

# The pursuit of expertise: A paradigm **shift** in pilot training



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# Human Factors

Science

Systems

Performance

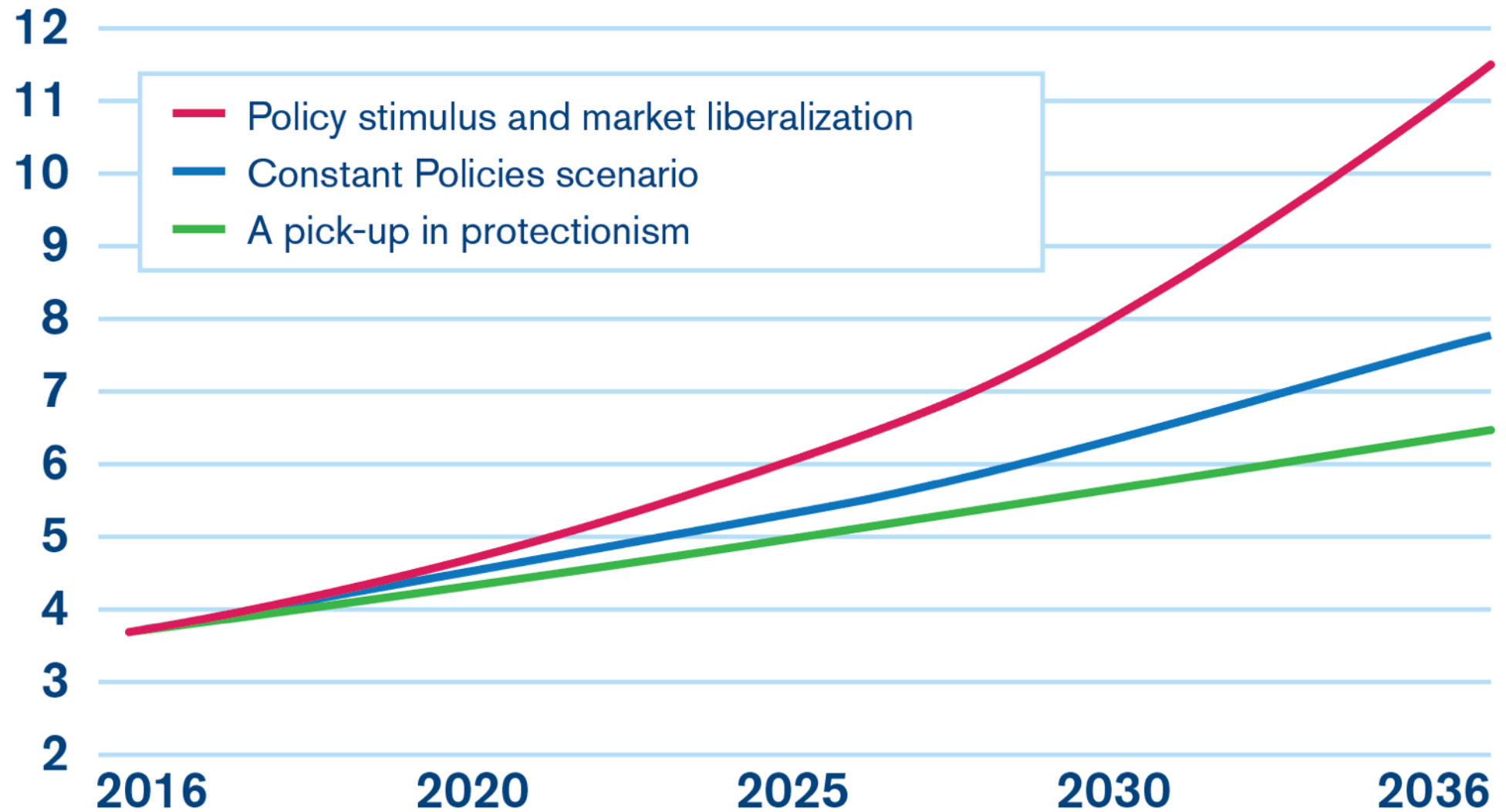
de·sign  
/dəˈzīn/

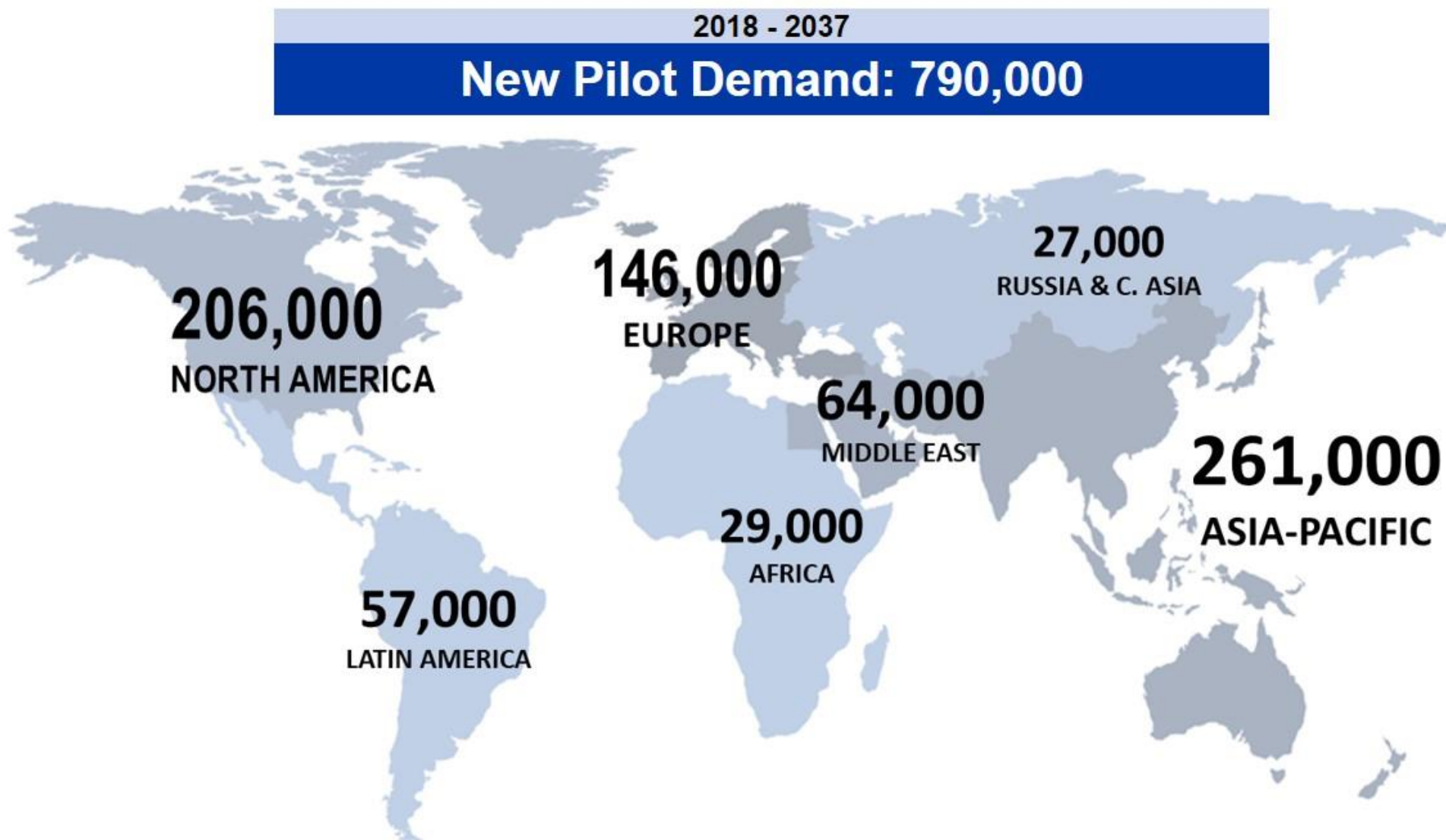
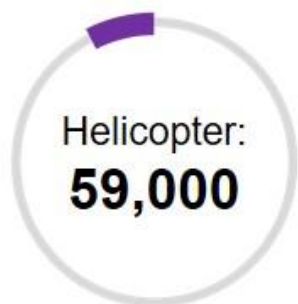
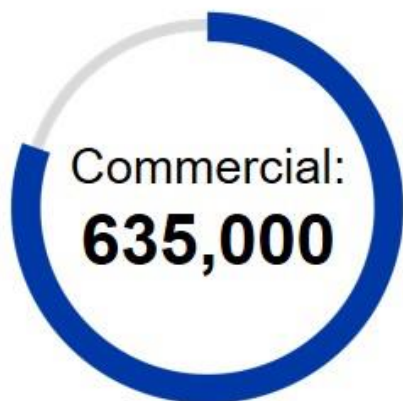
noun

