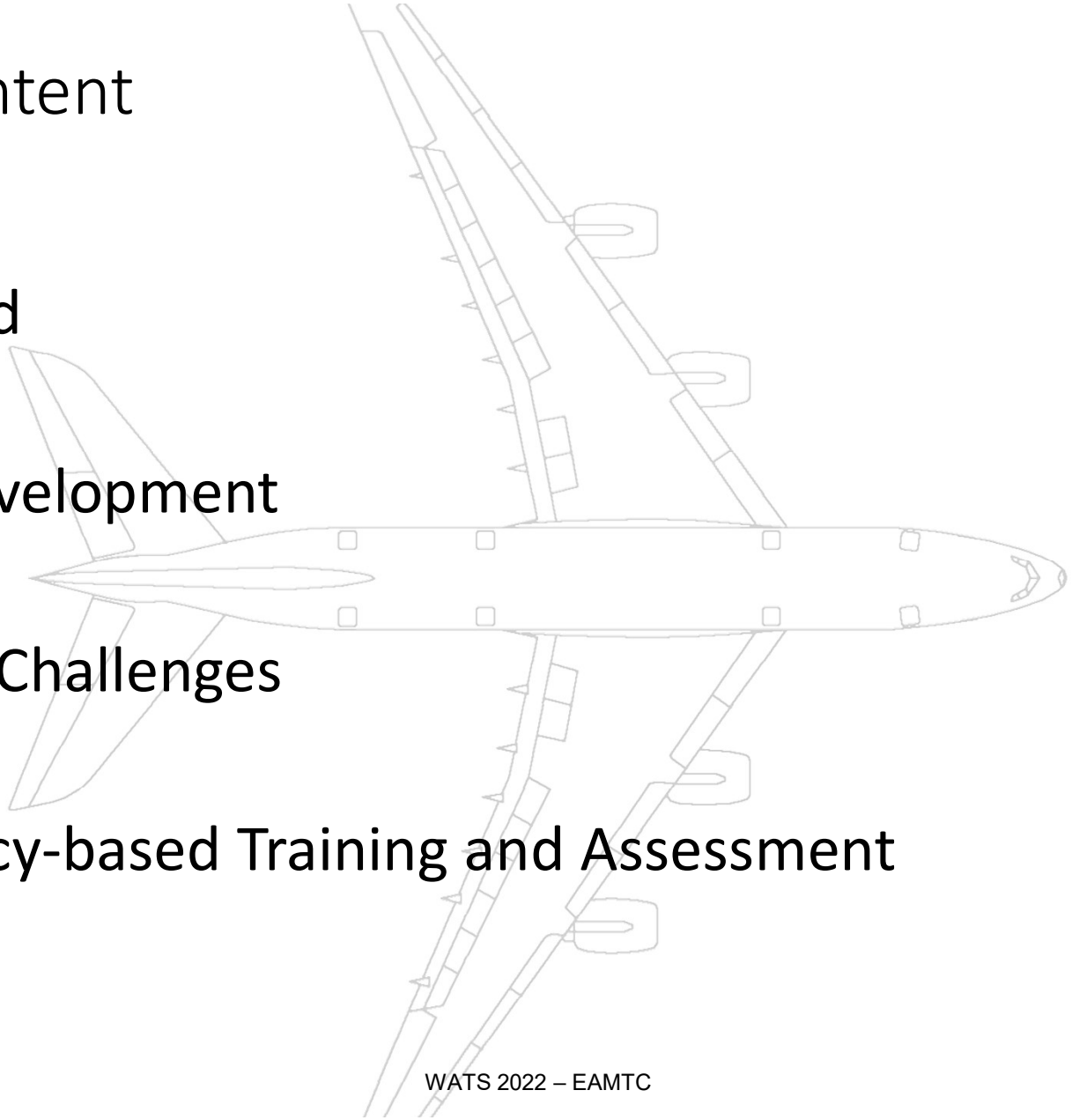
Competency-based Maintenance Training and Assessment - A European Perspective -

European Aviation
Maintenance Training Committee

Working together in the maintenance training world

Hans R. Mayer
President

Content



1. Background
2. Current development
3. Facing the Challenges
4. Competency-based Training and Assessment

1. Background

History and who we are

1980s – Aviation Maintenance Training became an increasing important issue across companies in Europe

- Different national licensing systems faced JAA and on to EASA

2007 – Growing number of participants established the the **EAMTC –**

European **A**viation **M**aintenance **T**raining **C**ommittee

A pan-”EASA world” non-profit industry Association

- Culturally diverse Members share mutual goals dedicated to Maintenance Training

1. Background

Member

1. Background

Mission Statement

Shaping the future of aviation maintenance training

EAMTC is

- **International, independent, self-sustaining**
- Committed to **promoting safety through training** and **best practice**
- **Representing** towards EASA, ICAO, Authorities and other industry bodies
- **Offering solutions** and sharing them between members and regulatory bodies via Guidelines and Recommendation publications
- **Providing a networking** environment for its members and authorities to share experiences and interact with other training professionals

