Flight Safety Foundation IASS 2023

The Future of Flight Training

Competency-Based Training & Assessment, new simulation technology and data-driven learning

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CAE

THE FUTURE OF FLIGHT TRAINING

Flight Safety Foundation believes the pilot career path we have today will not take us where we need to go tomorrow

It's time to take a data-driven, pragmatic approach:

Improve processes	Update screening processes and training for basic non-technical competencies that are usually obtained through experience (e.g., communication, analysis, problem solving, leadership and decision making).
Produce qualified, competent pilots	Renewed focus on the competency and quality of training to ensure training programs are developed and delivered to meet the safety standards of the industry.
Develop data-driven training programs	Continually updated competency- or evidence-based programs based on pilot task-level performance, maximizing the use of simulation, yet flexible enough to be customizable to air carrier operations.
Universally recognized standards	Development and sponsorship of a worldwide quality / performance criteria that is universally recognized.
Partnering with industry leaders	A partnership with the International Civil Aviation Organization (ICAO) and industry leaders to define rules, recommendations, guidelines and expected quality and performance required of flight academies.
Uncompromising standards	Developing proficiency / qualification standards that cannot be compromised.

Flight Safety Foundation Position Paper on Pilot Training & Competency (2018)

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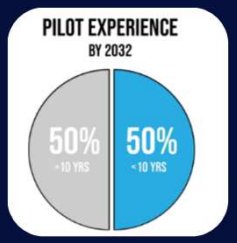
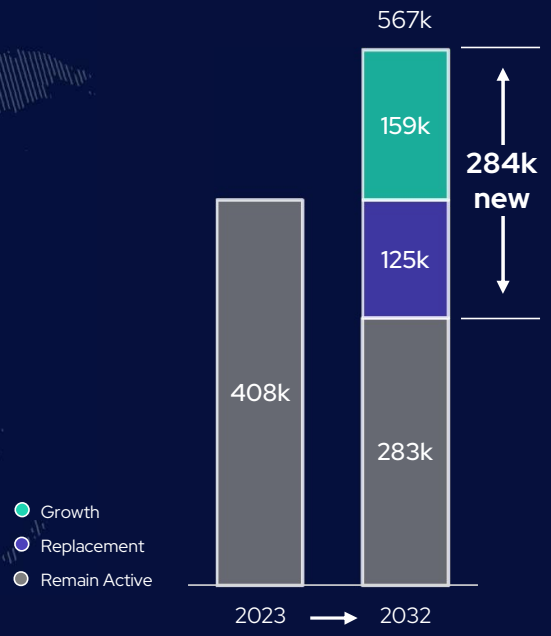
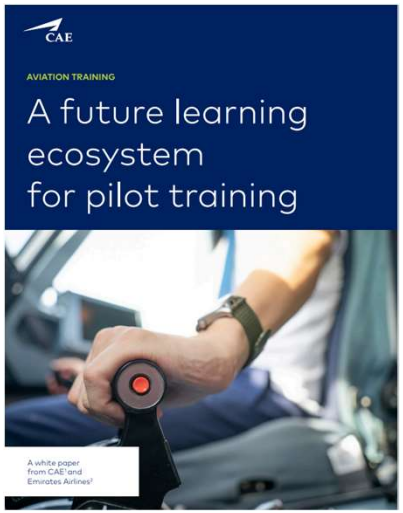
284,000 new Commercial & Business Aviation pilots needed over the next 10 years

