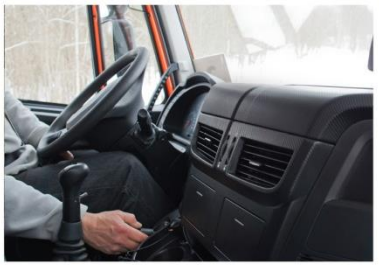
Trafik-, Bygge- og Boligstyrelsen
Danish Transport, Construction and Housing Authority

Examiner
Human Factors Training







Trafik-, Bygge- og Boligstyrelsen
Center for Luftfart
Examiner briefing in Dubai
02nd October 2019

Transport-, Bygnings- og Boligministeriet

Examiner
Human Factors Training

Dubai

02nd of October 2019

Program

- Introduction / expectations?
- The examiner role
- The performance triangle (knowledge, attitude & skills)
- The “super eight”
- Threat & Error Management (TEM)
- Cases
- Safety briefings
- Vested interest
- How to evaluate a scenario?
- CAP 737 / NOTECHS
- Summary & questions?

Link to “last time”

How to cook your Examiners?

FCL.1020 Examiners assessment of competence

Applicants for an examiner certificate shall demonstrate their competence to an inspector from the competent authority or a senior examiner specifically authorised to do so by the competent authority responsible for the examiner’s certificate through the conduct of a skill test, proficiency check or assessment of competence in the examiner role for which privileges are sought, including briefing, conduct of the skill test, proficiency check or assessment of competence, and assessment of the person to whom the test, check or assessment is given, debriefing and recording documentation.

Humans and performance in the examiner setting

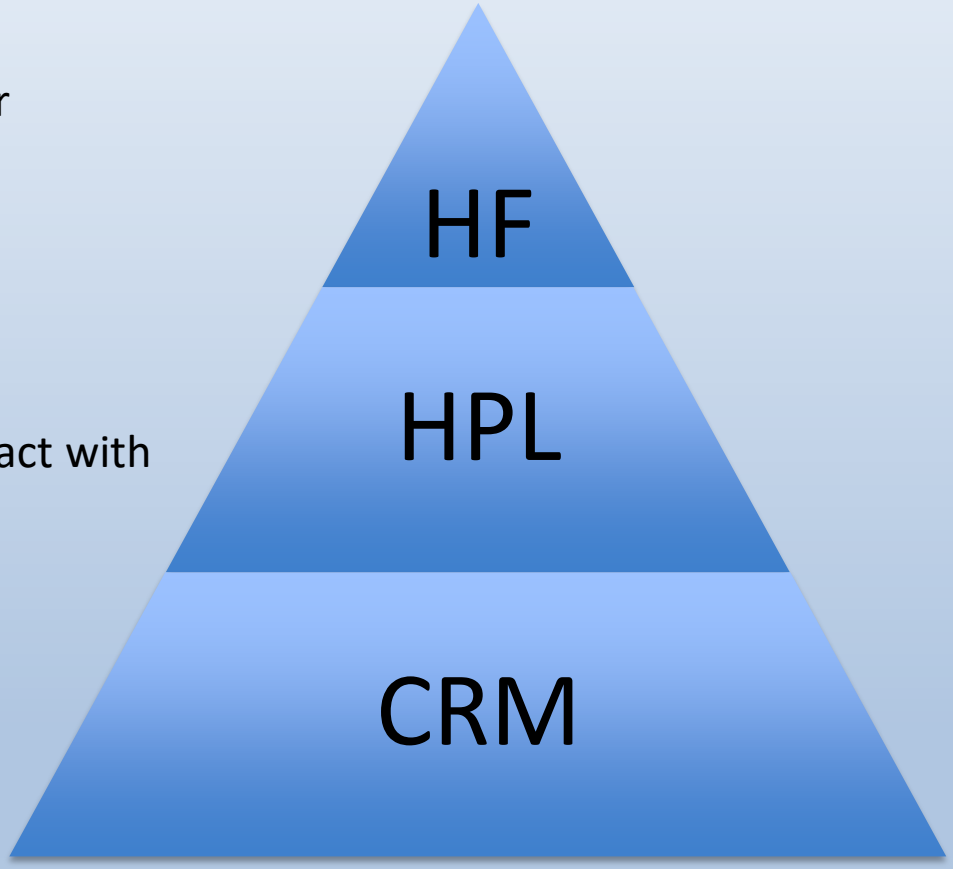
- Complex environments
  - The importance of culture and drift
- What is Non-Technical performance
  - Human Factors (HF)
  - Human Performance Limitations (HPL)
  - Crew Resource Management (CRM)
- Threat and Error Management (TEM)

HP – HPL – CRM

Human Factors
"fit" between the user, equipment and their environments

Human Performance & Limitation
How the human body, its limitations, the psychological processes and how they interact with the (aviation) environment

