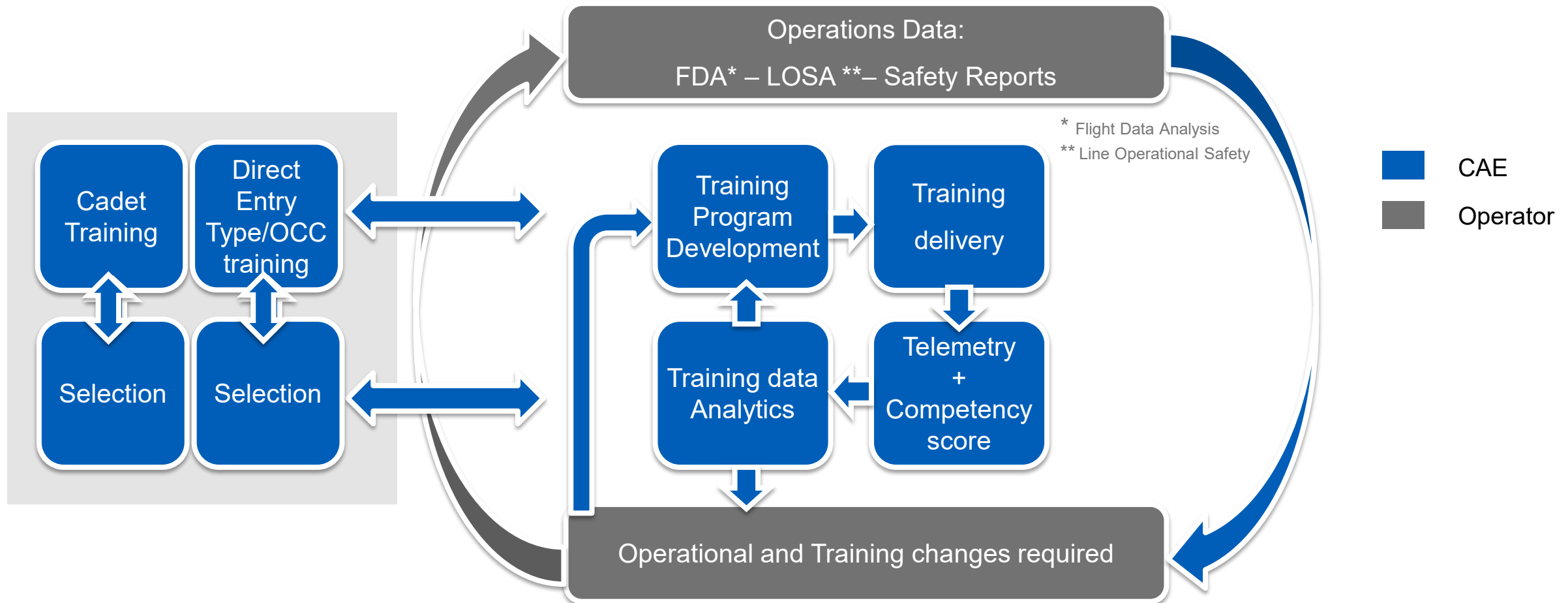# A Data driven approach to Instructor Training and Standardisation

Chris Ranganathan
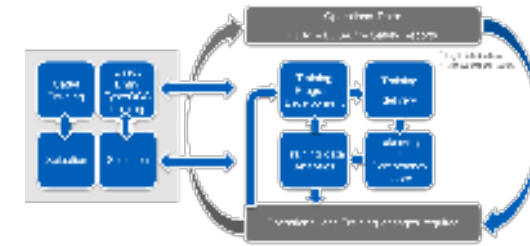
Chief Learning Officer, Civil

Model of an Integrated Safety Management System (ISMS)

An ATO can provide many of these services at scale and provide benchmark data

Going beyond the generation of aircraft…..

70% ✈

Type/Generation of aircraft

- Regs./Task Analysis/EBT data report
  - Operational environment
  - Safety investigations
  - Occurrence reports
  - OFDM
  - LOSA
  - Crew surveys
  - Academic & industry literature
  - In-house research

20%

Generation of pilots

- Demographic learning patterns
  - Experience on type
  - Experience in seat
  - Experience in total

