



Hello Tomorrow



Flight Safety, Human Factors, and CRM – A holy trinity or not even in the vicinity?

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Human Factors Manager

Content



- Flight Safety, Human Factors and CRM
- The Current State of CRM
- CRM at Emirates
- The Way Forward for CRM

Flight Safety

Human Factors and CRM

The History of Flight Safety



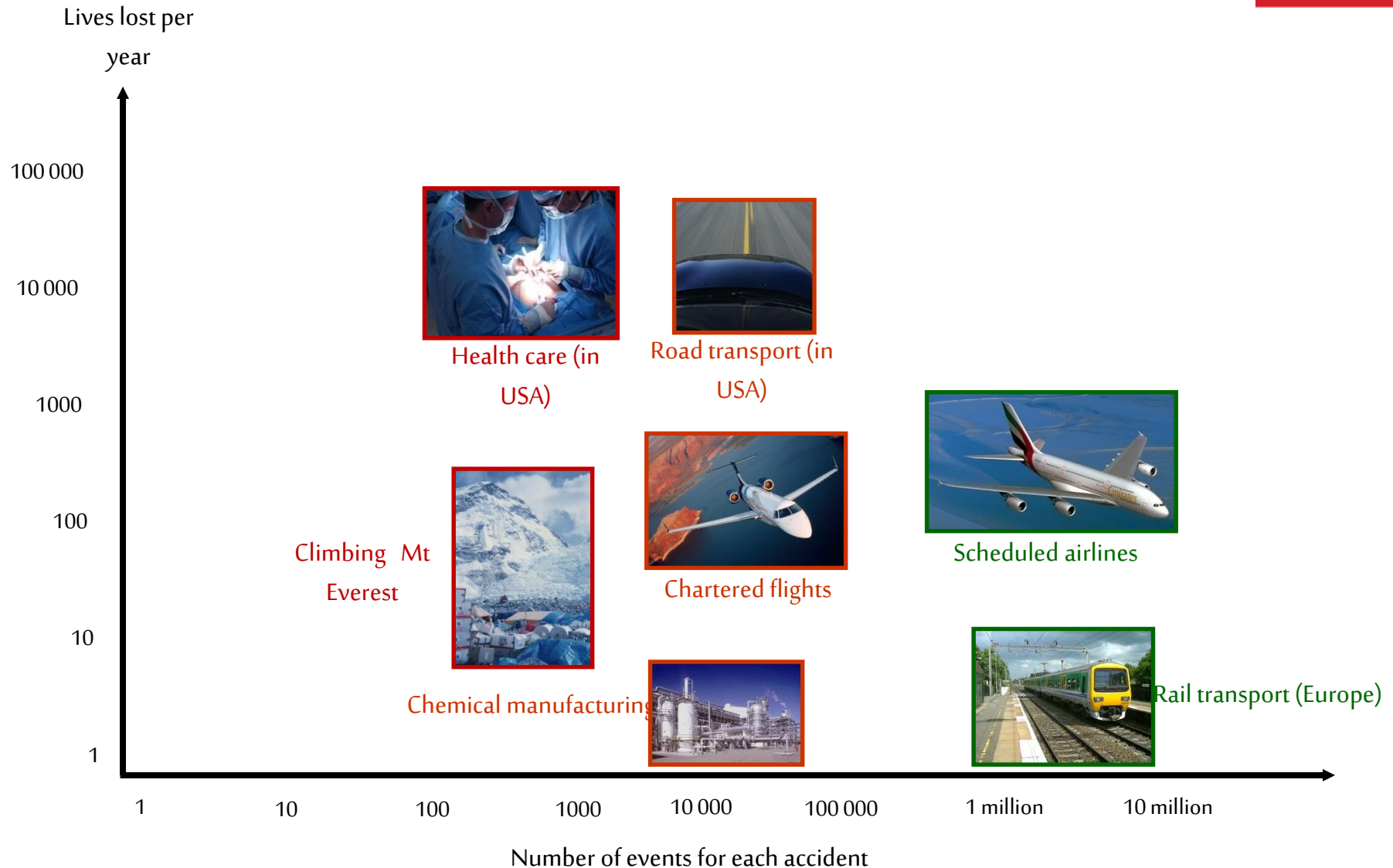
“Figure out what happened to the last crew here, and tell the next crew not to do that.”

Understanding Flight Safety

- The Changing Nature of Flight Safety



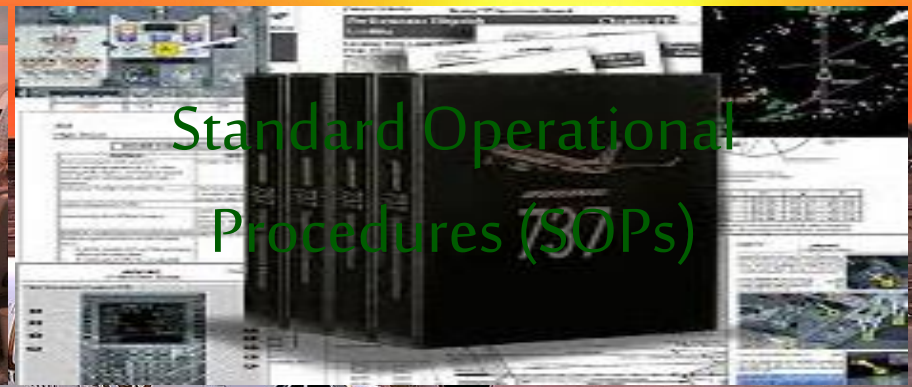
Flight Safety – How safe are we?



Flight Safety, Human Factors and CRM



Improved technology
and design

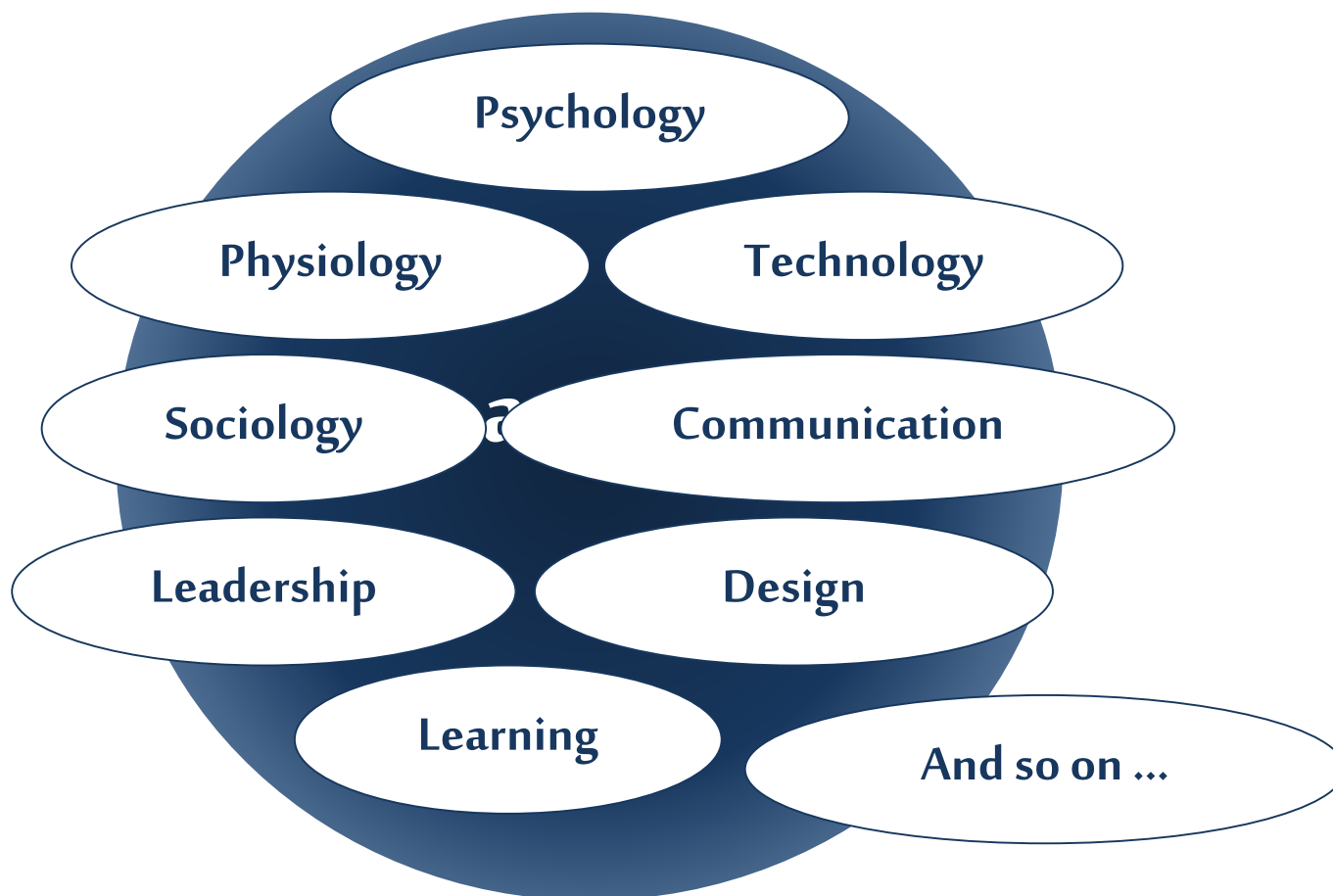


Standard Operational
Procedures (SOPs)