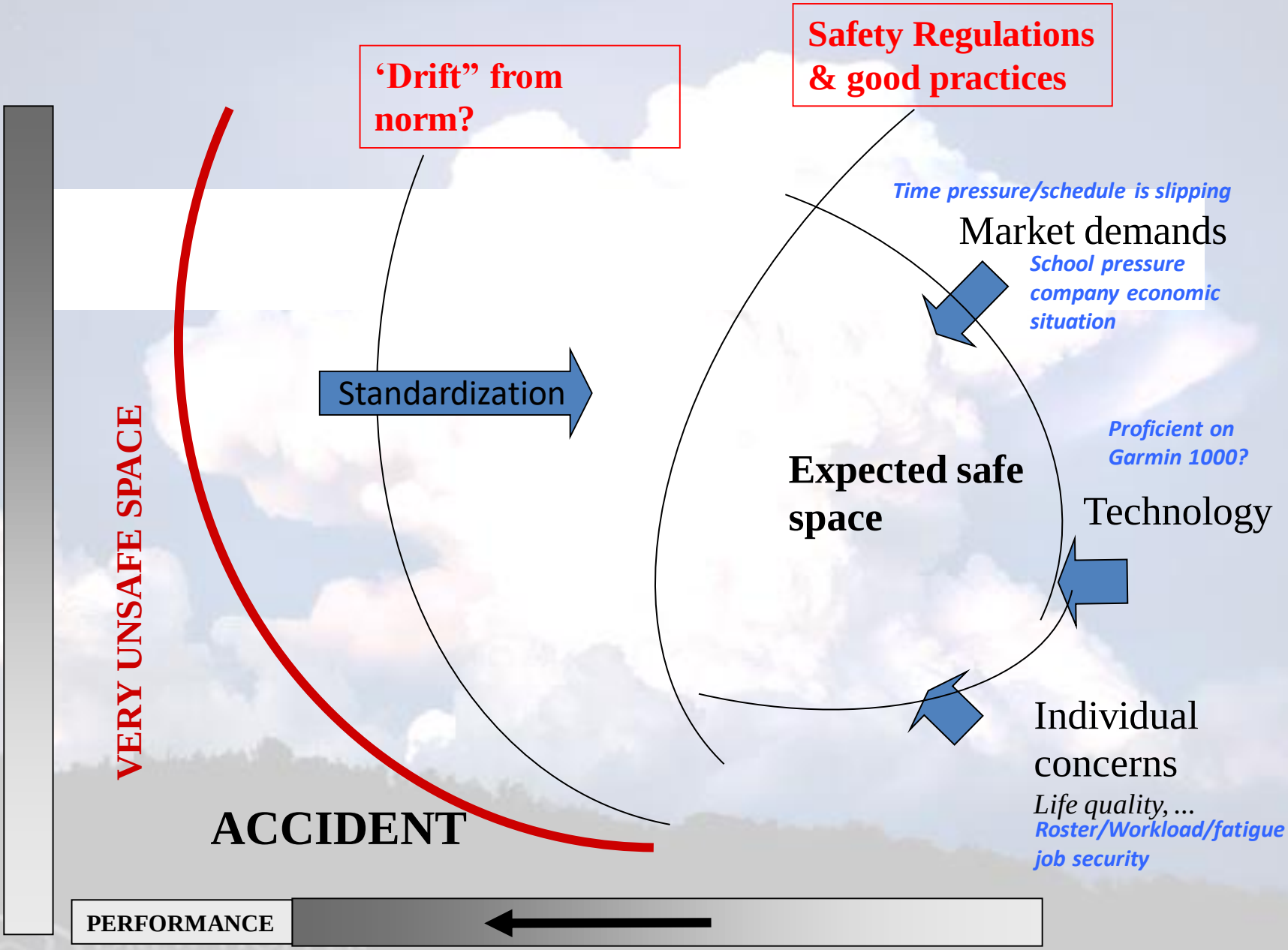
CRM
Focuses on interpersonal communication, leadership, automation and decision making in the cockpit and/or with other teammembers



Technology and Human Error at the "sharp" end

DENMARK, 6, 2000 : a patient broke wind while having surgery and set fire to his genitals. The 30-Years-old man was having a mole removed from his bottom with an electric knife when his attack of flatulence was ignited by a spark. His genitals, which where soaked in surgical spirits, caught fire. The man who is suing the hospital, said: 'When I woke up, my penis and scrotum were burning like hell. Besides the pain, I can't have sex with my wife.' Surgeons at the hospital in Kjellerup said: 'It was an unfortunate accident'

Examiners integrity – role models!



Source: Rasmussen & R. Amalberti, Simplified from The paradoxes of almost totally safe transportation systems, 2001.

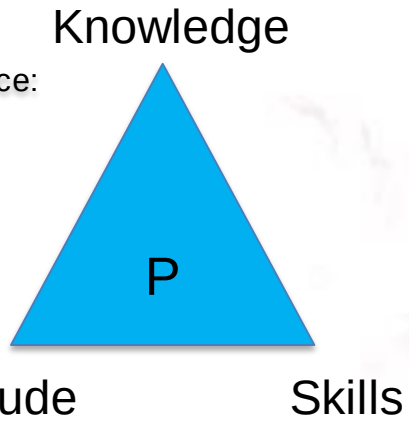
Performance triangle – (KAS)

Knowledge:

- Knowledge the pilot must remember by heart (e.g. memory items for a critical emergency)
- Knowledge the pilot knows where to find (operation manuals, checklists, eletronic flightbag etc.)

Knowledge can also be weighed in terms of importance:

- Knowledge the pilot MUST know
- Knowledge the pilot SHOULD know
- Knowledge that might be NICE to know



Attitude:

Attitude is demonstrated by the manner in which the pilot carries out his duties and how he communicates with others, particular tone of voice and non-verbal comunication.

Some factors that can influence attitude are:
Motivation, beliefs, feelings, value, opinions, expectations, desires and temperaments which relates to the pilots personality.