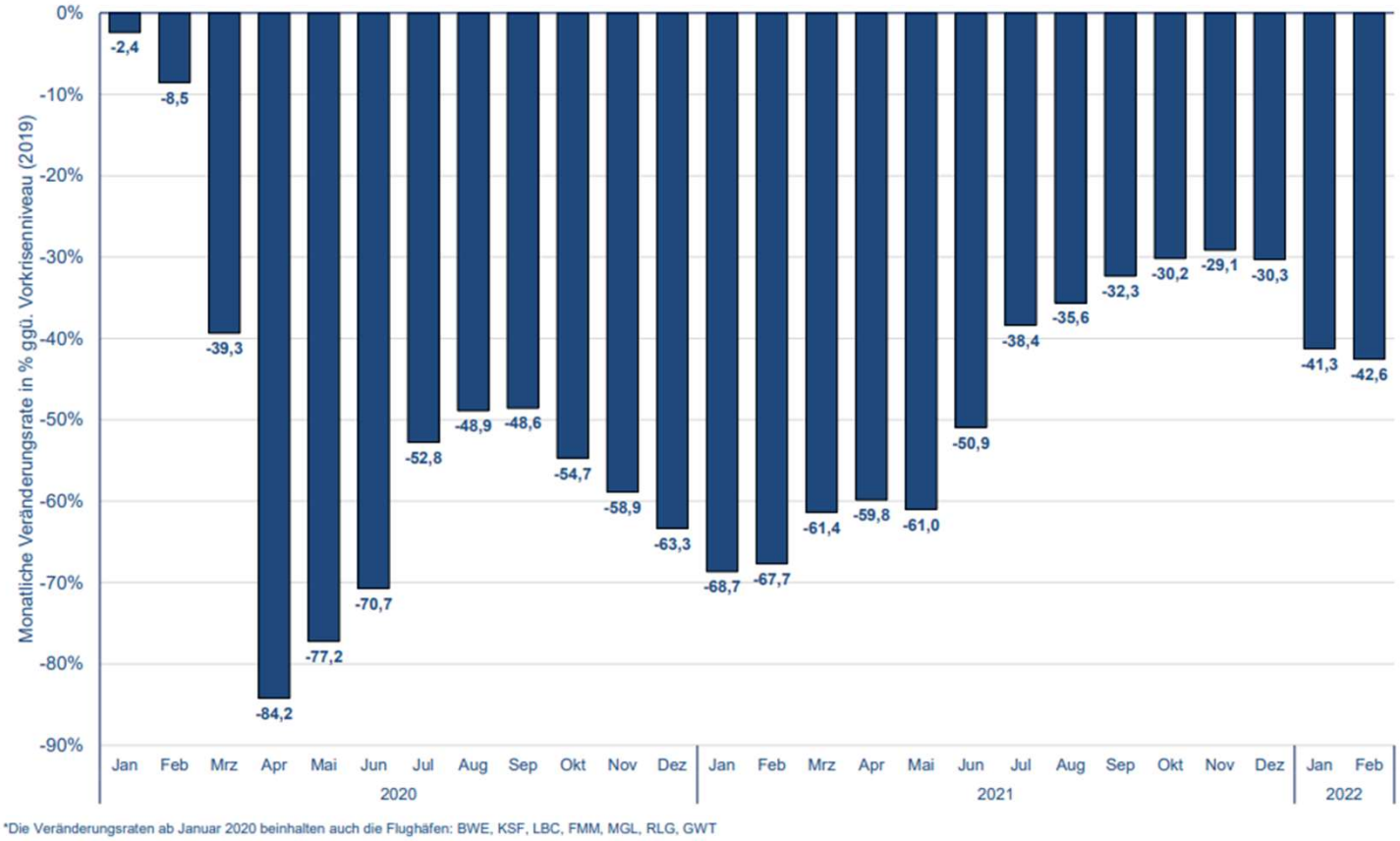
1. Background

Recent Situation in Aviation

- Pandemic effects – European Risk Portfolio
- Cost Pressure
- Technology development

1. Background

Aircraft movements January 2020-Febrary 2022 (total)