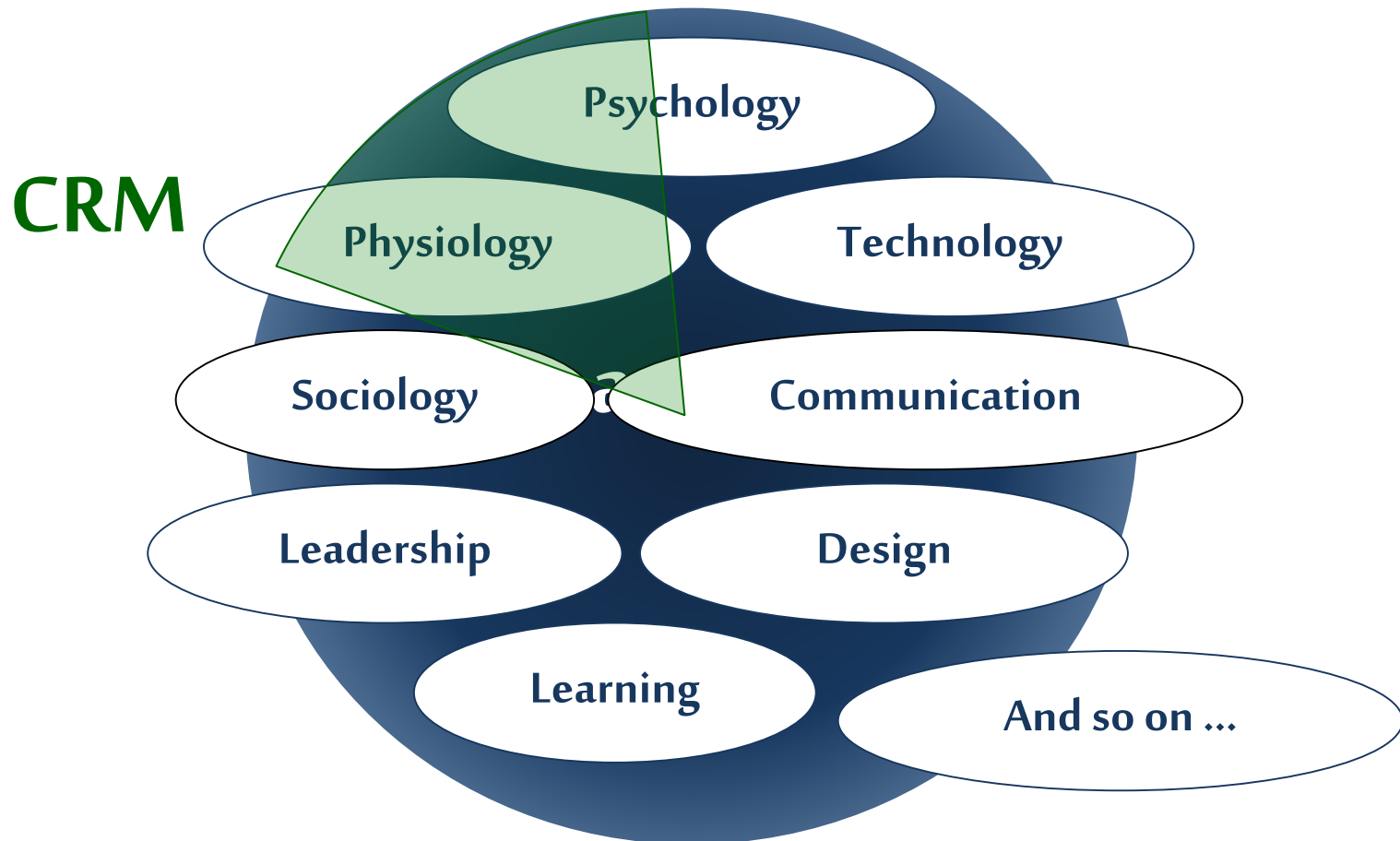


Human Factors
and CRM

Human Factors and CRM



Human Factors and CRM



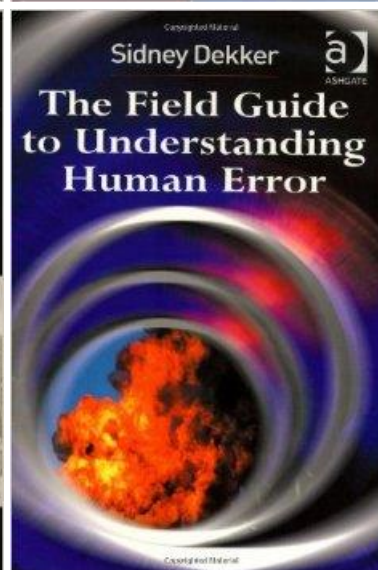
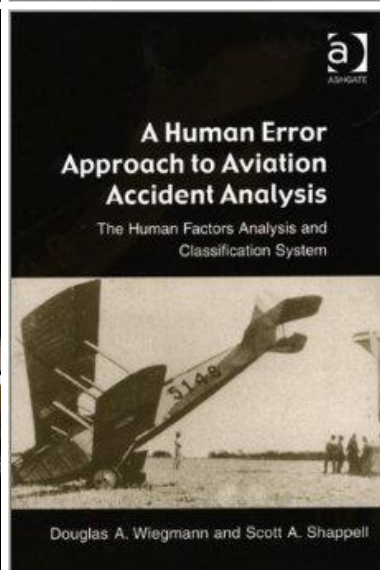
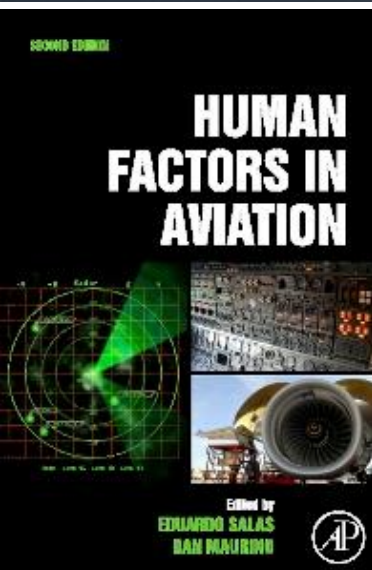
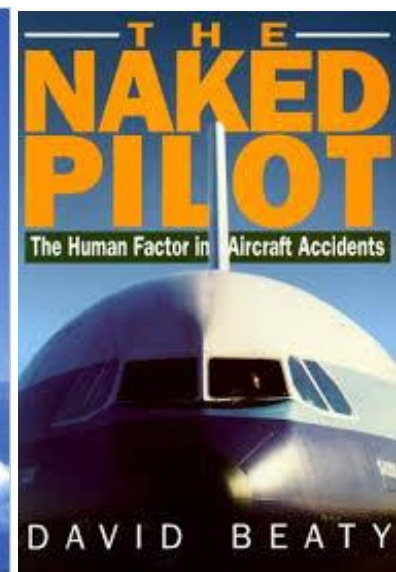
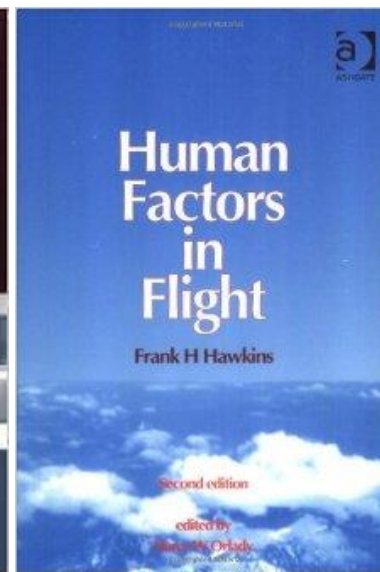
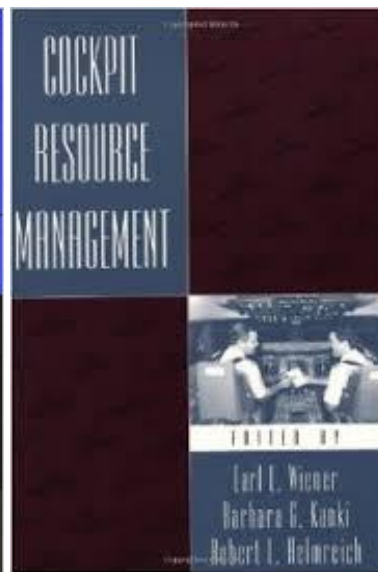
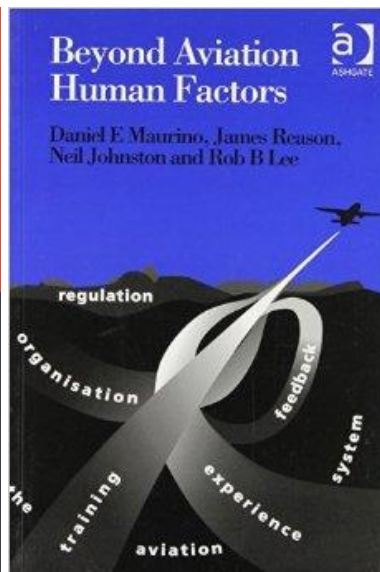
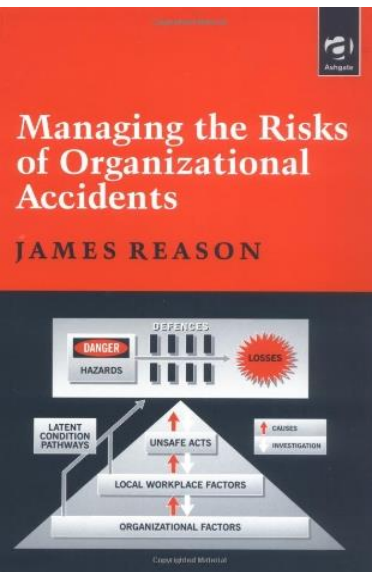
Crew Resource Management



CRM is the effective utilisation of all available resources (e.g. crew members, aeroplane, systems and supporting facilities) to achieve *safe and efficient* operation.

The Current State of CRM

The Foundation – HF Research



Regulatory Status and Industry Acceptance



European Aviation Safety Agency — Rulemaking Directorate Notice of Proposed Amendment 2014-17

Crew resource management (CRM) training

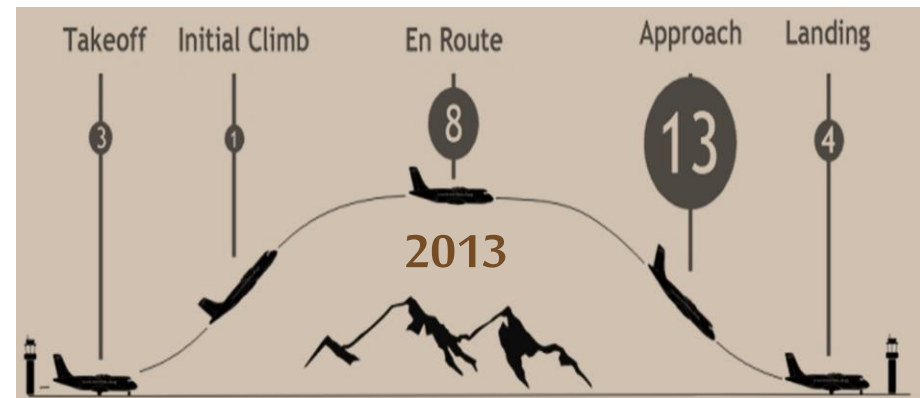
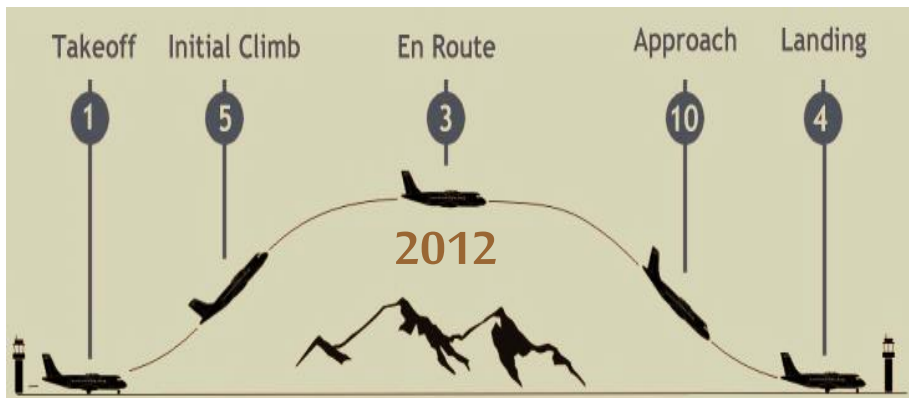
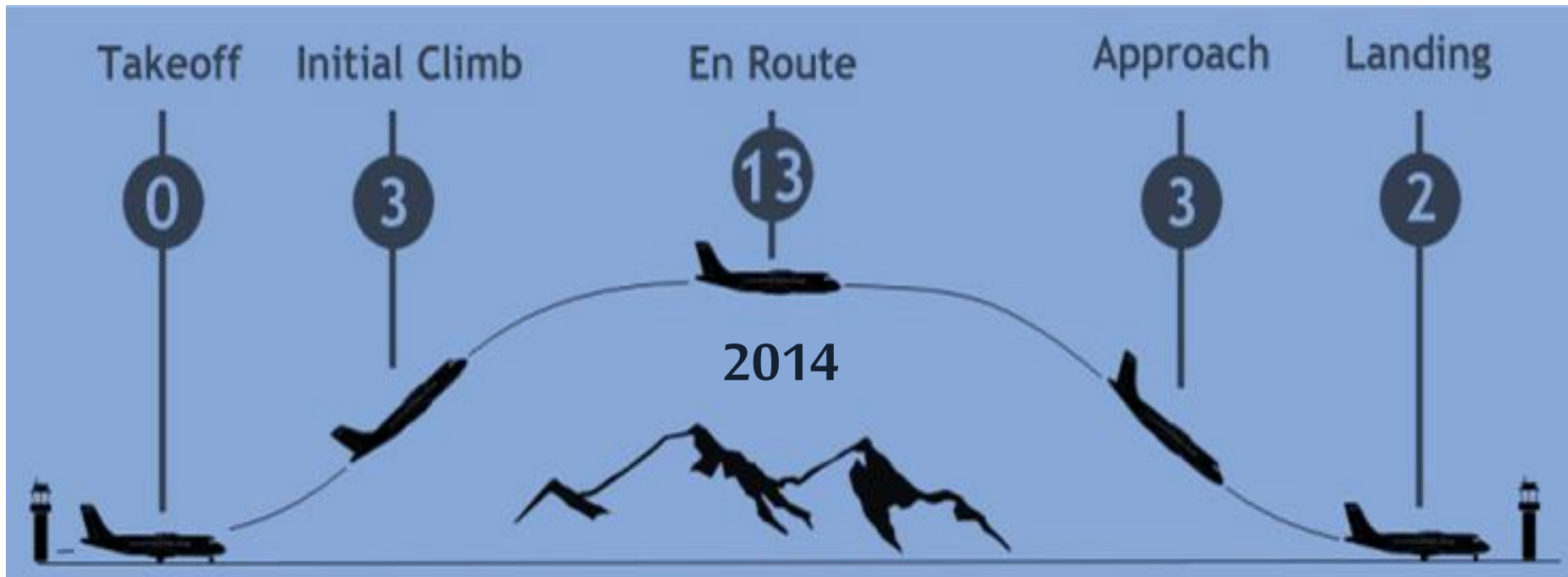
RMT.0411 (OPS.094) — 26.6.2014



