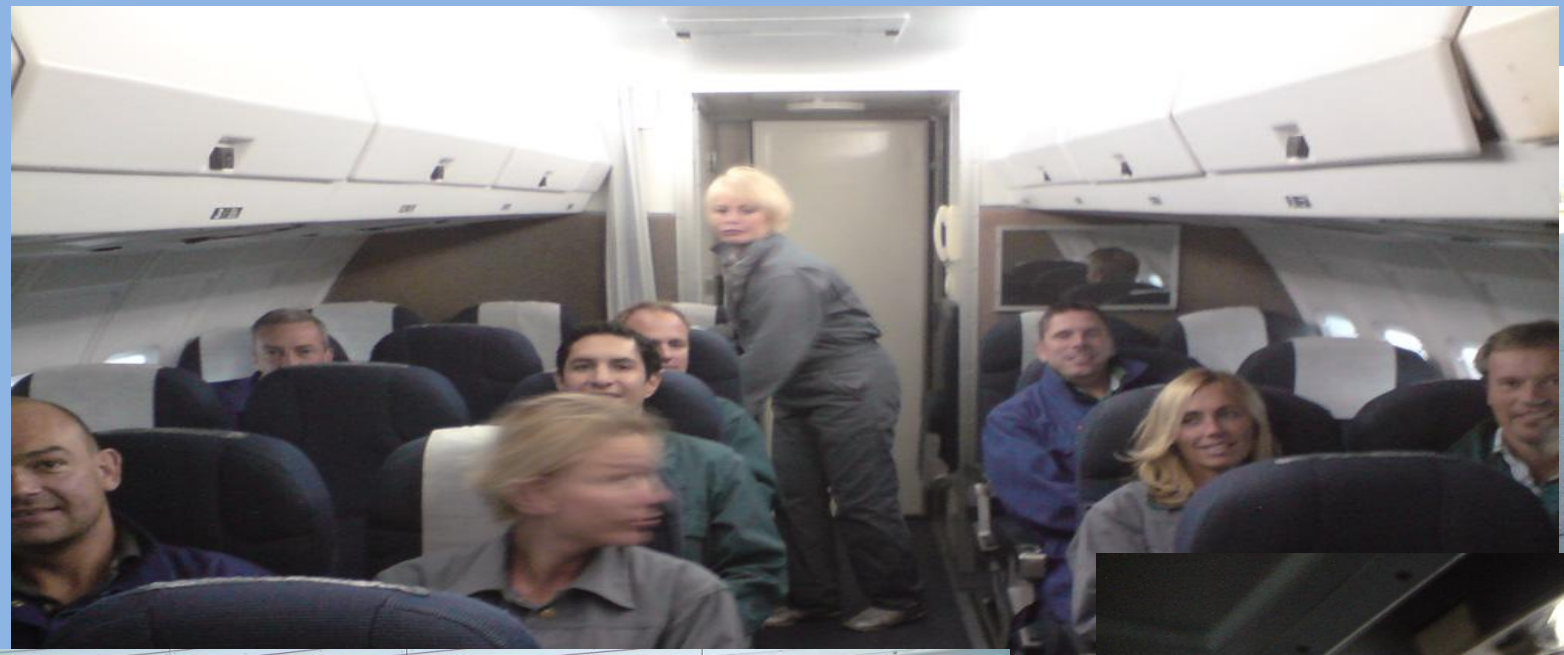
Anders Lundahl

anders.lundahl@sas.dk

070-5534555

CRM i SAS

- 14 CRM instructors fördelade på de tre baserna
- Håller en mängd olika kurser kopplade till CRM:
- RCRM för piloter vart tredje år
- RCRM för kabinpersonal vart tredje år
- RGT årligen för piloter, vart tredje år även för kabinpersonal
- ICRM (Initial CRM), OCCCRM (Operational convertion course), Commander follow up course, Instructor course, Purser CRM, m fl