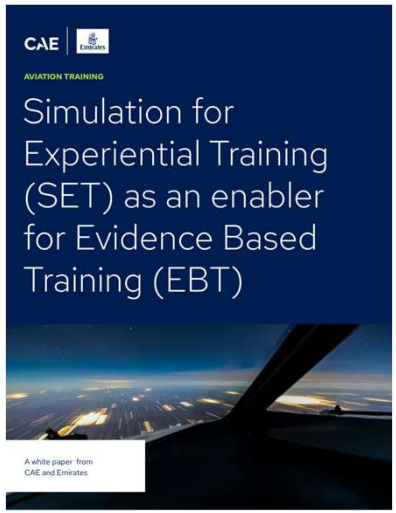


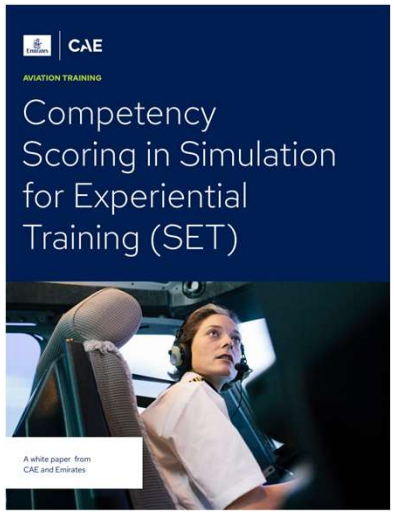


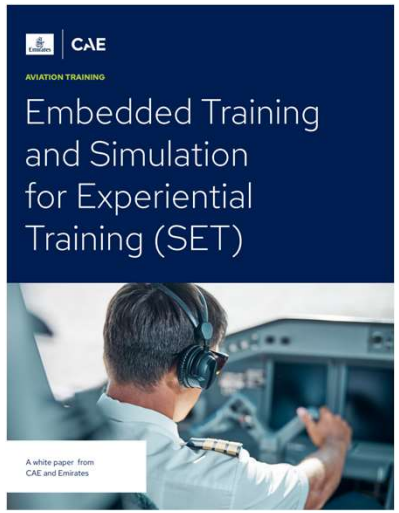
Pilot training in the future will be very different compared to pilot training today

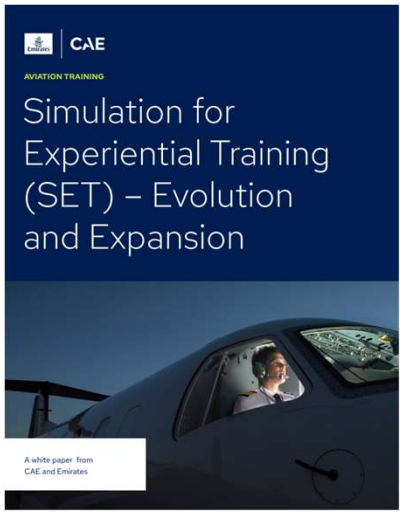
Developing new methods to illustrate and simulate situations for training and enhancement of training approaches and methods, while improving quality and reducing costs of the training itself.











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Competency-Based Training and Assessment (CBTA)

- It is impossible to foresee all plausible accident scenarios
- Modern aviation training methods can address this challenge
- Requires a move away from purely task-driven / scenario-based training
- Requires move towards development and assessment of key pilot behaviors

Key pilot behaviors organized into pilot competencies

- Application of Knowledge
- Flight Path Management using Automation
- Problem Solving and Decision Making
- Application of Procedures and Compliance with Regulations
- Flight Path Management Manual Control
- Situational Awareness and Management of Information
- Communication
- Leadership and Teamwork
- Workload Management

Traditional Task-Based Training vs. CBTA

Task-Based Training	CBTA
• Training required to get a certificate.	• Training required to perform the job on Day 1.
• Focus on technical and procedural elements: manual handling, automation management, knowledge and application of procedures.	• Focus on **all** competencies required to do the job in operations (i.e., equal focus on communication, leadership/teamwork, situation awareness, workload management and decision making).
• Success is measured by performing fixed tasks in isolation, within simple flight path deviation tolerance limits.	• Success is measured by the ability to demonstrate behaviours required for safety, in complex immersive scenarios.
• Focus is on the outcome only (i.e., no exceedances).	• Equal Focus on Process (behaviour) and Outcome (exceedances).
• Focus is on preparing for the known (expected).	• Focus is on preparing for both the known **and** the unforeseen.
• Focus on Error Management.	• Focus is on Threat and Error Management.
• -	• Focus is on preparing to deal with Startle and Surprise.
• -	• Focus is on developing Resilience.
• Limited requirements on collection and analysis of data.	• Training and Operational data analysis and comparison for efficacy measurement, are mandatory.

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Immersive, high fidelity, mixed reality flight simulation training devices

Using Mixed Reality (MR) technology to combine physical reality and digital environments to enable interactions with the real world amongst virtual objects.