Skills:

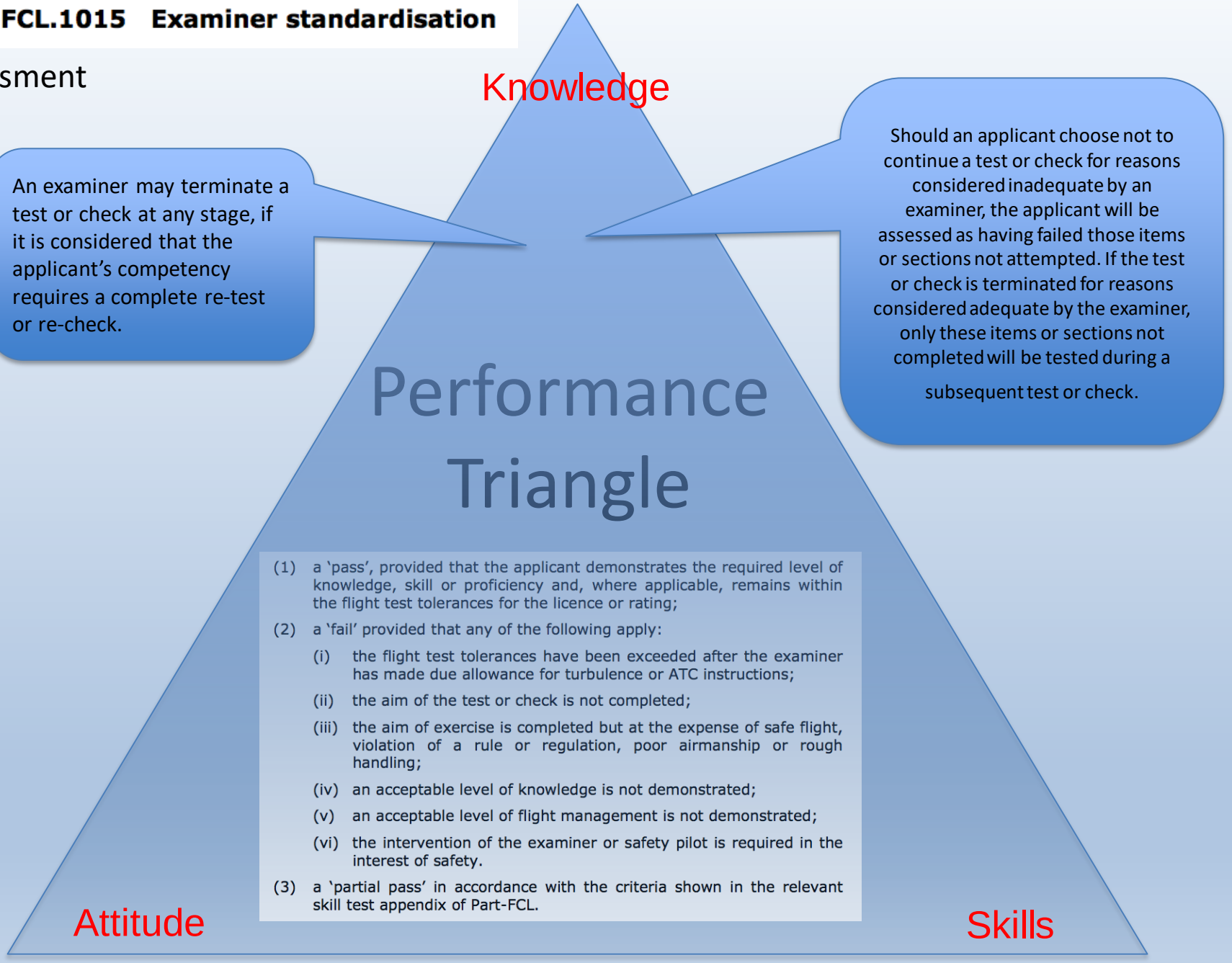
Skills can be divided into 5 basic categories:

- Manual skills – basic functions such as operating switches and levers
- Cognitive skills – problem solving, decision making and including such non-technical skills as leadership and judgement
- Communication – crew coorporation and creating situation awareness
- Psychomotor skills – when mental activity stimulates simultaneous physical activity such as flying and cycing
- Perceptual skills – colour matching, tasting, performance assesment …. Reaching conclusions based on the use of the senses

Important:
Knowledge and skills must be divided into technical and non-tecknical skills

AMC2 FCL.1015 Examiner standardisation

Assessment



The Performance Triangle

Questions	K	A	S
The pilot did calculate takeoff performance correct	X		X
The pilot did not know the takeoff wx requirements for the aircraft/helicopter type	X		
The pilot did recover from an ”upset aircraft attitude” after encountering wake turbulence on final			X
The pilot did not accept the ”fail” due no go-around on an unstabilized visual approach		X	
The pilot was unable to apply correct temperature correction to minima during a winter ops. approach	X		X
The pilot were unable to apply x-wind corrections During the NDB approach			X