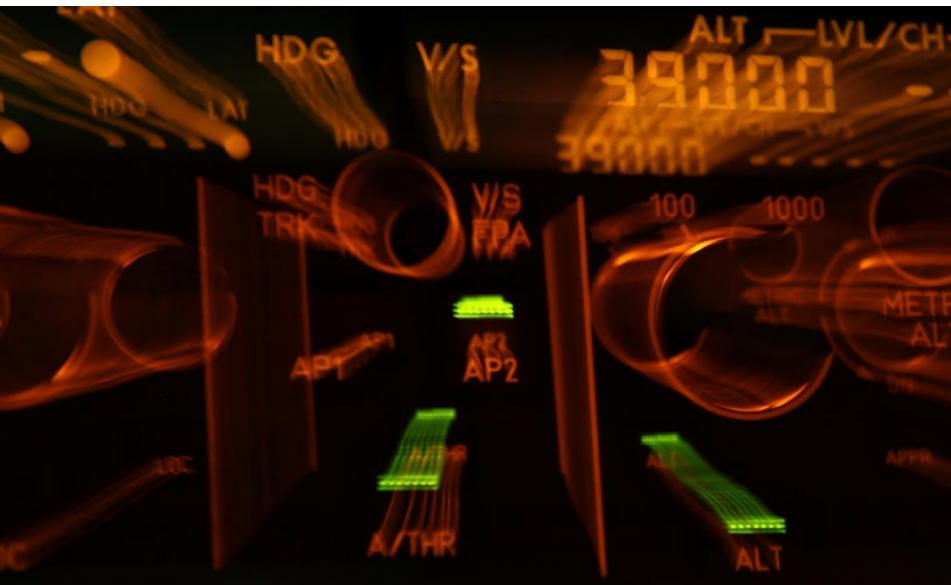
Delivery of CRM and Crew Acceptance



Accident Review and Trends



Current CRM Considerations



Implementation

- Does CRM work?

- Research at academic medical center in UK
- Mandatory CRM training for 517 staff (surgeons, anaesthetists, nurses etc.), including use of briefings and checklists for coordination
- Pre-operative briefings in the operating room from 6.7% to 90% within four months
- Wrong-site surgeries and retained foreign objects down from 7 in 2007 to one in 2008, after 14 months with training up to 5 in 2009
- Malpractice expenses down from \$ 793 000 (2003-2007) to 0 (zero) in 2008



CRM at Emirates

Goal of Emirates CRM Training



Awareness – Airmanship – Suspicion
Resilience

HF Office – The Work We Do

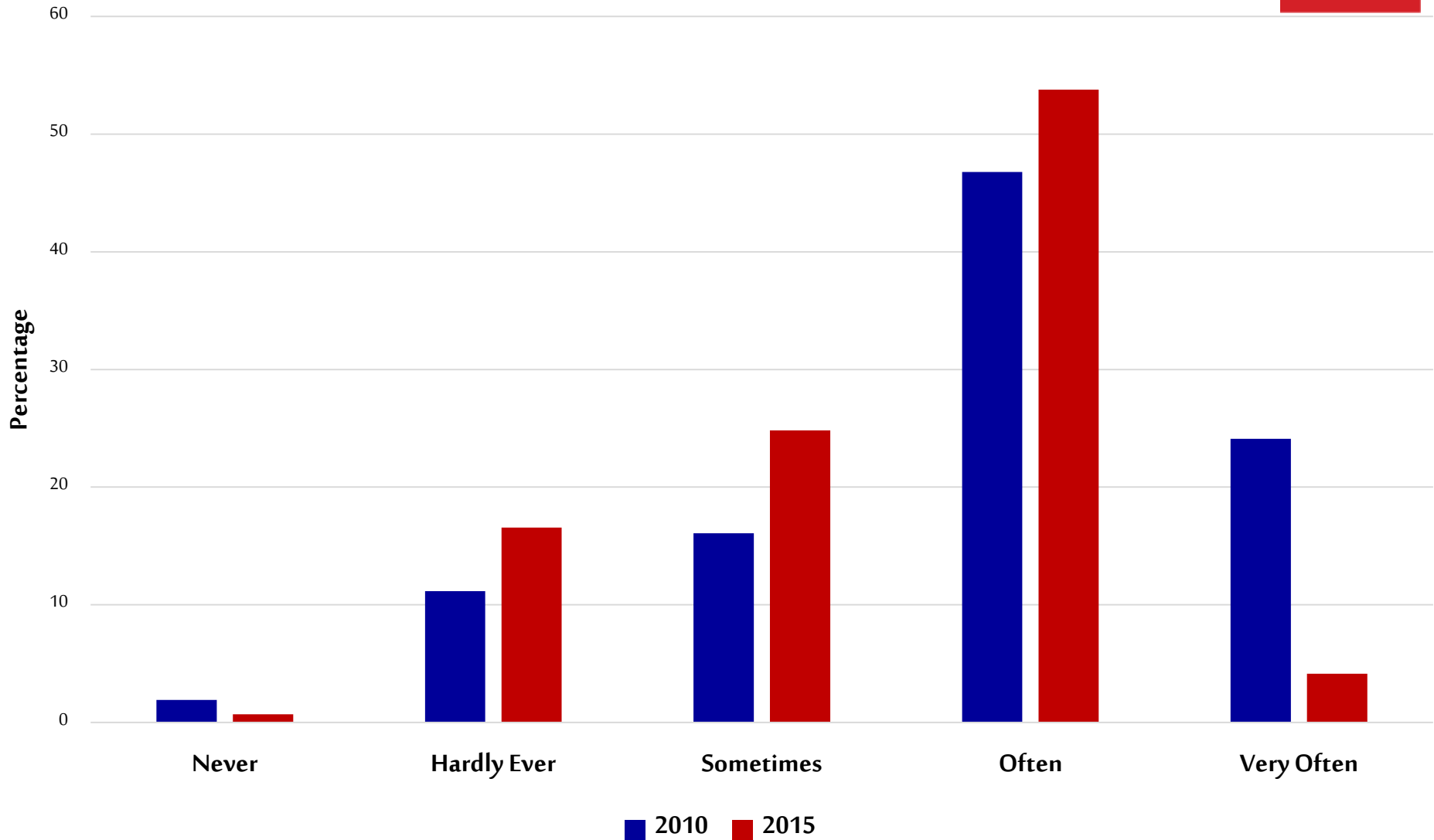


- Development and delivery of:
 - Flight Crew CRM
 - Cabin Crew CRM
 - Combined CRM
 - Dispatchers, ATC, Third party etc.
- Train the Trainer (Standardisation meetings, instructor courses, etc.)
- Assessment of CRM / Coaching
- Investigation / Support



