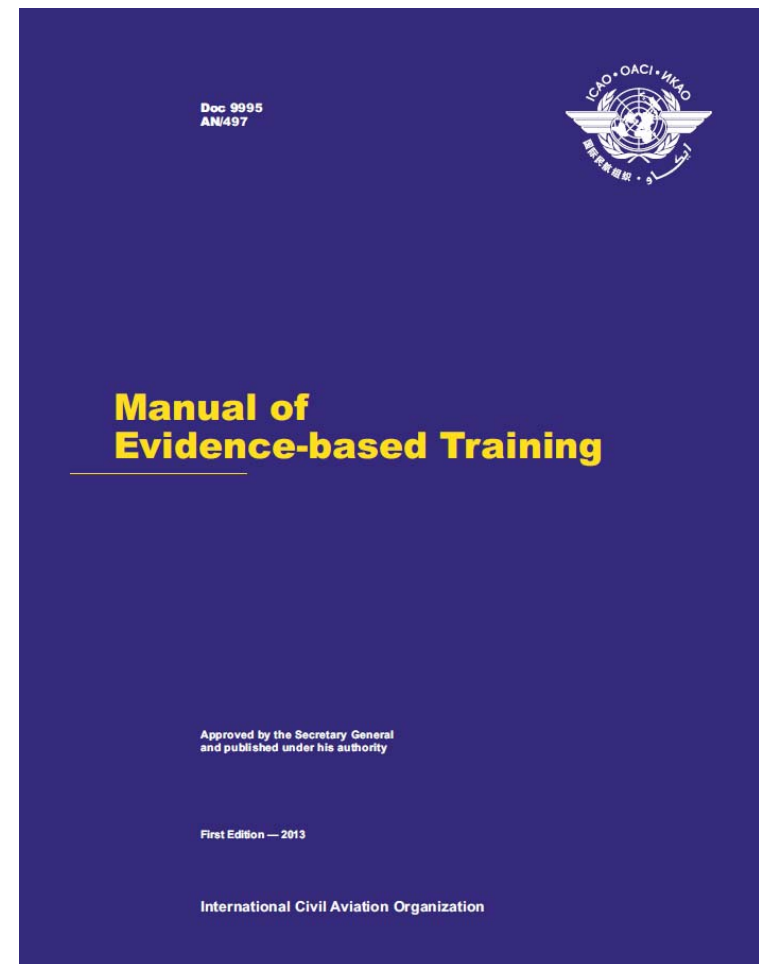




# Doc 9995



- EBT development & programme outline:
  - EBT Principles
  - Implementation
  - Instructor qualifications
  - Conduct of EBT
- EBT programme:
  - Development process for EBT
  - Regulatory approval
- Core competencies (Appendix 1)
- Training programmes for 6 Generations of aeroplanes (Appendices 2 to 7)



# EBT & Generations of Aeroplanes



- Generation 4 - Jet

- A318/A319/A320/A321 (including neo), A330, A340-200/300, A340-500/600, B777, A380, B787, A350, Bombardier C Series, Embraer E170/E175/E190/E195

- Generation 3 - Jet

- A310/A300-600, B737-300/400/500, B737-600/700/800 (NG), B737 MAX, B757, B767, B747-400, B747-8, B717, BAE 146, MD11, MD80, MD90, F70, F100, Bombardier CRJ Series, Embraer ERJ 135/145

- Generation 3 - Turboprop

- ATR 42-600, ATR 72-600, Bombardier Dash 8-400, BAE ATP, Embraer 120, Saab 2000

- Generation 2 - Jet

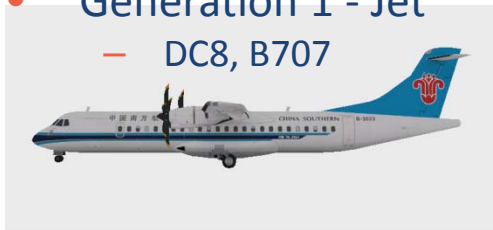
- A300 (except A300-600), BAC111, B727, B737-100/200, B747-100/200/300, DC9, DC10, F28, L1011