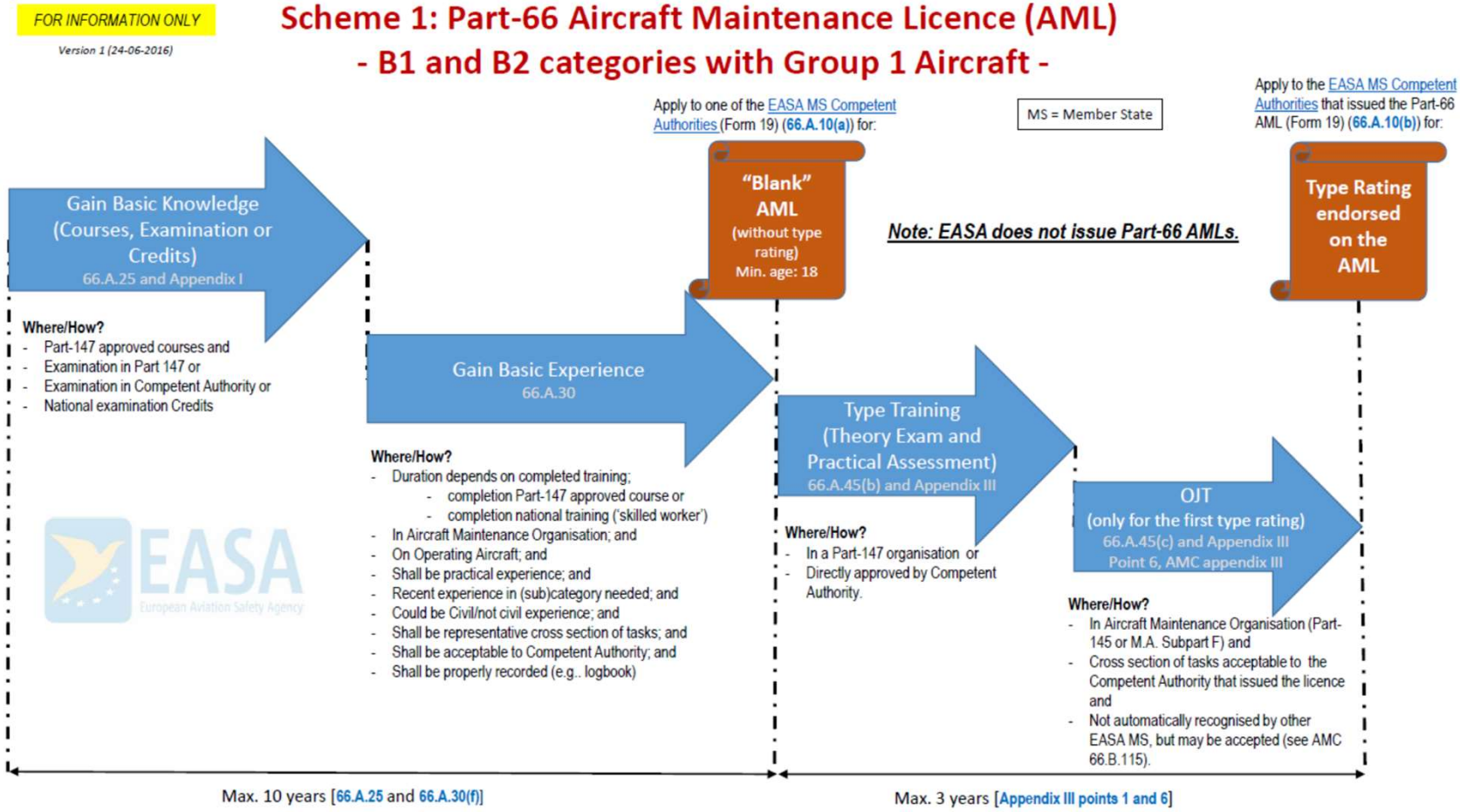


Source: German Airports Association ADV (Arbeitsgemeinschaft Deutscher Verkehrsflughäfen)

