Examiner
Human Factors training

Steen Sandal & Bo Nielsen

Program

- Introduction / expectations?
- Link to last examiner briefing
- Threat & Error Management (TEM)
- Vested interest ("habilitet")
- How to evaluate a scenario?
- CAP 737 / NOTECHS
- UPRT
- Safety briefing
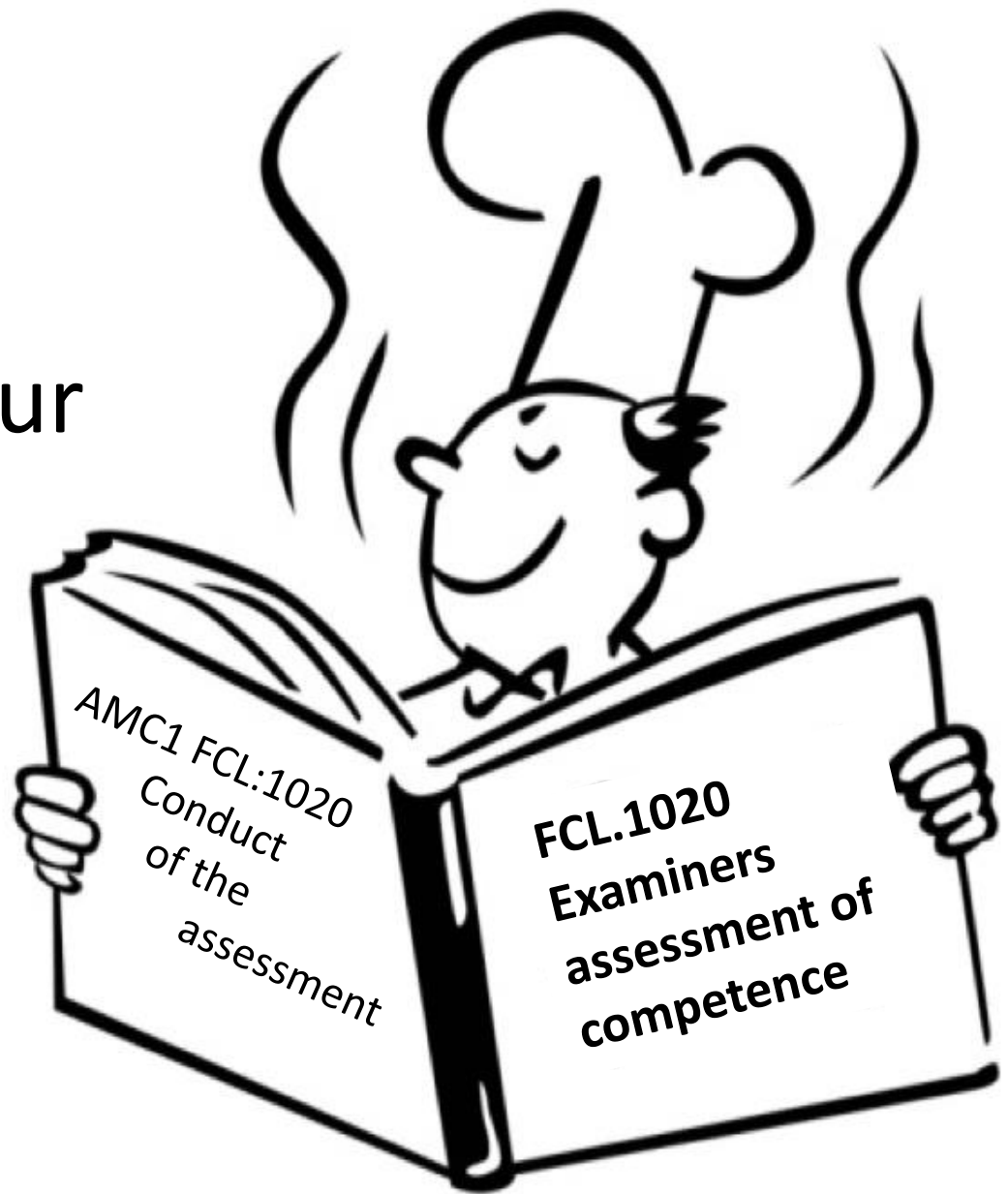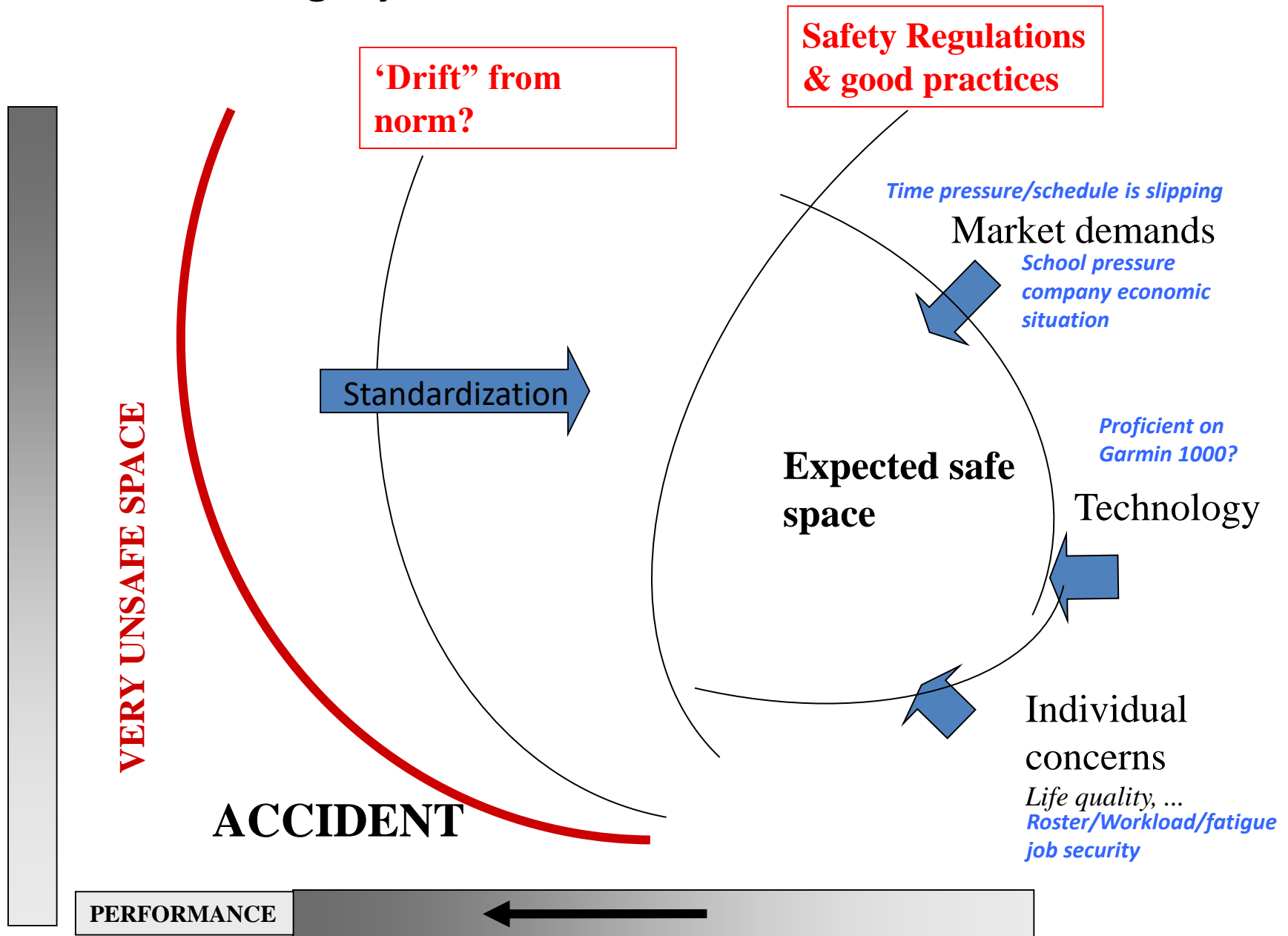- Summary & questions