1. a plan or drawing produced  
and function or working  
or other object before i  
"he has just unveiled  
museum"

synonyms: plan, bl  
outlin  
repr

# Global Passengers (billion, segment basis)









## Challenges:

- Industry skills shortage, and lower experience base in airlines
- Maintaining effective performance with increased operational complexity and rate of change
- Manual skills retention in highly automated systems
- Fewer predictable aircraft failures - more events are 'unforeseeable'





Source: [www.humanisticsystems.com](http://www.humanisticsystems.com)  
(picture: Black Isle Brewery)

The background of the slide features a low-angle, upward-looking perspective of several modern skyscrapers. The buildings are characterized by their glass and steel facades, with some showing distinct window patterns and architectural details. The sky is filled with soft, white clouds, creating a bright and airy atmosphere. The perspective makes the buildings appear to converge towards the top of the frame, emphasizing their height and scale.

# **Systems Approach to Training:**

- Understand and train performance in the context of the operational system
- Systems to collect and analyse data to inform training
- Formal, structured training needs analyses
- Systems to assess or measure performance







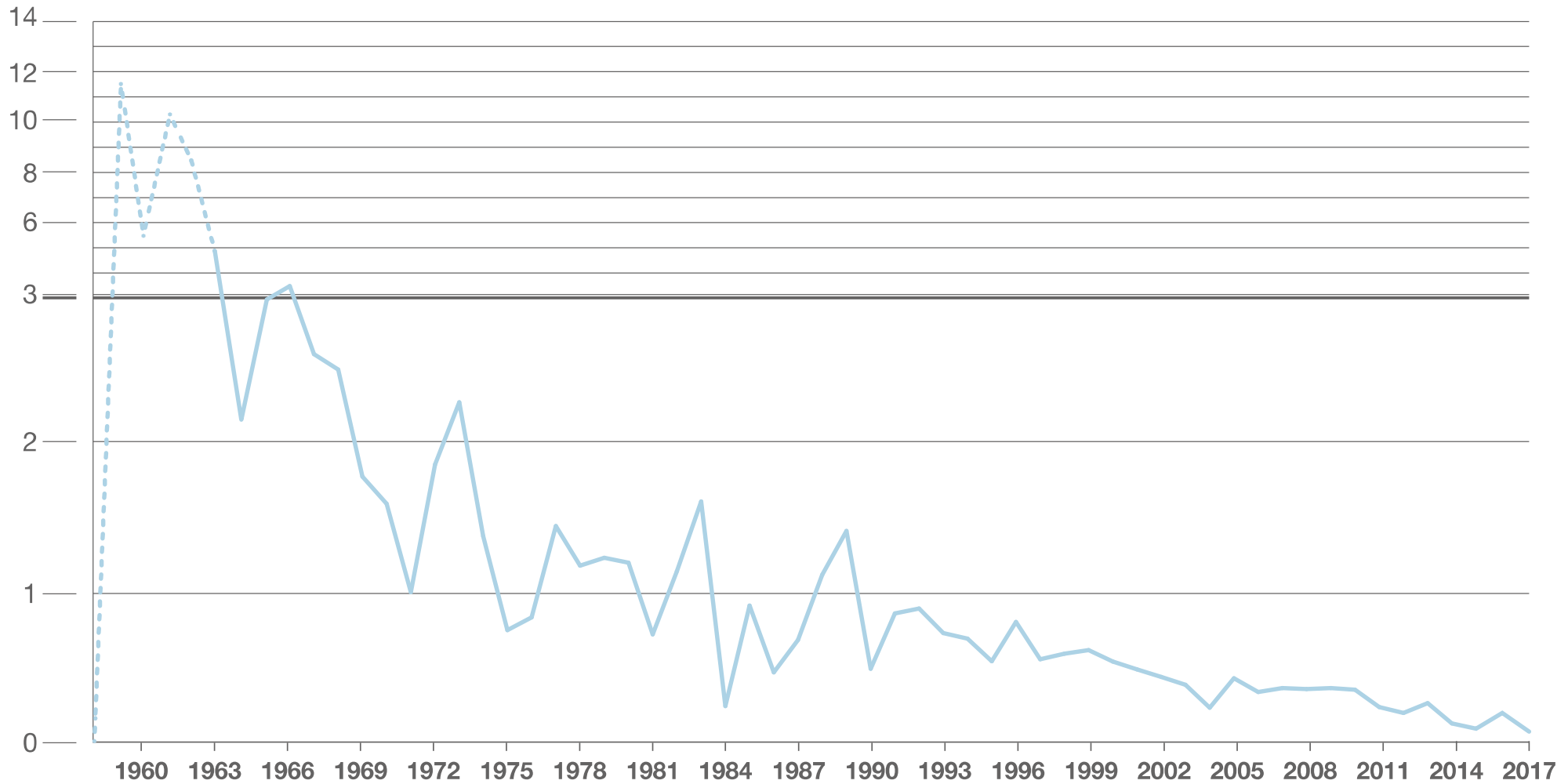






Yearly fatal accident rate

Yearly fatal accident rate per million flights



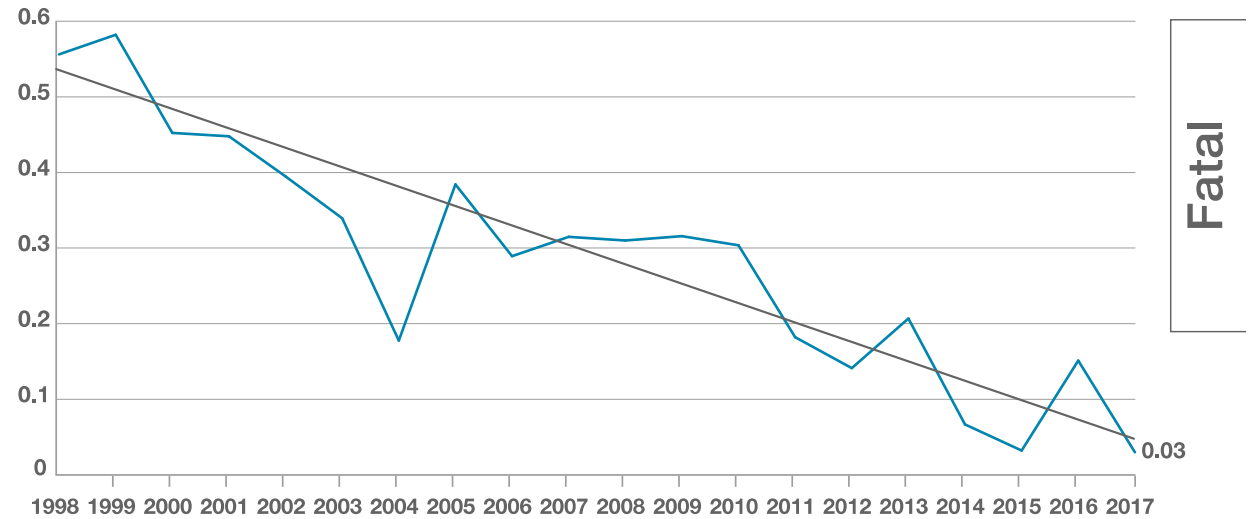
Fatal



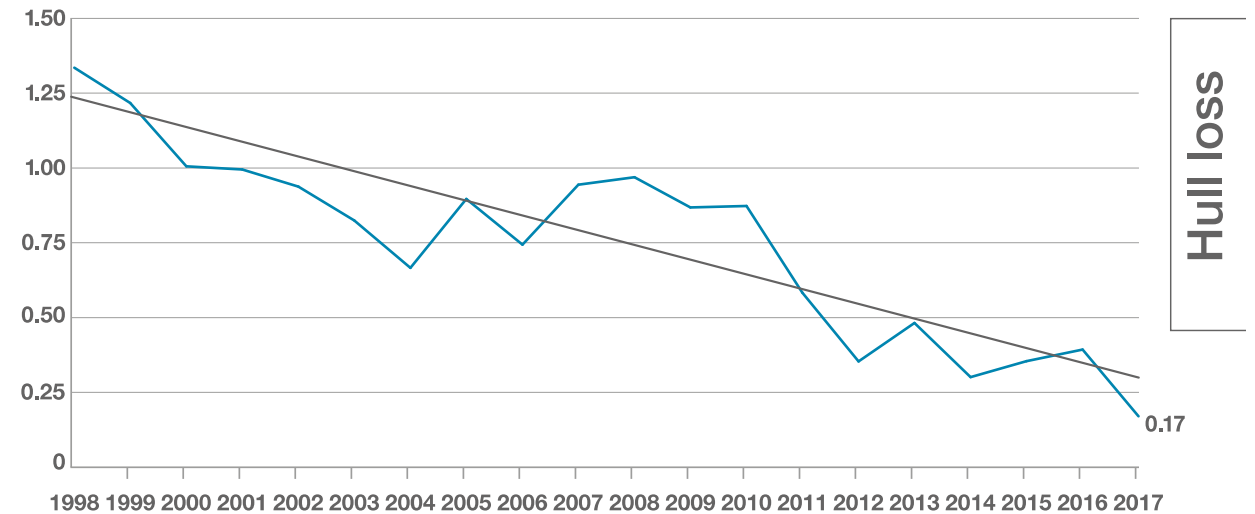
**1998 – 2017:**

- 95% reduction in fatal accident rate
- 70% reduction in hull loss rate

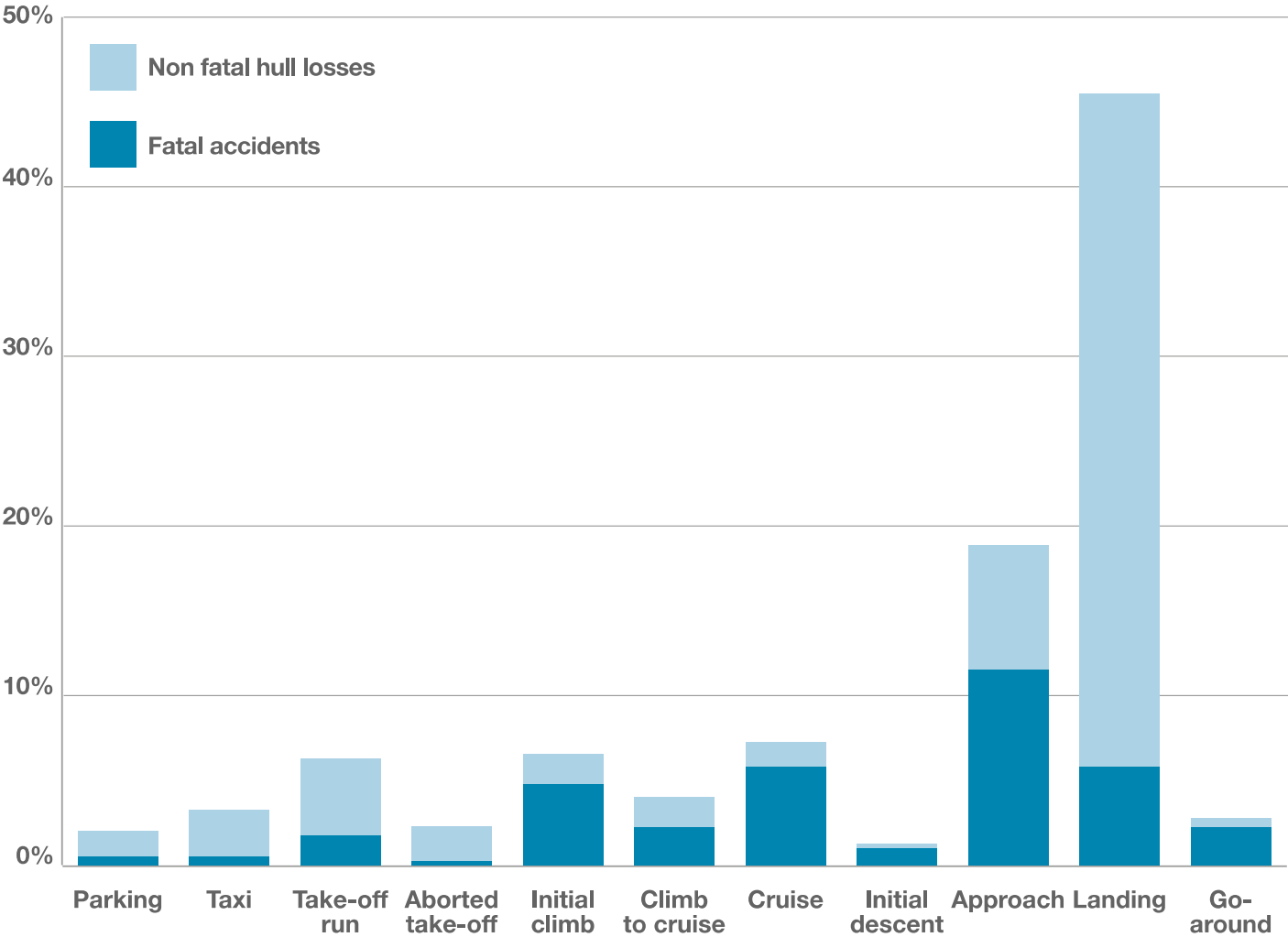
**Yearly fatal accident rate per million flights**