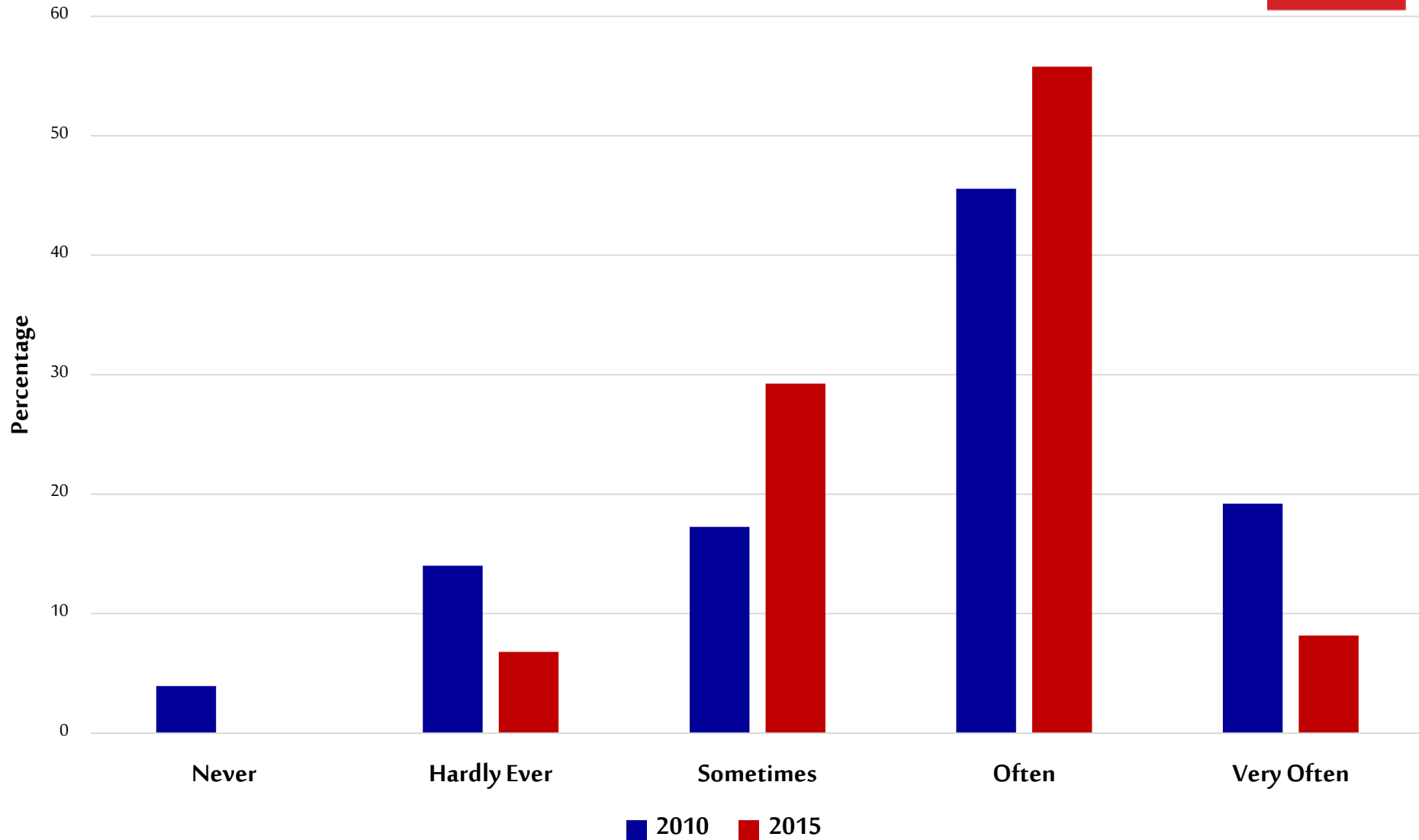
Knowledge - Interaction - Tools

My decision making ability is as good in emergencies as in routine flying operations



(Comparison of 2095 EK Pilots in 2010 to [SD=1.07] vs 182 EK Pilots in 2015 [SD=0.84])

I am more likely to make errors when the workload is high



(Comparison of 2095 EK Pilots in 2010 to [SD=1.07] vs 182 EK Pilots in 2015 [SD=0.84])

Video for CRM



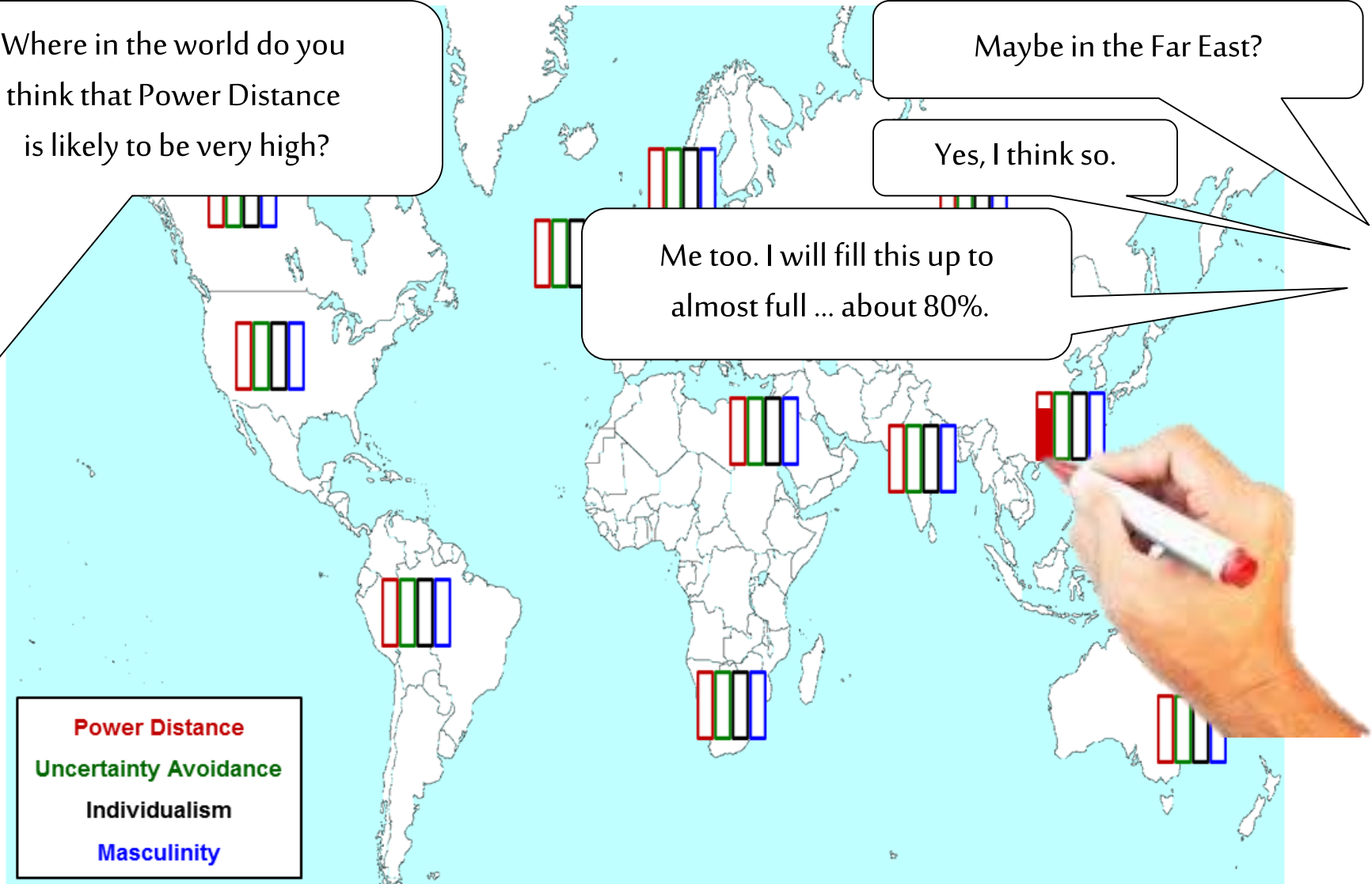
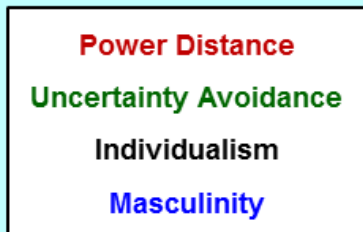
Culture Module – Exercise

Where in the world do you think that Power Distance is likely to be very high?

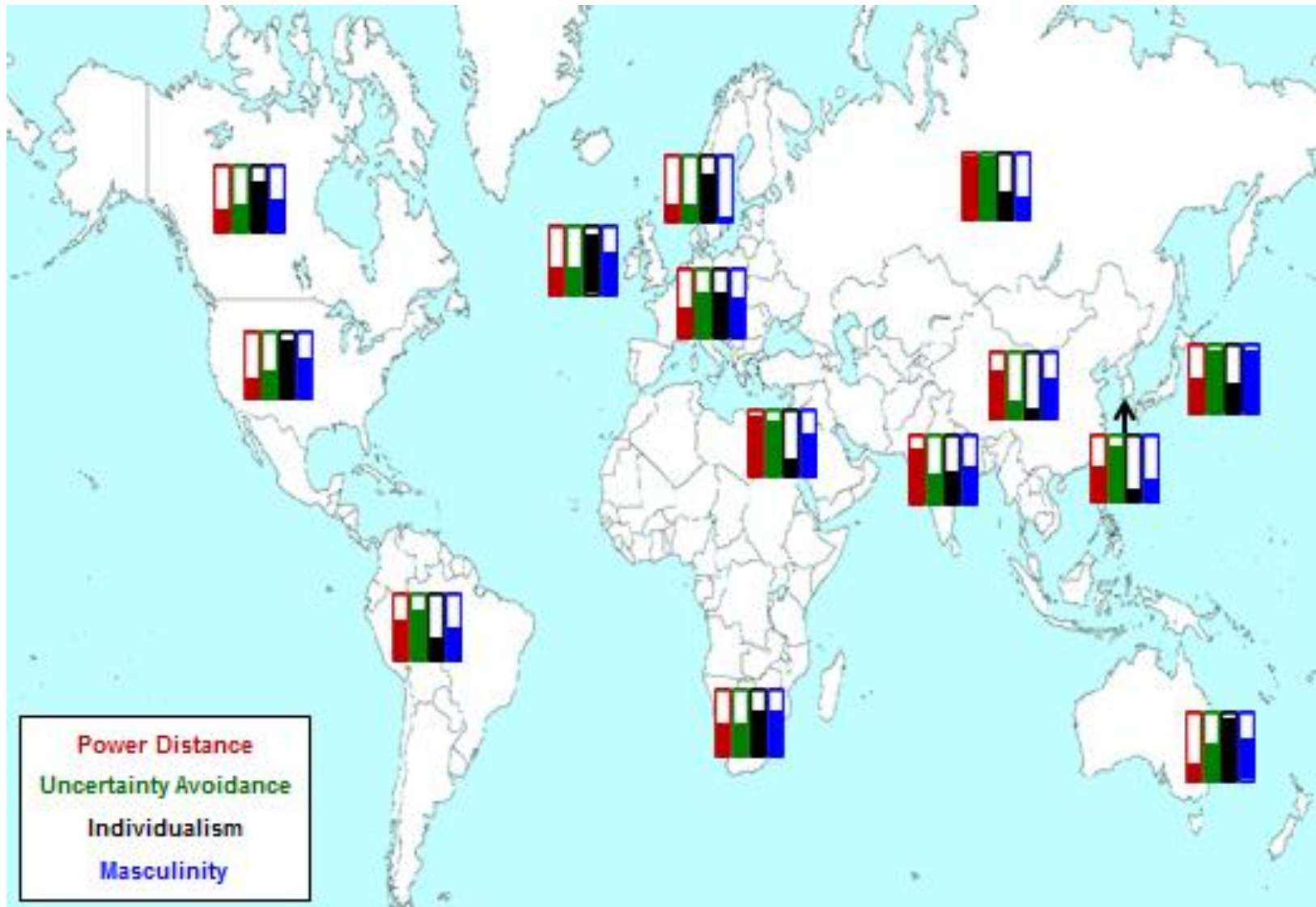
Maybe in the Far East?

Yes, I think so.