Expectations

?

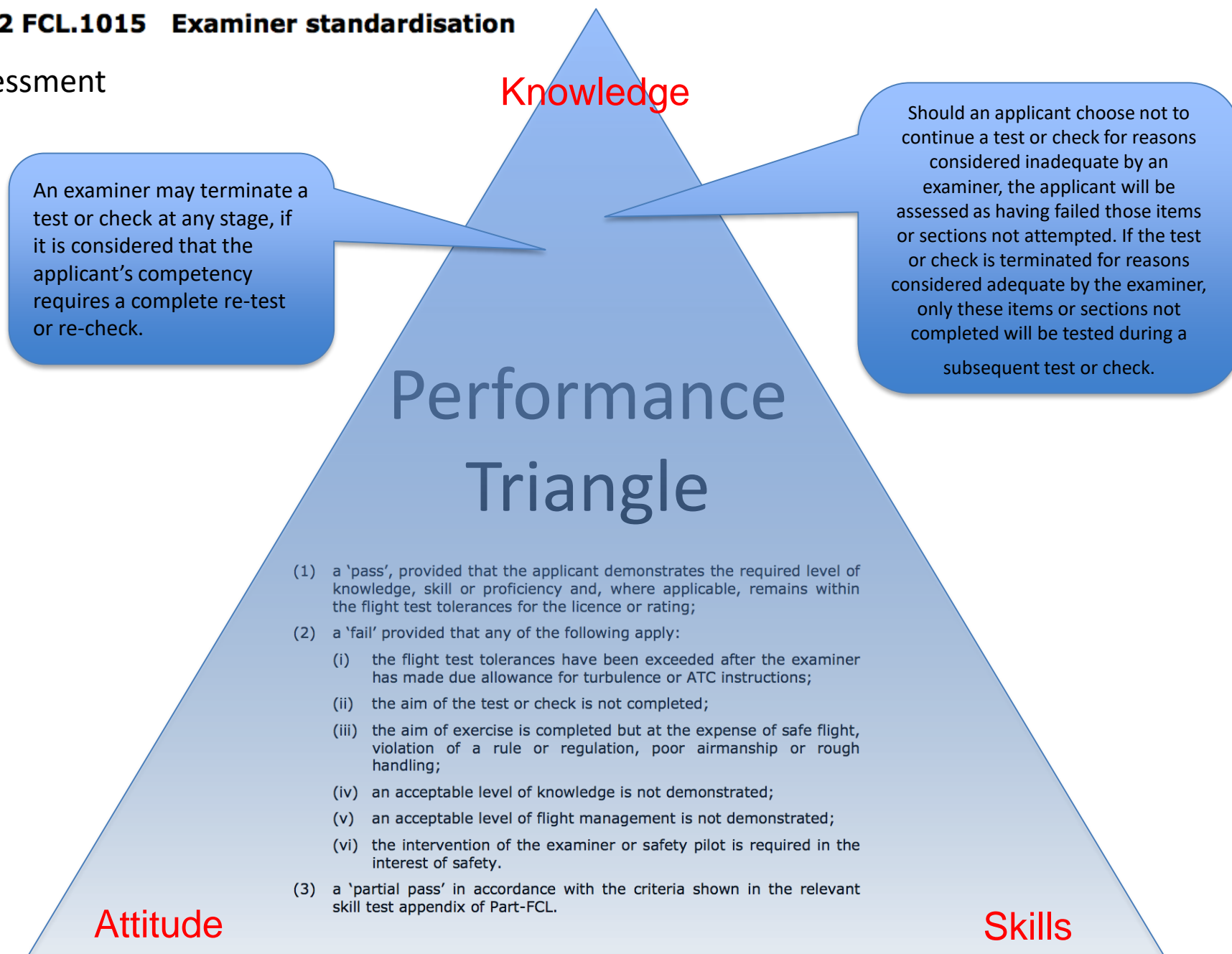3 minutes of reflection (2 and 2)

Link to last time

How to cook your Examiners

AMC1 FCL:1020 Conduct of the assessment

FCL.1020 Examiners assessment of competence

Examiners integrity – role models!

'Drift" from norm?

Safety Regulations & good practices

Time pressure/schedule is slipping

Market demands

School pressure company economic situation

Standardization

Expected safe space

Proficient on Garmin 1000?

Technology

VERY UNSAFE SPACE

ACCIDENT

Individual concerns

Life quality, ...
Roster/Workload/fatigue job security

PERFORMANCE

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

AMC2 FCL.1015   Examiner standardisation

Assessment

Knowledge

An examiner may terminate a test or check at any stage, if it is considered that the applicant's competency requires a complete re-test or re-check.

Should an applicant choose not to continue a test or check for reasons considered inadequate by an examiner, the applicant will be assessed as having failed those items or sections not attempted. If the test or check is terminated for reasons considered adequate by the examiner, only these items or sections not completed will be tested during a subsequent test or check.