Berlin, 04.04.2022

1. Background

EASA Qualification Path



1. Background

Aircraft Technician Self-perception

Successfully qualified

highly competent

ready to perform to the

highest standard

1. Background

Partnership for Safety

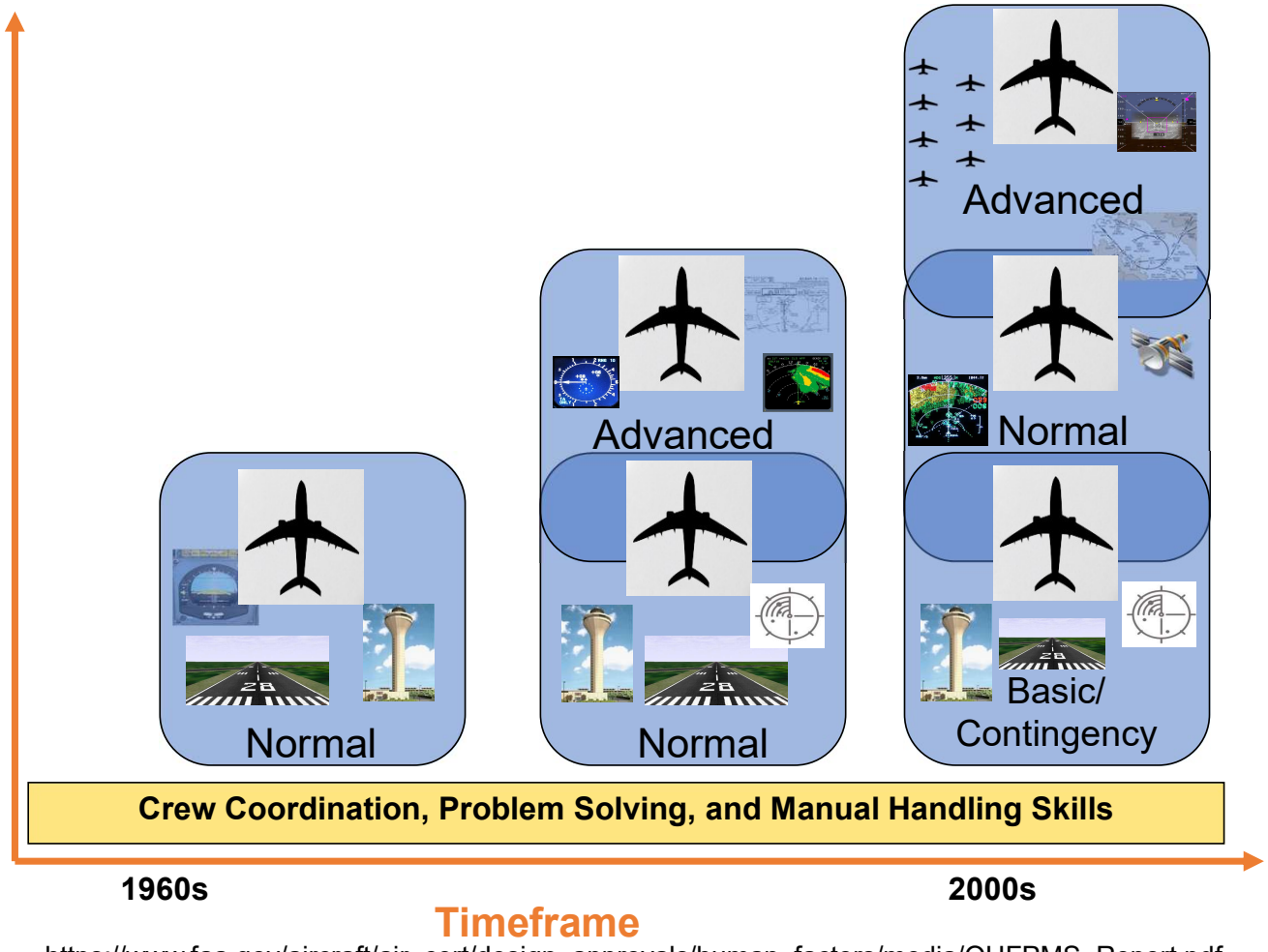
A partnership of

highly capable experts

secures safe operation

2. Current Development

Cockpit Development

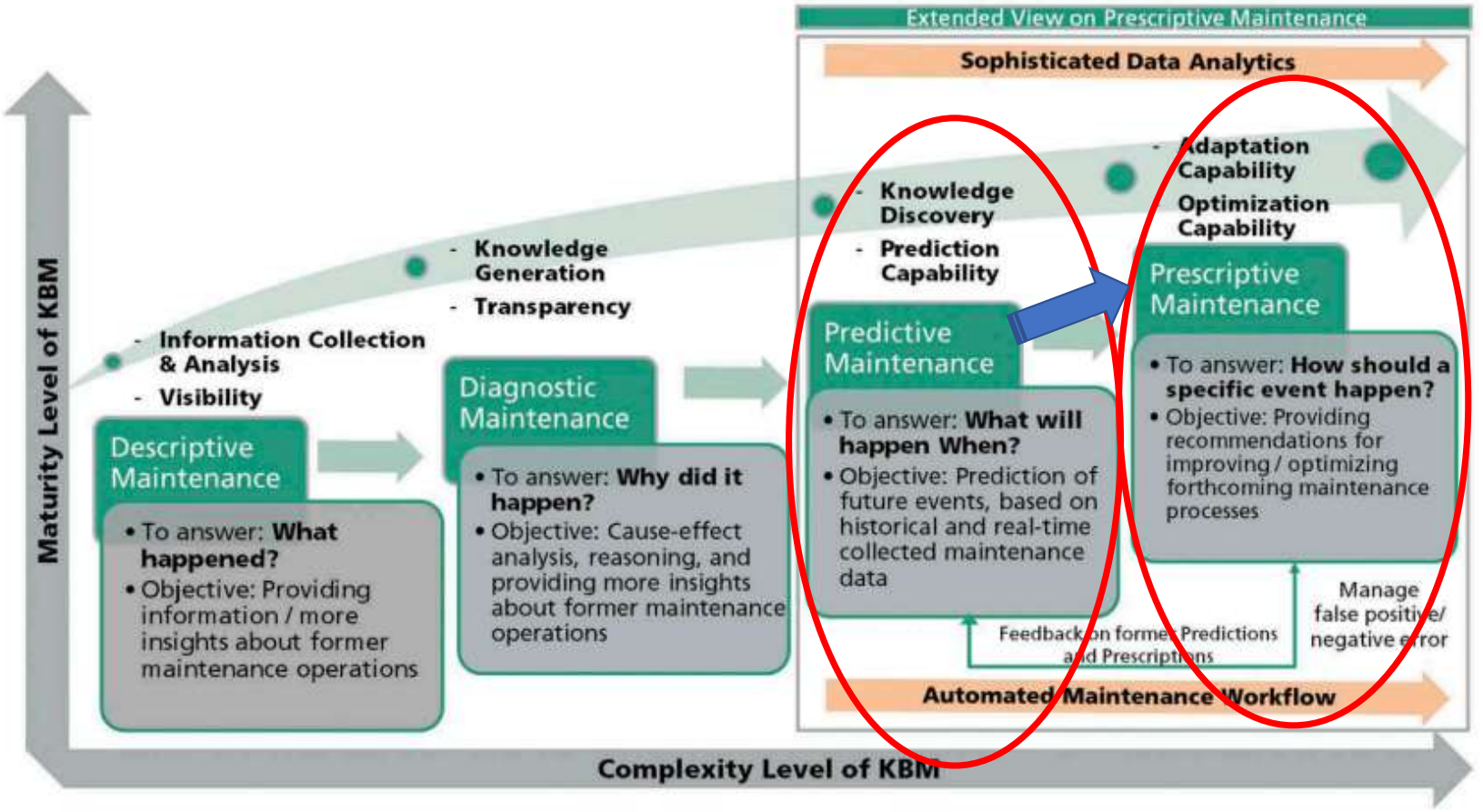


https://www.faa.gov/aircraft/air_cert/design_approvals/human_factors/media/OUFPMS_Report.pdf

Kathy H. Abbott, PhD, FRAeS
Chief Scientific and Technical Advisor
Flight Deck Human Factors
Federal Aviation Administration

2. Current Development

Next Generation Maintenance



https://www.tandfonline.com/doi/pdf/10.1080/0951192X.2019.1571236?needAccess=true

KBM
Knowledge-Based Maintenance

In essence, **prescriptive maintenance** will not only let you know, **when** something needs to be fixed but will suggest **how** to resolve it.

2. Current Development

EASA understanding

https://www.easa.europa.eu/sites/default/files/dfu/EASA-AI-Roadmap-v1.0.pdf

Industry key players have already recognized the value of predictive maintenance.
For instance, Airbus' Aircraft Maintenance Analysis (Airman), used by more than a hundred customers, constantly monitors health and transmits faults or warning messages to ground control, providing rapid access to maintenance documents and troubleshooting steps prioritized by likelihood of success.

Certain university researches estimate that predictive maintenance can increase aircraft availability by up to 35 %[1].

[1]PREDICTIVE & DETECTIVE MAINTENANCE: EFFECTIVE TOOLS IN THE MANAGEMENT OF AERONAUTICAL PRODUCTS. José Cândido de Almeida Júnior, Rogerio Botelho Parra FUMEC University — 31st Congress of the International Council of the Aeronautical Sciences — Belo Horizonte, Brazil; September 09-14, 2018