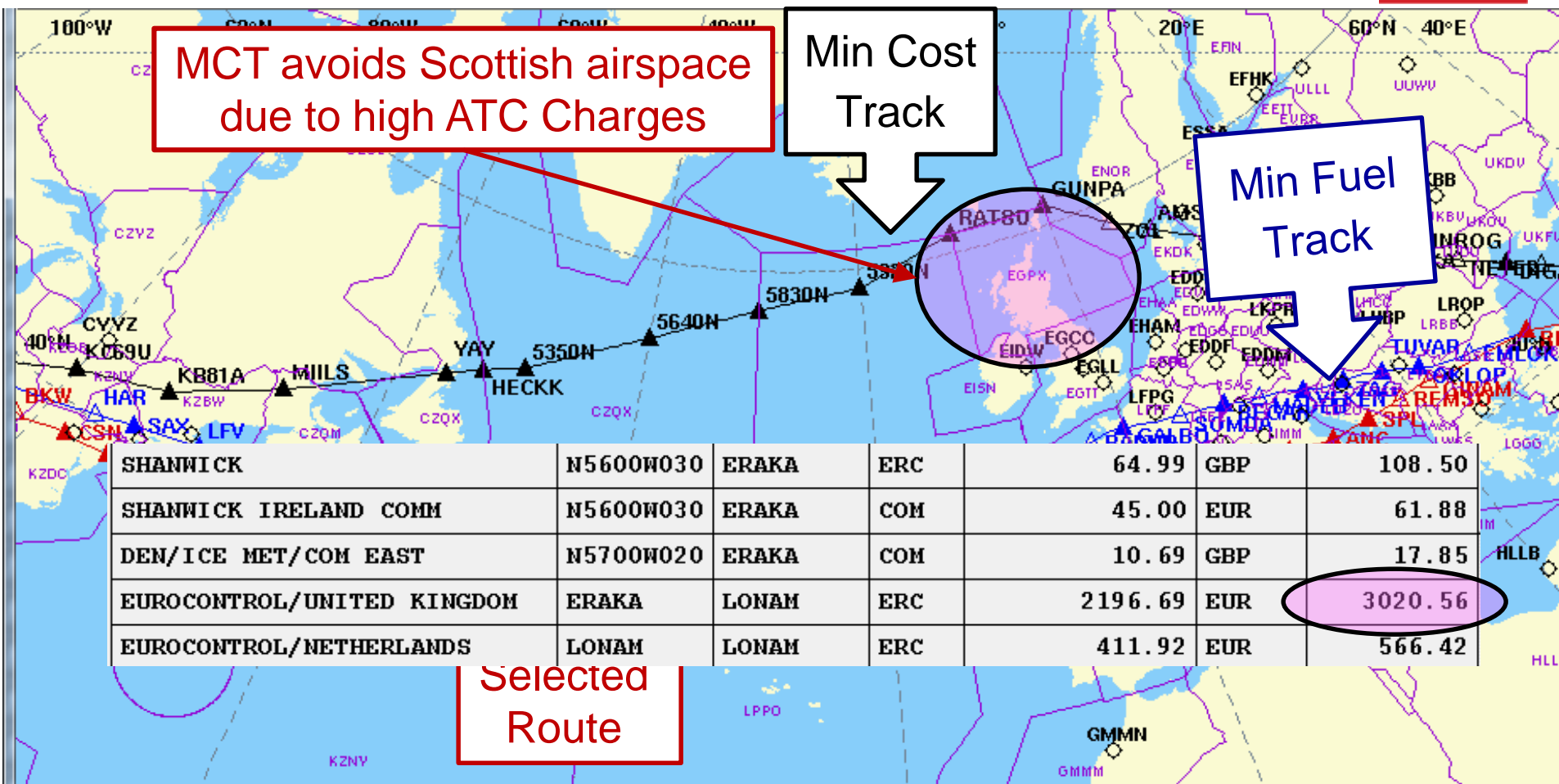
Me too. I will fill this up to almost full ... about 80%.



Culture Module – Exercise

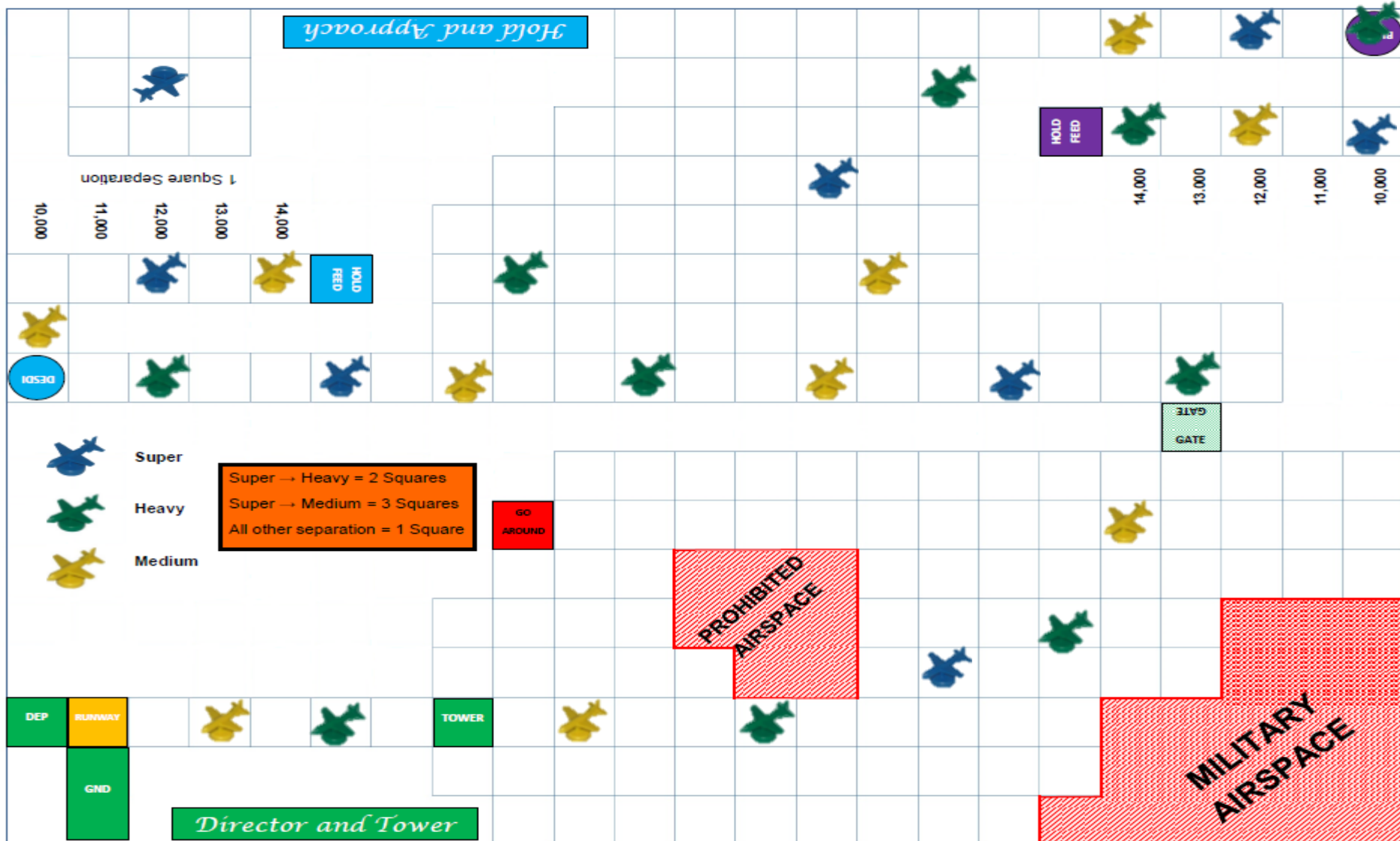


Dispatch Module - Exercise



- It is 4 am (00:00Z) at HQ and you are the North America dispatcher - NA1
- You must generate the route for EK 225 DXB–SFO (STD 04:50Z) whilst managing your other flights –
The route must be ready by 01:00Z

ATC Module - Exercise



ATC Module - Video



The Next Step?

Using "Simple" Simulation for CRM Training

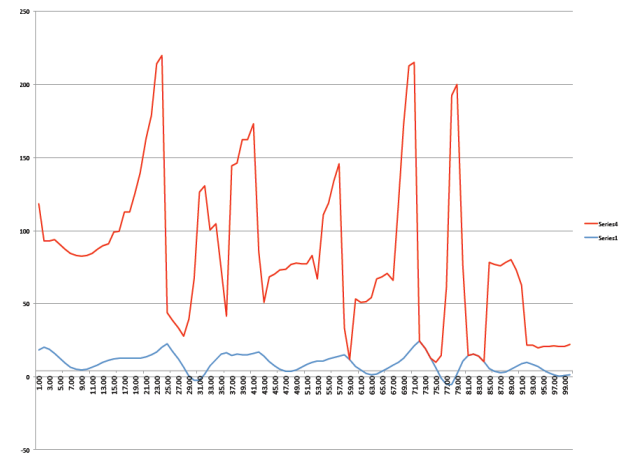
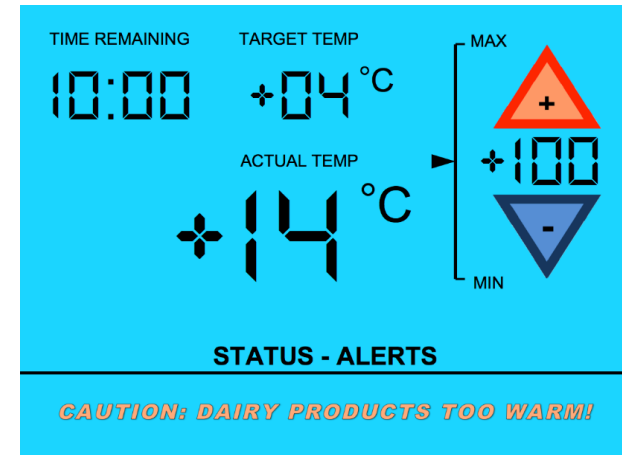


Example 1: Cold Store

- Exploring Information Processing



- Simulation used to explore understanding of dynamics of complex system interactions
- Single parameter and simple process, but there is a lag
- Used for research on information processing, decision making etc.
- Used for Master's thesis by CRMI Captain Mark Cameron