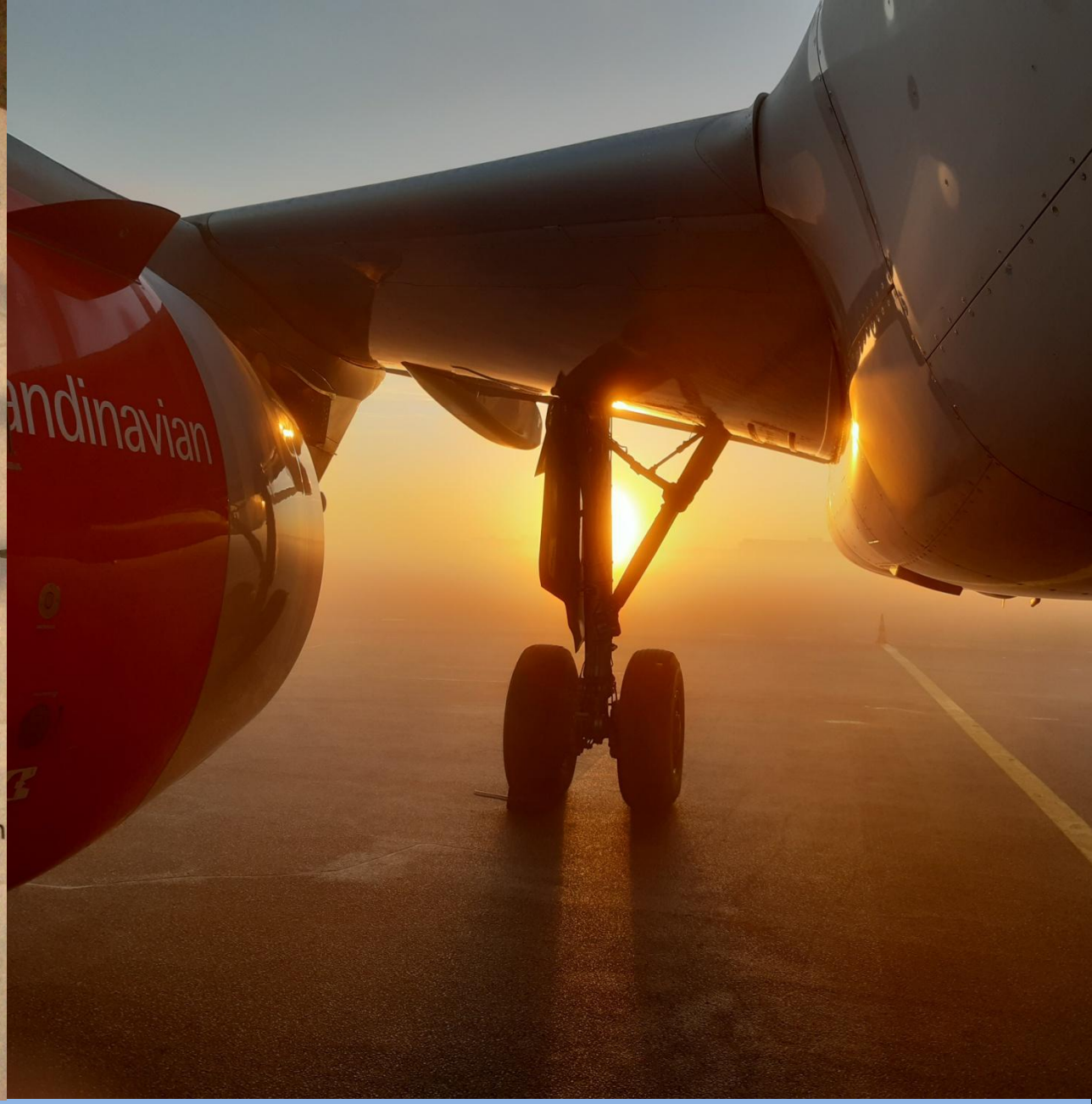

CREW


CREW

CRM in SAS

- SAS CRM culture is characterized by a low **authority gradient,** meaning we encourage and expect all team members to speak up in an assertive manner.
- SAS acknowledges that human errors are part of everyday operation. CRM is all about **preventing, avoiding, detecting, and acting** upon errors.
- SAS believes that good **CRM is the key** to safe flight operations.
- Your **personal dedication** and ability to interact within the team is essential for a successful outcome.