Performance Triangle

(1)   a 'pass', provided that the applicant demonstrates the required level of knowledge, skill or proficiency and, where applicable, remains within the flight test tolerances for the licence or rating;

(2)   a 'fail' provided that any of the following apply:

(i)   the flight test tolerances have been exceeded after the examiner has made due allowance for turbulence or ATC instructions;

(ii)   the aim of the test or check is not completed;

(iii) the aim of exercise is completed but at the expense of safe flight, violation of a rule or regulation, poor airmanship or rough handling;

(iv) an acceptable level of knowledge is not demonstrated;

(v)   an acceptable level of flight management is not demonstrated;

(vi) the intervention of the examiner or safety pilot is required in the interest of safety.

(3)   a 'partial pass' in accordance with the criteria shown in the relevant skill test appendix of Part-FCL.

Attitude

Skills

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, IPAD's 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

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

Knowledge

P

Attitude   Skills

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.

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

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

Drift from norm

Have you experienced any cases, where "drift" was a factor?

How can we avoid drift!

Safety briefing

Deviation from approved program

Examiner / instructor role

Pass / fail criteria

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.

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.

Threat & Error Management (TEM)

Horizontal reference difficult
Abnormal perspective
Obstacles in approach + GA
Runway slope?
Elevation (density altitude)
Displaced threshold
Runway short
Variable W/V
Trees and rocks if engine fails

Mountain course/ADI
Mountain course/ADI/brief/fly with a friend
Performanc calc.
Check AIP
Perfomance calc. / conservative/worst case
Check AIP/performance calculation
Perf. calc./ precise touchdown
Perf. calc / worst case
Prepare/ contingency plan

Countermeasures?

Your "Threat radar"

….. a technique!

Threat

Environmental / organization - use countermeasures

Error

Aircraft handling / procedural / communication
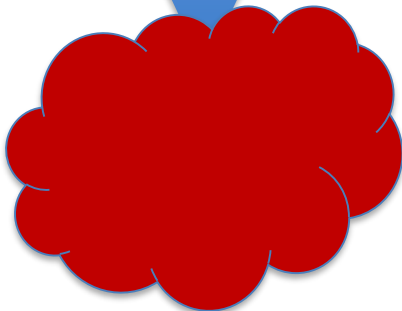
Avoid undesired aircraft state – use countermeasures!

Case(s) "TEM"

When do you normally start your TEM?

How do you do TEM?

10 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.

What do you expect ?

What is your pass/fail criteria?