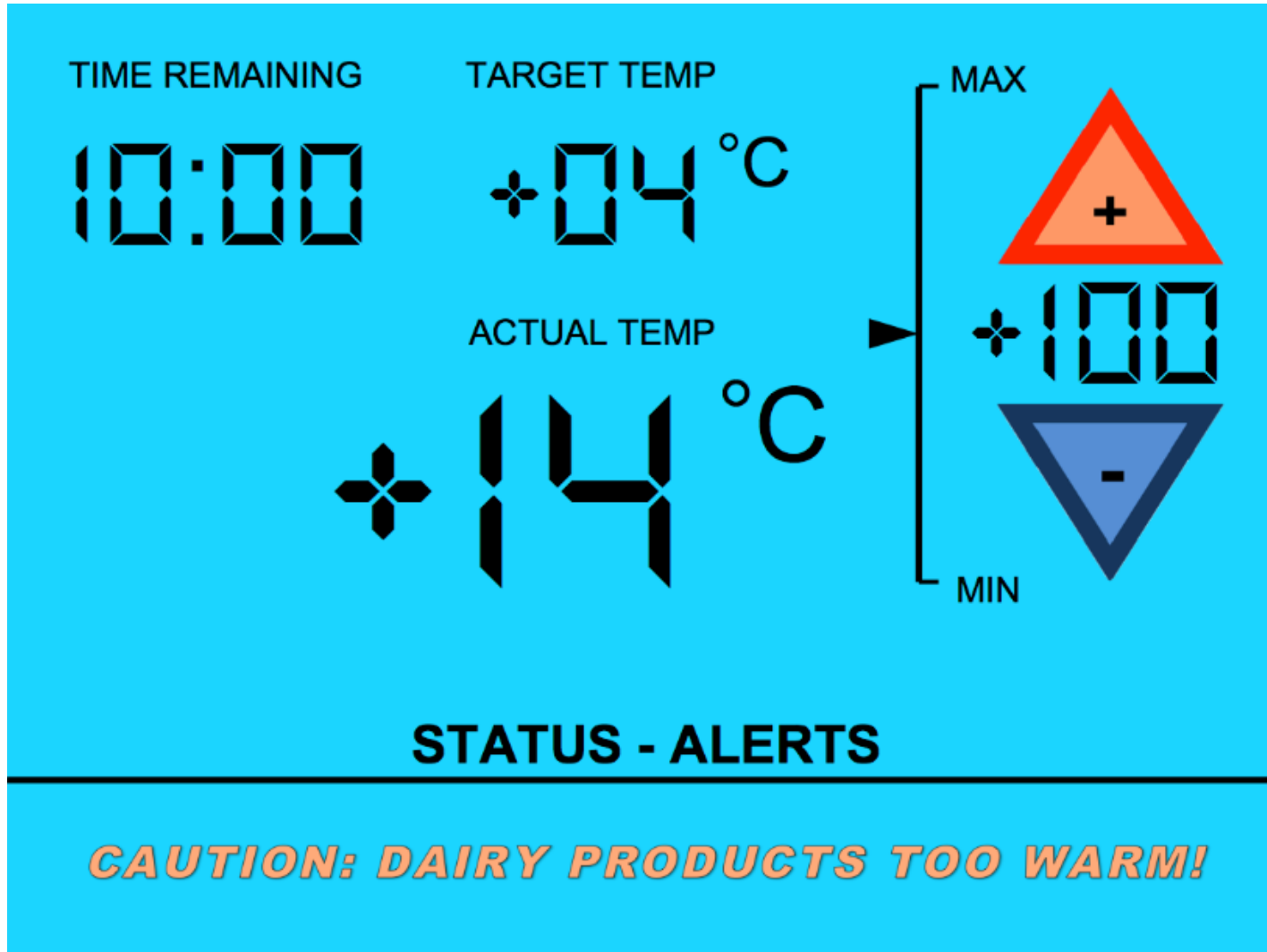


Example 1: Cold Store

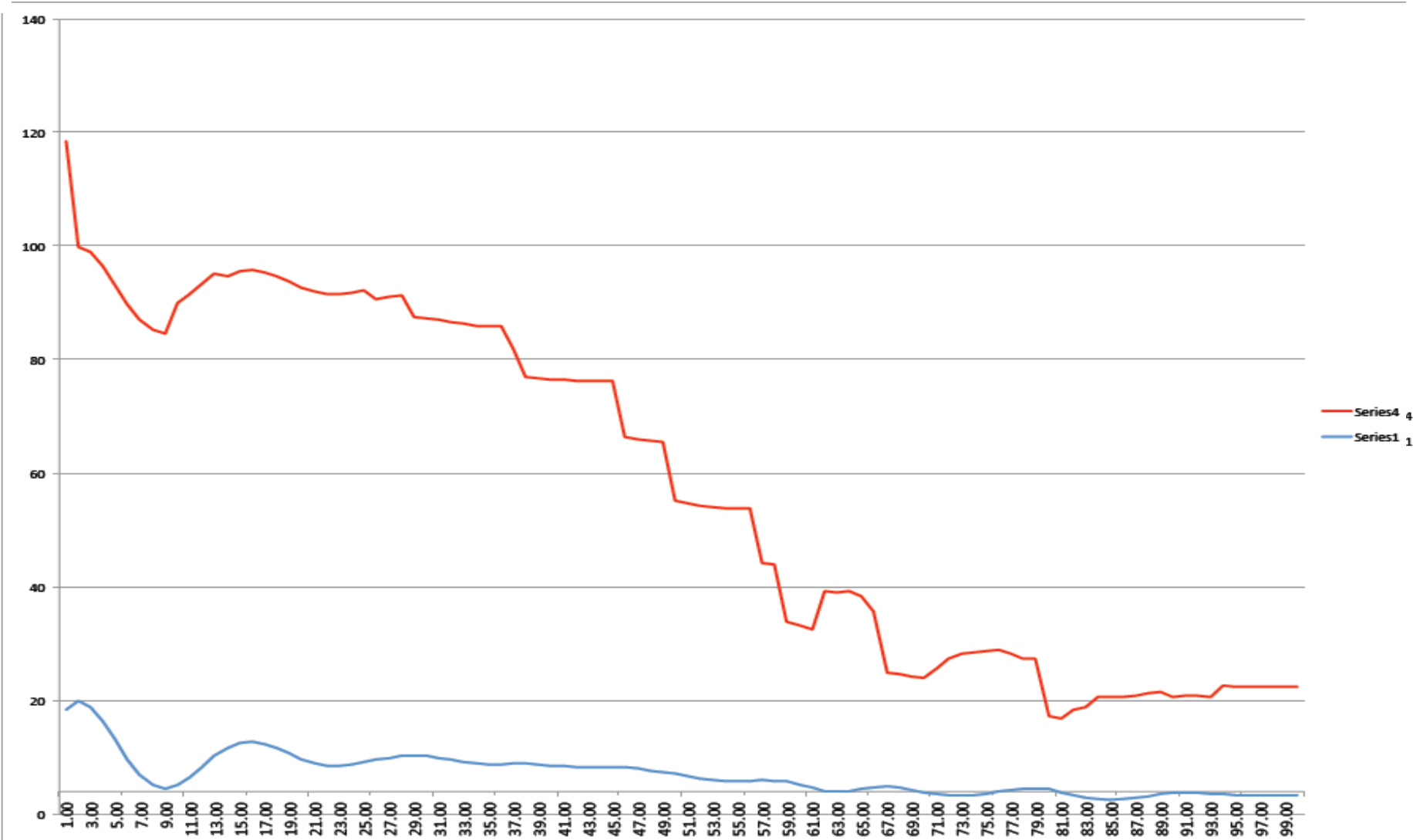
- Supermarket Manager
- Call from supermarket: *"The control for the cold store is out of order!"*
- Control for temperature can be used, but results only seen on thermometer
- Task is to maintain temperature at 4⁰ C