Communication
Personality Awareness
Decision Making
Robustness
Shared Situation Awareness
Automation management
Vigilance
Delegation
Assertiveness
Stress management
Situational triggers
Fatigue management
Resilience
Workload management
Threat assessment
Standard Operating Procedures
Team Resource Management
Team behavior Synergy
Cooperation
Error Prevention
Leadership
Monitoring


ndinavian

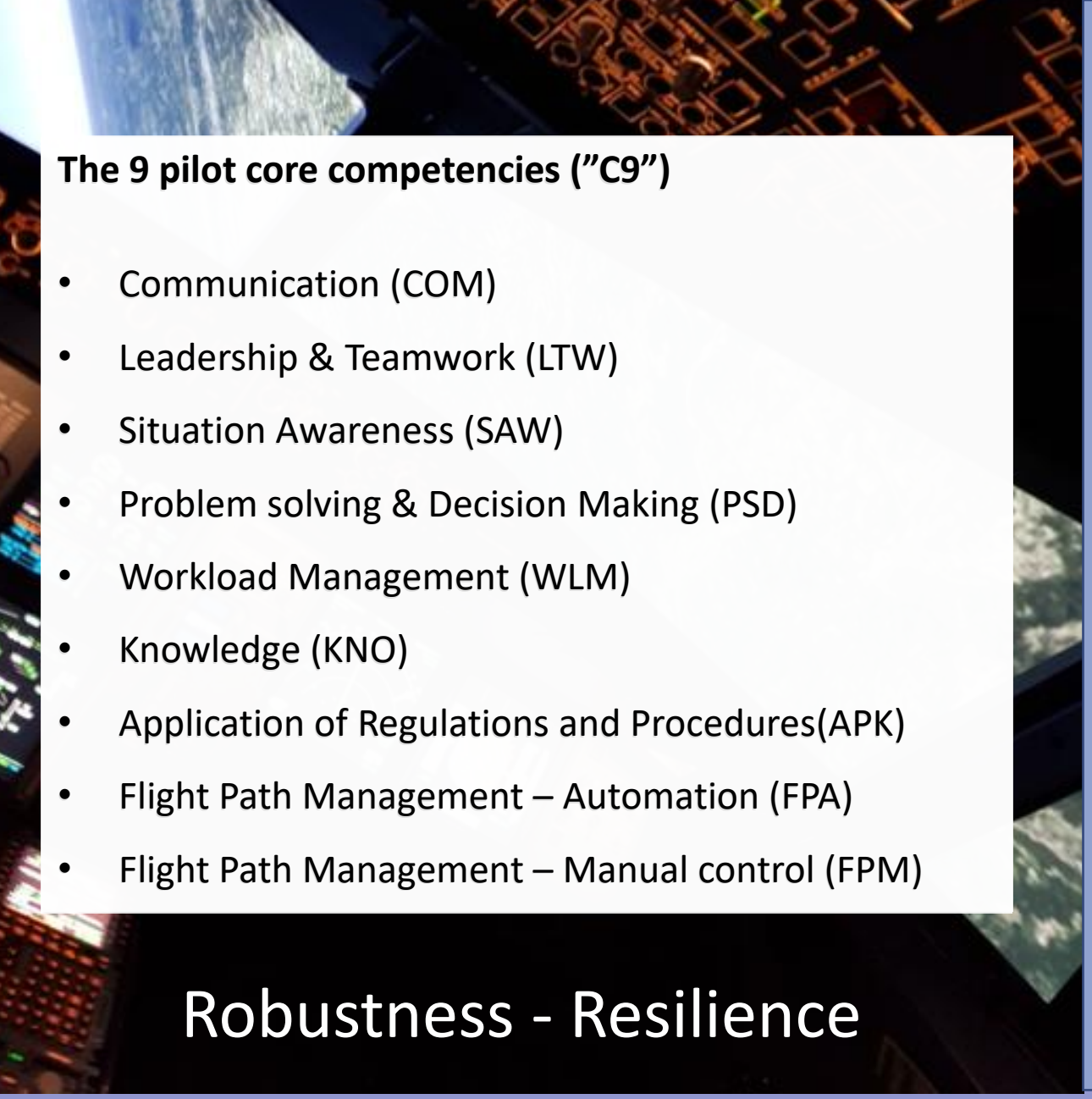
Competency based traing

The 9 pilot core competencies (”C9”)

- ✓ Communication (COM)
- ✓ Leadership & Teamwork (LTW)
- ✓ Situation Awareness (SAW)
- ✓ Problem solving & Decision Making (PSD)
- ✓ Workload Management (WLM)
- ✓ Knowledge (KNO)
- ✓ Application of Regulations and Procedures (APK)
- Flight Path Management – Automation (FPA)
- Flight Path Management – Manual control (FPM)

✓ CRM categories.

OM-D 1.3.3.3



The 9 pilot core competencies (”C9”)

- Communication (COM)
- Leadership & Teamwork (LTW)
- Situation Awareness (SAW)
- Problem solving & Decision Making (PSD)
- Workload Management (WLM)
- Knowledge (KNO)
- Application of Regulations and Procedures(APK)
- Flight Path Management – Automation (FPA)
- Flight Path Management – Manual control (FPM)

Robustness - Resilience

SK 778 – a return flight from ATH to CPH

Cruising FL 350 IMC conditions – embedded thunderstorms forecasted in the area (between FL 100 and FL 360)

Which competencies would be needed by the crew at this stage of the flight?

SK 778

The pilots were informed by ATC about a B777 crossing left to right at FL 360. The crew were unable to see the aircraft.
Two minutes later the A320 was abruptly forced into an ”undesired aircraft state” – 120 degrees right bank and 25 degrees nose low!