Case "TEM" (3)
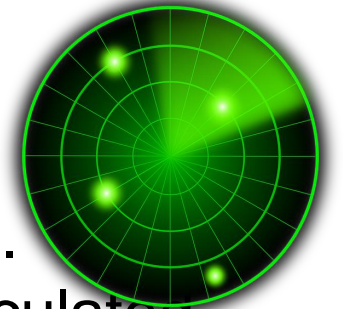
Rigshospitalet is the ONLY place for the treatment.
The range of the mission is 6 Nm outside your calculated range with commercial reserves, but 54 Nm within your absolute range.
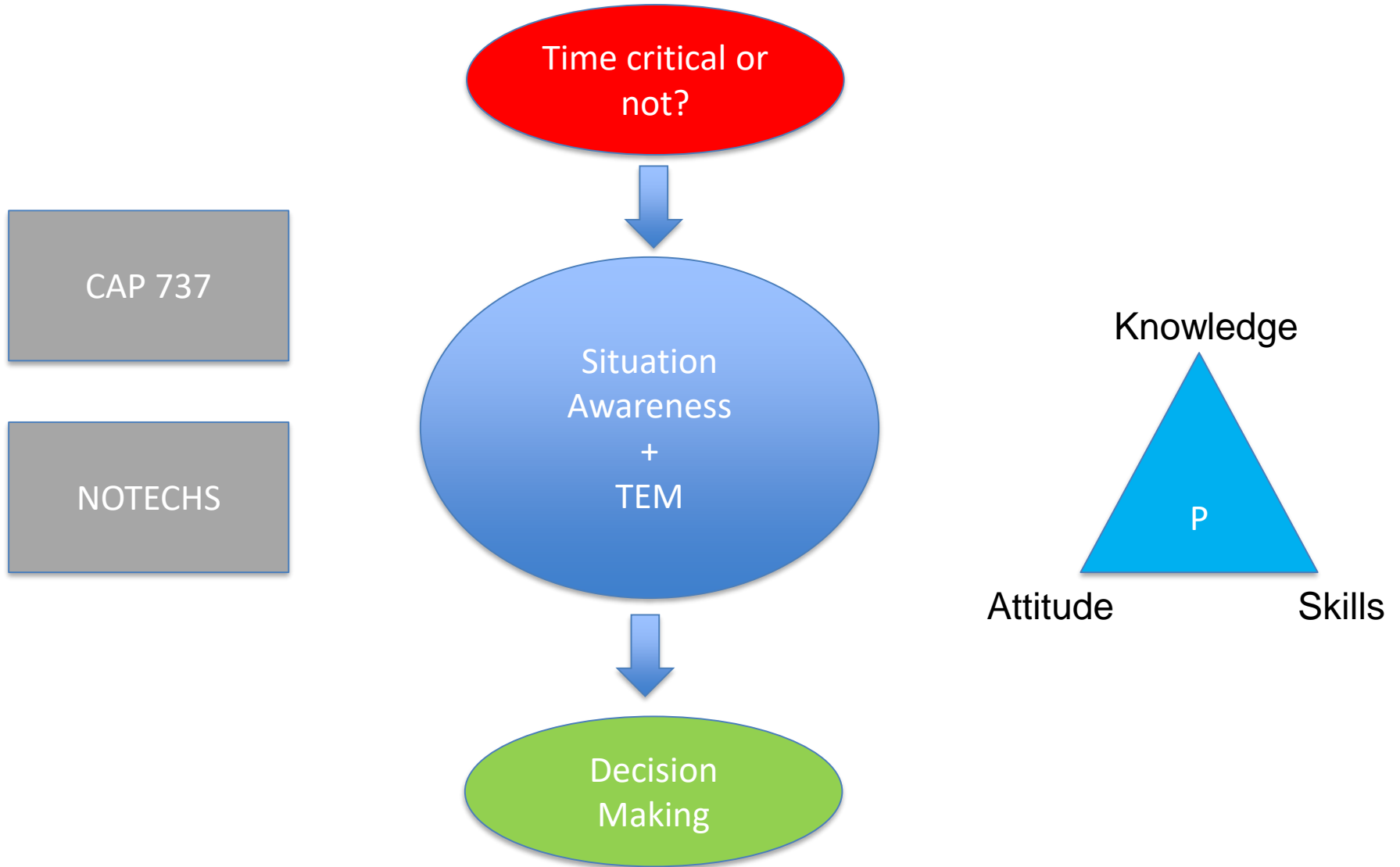What do you expect ? What are your pass/fail criteria?