2. Current Development

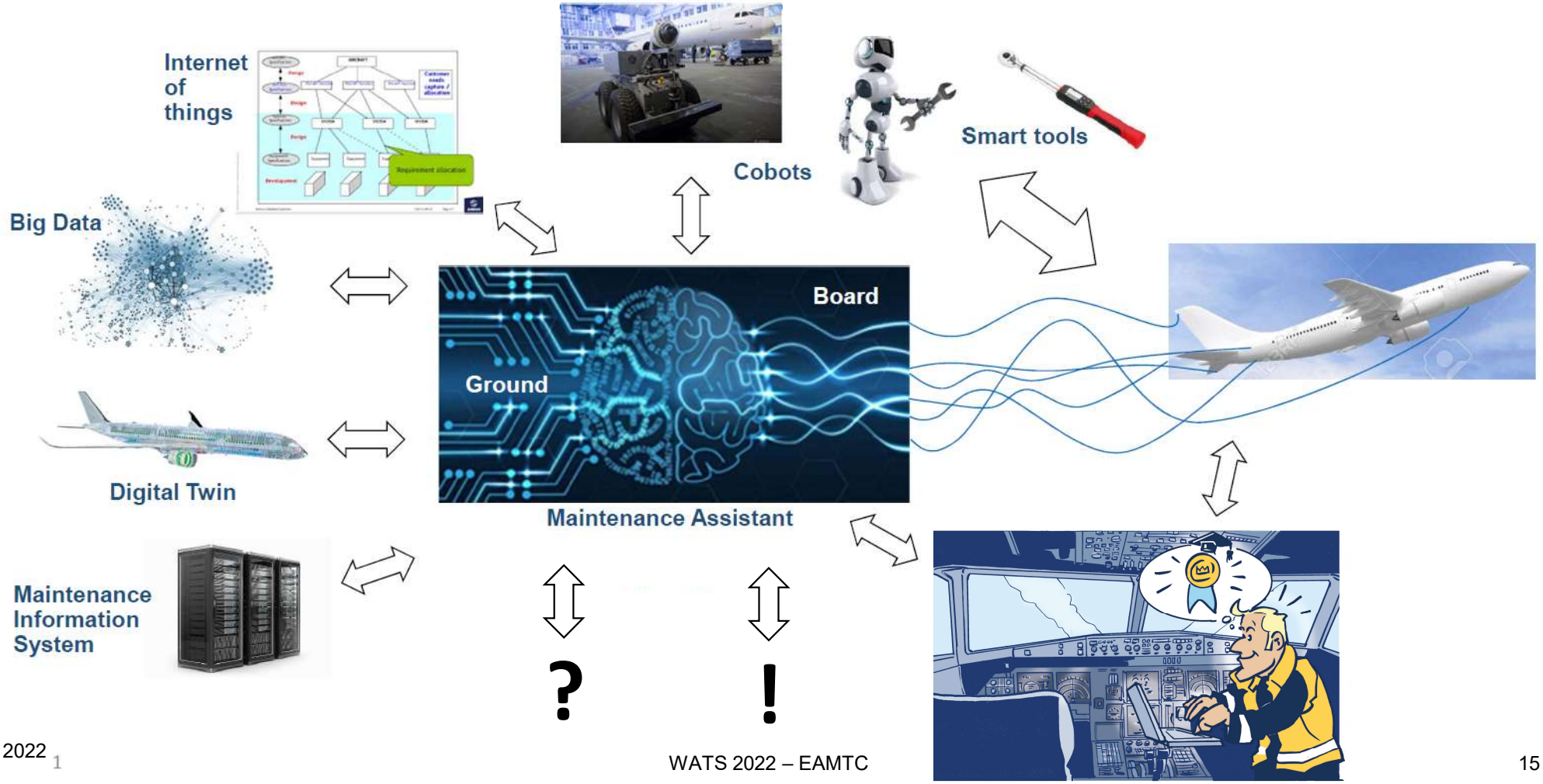
The Way forward

Training effectiveness and competence (SI-3011)

- Despite the obvious **technological advances** that have made the **aviation industry safer and more efficient** in the last few decades, **the way that those working in the industry are trained has not changed significantly.**
- Recently, ICAO has sought to address this through the development of competency frameworks;
- however, organizations and States need to assure themselves that they fully appreciate how to utilize competency frameworks to their best advantage, whilst striving for
- a shared understanding of terms and concepts.