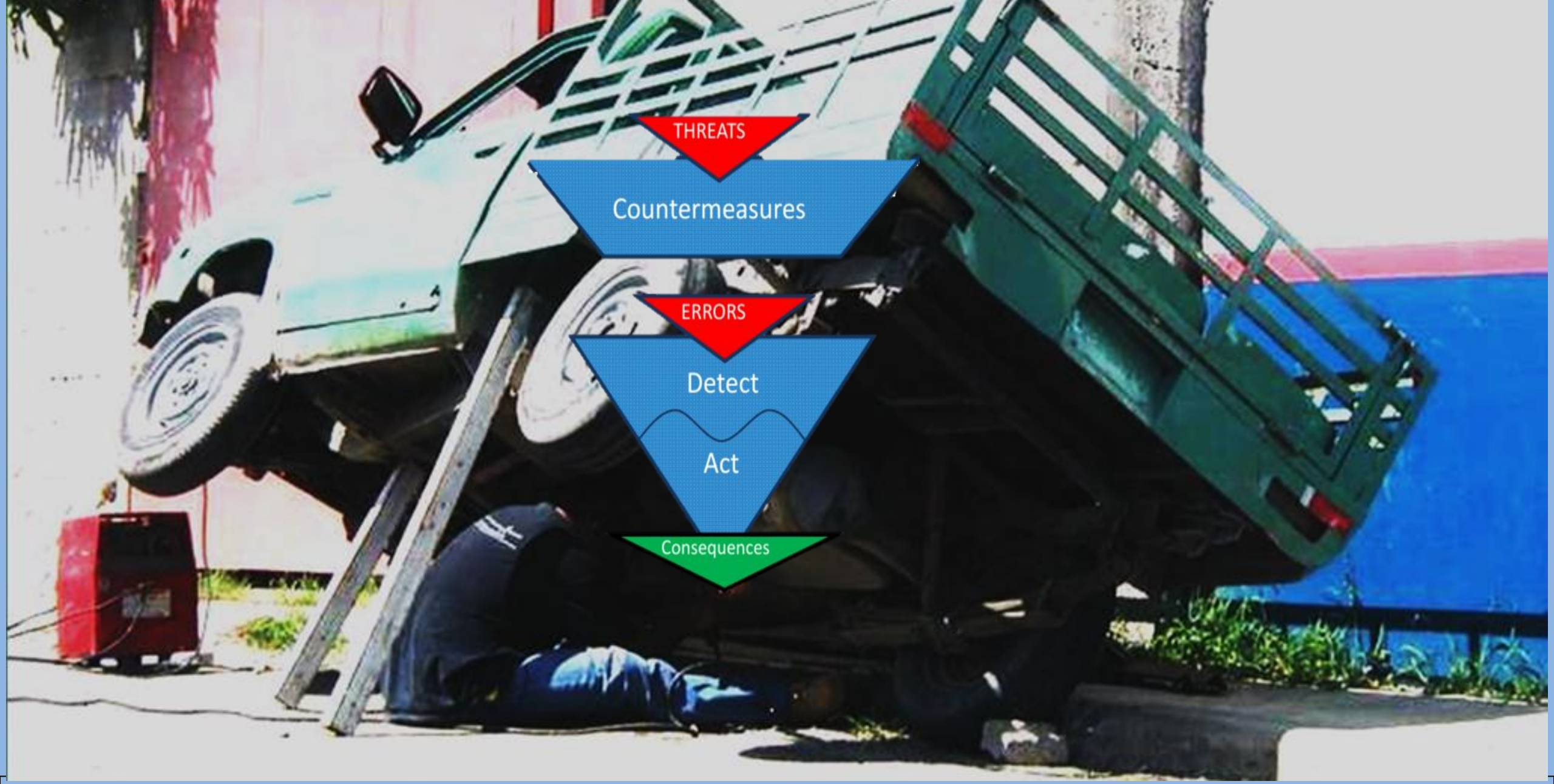
Which competencies would be needed by the crew at this ”undesired aircraft stage”?

SAS briefings

- Scalable/relevant
- Interactive (PM involvement)
- Unique (reflecting actual conditions)
- Threat based (example C TWO+Fuel)
- Big Picture (construct a mental picture of the situation)
- Clarify “how to” (especially when the complexity increase)
- Use OM-A Matrix (adapted to the situation, examples next slide)

Elements that may be considered during departure or arrival briefing

Maneuvering	Environment	Aircraft	Task Sharing
Dep/Arr procedure	Weather	OEB	STOP/GO
Engine Out	NOTAM	Tech status	Duties if evacuation
Use of FMS	RWY margins	Weight	EO procedures
Config. & Speed	Terrain	Fuel status	Look out
Auto brake	ATC	Flaps setting	PM duties
Runway exit + intersec.	Minimum altitudes	Stopping distance/Runway margin	Fatigue
Taxi in/out, hotspots	T/O alternate	Single Engine Taxi	Level of Automation
Missed App & GA		Use of APU	
Alt, SPD, constraint		Mixed Fleet/Variants	
App without GS			
Minima, +100			
Visual App			
RNP/CAT II/CAT III			


THREATS
Countermeasures
ERRORS
Detect
Act
Consequences

Briefing Better

Conclusions - what is mandatory?