10%

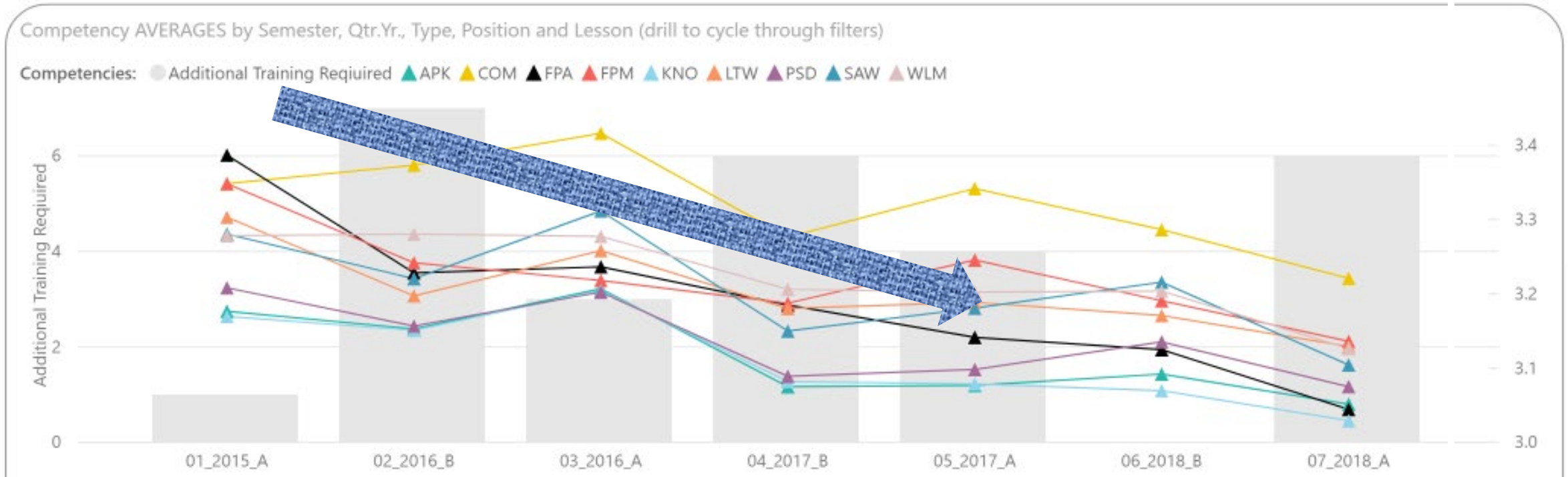### Individual pilots

- Pilot Learning history

Using data analytics to design effective training

Training analytics – Sample Operator Data

Recurrent Simulator Overall Grade - Overview (IE Grades removed)

Competency Analysis

Competency AVERAGES by Semester, Qtr.Yr., Type, Position and Lesson (drill to cycle through filters)

Competencies: ● Additional Training Reqiured ▲ APK ▲ COM ▲ FPA ▲ FPM ▲ KNO ▲ LTW ▲ PSD ▲ SAW ▲ WLM

How are all my pilots performing over time?

Training analytics – Sample Operator Data
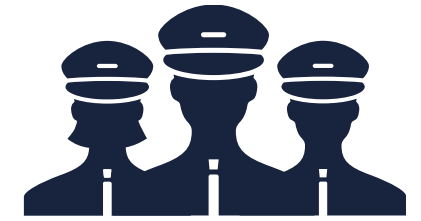
Competency AVERAGES by Total Flying Hours