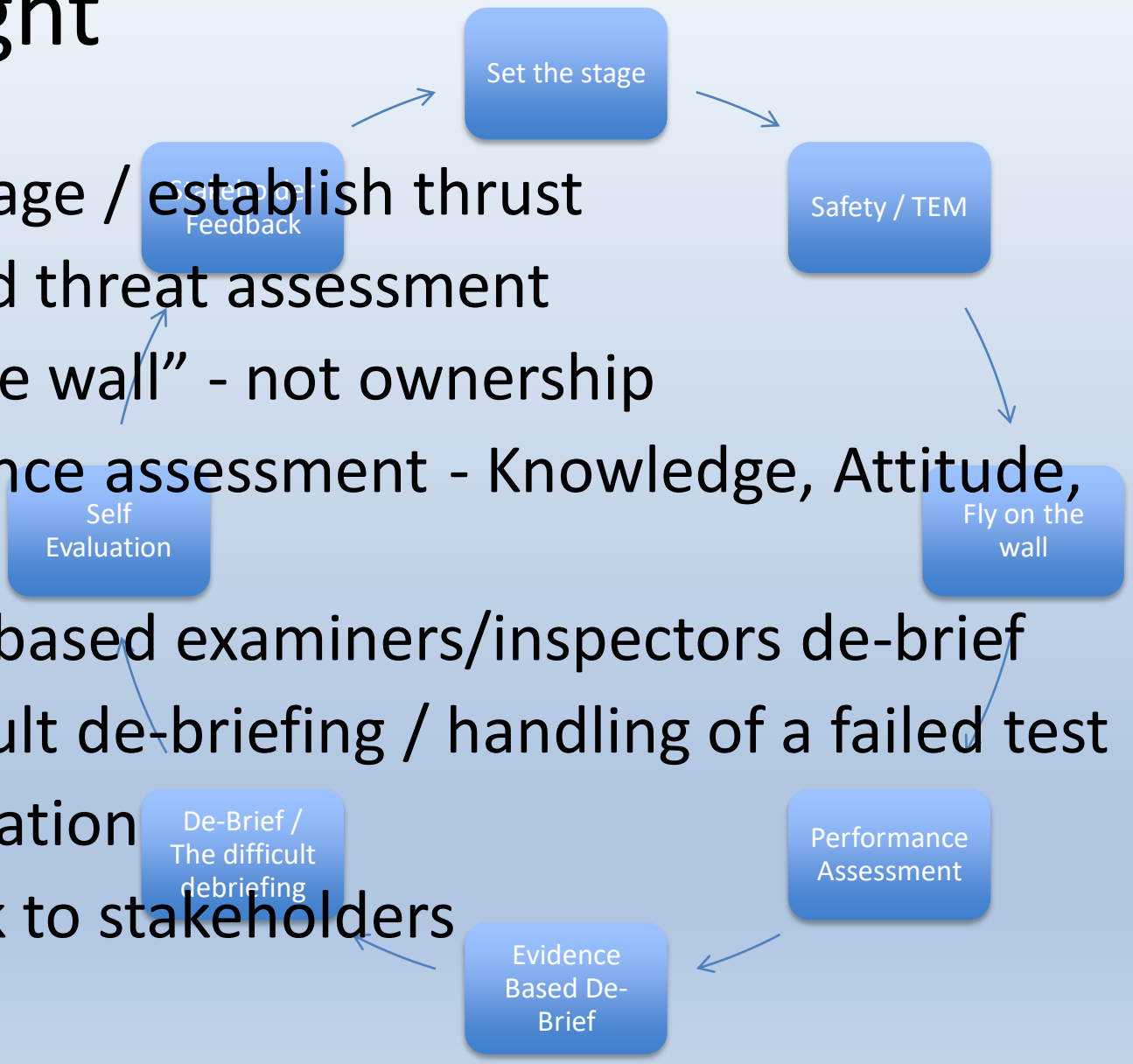
Culture

What is culture?

What are the challenges in relation to culture when you conduct a test?

Super Eight

1. Set the stage / establish thrust
2. Safety and threat assessment
3. “Fly on the wall” - not ownership
4. Performance assessment - Knowledge, Attitude, Skills
5. Evidence based examiners/inspectors de-brief
6. The difficult de-briefing / handling of a failed test
7. Self evaluation
8. Feed back to stakeholders



Examiner pre-flight objectives

- **Establish trust**
- **Assess if candidate is ready for test (attitude)**
  - **Attitude is seldom an issue – it is difficult to handle!**
- **Assess knowledge level**

Will I pass or not?

AMC FCL.1015 Examiner Standardization

EXAMINER APPROACH

(n) An examiner should encourage a friendly and relaxed atmosphere to develop both before and during a test or check flight. A negative or hostile approach should not be used. During the test or check flight, the examiner should avoid negative comments or criticisms and all assessments should be reserved for the debriefing.

Setting the environment (“the stage”)

- Deal with emotions & body language
- How is the applicant?
  - Appearance, sweating, anxiety
  - Illness
  - Fatigue (training schedule) etc.
- Applicant ready to perform
  - Language barrier (FCL.1030)
  - Comfortable (enough)
  - Trust established (sex, race, age)
- Test – formally (check examiner.dk)
  - Check qualification, training and experience documentation, medical (FCL.1030)
  - Type of test, pass/fail criteria
  - A/C papers, airworthiness
- Safety briefing

How to prepare the candidate?

<u>Good examiner practice:</u>

- Be on-time
- **Be communicative**
- **Be well prepared**
- Be motivated
- Be honest and humble
- Be open for feedback
- Create a nice “stage” – “test environment”

Voice communication

- Intonation & loudness
- Articulate clearly – no mumbling
- Hidden messages – no!
- Two-way communication
- Closed loop communication

How to prepare candidate?

(t) A test or check is intended to simulate a practical flight. Thus, an examiner may set practical scenarios for an applicant while ensuring that the applicant is not confused and air safety is not compromised.