– Departure

- Departure to be flown (check with recieved clearence)
- First altitude (FCU/MCP setting)
- Procedure to be followed in case of engine failure

- Arrival

- Arrival route & transition
- Landing RWY, procedure and minima (e.g ILS 22L MDA 210)
- Procedure to be followed in case of missed approach

Pilot Monitoring duties - MADI

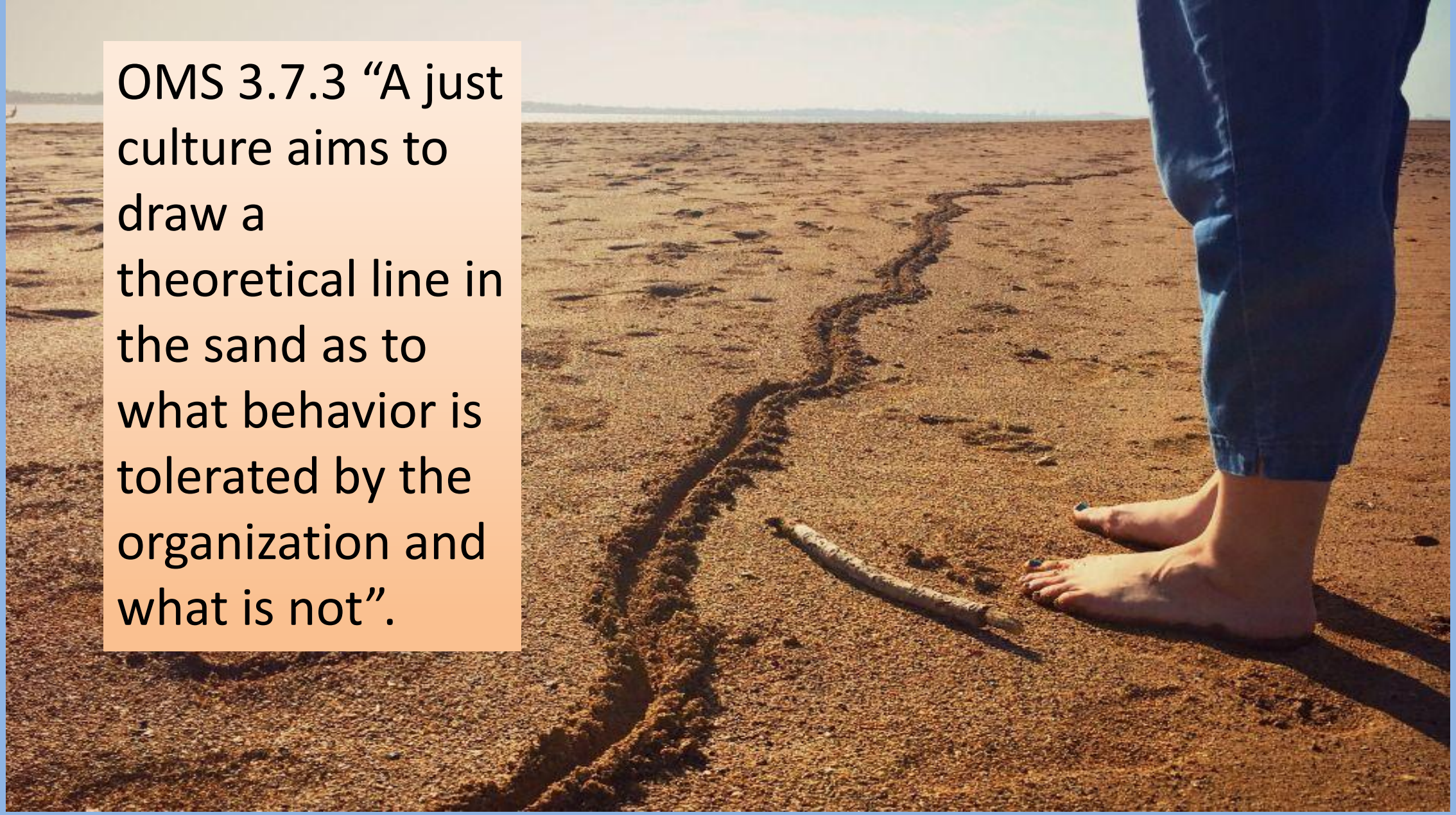
Monitor

Assist

Direct

Intervene


Artigianale



OMS 3.7.3 “A just culture aims to draw a theoretical line in the sand as to what behavior is tolerated by the organization and what is not”.