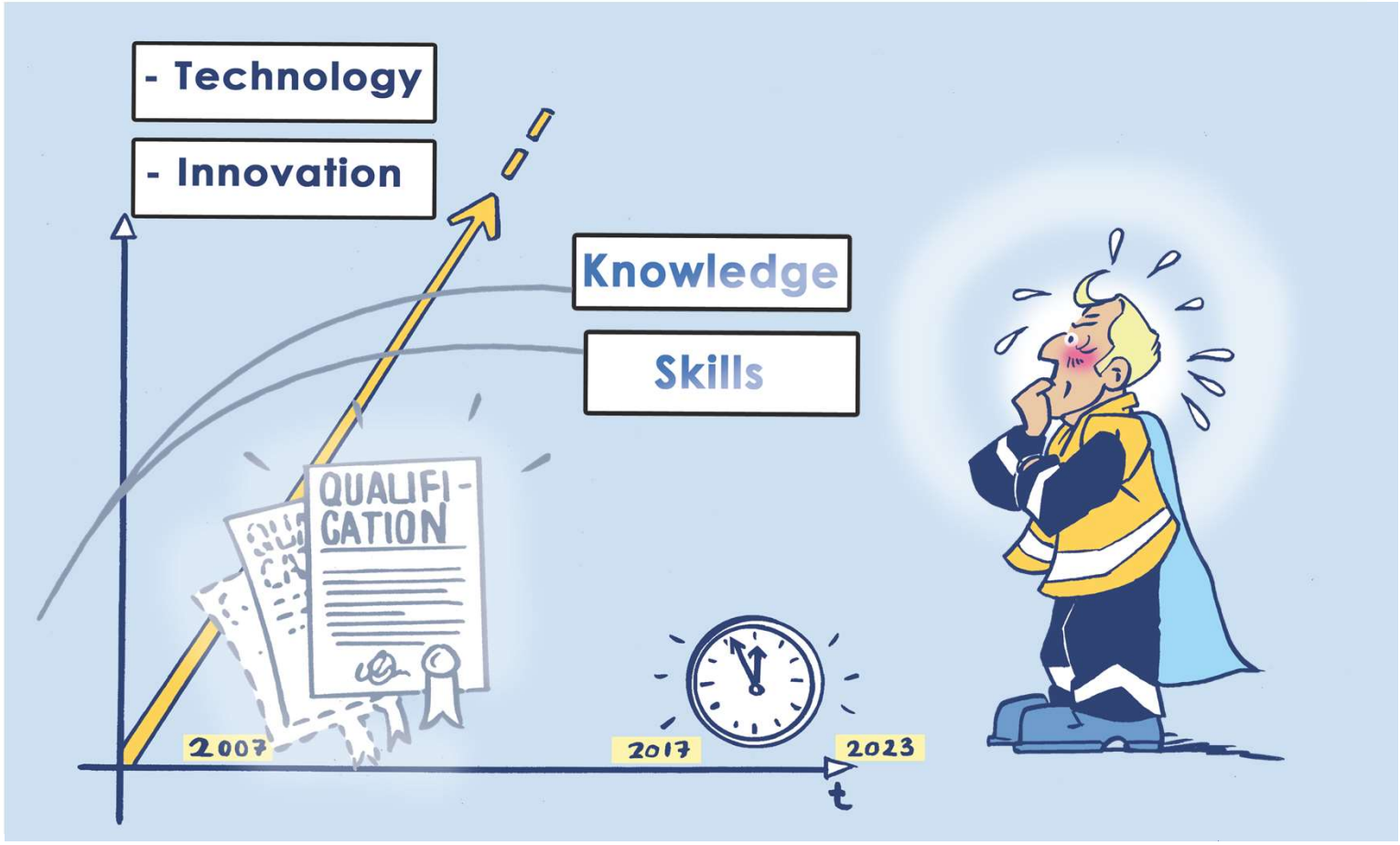
2. Current Development

Challenge: Keeping the Human competent



3. Facing the Challenge

As time goes by – Innovation changes Work…



… and the Maintenance Expert needs to keep up with the Changes!

3. Facing the Challenge

Actual Activities

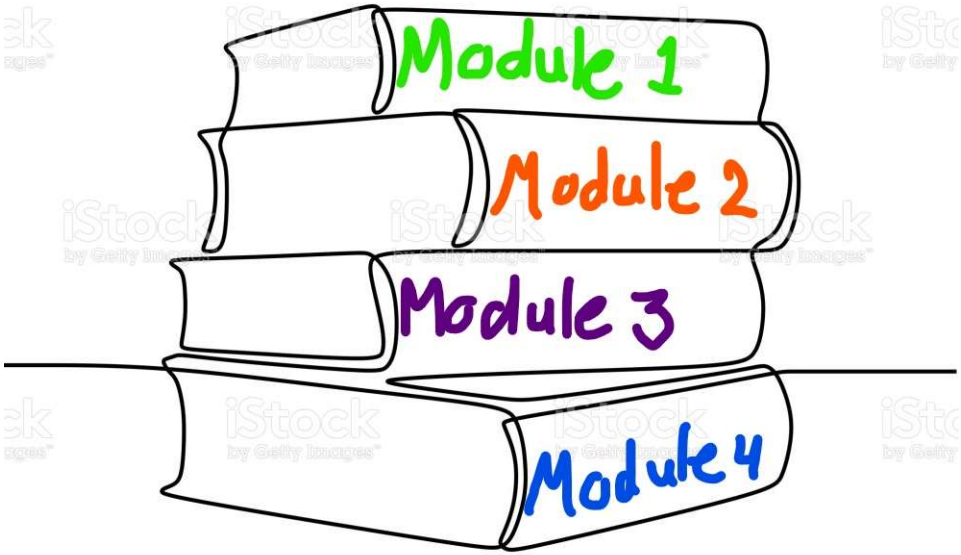
EAMTC – New Training Standards Working Group

Project scope:

- Use **EAMTC knowledge** from earlier projects like EASA Working Groups and **ICAO CBTA Working Group** and as Covid19 forced our industry to go new ways
- **Blend our knowledge** from the above **to set up a new way to conduct training** in various areas in aviation maintenance