Example 1: Cold Store



Example 1: Cold Store



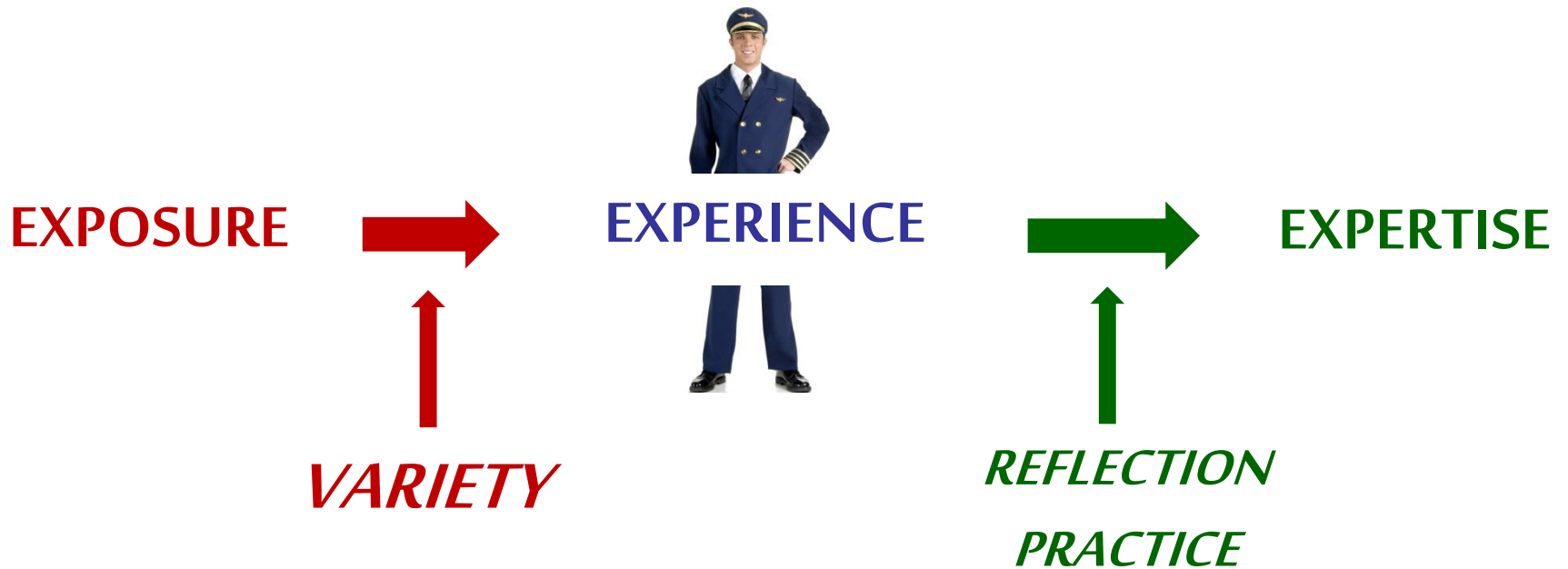
Example 2: M/S Antwerpen

- Training for Unusual and Unexpected Situations



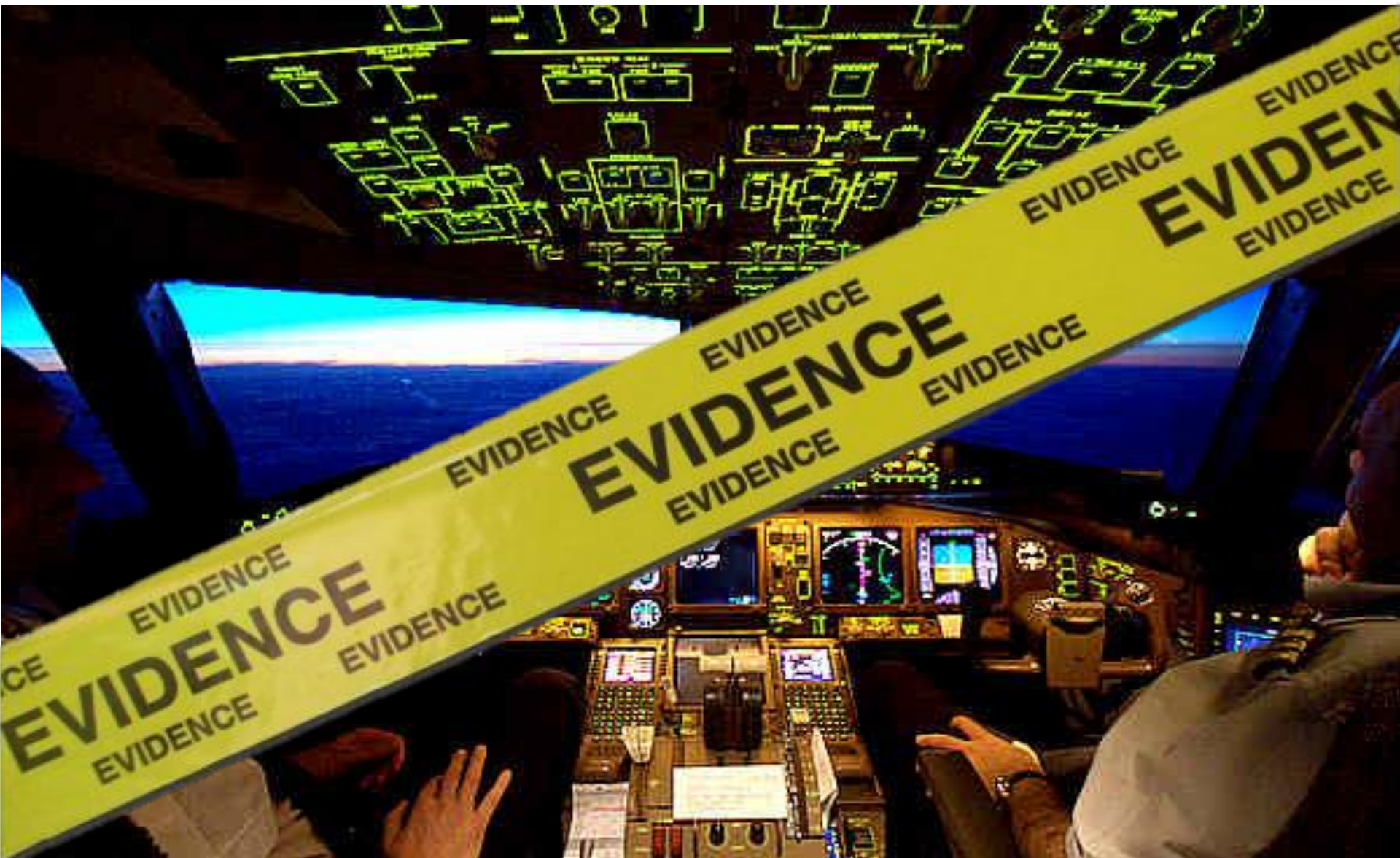
The Way Forward for CRM

The Challenging Change of Pilot Expertise

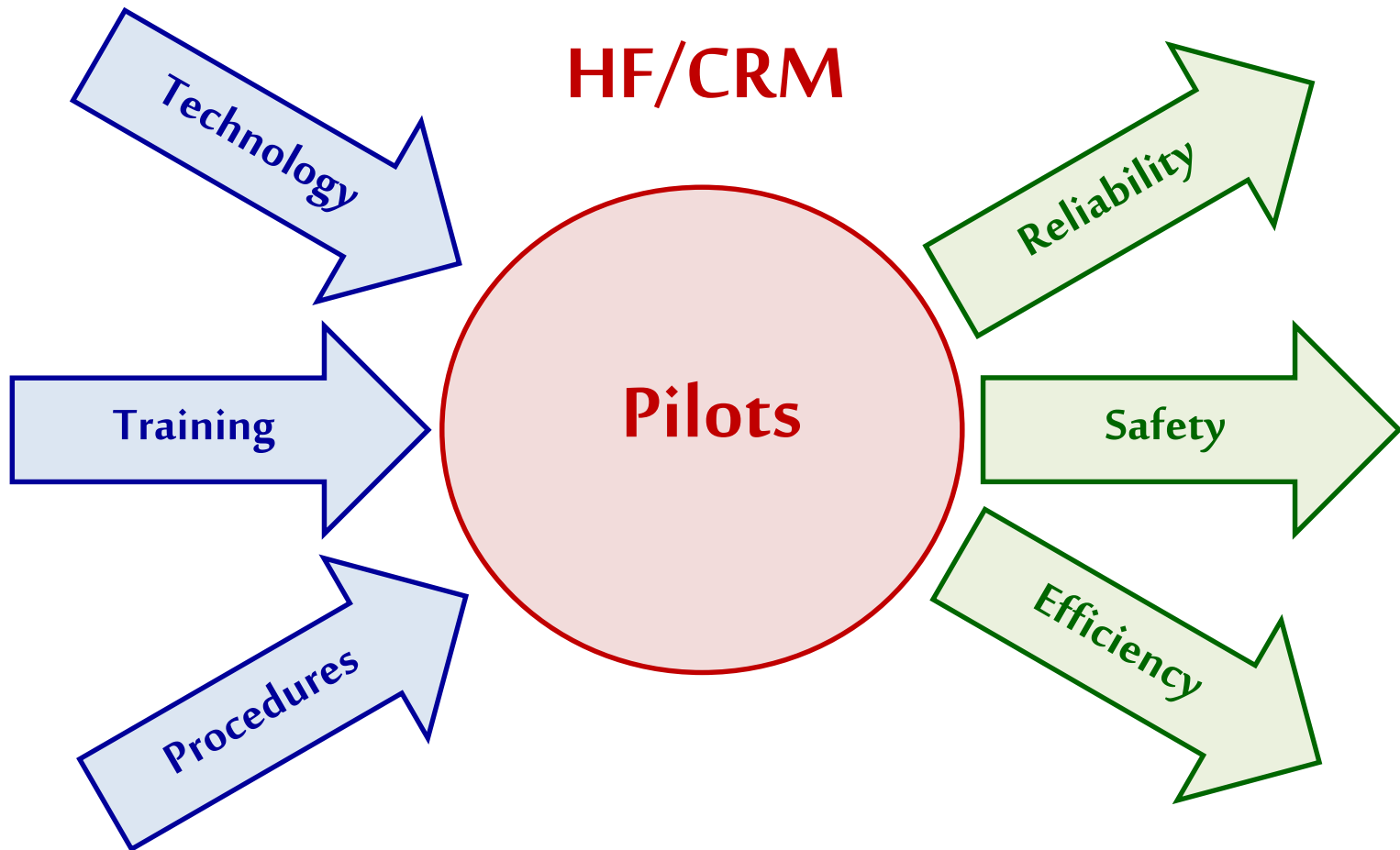


Limited exposure ➡ Degraded experience ➡
More effective training to achieve expertise