CAE 700MXR

Delivering high-fidelity, physics-based simulation with:

- Enhanced reality, high-precision head & hand tracking
- Accurate, tactile feel and physical experience of the aircraft's flight controls and flight instrument displays
- 360° Field-of-View visuals
- A compact mini-motion platform

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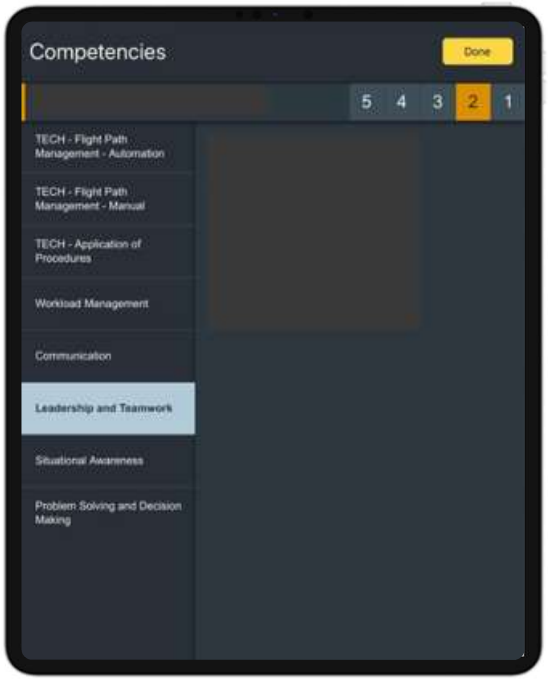
Training data – Insights into pilot performance



Correlating simulator telemetry data with instructor eGrading

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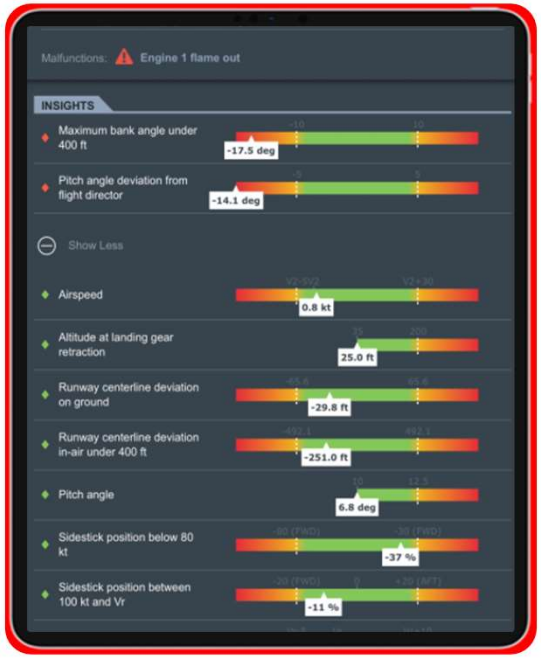
Using simulator telemetry date to support instructor debriefing

ILS Approach

Helps instructors to detect parameter exceedances which could be challenging to monitor from the instructor seat.

Supports the instructor in providing effective debrief to pilots based on objective data.

Facilitates debrief by allowing focus on the positive while also looking for root causes for further improvement.