- Generation 2 - Turboprop

- ATR 42, ATR 72 (all series except -600), BAE J-41, Fokker F27/50, Bombardier Dash 7 and Dash 8-100/200/300 Series, Convair 580-600 Series, Shorts 330 and 360, Saab 340

- Generation 1 - Jet

- DC8, B707



ATR 72

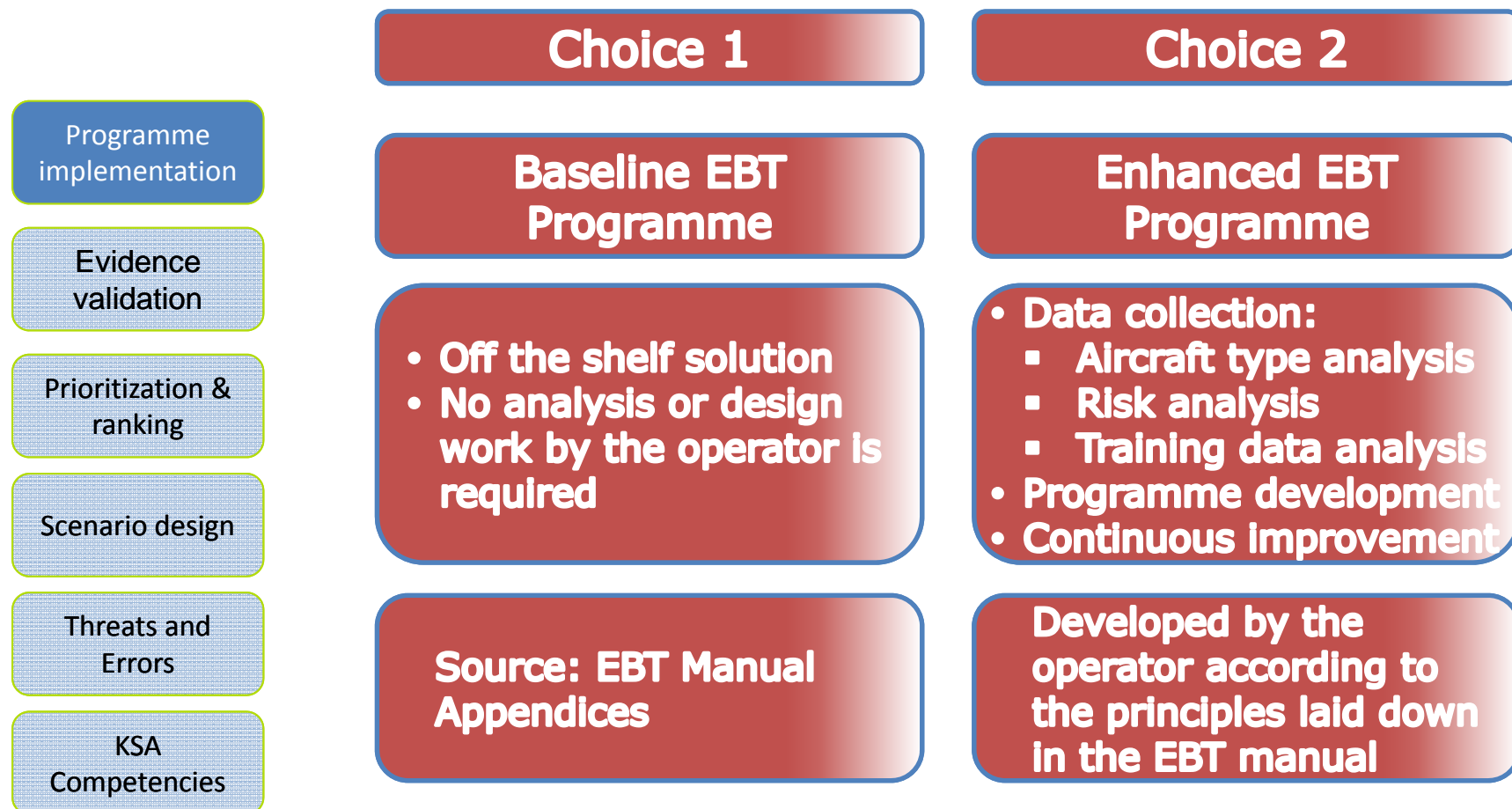


# 3 phases of an EBT module

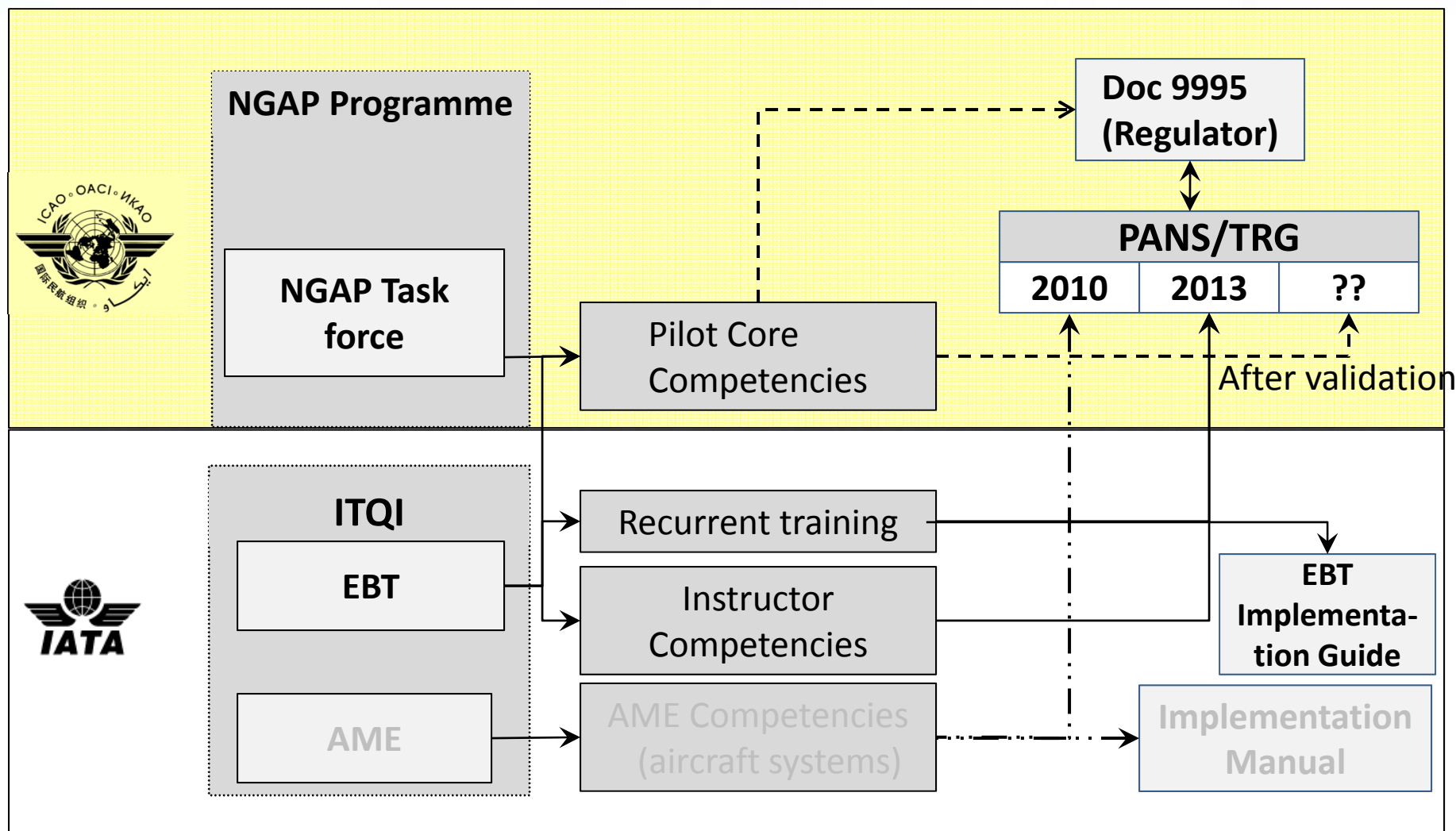


	1 Evaluation Phase	2 Manoeuvres Training Phase	3 Scenario-based Training Phase
Objective	<ul style="list-style-type: none"><li>• Assess competence</li><li>• Identify training needs</li><li>• Validate training system performance</li></ul>	<ul style="list-style-type: none"><li>• Train manoeuvre skills to proficiency.