JUST CULTURE IN SAS

- **Just Culture Statement**
- SAS statement of a just culture is incorporated in the safety policy as follows:
- Maintain a positive safety culture characterized by knowledge, learning from mistakes and with confidence in that all employees and business partners put safety first.
- Encourage our employees to report occurrences, hazards and errors without fear of retribution and be confident that the appropriate action is taken.
- Maintain a just culture where human errors are accepted as part of human nature, but recklessness or deliberate violations of rules and established procedures are not accepted.

CRM-undervisning i praktiken

Today's program

- **It's all about you** - introduction
- **CRM Quiz** – 10 questions, no right or wrong, ABCD
- **CBTA** – why? how dose it benefit your training?
- **Case study** – drawing learning points form a case
- **The Team and You** – how to maintain your team
- **Story telling theory** – effective learning method
- **Own cases/presentation** – tell your story
- **Summary** – a rundown of what we have been doing today
- **Time for reflection** – take a minute, where did you find inspiration
- **Responster** – important with feedback

How do YOU create “Shared situation awareness”?

A

I speak openly about other´s mistakes, in an assertive way

B

I share my thoughts and ideas and invite other team members to comment

C

By asking questions when I´m in doubt

D

I establish a low authority gradient that makes every team member willing to speak up.

Today's program

- **It's all about you** - introduction
- **CRM Quiz** – 10 questions, no right or wrong, ABCD
- **CBTA** – why? how dose it benefit your training?
- **Case study** – drawing learning points form a case
- **The Team and You** – how to maintain your team
- **Story telling theory** – effective learning method
- **Own cases/presentation** – tell your story
- **Summary** – a rundown of what we have been doing today
- **Time for reflection** – take a minute, where did you find inspiration
- **Responster** – important with feedback

18. Pilot Incapacitation – Case study - Orly

Objective

After the case study the participants should be able to identify deviations from plan, be ready to use MADI and apply correct error management techniques.

Motivation

To learn from others is a well-known method in our industry. Use the case as an inspiration on how to act both proactive and reactive during your everyday operation.

Time

40 min

Slide flow

Depending on the size of the group etc. this case study may be performed in plenum.
Avoid technical discussions throughout the case. E.g., soft go-around with predictive windshear.
Remind the participants to only read one phase at the time.

On swipe, objective appears. Additional swipe, wind shear ahead-audio will sound. Ask the participants to get the case study out in DocuNet and read it according to instructions.

History of flight.

A French Bee flight from SFO to Orly with an A350.
The crew consisted of: CDR (PM), FO (PF), FO(L).
The flight was stabilized on ILS 25 and configured for landing, the FO was PF and the CDR was PM.

Conditions:
Visibility at Orly was more than 10 km and the ceiling was at around 4,500 ft. There was a northwesterly wind of about 25 kt.

Phase 1

At 1350 ft PF disconnected AP and four seconds later predictive windshear "GO AROUND, WINDSHEAR AHEAD" was triggered. The crew were surprised by this warning given the day's meteorological conditions.

The CDR ordered a go-around.
TOGA and soft GA was selected, the crew retracted the landing gear and set the flaps to CONF3. Climb was initiated towards Missed approach altitude, preselected to 2000 ft.

Task after phase 1:

How do you assess the situational awareness of the crew at this point?
A confusing situation. Weather is good and the CDR calls for a go-around. As PF I may disagree with the CDR but must act anyway. Am I not perceiving the situation correctly?

What are the immediate threats?

- *Possible windshear*
- *Traffic*
- *Low-level off*
- *Startle and surprise*

What are the MADI tasks at this stage?