3. Facing the Challange

Still current Situation in Training Regulation

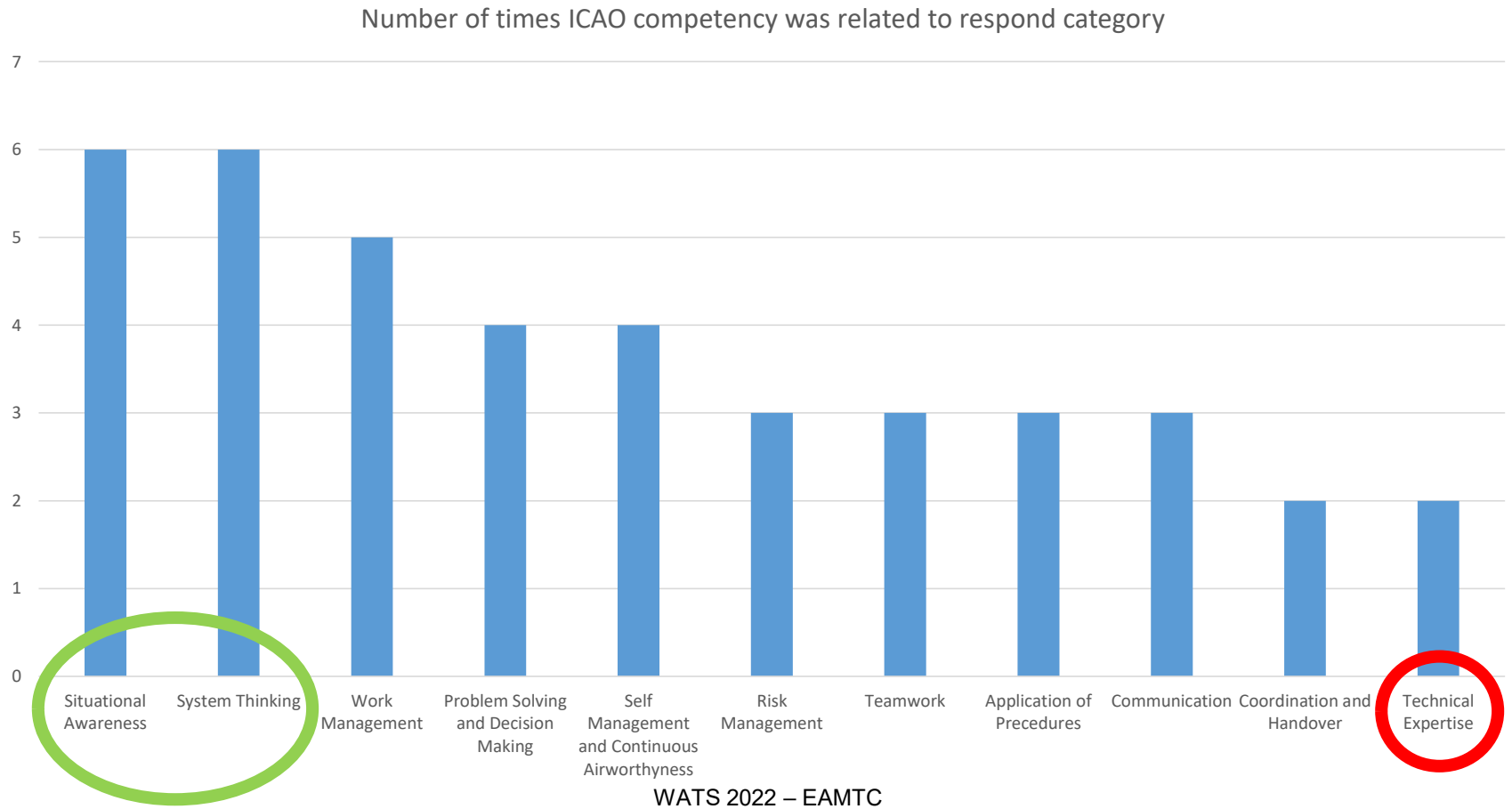


- Hours based training
- Frontal teaching
- Quantified and standardized learning experiences
- Fragmentized approach
- Convenient for regulators
- Non-flexible for the aviation (training) industry
- From an educational point of view very debatable

3. Facing the Challenge

EAMTC Member Survey

Top 3 Safety Competencies versus ICAO Competency Framework



4. Competency-bases Training and Assessment

Why Competency-based Training?

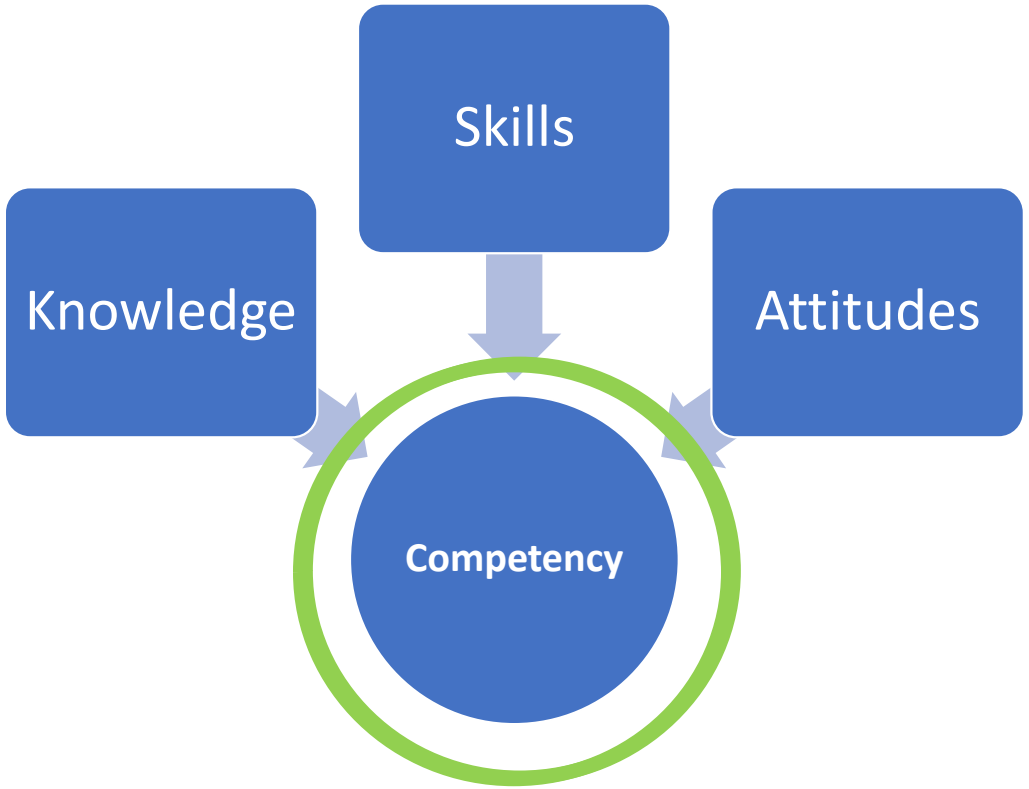
- **Shift from quantity to quality**
  (the students and organizational needs are central, not the training hours)
- Recognition of **new teaching technologies** (VR / AR / E-Learning)
- **Framework of generic skills** that don't need to be demonstrated repeatedly within subsequent aircraft type ratings
- **Flexibility** to anticipate faster on changing circumstances and technologies (Lifelong Learning)
- **Ability to cross-train from other industries with complementary competencies**
- **Cost reduction**; prior learning and previously developed competencies count → expedites the training path of the learner (self-paced learning)

4. Competency-bases Training and Assessment

What is Competency-based Training?