Competencies: ⬤ % Additional Training Required ▲APK ▲COM ▲FPA ▲FPM ▲KNO ▲LTW ▲PSD ▲SAW ▲WLM ▲ALL
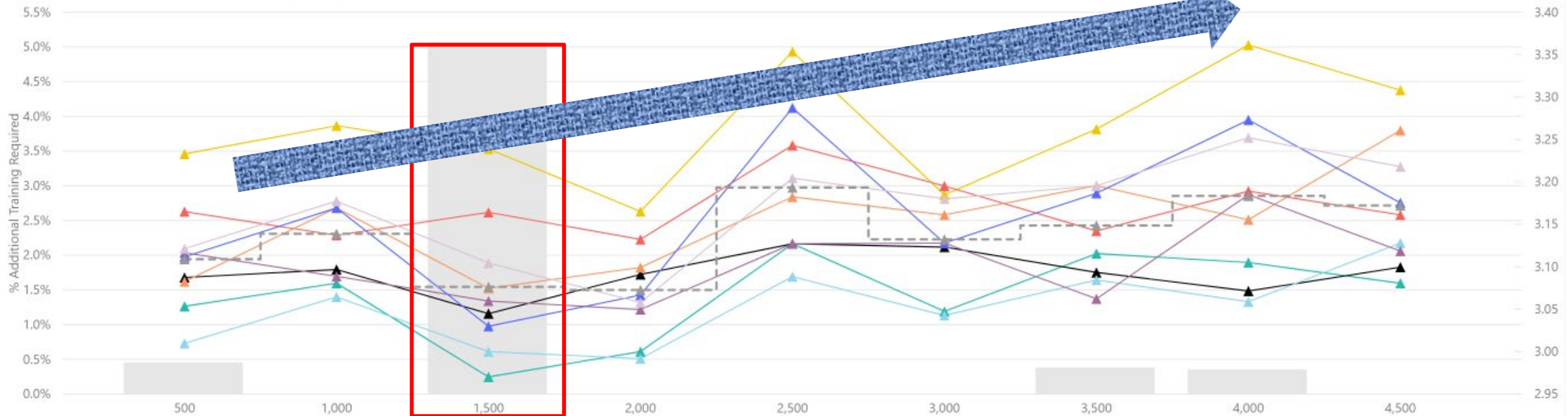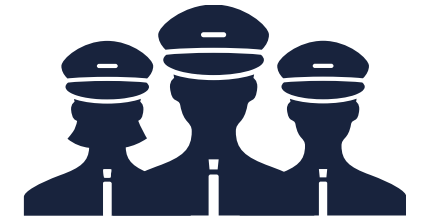
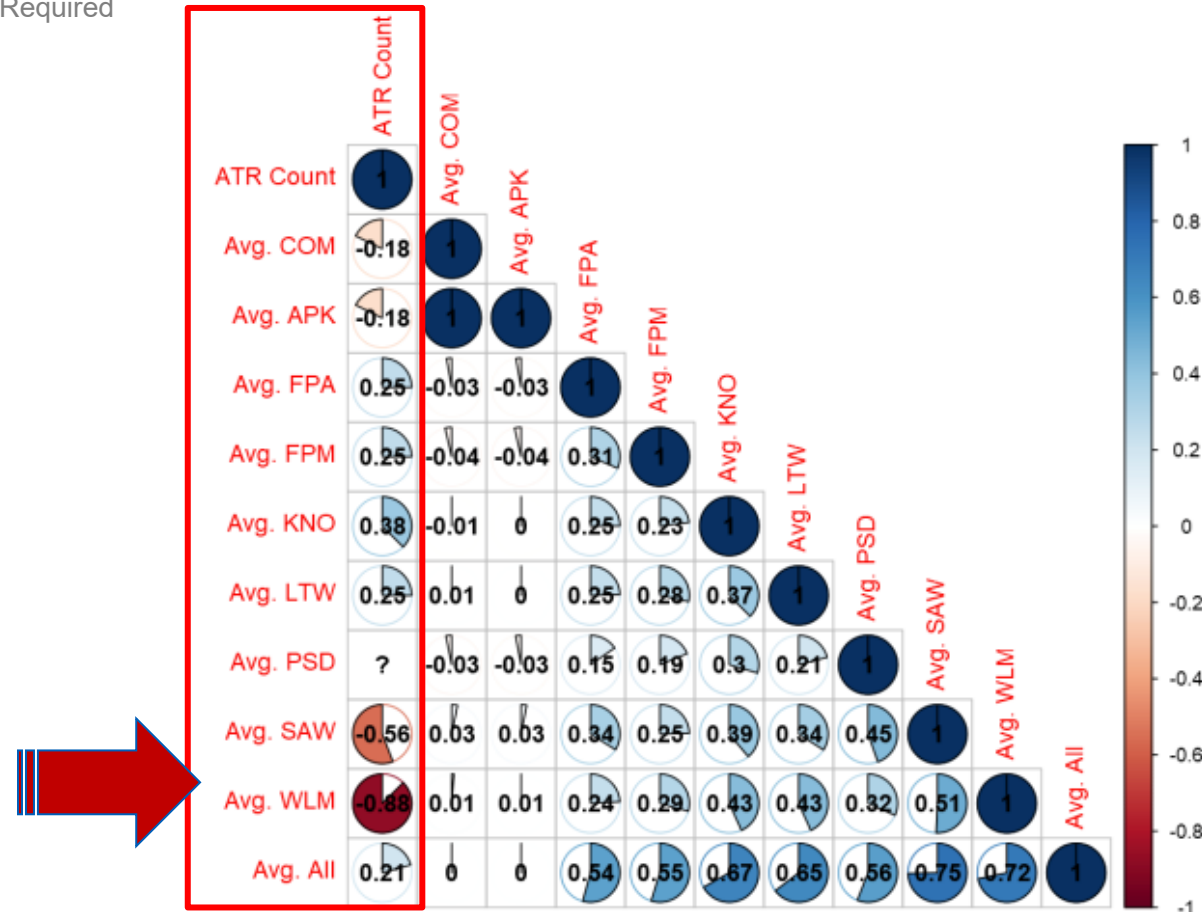Recurrent Simulator Overall Grade - By Experience (IE Grades removed)

How are my pilots performing as they gain more experience?