"Habilitet" (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

Knowledge

P

Attitude   Skills

CAP 737 and NOTECHS
…… increased awareness of Human Factors & CRM
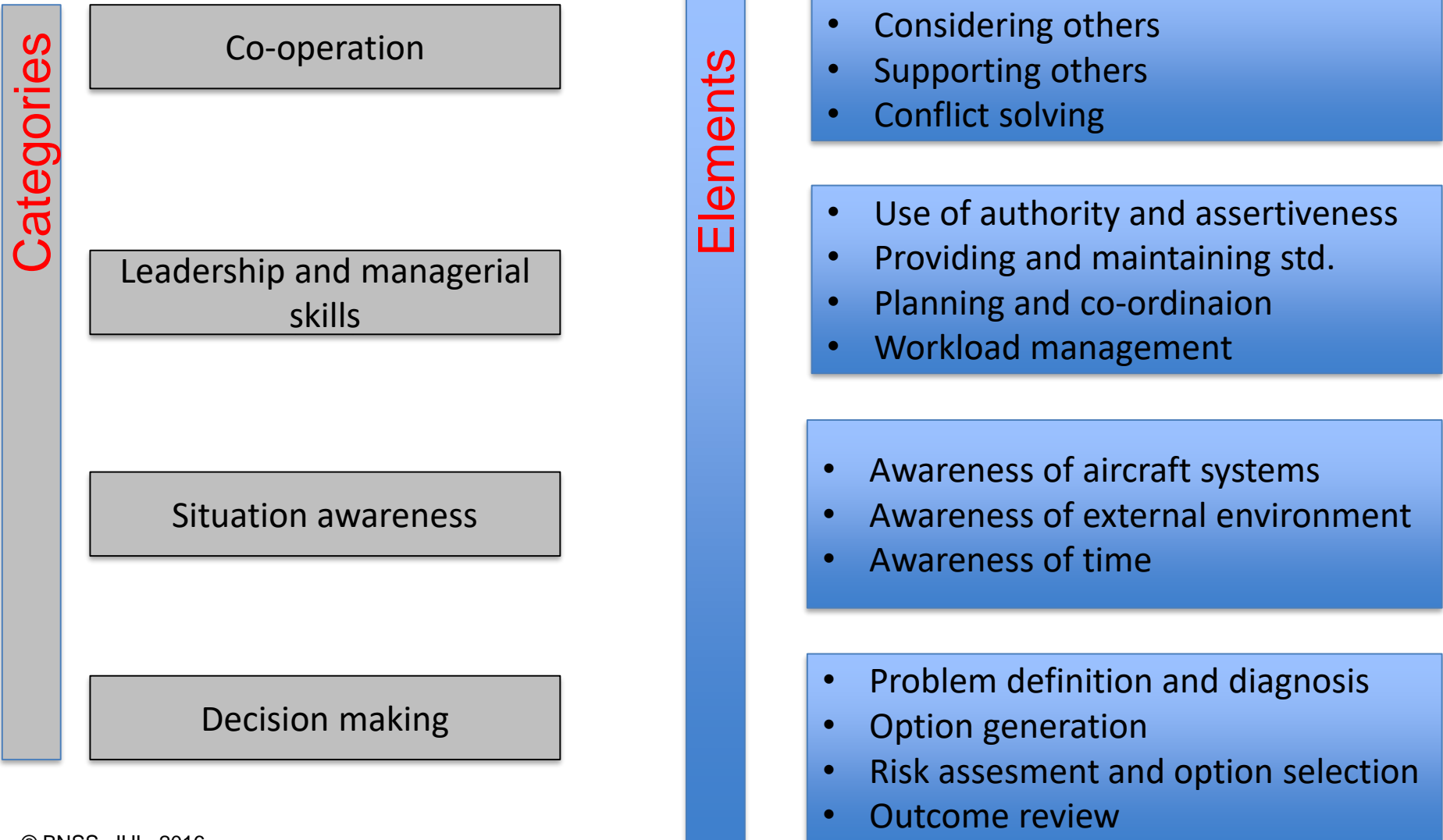
CAP 737

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

| Co-operation |

| Leadership and managerial skills |

| Situation awareness |

| Decision making |

Elements

- Team-building and maintaining
- Considering others
- Supporting others
- Conflict solving

- Use of authority and assertiveness
- Providing and maintaining std.
- Planning and co-ordinaion
- Workload management

- Awareness of aircraft systems
- Awareness of external environment
- Awareness of time