Engine Failure after V1

Identifying root causes for good performance and areas of improvement

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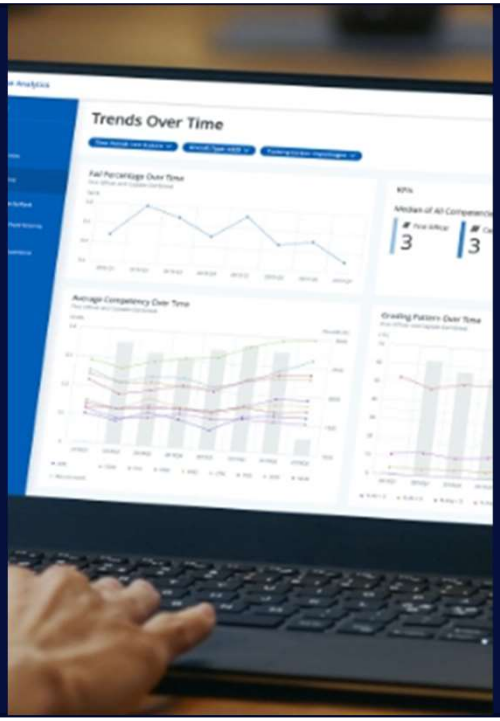
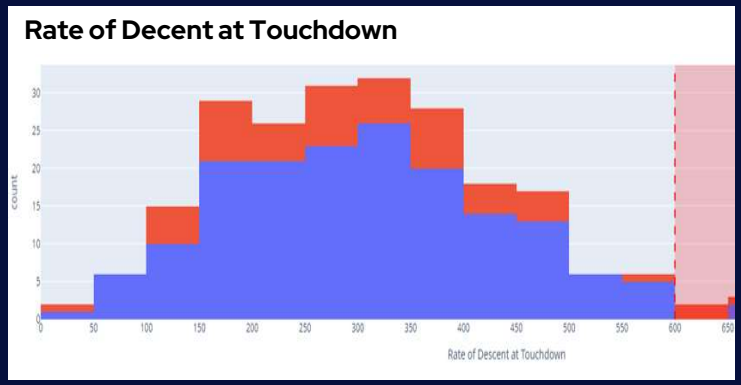
Drive continuous training program development with data trends and analysis



1. Tailor training content based on training data trends.

2. Understand how a particular fleet or experience level of pilots react in abnormal situations.



3. Provide evidence for good performance and mastery of specific competencies, as well as identifying where performance could be improved.

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Pairing biometrics + telemetry data for additional insights

General Pilot Monitoring behaviour

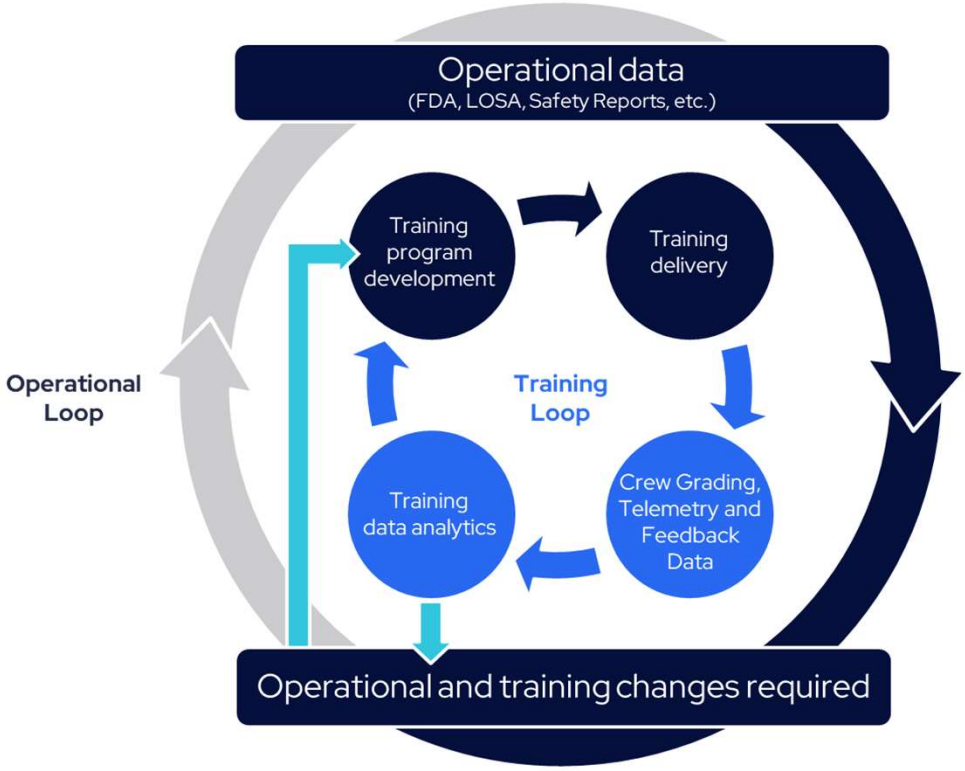
General scan patterns

Gaze transition on landing (from in to out)

Flare behaviour

Cognitive workload

Integrating operational data with training data to design effective training programs



FDA: Flight Data Analysis
LOSA: Line Operational Safety Audit

Thank you!