Training analytics – Sample Operator Data

ATR Count = Count of Additional Training Required

Which <u>competencies</u> should we focus on for a particular <u>pilot demographic</u>? (ex. <1500hrs)

Going beyond the generation of aircraft…

Generation of aircraft   Generation of pilots   Individual pilots

Combined Wordmap (Top 10 PIs)

Competency	04_2017_B	05_2017_A	06_2017_B	07_2017_A
COM				
Conveys messages and information clearly, accurately, timely and adequately		20 %	12 %	8 %
Listens actively, patiently and demonstrates understanding when receiving information			38 %	8 %
Confirms that the recipient correctly understands important information			12 %	5 %
Is receptive to other people's views and is willing to compromise		20 %	6 %	5 %
PSD				
Uses appropriate, agreed and timely decision-making processes	14 %		12 %	13 % 11 %
Applies essential and desirable criteria and prioritizes	14 %		6 %	5 %
Improvises appropriately when faced with unforeseen circumstances to achieve the safest outcome	14 %		6 %	5 %
WLM				
Manages interruptions, distractions, variations and failures effectively			6 %	13 % 5 %
Manages time efficiently when carrying out tasks	14 %			13 % 5 %
Plans, Prepares, prioritizes and schedules tasks effectively			6 %	13 % 5 %
APK				
Follows SOP's unless a higher degree of safety dictates otherwise	14 %	20 %		13 % 8 %
Correctly uses aircraft systems, controls and instruments	14 %	20 %		5 %
SAW				
Is aware of the state of the aircraft and its systems.	14 %		12 %	8 %
Develops "what if" scenarios and plans for contingencies.			12 %	5 %
LTW				
Anticipates other crew members' needs and carries out instructions when directed		20 %	12 %	8 %

What scenarios are best suited for this particular demographic or individual's development?

- Scenario #1 → 18%
- **Scenario #2 → 35%**
- Scenario #3 → 24%
- Scenario #4 → 11%
- Scenario #5 → 8%

Which _behaviours_ should we focus on for a _particular pilot or a demographic_ ? How do we train these?

CAE Inc. Proprietary Information and/or Confidential

Verifying the accuracy of instructor grades

- Item 5.1 EASA Guidance for
  Mixed EBT Implementation

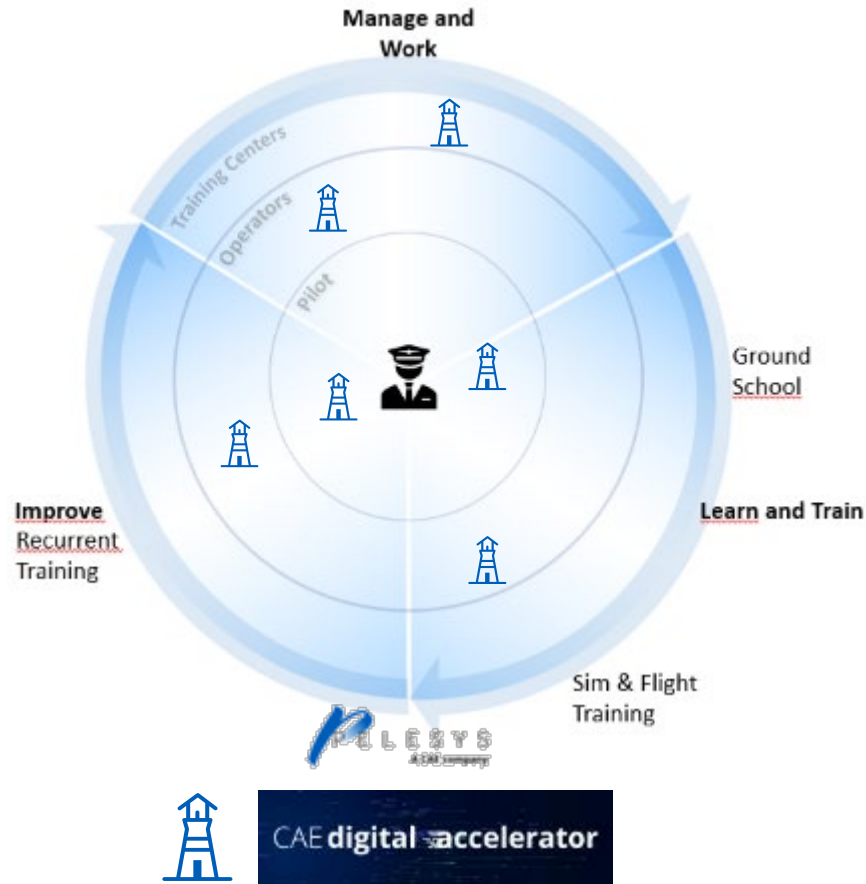[… The competent authority is invited to **verify if the operator has a system (including procedures) to ensure the accuracy of the grading system,** this system provides a reasonable root cause analysis when there is a mismatch, and sensible corrected actions are established in such case.

Can data science and technology augment our data driven decisions?