**Yearly hull loss accident rate per million flights**



Accidents by flight phase as a percentage of all accidents 1998-2017

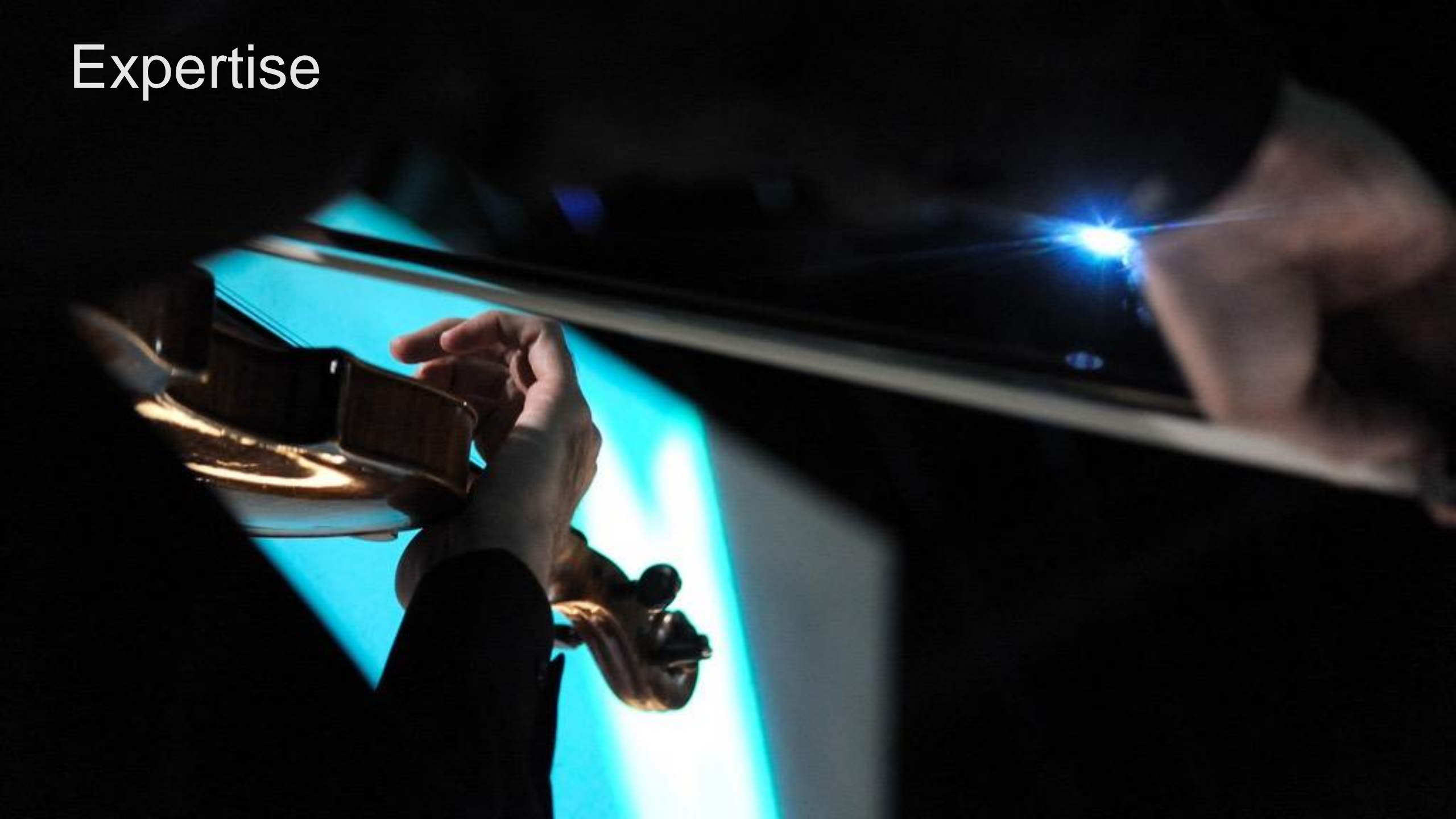


**Approach and Landing:**

...“significant demands on the crew.... navigation, aircraft configuration changes, communication with ATC... congested airspace, degraded weather conditions.”



Expertise









## Development of expertise:

- Specific measurable performance goals
- Learning through exposure to challenging situations
- Stretching beyond 'comfort zone'
- Involves feedback and self-reflection
- Mental rehearsal, visualization, what-if scenarios
- Learning to manage stress / pressure (e.g. relaxation, breathing, self-talk, building confidence)



"it's about  
focusing on the  
process and then  
I know I'll achieve  
the outcome I  
want"  
(Kyle Chalmers)











# Underlying Competencies



# Core Competencies

Application of Procedures (APK)

Communication (COM)

Flight path management automation (FPA)

Flight path management manual (FPM)

Knowledge (KNO)

Leadership & teamwork (LTW)

Problem solving & decision-making (PSD)

Situation awareness (SAW)

Workload management (WLM)







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Principle 1:

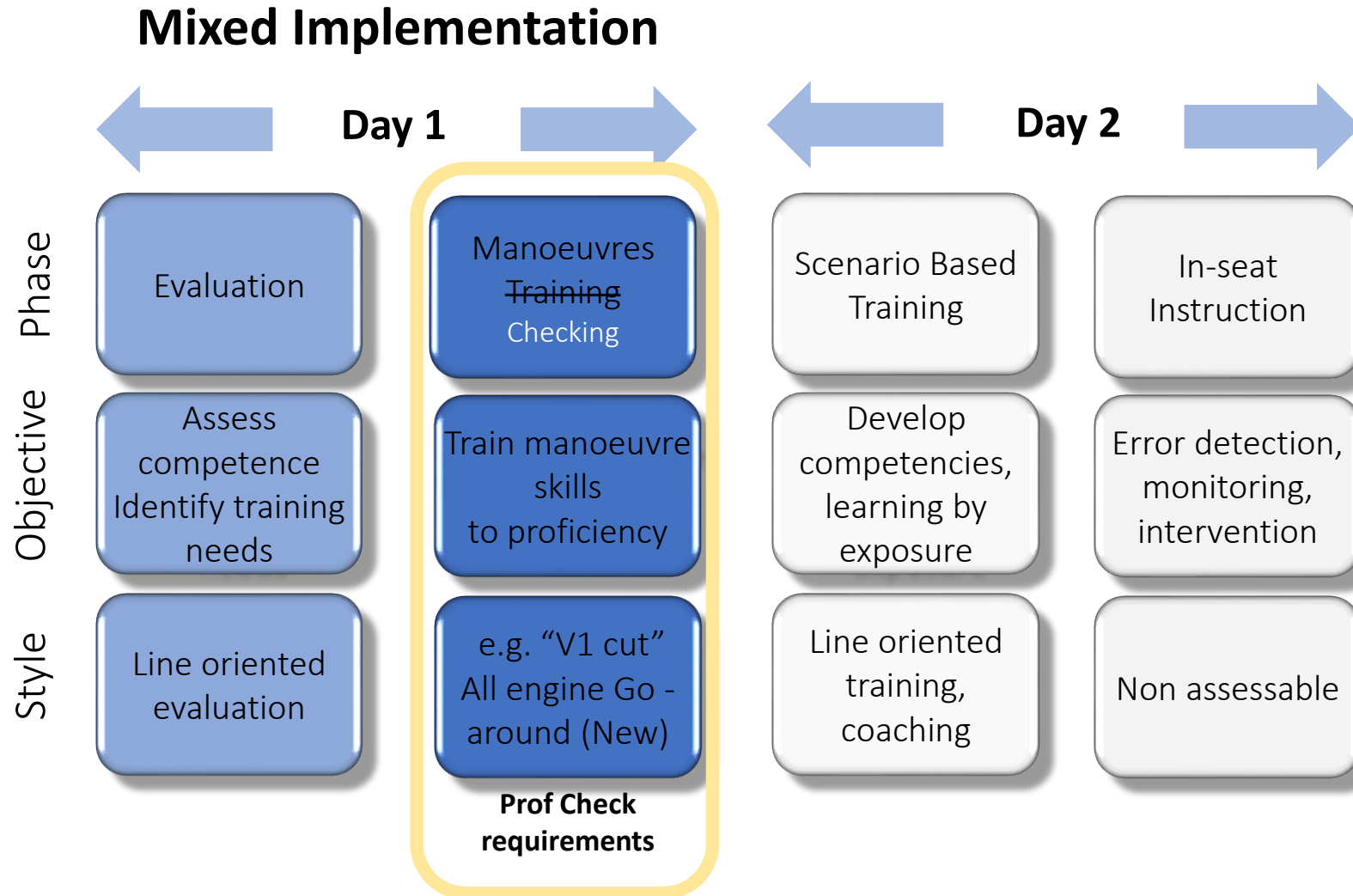
Training based on underlying  
core competencies

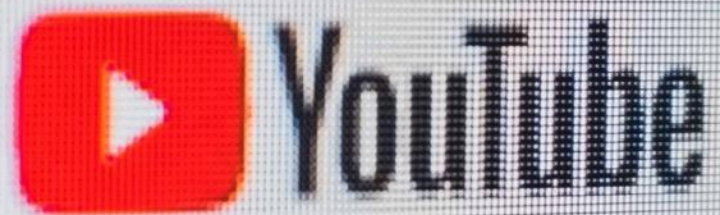
ONE SIZE

ONE SIZE FITS ALL



# EBT Program





Search

YouTube

jamie oliver poached egg



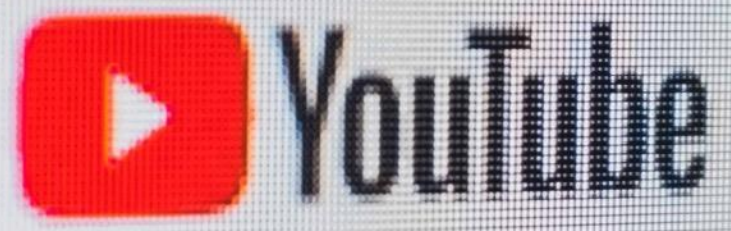
#FOODTUBE

How to Make Perfect Poached Eggs - 3 Ways | Jamie Oliver

7,086,985 views

70K 1.3K SHARE SAVE ...





