

CRM i EBT (Evidence Based Training)

CRM-seminarium

Human Factors Network, Linköpings universitet

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Cockpit 1903 – överlag låg komplexitet

V-listor?

nödsituationer?

Bälte?

Varnings-
system?

Sitta/ligga?

Autopilot?

Skydd mot
vind och
kyla?

Vibrationer?



Instrumentering?

Skyddsutrustning?

2022-12-12

Cockpit 2013 – fortsatt ökad komplexitet!

Luftrum och flygplatser?

Stora & mångkulturella organisationer?

Regel- och miljökrav?



Utbildning?

Utredningar?

Automation?

Tidszoner?

Certifieringar?



Nödsituationer?

V-listor/manualer

Tillsyn?

Säkerhetskrav?

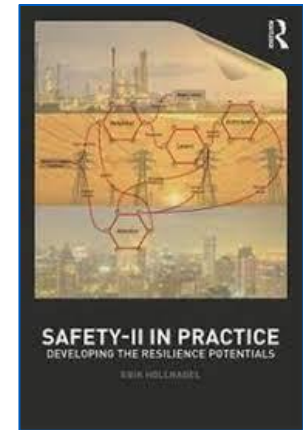
Teknik & Underhåll?

Infrastruktur?

SMS?

Känner vi kanske igen följande resonemang/påståenden?

- Världen och vår omgivning blir mer komplex (t.ex. socio-tekniska system)
- Systemens komplexitet leder till nya och olika utmaningar, t.ex. att alla eventualiteter inte kan beskrivas eller fullt förstås (ibland inte ens med facit i hand)
- Säkerhet ligger bl.a. i individers förmåga att anpassa sitt utförande till rådande omständigheter
- Vi behöver nya lärdomar om hur individer och organisationer kan hantera ökad komplexitet



Flygutbildning - kort bakgrund

- Internationella standarder och bestämmelser för pilotutbildning togs ursprungligen fram som respons på olyckor med tidig generation jetflygplan
- Förlegade kriterier och upplägg av pilotutbildning ("tick-the-box", manöverbaserad träning)
- Tillgång till ny data (t.ex. FDA, LOSA, safety reports), ökad automation, komplexa system/multipla interaktioner, "nya" olyckor t.ex. CFIT etc.
- Behov av en översyn av flygutbildning för kommersiella piloter (fokus repetitionsutbildning och typutbildning)
- Inleddes ett globalt säkerhetsinitiativ (ICAO, IFALPA, IATA, EASA) vars mål var att fastställa relevansen av befintlig pilotutbildning i förhållande till bl.a. flygplansgeneration

Rekommendationer från haveriutredningar

- Identifiera & förstå olika OPS-scenarior, från teori till praktik, "capacity to manage CRM-resources", unexpected situation (competencies, not performance-focused), instruktörens roll i att förklara orsak/verkan, HF-analyser som kan belysa "normal ops"
- Behöver metoder för träning av piloter ur ett riskbaserat perspektiv
 - Flight path — Manual aircraft control
 - The unstable approach paradox
 - Crew Resource Management
 - Surprise
 - **Prioritisation of training topics**
- Behov av att stärka piloters kompetens inom olika områden ("maximize training, minimize checking")

Slutsats och åtgärdsförslag

“Data indicates the need for pilots to be **exposed to the unexpected** in a **learning environment**, and be more challenged with and immersed in complex situations, rather than being repetitively tested in the execution of manoeuvres” (EASA, 2015)

- ✓ **EBT – Evidence-based Training**
- ✓ **Kommersiell flygverksamhet**
 - Certifierade piloter (type-rating, föremål för rep-utb)
 - Jetflygplan 50 pax eller fler, turbo-prop 30 pax eller fler

Vad är EBT?

“Evidence-based training (EBT) means assessment and training based on **operational data** that is characterised by developing and assessing the overall capability of a pilot across a range of **competencies** rather than by measuring the performance in individual events or manoeuvres”



Competency: “A combination of knowledge, skills and attitudes required to perform a task to the prescribed standard”

Core competencies: “A group of related behaviours, based on job requirements, which describe **how to** effectively perform a job and what proficient performance looks like. They include the name of the competency, a description, and a list of behavioural indicators”

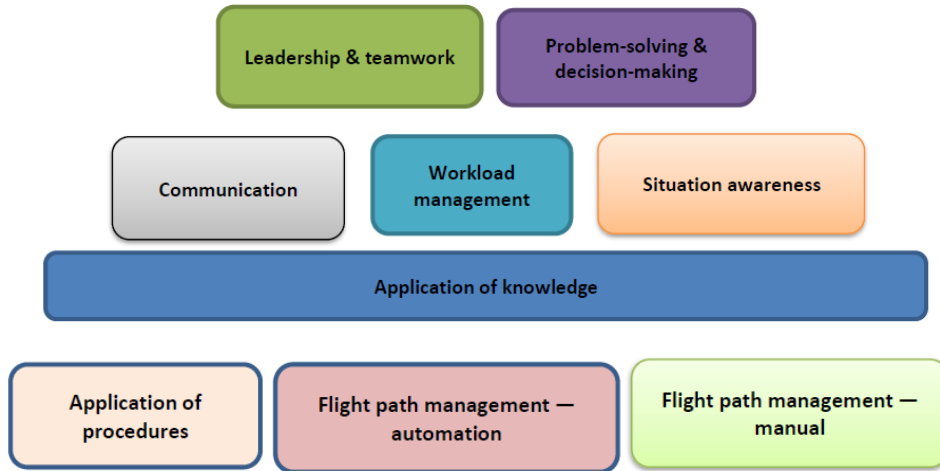
EBT competencies (EASA framework)