CAE

Roadmap to CAE's Digital Ecosystem

1 Digitize operations

Manage and Work

Training Centers

Operators

Pilot

Ground School

Learn and Train

Improve Recurrent Training

Sim & Flight Training

PELESYS

CAE digital accelerator

2 Connect data

CAERise™
TRAINING SYSTEM
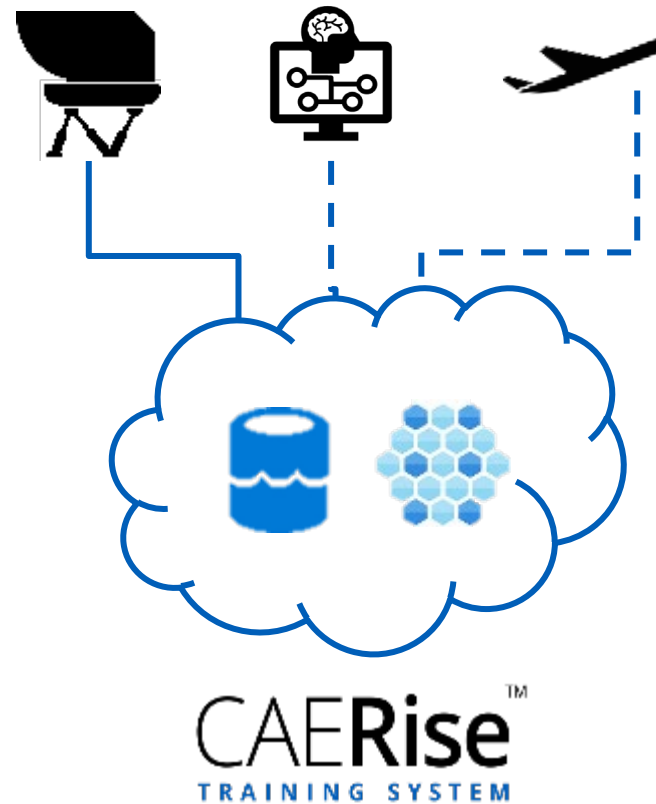
3 Elevate ecosystem

Optimized operation
- Reduced administration
- Flight / training schedule optimization

Advanced learning
- Interactive
- Adaptive
- Micro
- Immersive

Integrated training
- Competency based
- Advanced AI analytics
- Integrated safety systems
- Industry benchmarking

CAE Rise™ training system

CAERise™
TRAINING SYSTEM

What is CAE Rise?

- Real–time Insights that assist Standardised Evaluation

- Built in SOP references

- De-briefing tool

- Training Data Analytics

All enabled through a simple digital delivery platform

Aid to instructor standardisation – allows the instructor to focus on crew behaviour

What is CAE Rise?

- Real–time Insights that assist Standardised Evaluation

- Built in SOP references
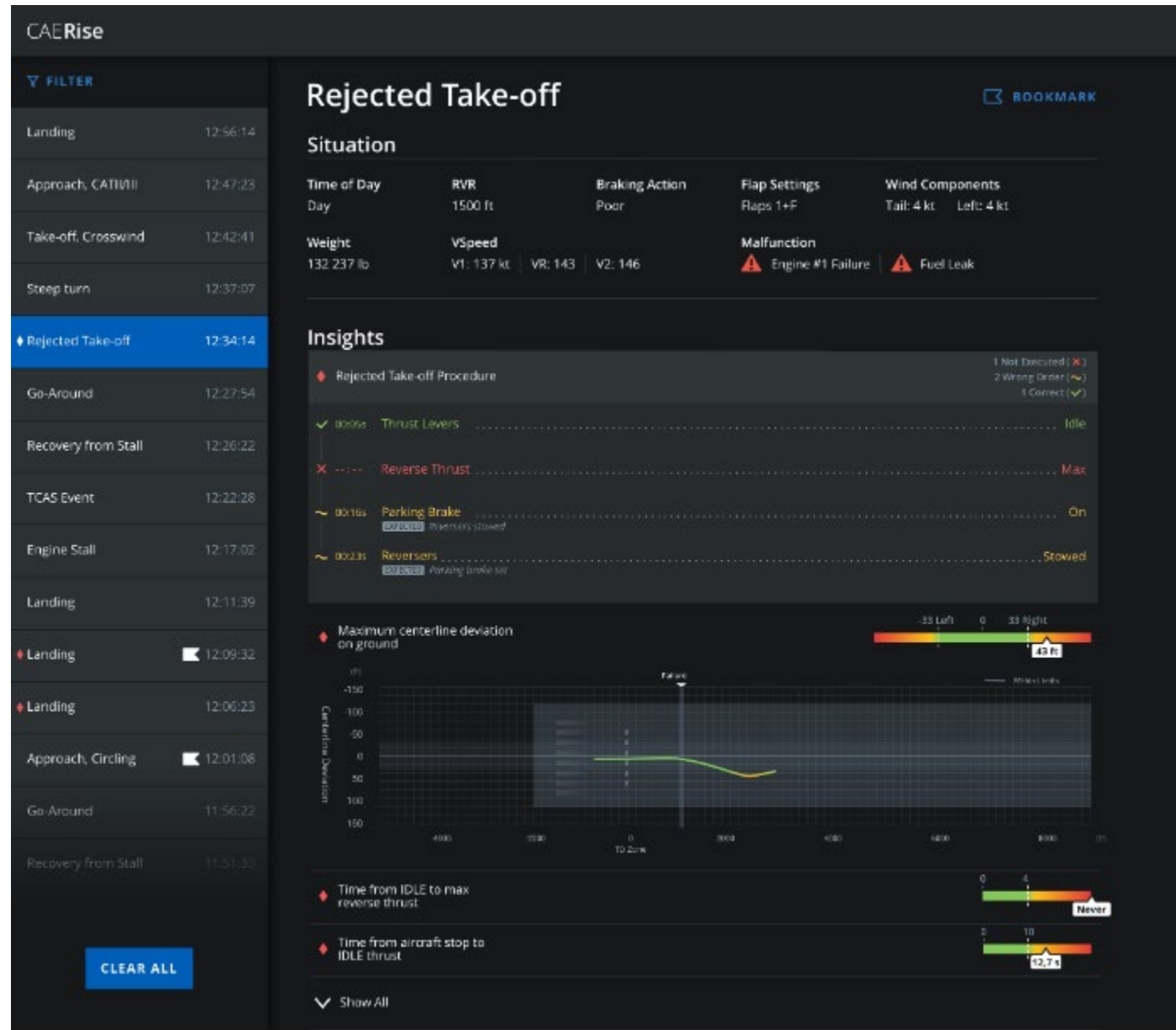
- De-briefing tool