- *Monitoring of the go-around from PM and FO(L)*
- *Be prepared to assist and direct.*

Phase 2

The CDR called out "SPEED, ALT STAR".
Seeing that they were going to bust the selected altitude, the CDR and the relief pilot asked the copilot (PF) to stabilize the aircraft at 2,000 ft. The copilot did not react.
The plane overshot the published missed approach altitude of 2,000 ft with an indicated airspeed of 167 kts and a vertical speed of + 1,800 ft/min. Three seconds later, the crew retracted the flaps to CONF1.
Around 2,750 ft and with an airspeed of 185 kts, the copilot manually levelled off and they cleaned up.

Task after phase 2:

Reflect upon why the copilot (PF) did not react when approaching 2000 ft.

- *Startle and surprise*
- *Confusion, task saturation*
- *Fatigue*

- *Disagreement with the CDRs decision*
- *Challenging go-around altitude from other than minima.*

How was MADI used, in your opinion?

- *Assist and direct from PM and FO(L)*

In a perfect world, how would you have used MADI? (Error management)

- *If you see insufficient reaction after Direct, Intervene should be used*

Phase 3

OP DES was selected. The A/THR reduced the engine power to IDLE but as the AP was not engaged, the aircraft did not automatically descend to the selected altitude of 2,000 ft and remained stable at an altitude of around 2,800 ft.
The air traffic controller asked the crew to turn left to heading 180°. The CDR read back.
The controller also informed them of traffic at 1 o'clock at 4 NM departing from Orly.
The crew selected heading 180° and engaged the HDG mode. As the AP was still disengaged and the crew did not make an input on the stick, the aircraft kept the current heading of 267°.

Task after phase 3:

How would you handle this situation as FO(L), FO(PF) or CDR(PM)?
What could be the reasons for not turning and descending?

Phase 4

The CDR was aware that they were too high, that there was traffic nearby, that they had to turn left and that the copilot was reacting to neither his requests nor those of the ATC.
The CDR took control and a few seconds later the speed brakes was extended by one of the crew members (probably the copilot) without a callout.
The CDR then engaged the AP.
The CDR saw the VLS increase and heard the relief pilot's warning about the speed.
"SPEED, SPEED, SPEED" was triggered for 3 s.
In the following seconds, the CDR selected a target speed of 260 kts, put the thrust levers in the TOGA detent and started making inputs on the sidestick which caused the AP to disengage.
The selection of TOGA led to the automatic retraction of the speed brakes even though the control lever remained in the extended position. This triggered a Master Caution for 38 s.

Inputs, sometimes up to full deflection on the two axes, were recorded on the CDR's sidestick for around 30 s.
The aircraft flew through the altitude of 2,000 ft with an increasing speed of 235 kts and a vertical speed of - 2,200 ft/min.
The FO(L) suggests the use of AP several times. The CDR demands silence in a firm voice.
Eventually AP was engaged, the flight was stabilized and returned for an uneventful landing.

In the aftermath, the copilot indicated that there had been moments when his mind went blank, although he had not been aware of it at the time, and he could only partially remember the sequence of the occurrence.

Task after phase 4:

What are the learning points from this incident? (MADI, handling of unexpected go-arounds, use of automation, assertiveness, error management)
How do you detect and act on incapacitation?
Why would a case like this never happen to you?

Conclude that:
Incapacitation is sometimes very difficult to detect and therefore hard to handle.
Proper use of MADI is an excellent tool to detect and act in such a case.

References

SVG incapacitation – Safety magazine.
A350 Orly, Safety magazine.
www.avharald.com:
Incident: French Bee A359 at Paris on Feb 4th 2020, altitude and heading deviations and low speed warning during go around (avherald.com)

Case study – Sundsvall Härnösand

A recognised situation which by memory recall triggers a new Threat Assessment/Threat Management process and subsequent Error Management.

Case study – Sundsvall Härnösand

Anders Lundahl

anders.lundahl@sas.dk

070-5534555