(u) When manoeuvres are to be flown by sole reference to instruments, the examiner should ensure that a suitable method of screening is used to simulate IMC.

(v) An examiner should maintain a flight log and assessment record during the test or check for reference during the post or flight debriefing.

(w) An examiner should be flexible to the possibility of changes arising to pre-flight briefings due to ATC instructions, or other circumstances affecting the test or check.

(x) Where changes arise to a planned test or check an examiner should be satisfied that the applicant understands and accepts the changes. Otherwise, the test or check flight should be terminated.

Context

Screen

Log

Flexible

Changes

How to prepare candidate

The examiner should

- State objectives clearly
- Show a structured plan for the session
- Master question techniques
  - Open questions
  - No trap questions
- Wait for candidates to answer

  Balance verbatim and paraphrasing
- Follow up on candidate inputs
  - Be flexible and follow leads but use questions to direct and get back on track
- Keep candidates in the loop
- KEEP CONTEXT IN MIND
- Use updated briefing material
- Keep track of time
- Stick to the books (rules)

Examiner performing the test

- During LOFT act as support, do not interfere
- During manoeuvres support, reposition and shortcuts are possible
- Don’t take a share in decision making – it will be difficult to fail if you have a stake in the outcome
- Timing is crucial
- All required items must be performed
- If substandard performance, decision to retake maneuver reasonable?
- Keeping brief, factual and unobtrusive notes
- Feedback is important!

What is TEM?

3 minutes of reflection (2 and 2)

Threat & Error Management (TEM)

Threats are defined as events or errors that occur beyond the influence of the team member(s), increase operational complexity, and which must be managed to maintain the margins of safety e.g. weather conditions at aerodrome of operation.

Errors are defined as the actions or inactions by a team member that lead to deviations from organizational/operational intentions or expectations.

Ref: EASA, Annex to ED Decision 2011/016/R

Threat & Error Management (TEM)

Undesired aircraft states are flight crew-induced aircraft position or speed deviations, misapplication of flight controls, or incorrect systems configuration associated with a reduction in margins of safety.

Undesired aircraft states that result from ineffective Threat and Error Management may lead to compromising situations and reduces margins of safety in flight operations.

Threat & Error Management (TEM)

Countermeasures

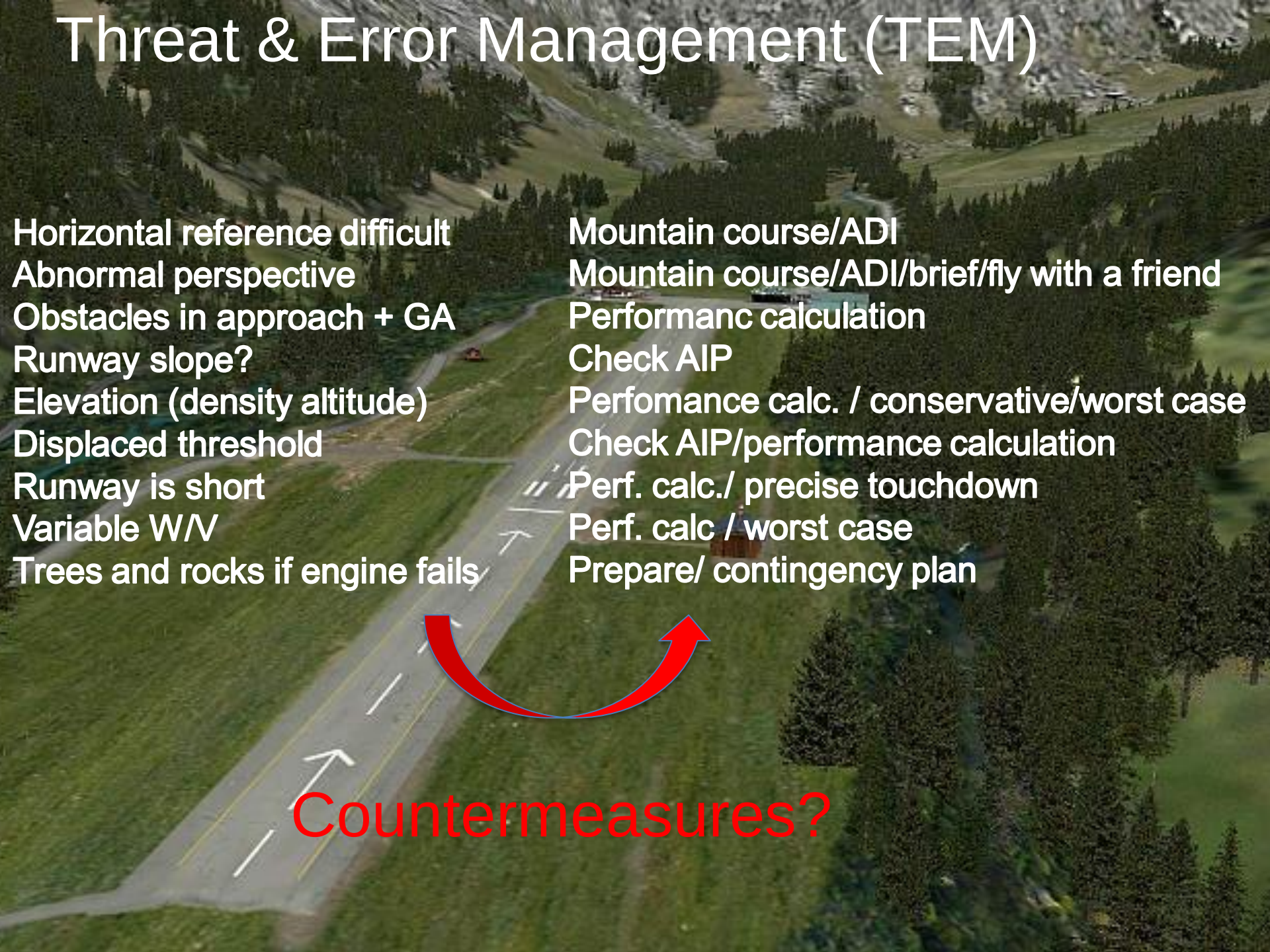
Flight crews must, as part of their operational duties, employ countermeasures to keep threats, errors and undesired aircraft states from reducing margins of safety in flight operations.