- Training Data Analytics

Aid to assessing Technical competencies, Application of Procedures, Flight Path Management
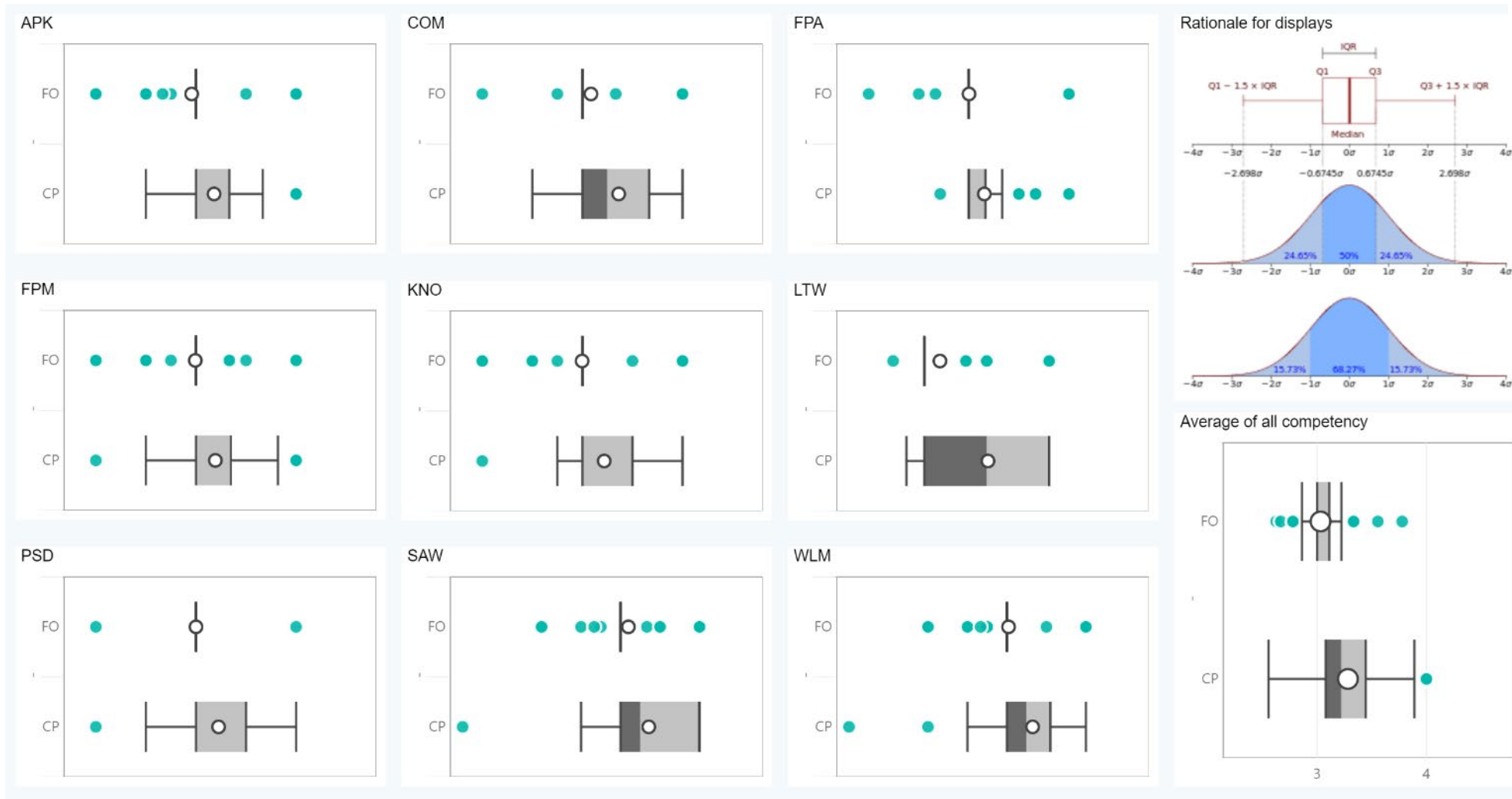
Do we need to focus our IRR recurrent training on a particular competency?