Search



why do cats land on their feet

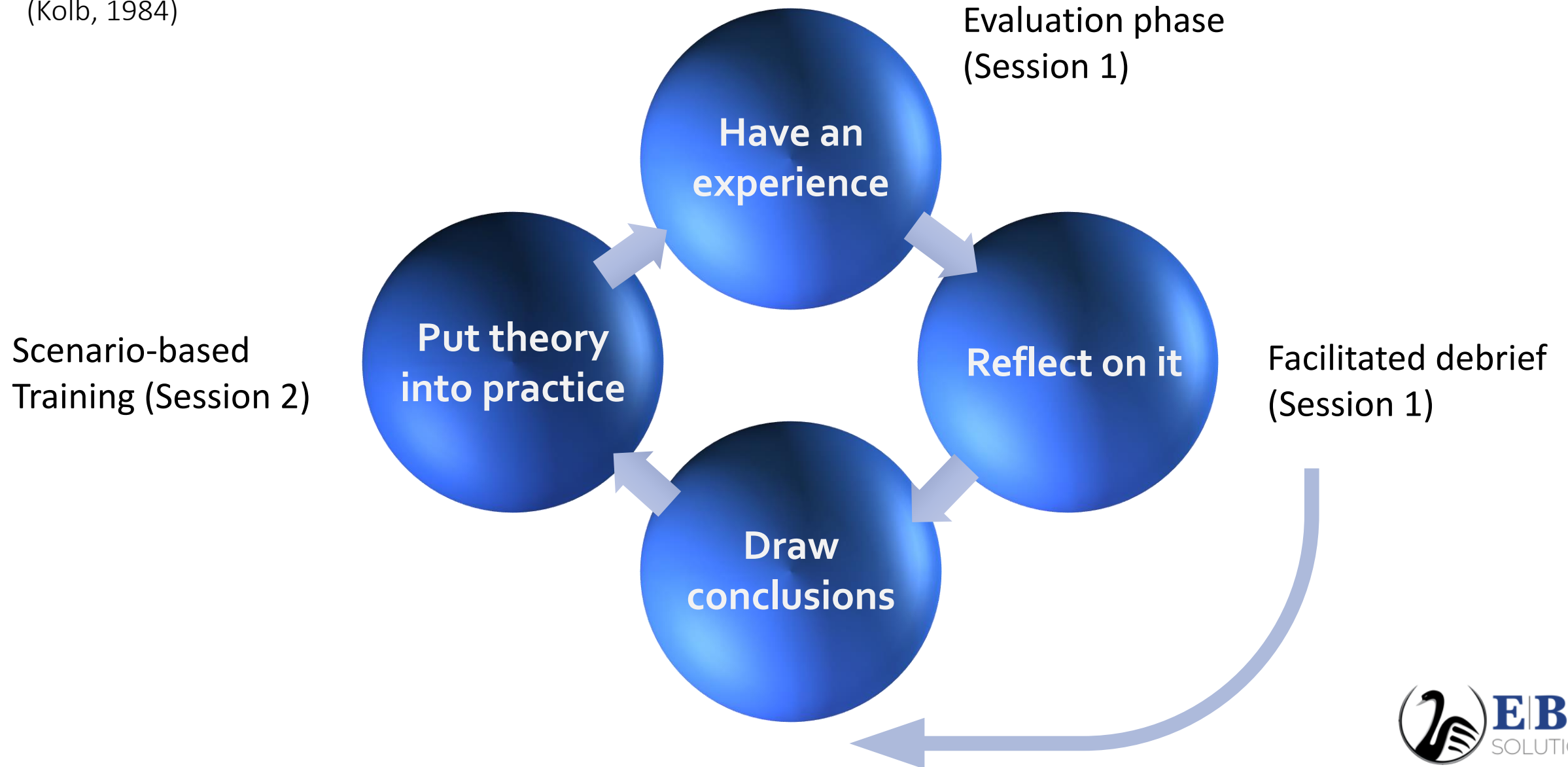


Why Do Cats Always Land On Their Feet?  
31,755 views

1.2K 13 SHARE SAVE ...

# Experiential Learning

(Kolb, 1984)





# “The Clickathon”



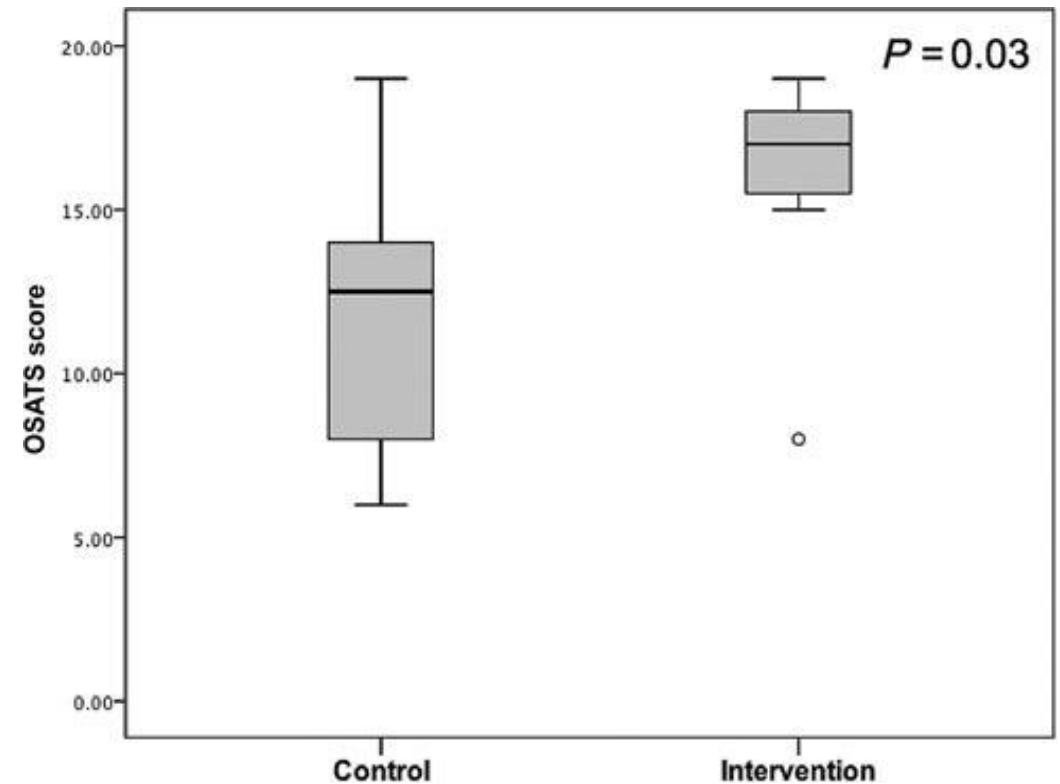


# Adaptive Learning Technology





# Training Based on Need



**FIGURE 3.** Postintervention OSATS score of the intervention and control groups. Horizontal bars, boxes, and whiskers represent the median, interquartile range, and range, respectively.

(Palter & Grantcharov, 2014)

A person wearing a white lab coat is standing in front of a control panel. The panel features several circular buttons and small digital screens displaying various colors like green, blue, and red. The person's arm and part of their torso are visible on the left side of the frame.

Principle 2:

Identifying and focusing on  
training needs



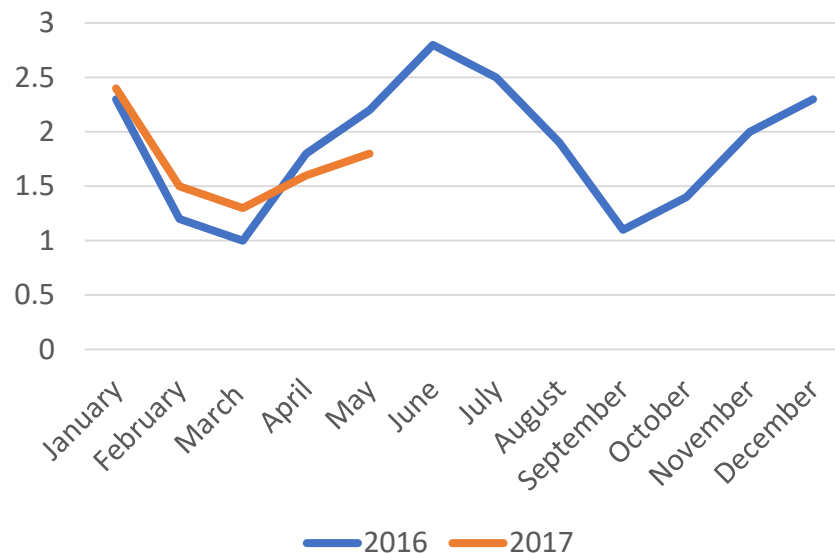
The image features a dark blue diagonal banner that runs from the top-left towards the bottom-right. On this banner, the words "Evidence /" are stacked above "Data", both in a white, sans-serif font. The background of the entire image is a blurred, out-of-focus photograph of a computer monitor. The screen displays a dense array of lines of code in various colors (green, blue, yellow, red) on a dark background, typical of a code editor or terminal window. The blurring effect gives a sense of motion or a wide-angle shot of a workspace.