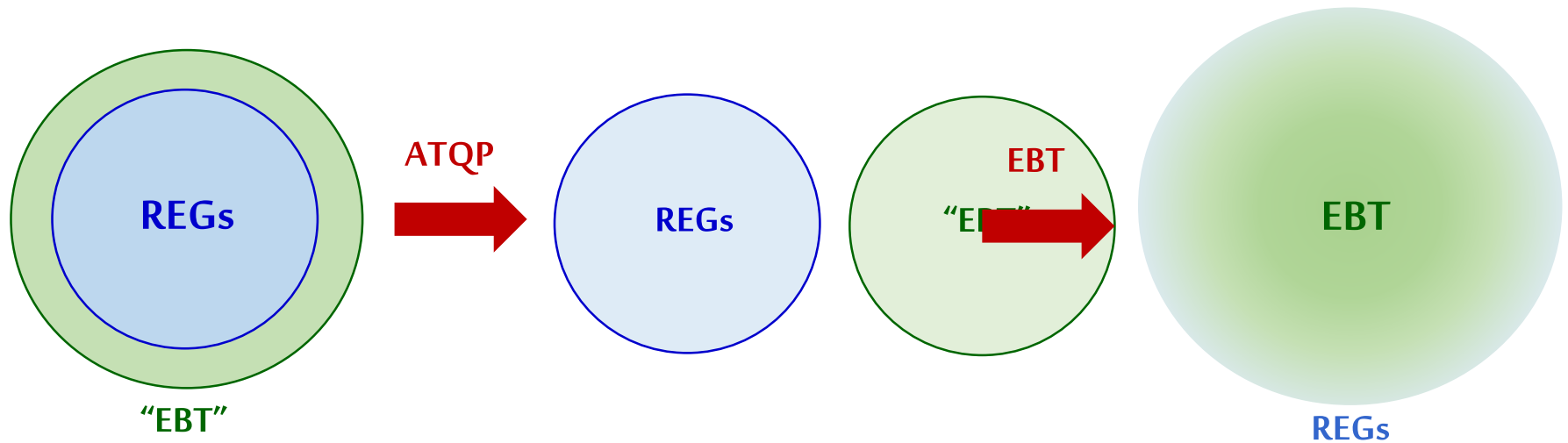
Training to meet the Challenge



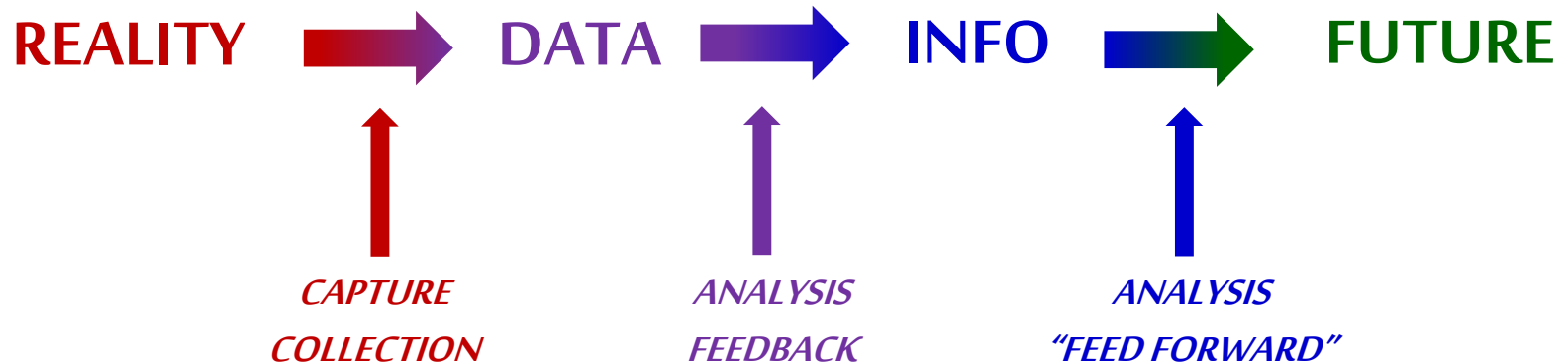
Evidence Based Training



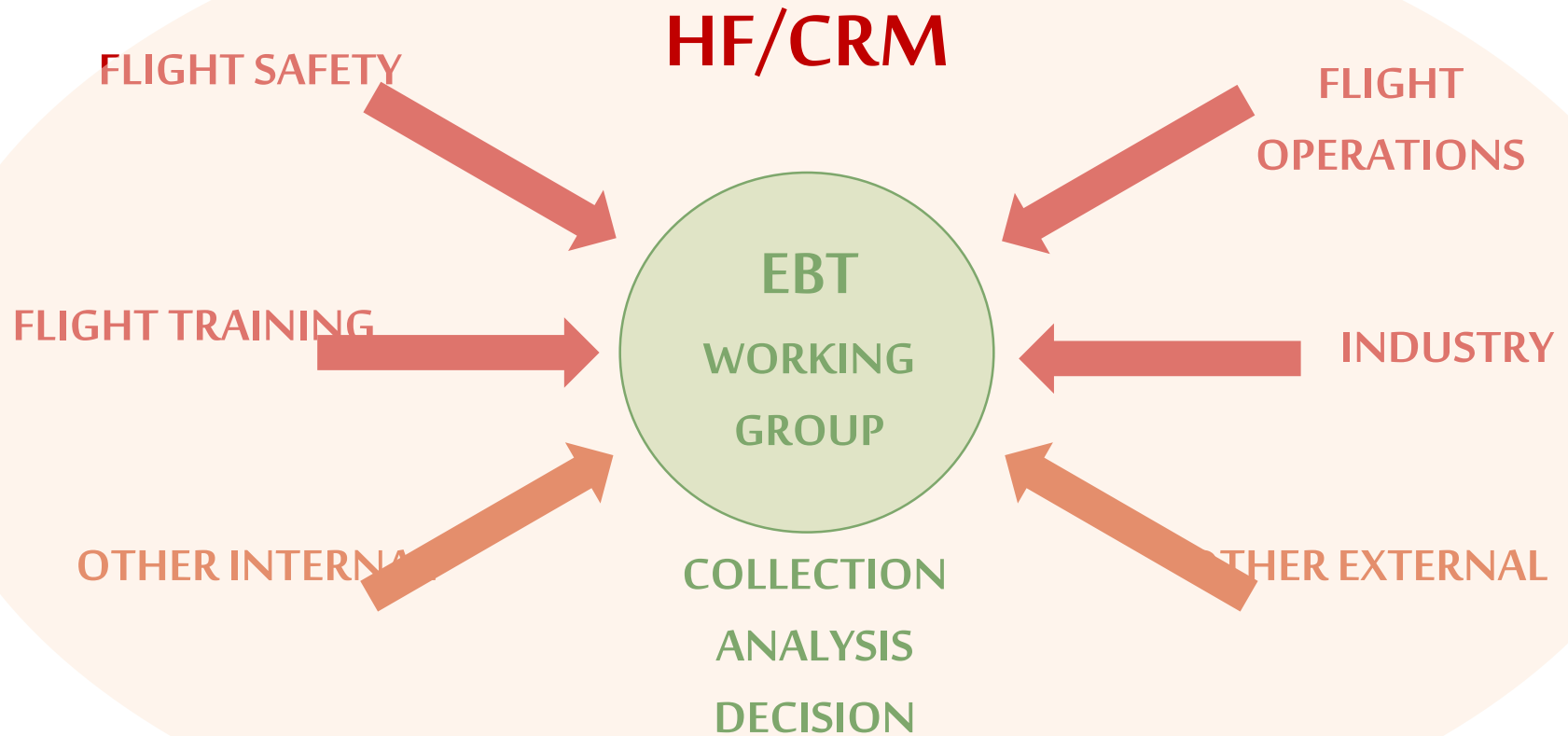
Evolution of EBT



What is Evidence?



Working with EBT



Implementation of CRM



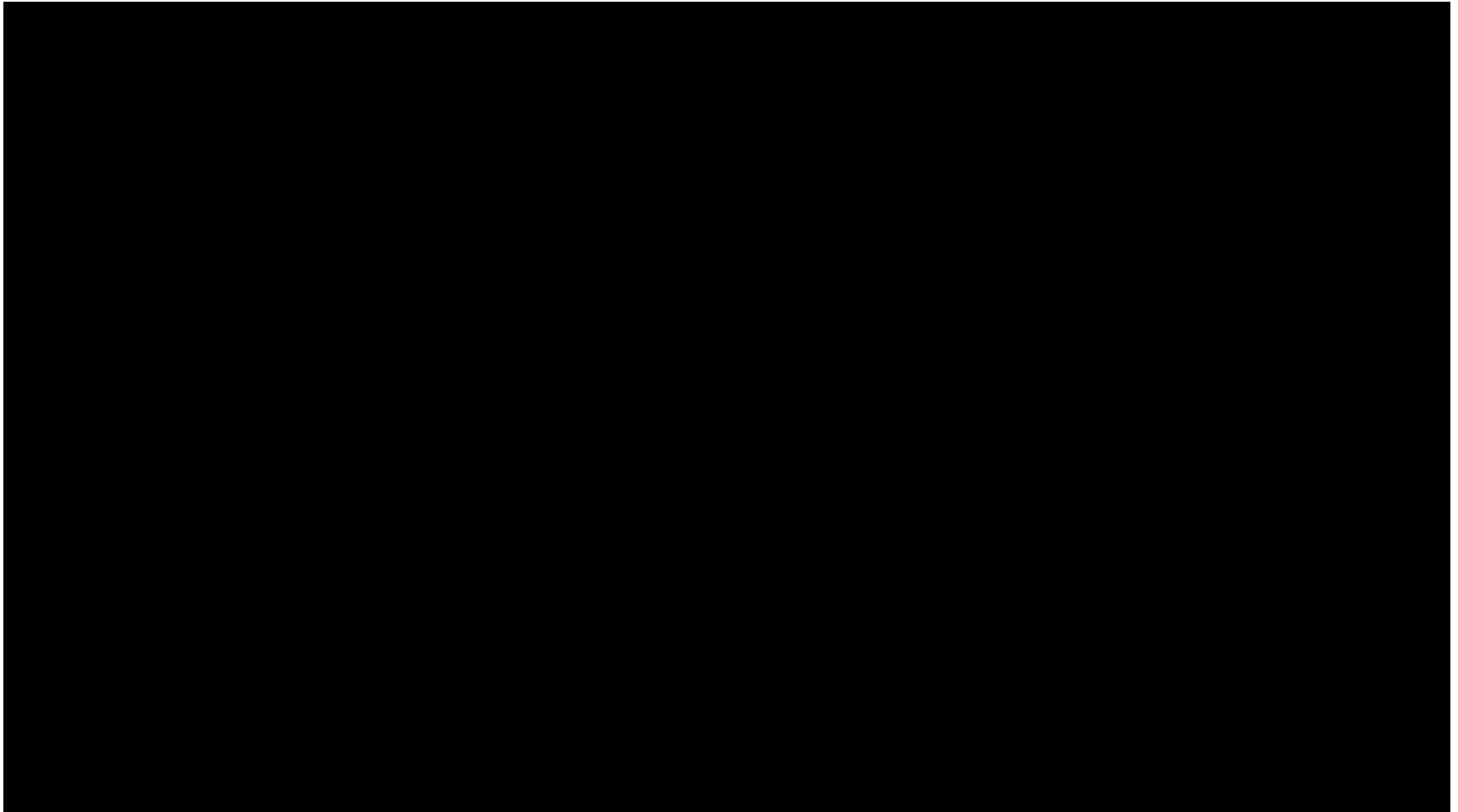
Integration of CRM

- 
- A background image showing several hands reaching in from the edges of the frame, holding and interlocking a set of black gears of different sizes. The scene is set against a light blue gradient background, symbolizing teamwork and the integration of various components.
- Continued work on understanding and acceptance
 - Integration in all aspects of training
 - Integration in all aspects of work
 - CRM as vehicle for cross-organisational knowledge
 - CRM as vehicle for building organisational culture

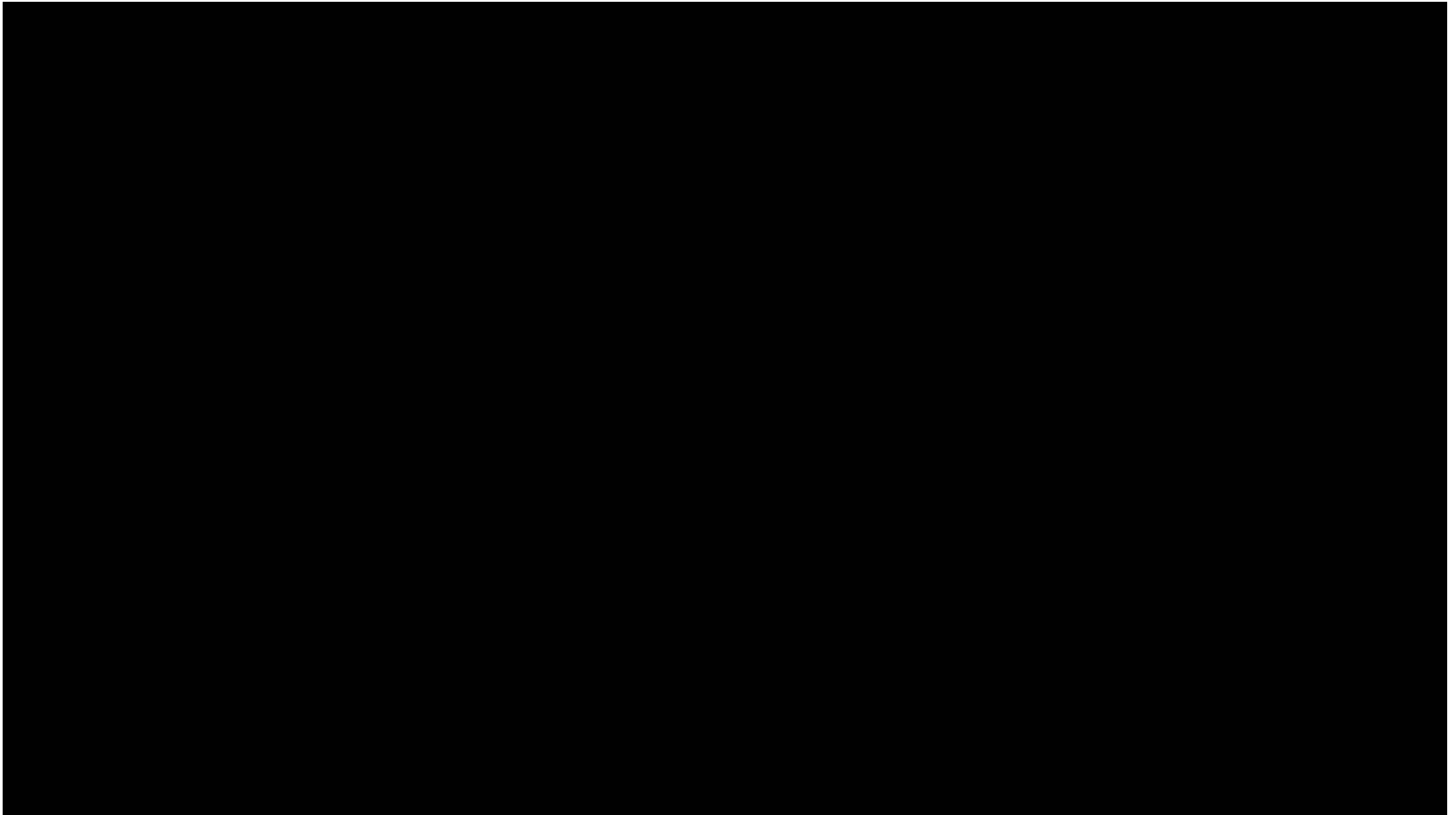
What are you "selling"?



Improving *Efficiency*



Protecting *Safety*



Summary

The Way Forward for CRM



• Irritation → Information



• Information → Interaction



• Interaction → Implementation



• Implementation → Integration



Thank you!

- Questions and Discussion



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