Training analytics – Looking for biases

Grade distribution over time

CAE Inc. Proprietary Information and/or Confidential
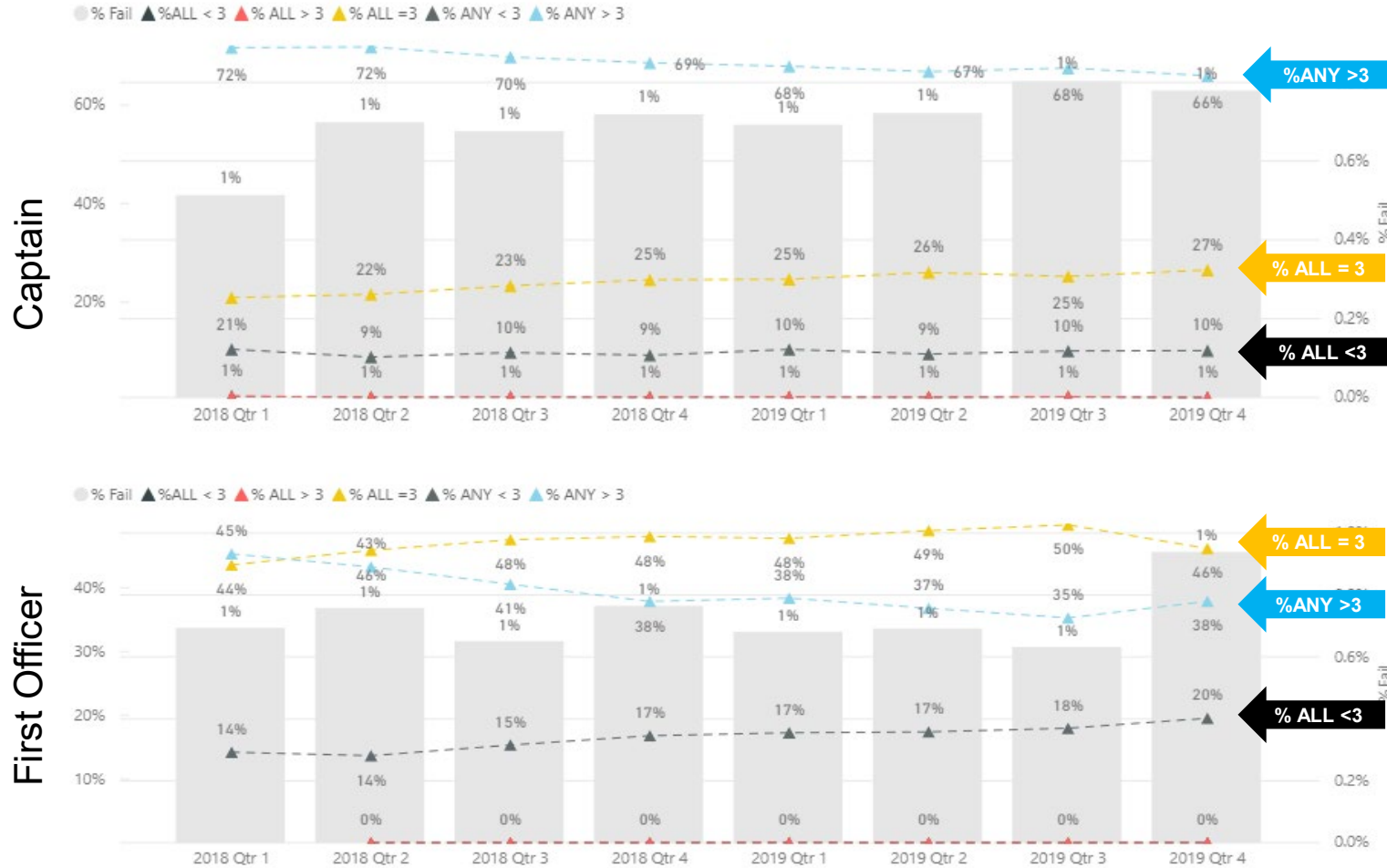
Do we need to focus our IRR recurrent training on a particular competency?