# EBT Data Analyses

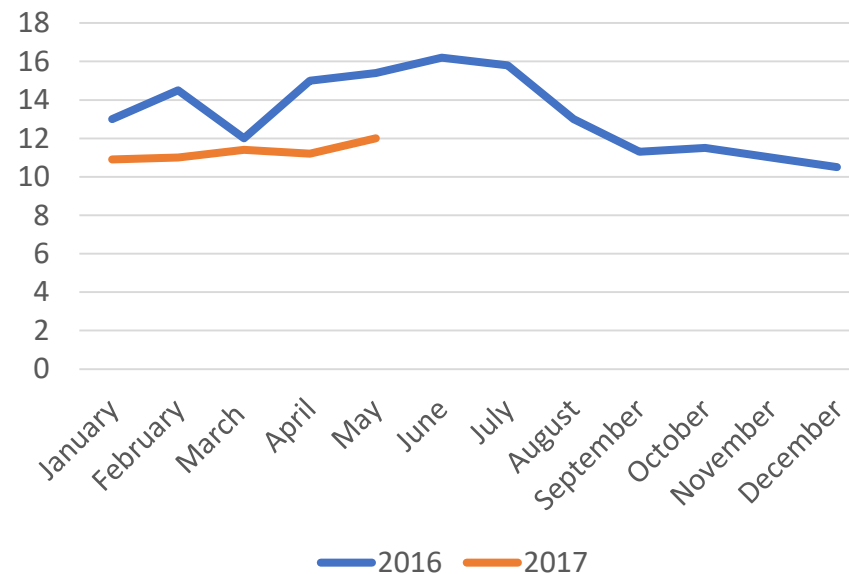




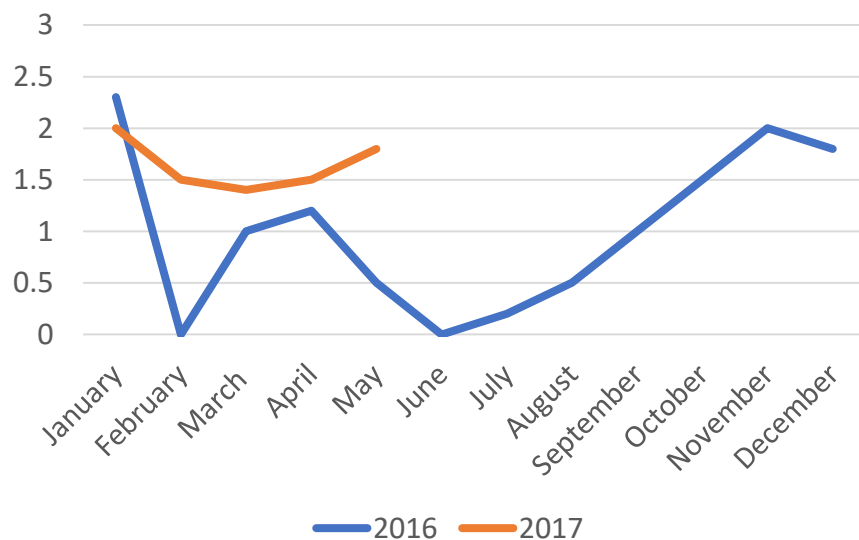
### EGPWS Events / 1000 dep



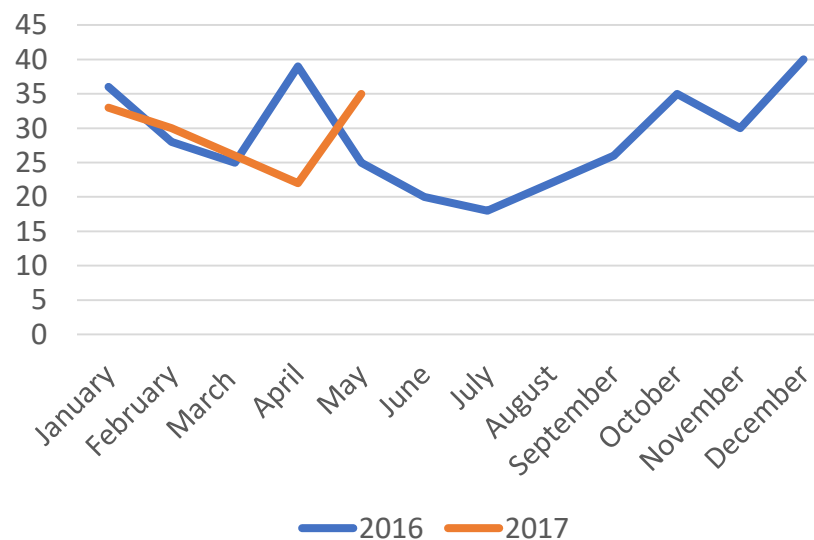
### Long Landings / 1000 dep



### Level Busts / 1000 dep



### High RoD / 1000 dep



# Evidence / Data









A person wearing a white lab coat is visible on the left side of the frame. The background is a server room with racks of equipment and glowing lights. A large blue rectangular box is overlaid on the right side of the image, containing white text.

Principle 3:

Examining the data / evidence



Do we know  
what is going  
right?



Aviation:  $1.4 \cdot 10^{-7}$  (Eurocontrol, 2013)