</li><li>• Validate system performance and skill decay.</li></ul>	<ul style="list-style-type: none"><li>• Manage the critical threats according to evidence</li><li>• Improve competency to manage foreseen/unforeseen threats</li></ul>
Conduct	<ul style="list-style-type: none"><li>• Line orientated - One or more occurrences</li><li>• Assessment of one or more Competencies</li></ul>	<ul style="list-style-type: none"><li>• Sequence of deliberate actions to achieve a prescribed flight path</li><li>• E.g. RTO, EF V1, OEI APP, OEI GA, Emer. Descent</li></ul>	<ul style="list-style-type: none"><li>• Line orientated flight scenarios</li><li>• One or more predictable or unpredictable threats</li></ul>

# Baseline vs. Enhanced EBT



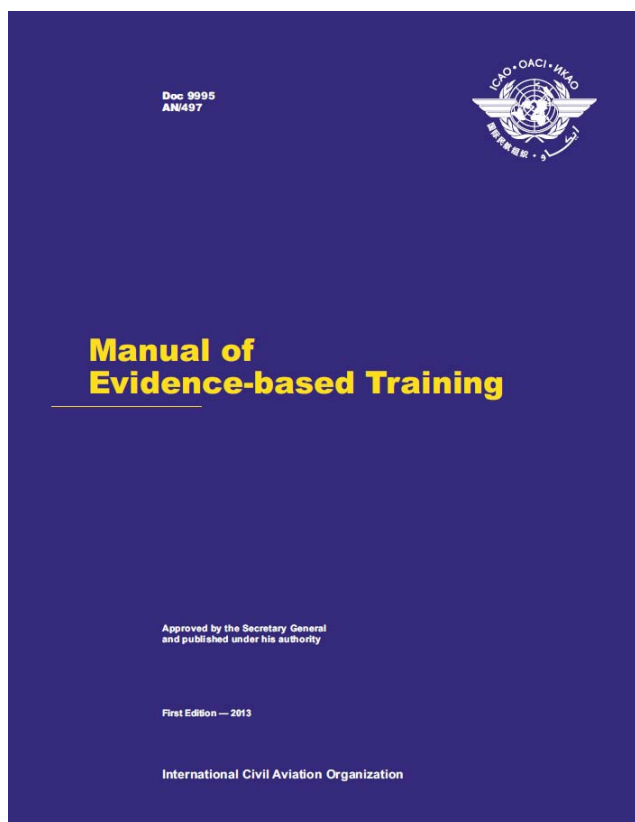
# EBT Development Process



# Pilot core competencies – the concept



- Pilot core competencies. A group of related behaviours, based on job requirements, which describe how to effectively perform a job. They:



- describe what proficient performance looks like.
- include the name of the competency, a description and a list of behavioural indicators.
- An example of pilot core competencies is in Doc 9995 and will be migrated to PANS-TRG in due time.