Can technology augment our data driven decisions?
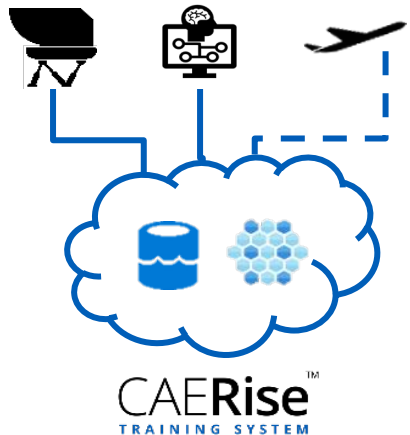
Centerline Deviation at Take-off

Take-off - Engine failure between V1 and V2

41% **19% had less than 18 meters and more than 10 meters of deviation**

2%

Centerline Deviation (m)

Mean: 6.8m
More than 5 meters: 62%
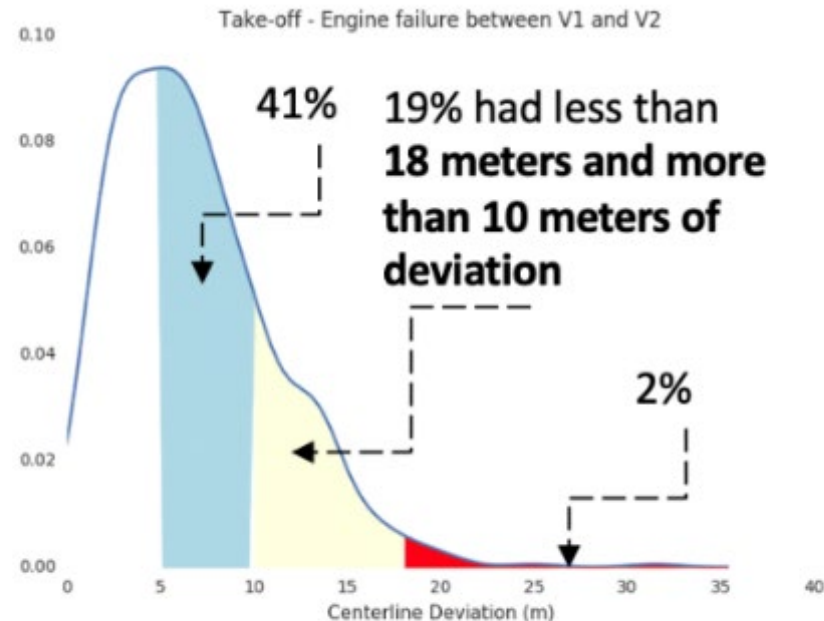
Deviation Range (m)	Repeat rate (%)
0 - 5	0.4%
5 -- 10	5.9%
10 -- 18	44.2%
>18	91.8%

CAERise™
TRAINING SYSTEM

Comparison from independent sources can provide increased confidence of grading data quality

Evaluator grades vs exceedance/error rates

	IE grade of 1 or 2	Exceedance/Error rate
Take-off - Engine failure between V1 and V2	22,8%	46,9%
Take-off - Engine fire between V1 and V2	18,3%	33,6%
Reactive Windshear	13,1%	47,1%
Landing - One engine inoperative	8,2%	19,3%
Go-around - At minima, One engine inoperative	7,7%	7,8%
Go-around - LVO	6,5%	18,1%
Emergency Evacuation	5,6%	7,4%
Take-off - Engine Fire below V1	4,4%	11,1%
VOR approach	4,2%	2,5%
Approach - ILS, Manually, With FD, One engine…	3,9%	8,8%
Go-around	3,5%	12,7%
Take-off - LVO, RVR 150-400m	2,8%	11,0%
Landing	2,6%	16,9%
Landing - LVO	1,9%	8,5%
TCAS Event	1,6%	20,2%
Approach - RNAV	0,9%	14,2%
Approach - VOR / DME	0,6%	11,9%
Take-off	0,3%	6,2%
Approach - ILS, Manually, With FD	0,3%	5,6%
Approach - ILS, LVO, CAT II	0,0%	1,0%

CAE Rise ™
TRAINING SYSTEM

Use this data source wisely. A just culture is a key enabler for better IRR

CAE's training philosophy
Connecting data across the training ecosystem to go beyond certification

Serving the needs of individual pilots
Using learning science to adapt and personnalize training curriculums to the needs of every pilot

Empowering instructors to better serve students
Equipping instructors to provide accurate assessments of their students and augment the learning experience

Providing heads of training with the insights & benchmarking
Using selection, eLearning, simulator and airline safety data to enhance training effectiveness and through an integrated Safety Management Systems

Challenges

- Data use, acquisition & ownership

- Data integrity, security, privacy & compliance

A strong Operator – ATO partnership to ensure a sustainable, learner centric, data-driven recovery

CAE

Our vision is to be the recognized global
training partner of choice
to enhance safety, efficiency and readiness.