- 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
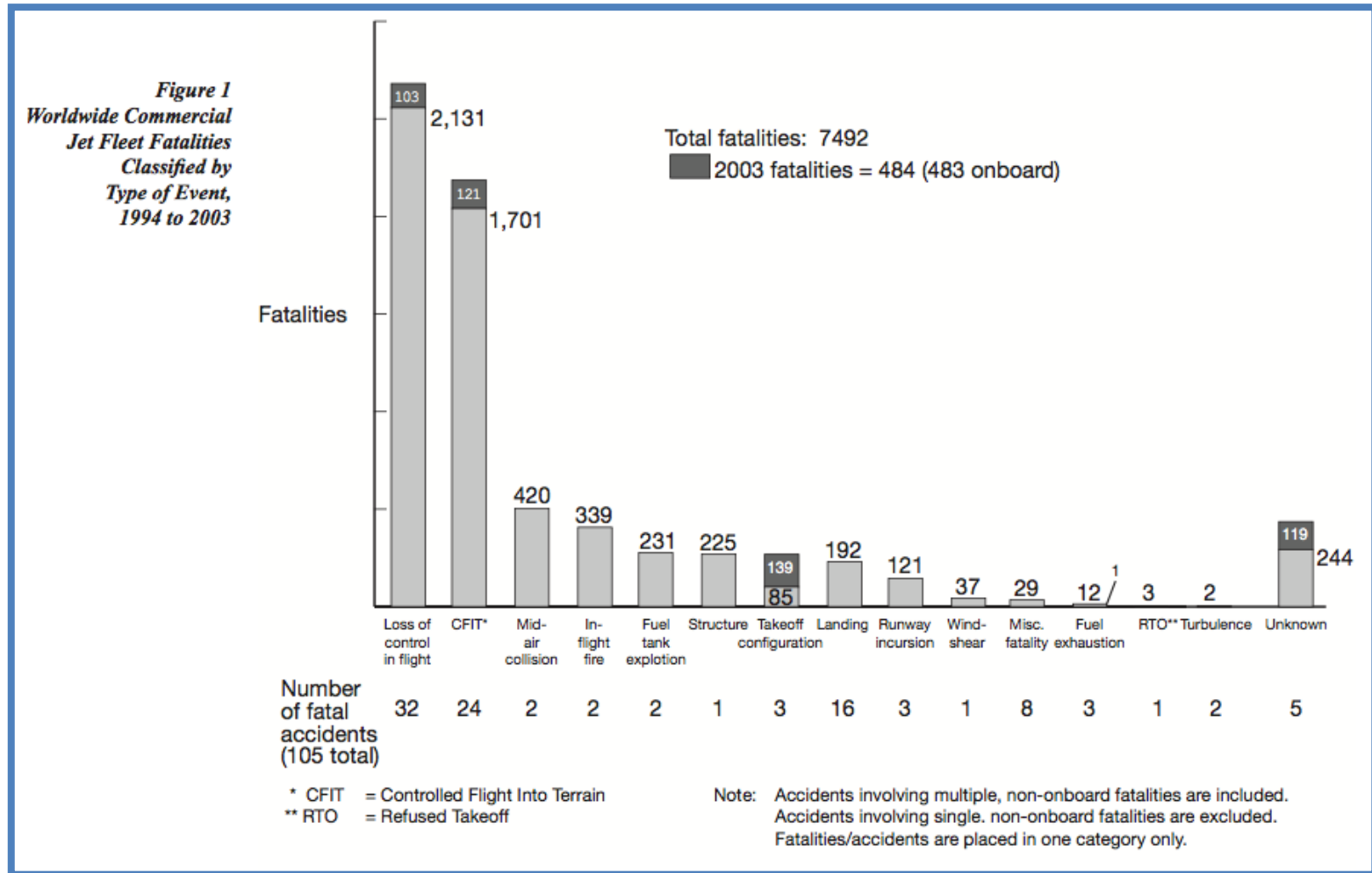
Poor practice:

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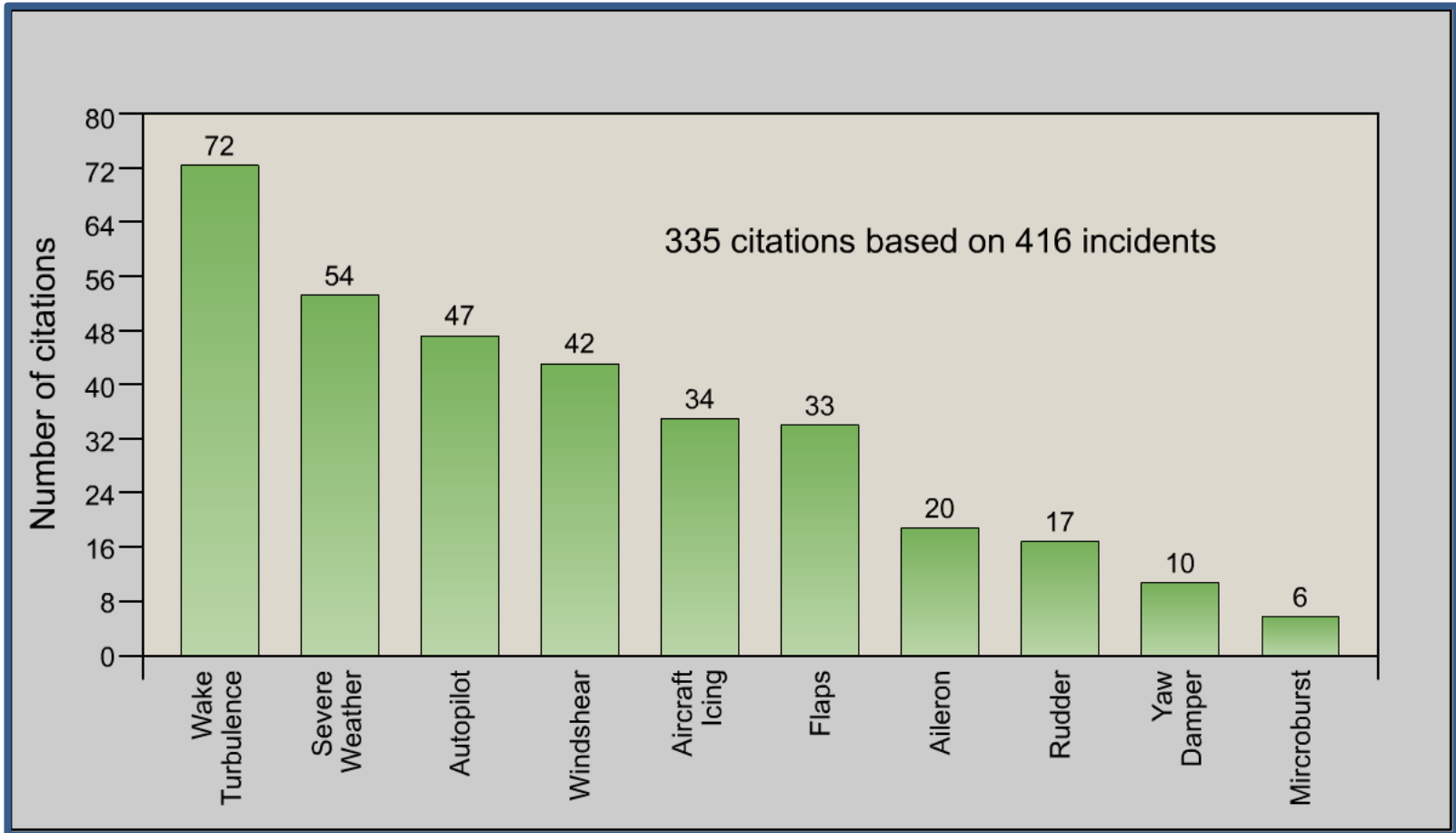- Does not show appreciation for the crew, coaches very little or too much

UPRT

- UPRT background
- Prevention of negative training
- Emphasis on "no room for personal techniques"
- Create scenarios that can be replicated
- Stall & AoA awareness
- UPRT during skill test:
  - Simulator
  - Aircraft
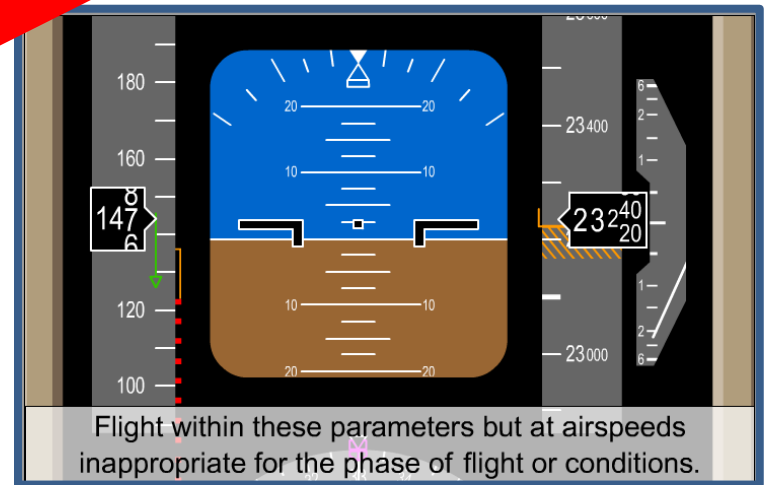 - Helicopter
- TEM during assessment of UPRT

Worldwide commerial jet fleet fatalities

Figure 1
Worldwide Commercial
Jet Fleet Fatalities
Classified by
Type of Event,
1994 to 2003

Fatalities - root causes

Definition of UPSET

Pitch attitude greater than 25 ° nose up

... more than 10 ° nose down

Bank angle in excess of 45 °

Flight within these parameters but at airspeeds inappropriate for the phase of flight or conditions.

Any time airplane deviates from the intended airplane state

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

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.

Examiner
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