# Doc 9995 example of pilot core competencies



# Upset prevention & recovery training (UPRT)



- EBT topics include UPRT
- ICAO new UPRT provisions:
  - Annex 1 and 6 requirements (Nov 2014)
  - PANS TRG procedures (Nov 2014)
  - *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011, Feb 2014)
  - Revision of Doc 9625, the *Manual of Criteria for the Qualification of FSTD* (end 2014)
- ICAO LOC-I symposium:
  - held 20-22 May 2014 in Montreal

# Taking advantage of existing/new material

- IATA ITQI:
  - EBT Implementation Guide
    - Aimed at assisting Industry
  - EBT Data Report
    - Soon to be published
- ICAO:
  - Published EBT Manual (Doc 9995)
    - Aimed at regulators & assisting inspectors
  - PANS-TRG amendment in 2013
    - EBT & instructor competencies
  - PANS-TRG amendment in Nov 2014
    - Upset prevention & recovery training
  - Evolution of personnel competencies
    - Working to upgrade and broaden pilot competencies



# What are the options for EBT in future?



- Currently:
  - Implementation guide
- Going forward:
  - Evaluate changes in evidence to regularly update guidance
  - Internationally accepted
- With enhanced EBT
  - Airlines will want to use own data
  - Challenge for regulator
    - Monitoring effectiveness of data gathering and analysis



# Conclusions



- Many challenges still associated with EBT
  - Implementation will require CAA efforts for proper oversight
- ICAO urges the use of existing material
- EBT includes upset prevention and recovery training
  - Focus on human performance
  - Supported by new ICAO requirements (Nov 2014) and guidance material





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Thank You





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# What are the EBT challenges for Regulators?



- A paradigm shift:
  - from mandatory items to EBT
- Major challenge for regulators:
  - Need to amend regulations
    - Enabling EBT recurrent training
  - Modify licensing requirements for checks
  - Training inspectorate
  - Conducting oversight of competency-based training
- Shift from prescriptive to performance-based:
  - Requires new inspector skill set
  - Data collection and analysis
  - Need for a training feedback mechanism



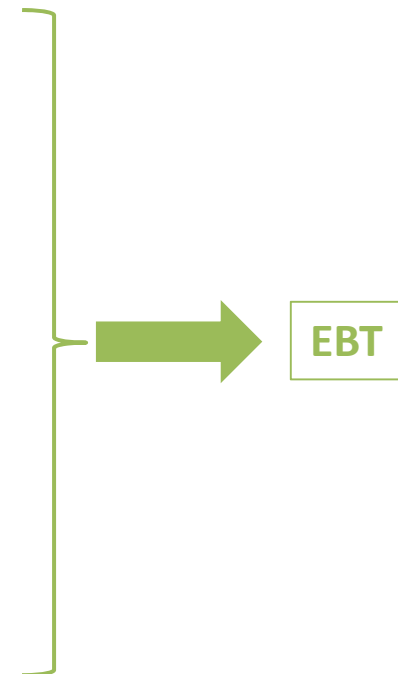
# What are the specific EBT challenges for Regulators? (1)



- Existing **prescriptive regulations** for recurrent training to be amended, **enabling EBT recurrent training**, either by exemption or through a regulation specific for EBT:

## Current list of 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
- Non-Precision approach to MDA
- Go-Around 1 engine-out at DA
- Landing critical engine inoperative....



# What are the specific EBT challenges for Regulators? (2)



- Regulatory change to enable **licence renewal** through EBT to maximize effectiveness of EBT
- Oversight of **competency-based training** (not specific to EBT)
- Training of **inspectors** for EBT oversight
- **Accept** the 3 phases of an EBT module, in the following optimum order : evaluation, manoeuvre training and scenario-based training phases

# What are the specific EBT challenges for Regulators? (3)



- Approval of EBT programmes:
  - Evaluation of the **pilot core competencies** and **performance criteria** used by the training organization
  - Qualifications of **EBT instructors** by the training organization
- Surveillance of EBT programmes:
  - Requirement for a **beta phase**?
  - **Surveillance** of the training effectiveness (feedback system, SMS)
  - For **enhanced** EBT (not baseline): monitoring the effectiveness of the **data gathering and analysis**



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