Examples of countermeasures would include checklists, briefings, call-outs, TEM and SOP's, as well as personal strategies and tactics. Flight crews dedicate significant amounts of time and energies to the application of countermeasures to ensure margins of safety during flight operations.
Empirical observations during training and checking suggest that as much as 70 % of flight crew activities may be countermeasures-related activities.

Management of Threats and Errors

- Knowledge
- CRM
- Task sharing (MP)
- Vigilant
- SOP’s
- Be honest
- Make correction

Threat & Error Management (TEM)



Horizontal reference difficult	Mountain course/ADI
Abnormal perspective	Mountain course/ADI/brief/fly with a friend
Obstacles in approach + GA	Performanc calculation
Runway slope?	Check AIP
Elevation (density altitude)	Perfomance calc. / conservative/worst case
Displaced threshold	Check AIP/performance calculation
Runway is short	Perf. calc./ precise touchdown
Variable W/V	Perf. calc / worst case
Trees and rocks if engine fails	Prepare/ contingency plan

Countermeasures?

Your ”threat radar”

….. a technique!

Case(s) “TEM”

When do you normally start your TEM?

How do you do TEM?

5 minutes of reflection (2 and 2)

Case(s) “TEM” ….. a technique!

When	Threat	Countermeasure
Schedule release	Unfamiliar AD or route. Crew composition	Prepare, ask colleague, AD briefing
Day of flight	Fatigue	Rest well
Transport to airport	Other road traffic ☺	Do mental preparations
Check in/Pre-flight planning	Complex planning Terrain, Weather, MEL	Be ahead, have more time. Use all team members
Pre flight cockpit duties	Last layer of defense. Actual aircraft status Do “TEM” for departure	Slow down, involve all team members
During flight	Continuous TEM	As relevant

Case “TEM” (1)

You are conducting a skill test for CPL (H) and simulate HEMS operation.

Case “TEM” (2)

Weather at accident site is simulated 1900 m and 400 ft base (below minimum)

What do you expect ?

What is your pass/fail criteria?

Case “TEM” (3)

”The suitable hospital” is the ONLY place for the treatment.
The range of the mission is 6 Nm outside your calculated range with commercial reserves, but 54 Nm within your absolute range.
What do you expect ? What are your pass/fail criteria?

How do you handle safety briefing?

Safety briefing
…… a countermeasure!

How do you perform your safety briefing?

Single engine: In case of engine failure or fire who will fly & do the checklist, any other malfunctions. HELICOPTER? Does everyone know this?

Multi engine: When a safety pilot can introduce emergencies and how (IFR simulations). Minimum altitudes for stall/unsual attitudes.
”How far are you willing to go?” Explain your ”bottom line”.

Simulator: Emergency STOP, flight freeze on overhead panel, motion off, emergency ladder/rope, fire in the sim/building, communication and local procedures.
TRI/TRE incapacitation.
How to get a hold of a technician.

Vested interests

GM1 FCL.1005(b) Limitation of privileges in case of vested interests

Examples of a situation where the examiner should consider if his/her objectivity is affected are when the applicant is a relative or a friend of the examiner, or when they are linked by economical interests or political affiliations. ….. etc.

Have you (as an examiner) ever been in a situation, where you considered ”habilitet” as a factor?

3 minutes of reflection (2 and 2)

How to evaluate a “scenario”?

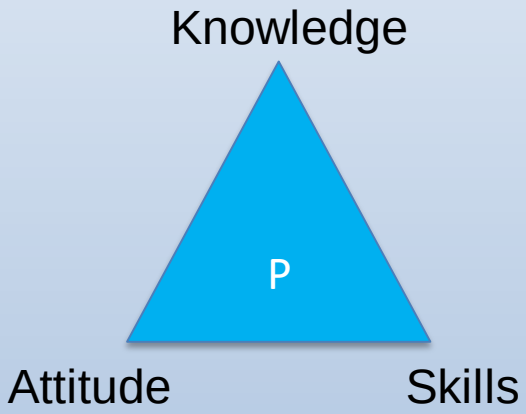
Time critical or not?

CAP 737

NOTECHS

Situation Awareness + TEM

Decision Making



CAP 737 and NOTECHS

…… increased awareness of Human Factors & CRM

CAP 737

Contents

…….. Chapters from CAP 737 – an example of a few chapters!