- Application of procedures and compliance with regulations
- Communication
- ➔ Airplane flight path management – automation/manual control
- Leadership & teamwork
- Problem solving – decision making
- Situation awareness & management of information
- Workload management
- Application of knowledge

<i>Competency</i>	<i>Competency description</i>	<i>Behavioural indicator</i>
Aircraft Flight Path Management, automation	Controls the aircraft flight path through automation, including appropriate use of flight management system(s) and guidance.	<p>Controls the aircraft using automation with accuracy and smoothness as appropriate to the situation</p> <p>Detects deviations from the desired aircraft trajectory and takes appropriate action</p> <p>Contains the aircraft within the normal flight envelope</p> <p>Manages the flight path to achieve optimum operational performance</p> <p>Maintains the desired flight path during flight using automation whilst managing other tasks and distractions</p> <p>Selects appropriate level and mode of automation in a timely manner considering phase of flight and workload</p> <p>Effectively monitors automation, including engagement and automatic mode transitions</p>

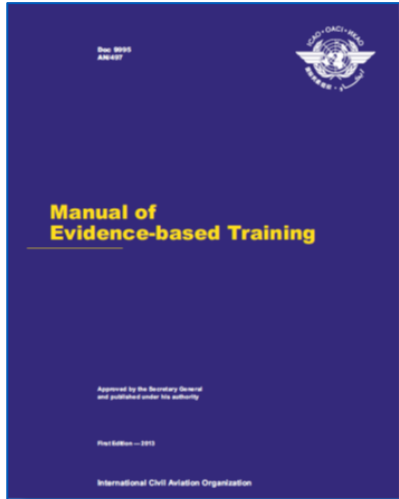
Kompetensblocken i utvecklingsarbetet

- ”Competency map process”



- What is to be trained?
- What tasks does the trainee need to be able to perform by the end of the training?
- What regulatory, technical and operational knowledge is required?
- What skills are required?
- What attitudes are required?

Hur ser ett EBT-program ut?



- Baseline, Mixed & Enhanced
- 3-faser:
 - Evaluation phase (line-oriented, no/few instructions, RCA)
 - Manoeuvres validation phase (practice and develop handling skills, instructor active trainer)
 - Scenario based training phase (train competencies for threats and errors, instructor active)
 - CRM ska inkluderas i samtliga faser
- Likheter CRM-program i struktur/innehåll
 - Kompetens instruktörer
 - Datadrivet



CRM i EBT

“Whenever practicable, the compliance-based approach concerning CRM training may be substituted by a competency-based approach such as evidence-based training” (Ref.: AMC1 ORO.FC.115 Crew resource management (CRM) training)

- Innehållet i EBT omhändertar delar av CRM-kraven
 - Det som inte kan inkluderas berör själva genomförandet av CRM-training och;
 - Specifika ”elements” som inte får inkluderas i EBT
- Gäller endast för annual recurrent CRM-training (motsv. repetitionsutbildning)
 - Inte initial, conversion, eller command course

Non-technical competencies i EBT

EBT non-technical competencies (återfinns även i CRM-kraven)

Communication

Airplane flight path management control (automation/manual)

Leadership & teamwork

Problem solving & decision making

Situation awareness and management of information

Workload management

Vad täcks inte i EBT? – några exempel

Genomföranden/aspekter av CRM

Combined CRM

Training in the non-operational environment

Identified safety risks (management system)

Review of training programme

CRM training other than recurrent CRM

CRM-elements utanför EBT-scopet (non-operational environment)

Human factors in aviation

Human performance and limitations

Fatigue and stress management

Cultural differences

Safety culture and company culture

(Resilience development)

(Surprise and startle effect)

(Threat and error management)

Case studies

Om man vill veta mer.....



European Union Aviation Safety Agency

SAFETY MATERIAL

RMT.0599

'Evidence-based and competency-based training.'

SPT.012

'Promote the new European provisions on pilot training'

Oversight guidance for the transition to **Mixed EBT** Implementation

According to:

GM1 ORO.FC.230 (a); (b); (f) Recurrent training and checking GM2 ORO.FC.A.245, ATQP

Diverse regelverk:

- ICAO Manual of EBT (2013, doc 9995)
- Implementation of EBT mixed (ED decision 2015/027/R) samt EBT baseline
- ED Decision 2021/002/R: Update of the AMC & GM to Subpart FC of Part-ORO (evidence-based training)
- EASA EBT Manual (draft 2022)

Bra hemsidor (sök på EBT):

- easa.europa.eu
- [SKYbrary.aero](https://skybrary.aero)

Sammanfattning

- Ökat behov av mer fokus på piloters kompetenser framför enskilda prestationer
- EBT ger goda möjligheter att bidra till detta
- EBT-filosofin kan sannolikt appliceras på andra områden/branscher än flyget