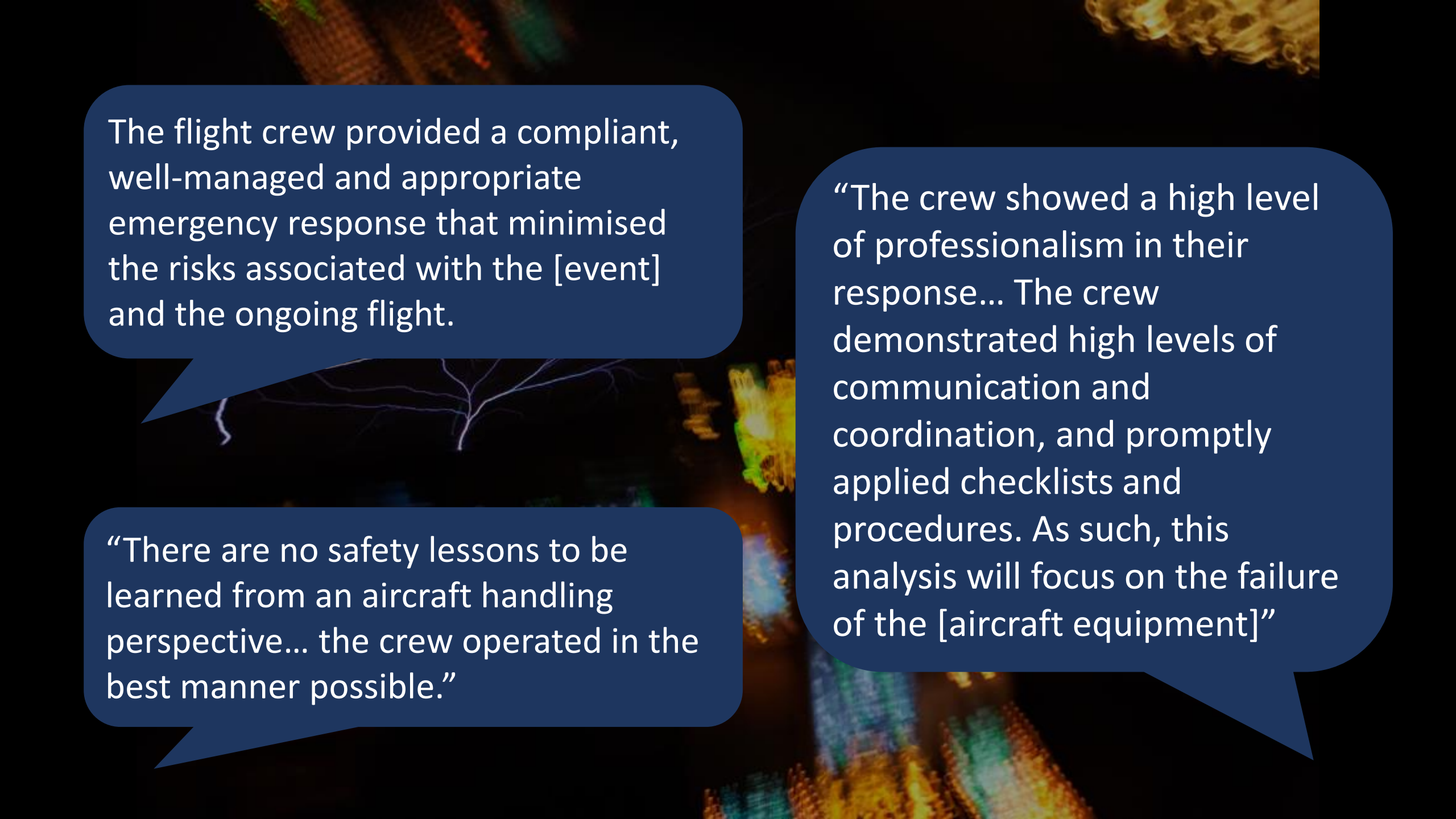
# Learning from the Positive





# A321 Frozen Angle of Attack probes, 2014





The flight crew provided a compliant, well-managed and appropriate emergency response that minimised the risks associated with the [event] and the ongoing flight.

“There are no safety lessons to be learned from an aircraft handling perspective... the crew operated in the best manner possible.”

“The crew showed a high level of professionalism in their response... The crew demonstrated high levels of communication and coordination, and promptly applied checklists and procedures. As such, this analysis will focus on the failure of the [aircraft equipment]”



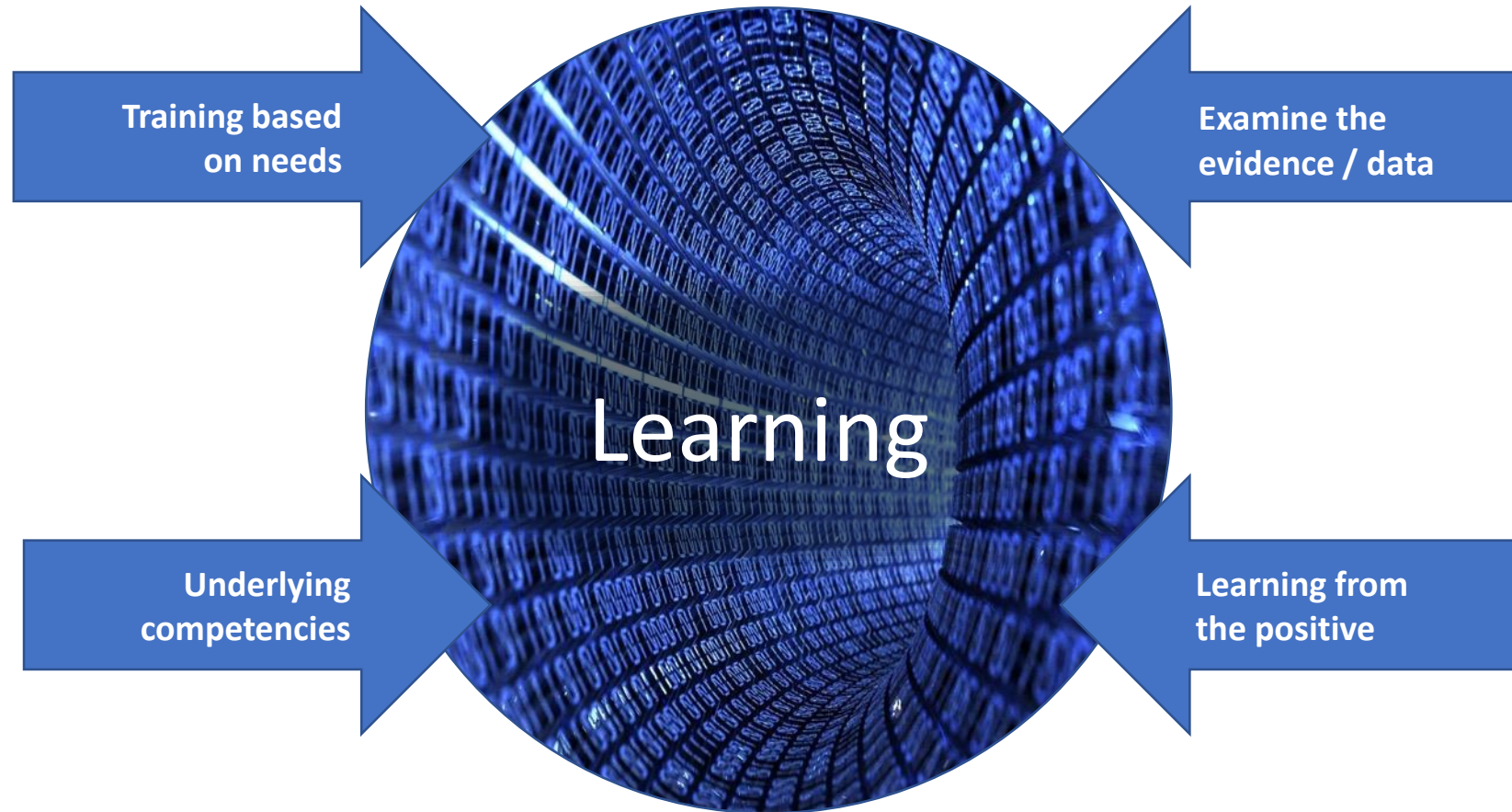


A person wearing a white lab coat is partially visible on the left side of the frame. The background is a server room with racks of equipment and colorful, blurred lights. A dark blue rectangular box is overlaid on the right side of the image, containing white text.

## Principle 4: Learning from the positive



# Developing Expertise







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