Chapter 6 Workload
Chapter 7: Surprise and startle effect
Chapter 8 Situational Awareness (SA)
Chapter 9: Decision Making – DM (Rational DM /quicker DM /very fast DM)
Chaapter 10: Stress in aviation
Chapter 11: Sleep and fatique
Chapter 12: Personality and cultural differences

NOTECHS – Non technical skills

Categories	Elements
Co-operation	• Team-building and maintaining • Considering others • Supporting others • Conflict solving
Leadership and managerial skills	• Use of authority and assertiveness • Providing and maintaining std. • Planning and co-ordinaion • Workload management
Situation awareness	• Awareness of aircraft systems • Awareness of external environment • Awareness of time
Decision making	• Problem definition and diagnosis • Option generation • Risk assesment and option selection • Outcome review

Behavioral markers

Element: Use of authority and assertiveness:

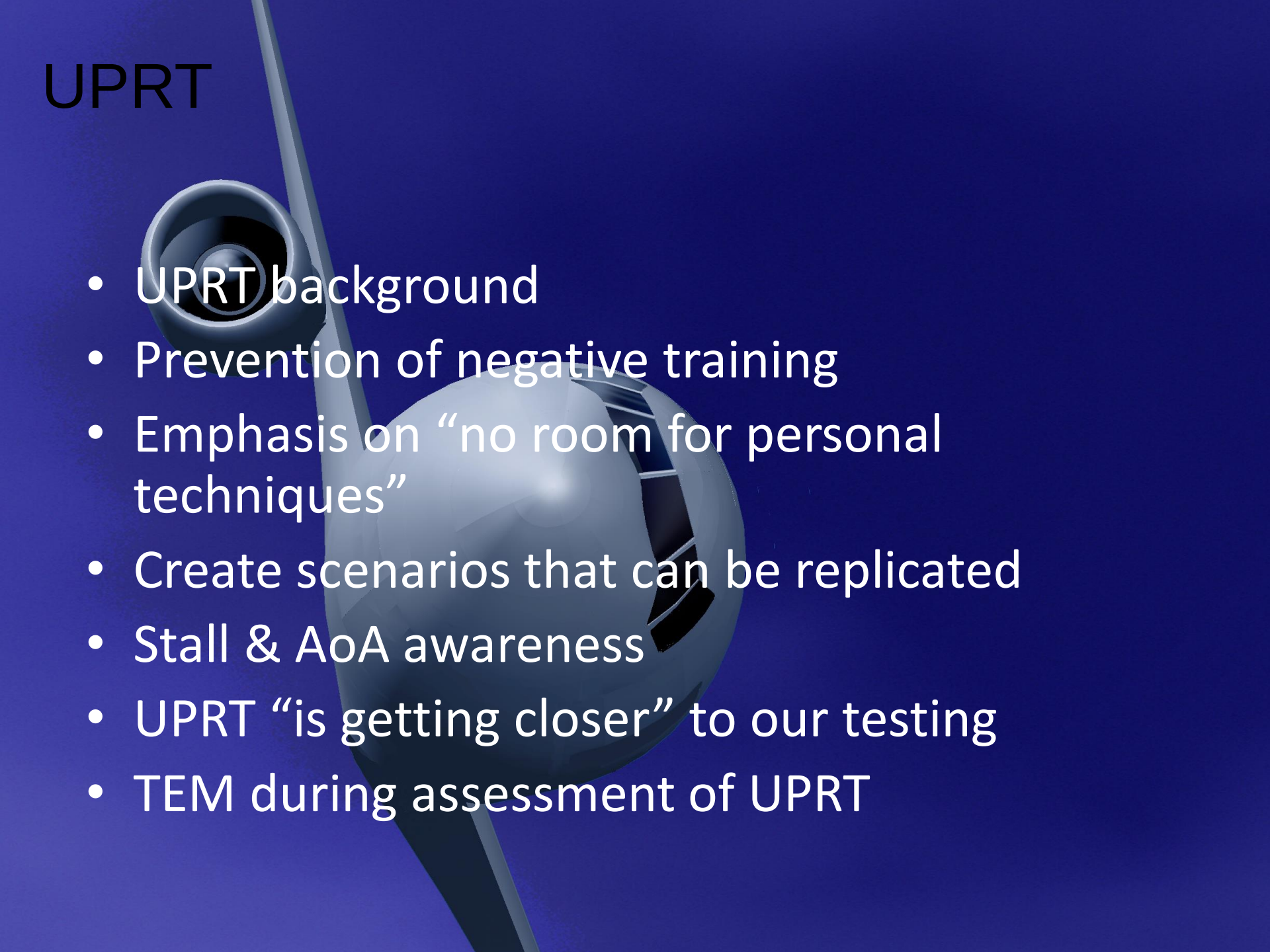
Good practice:

- Takes initiative to ensure crew involvement and task completion
- Takes command if situation requires, advocates own position
- Reflects on suggestions of others
- Motivates crew by appreciation and coaches when necessary

Poor practice:

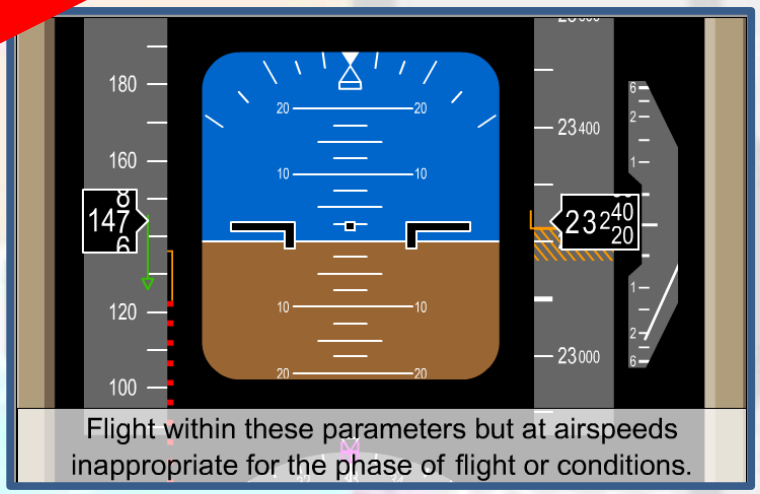
- Hinder or withholds crew involment
- Passive, does not show initiative for decisions, own position not recognisable
- Ignores suggestions of others
- Does not show appreciation for the crew, coaches very little or too much

UPRT



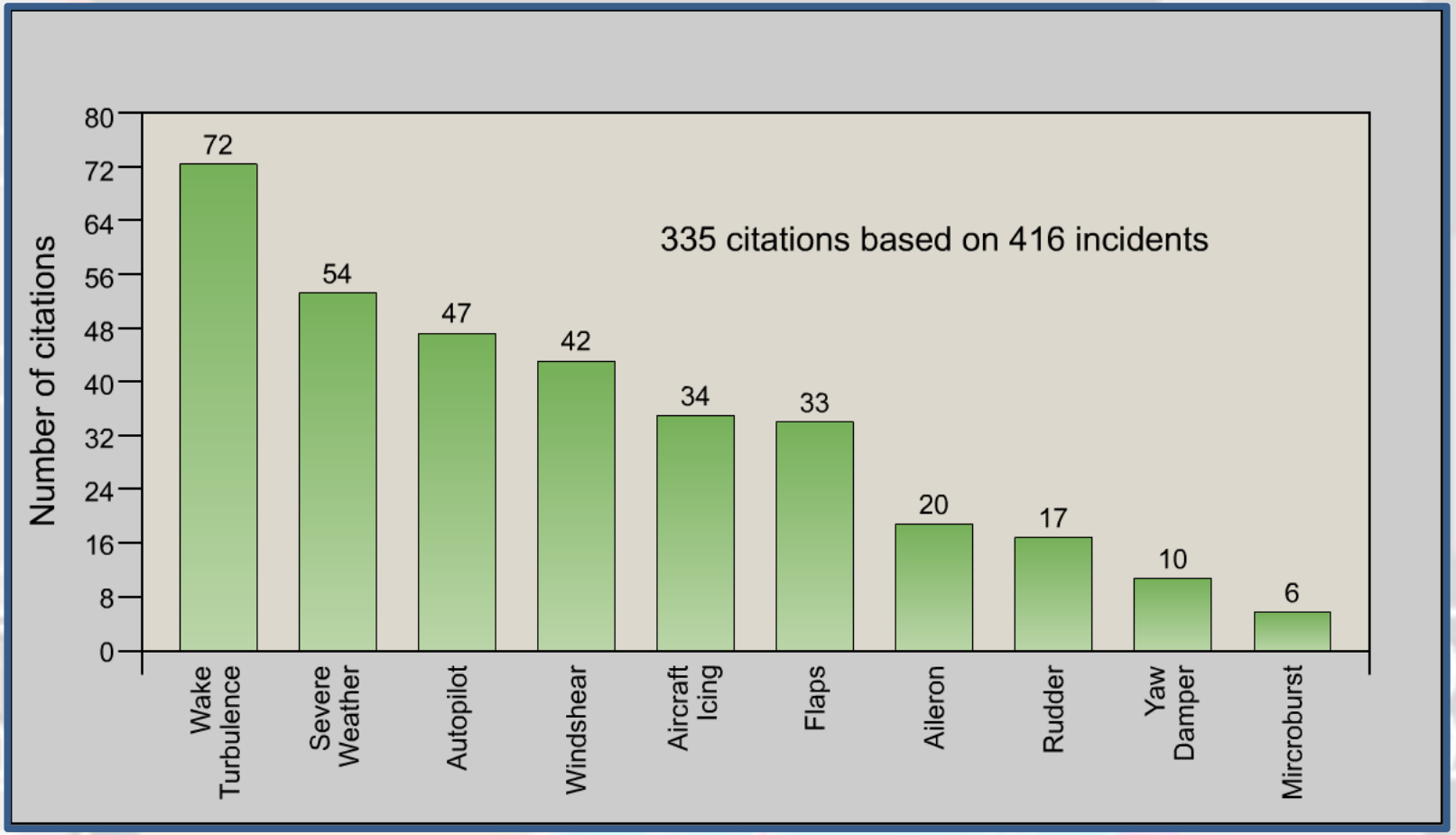
- UPRT background
- Prevention of negative training
- Emphasis on “no room for personal techniques”
- Create scenarios that can be replicated
- Stall & AoA awareness
- UPRT “is getting closer” to our testing
- TEM during assessment of UPRT

Definition of UPSET



Any time airplane deviates from the intended airplane state

Fatalities - root causes



UPRT & TEM

High altitude threats

- Low Mach fuel smart operation
- Thrust /performance limitation
- “Coffin corner”
- Temp changes / inversion
- Wind changes
- Mountain waves
- Icing
- Trying to “outclimb” thunderstorms
- Vortex (high level)
- Bank awareness
- Vertical speed during climb
- Unreliable airspeed

Low altitude threats

- Normal go-around
- Single engine approach
- Single engine go-around
- Unreliable airspeed
- Vortex (high level)
- Thunderstorms
- Windshear
- Icing

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Captain/TRE/TRI Bo Niel