From teaching to coaching

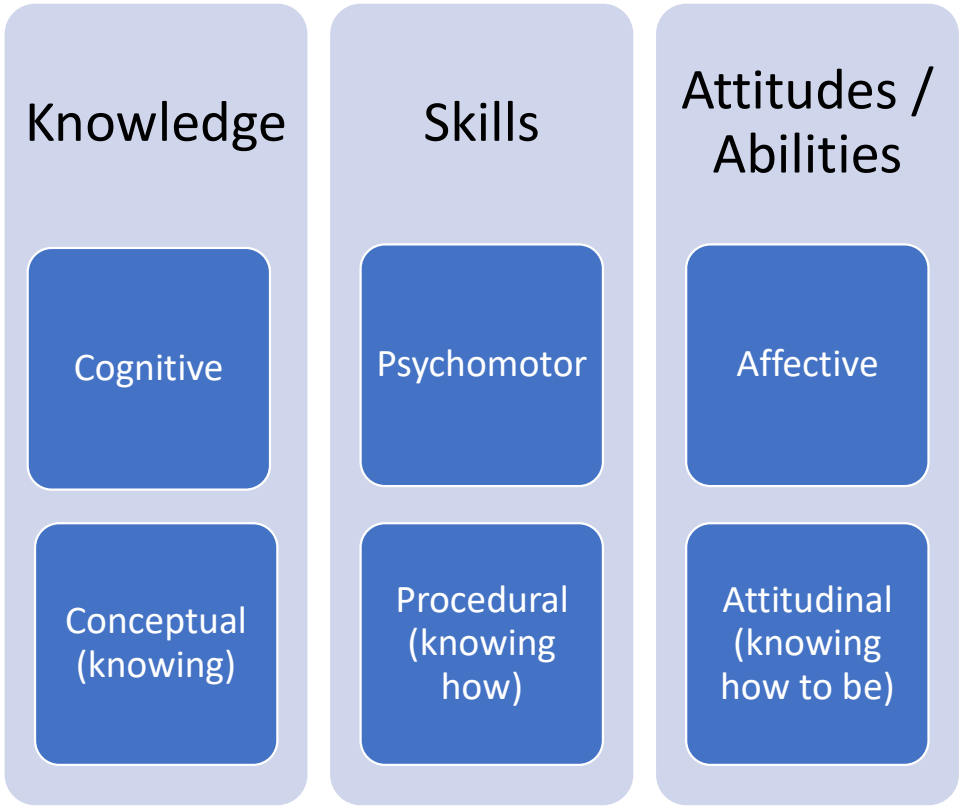
Competency Based Training



Competency can only be verified through performance!

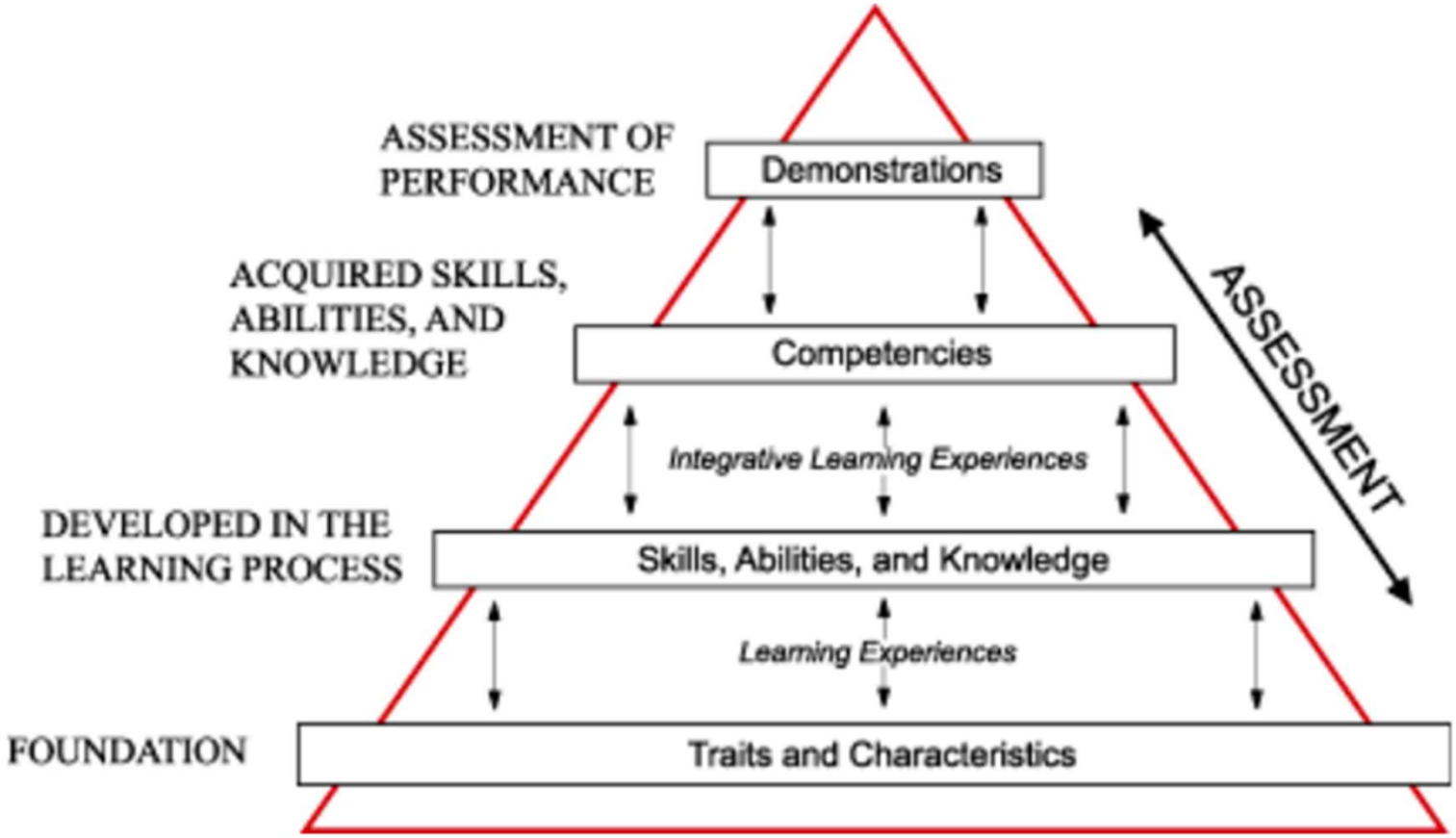
4. Competency-based Training and Assessment

How to design Competency-based Training?



- Focus on ***whole-task*** **learning experiences**
- Increase the **complexity** of the tasks during the training program
- **Integration of knowledge, skills and <u>attitudes</u>** to do justice to the complexity of real-world scenario's in MRO Aviation
- Combine 'Soft Skills' & 'Hard Skills'

4. Competency-based Training and Assessment

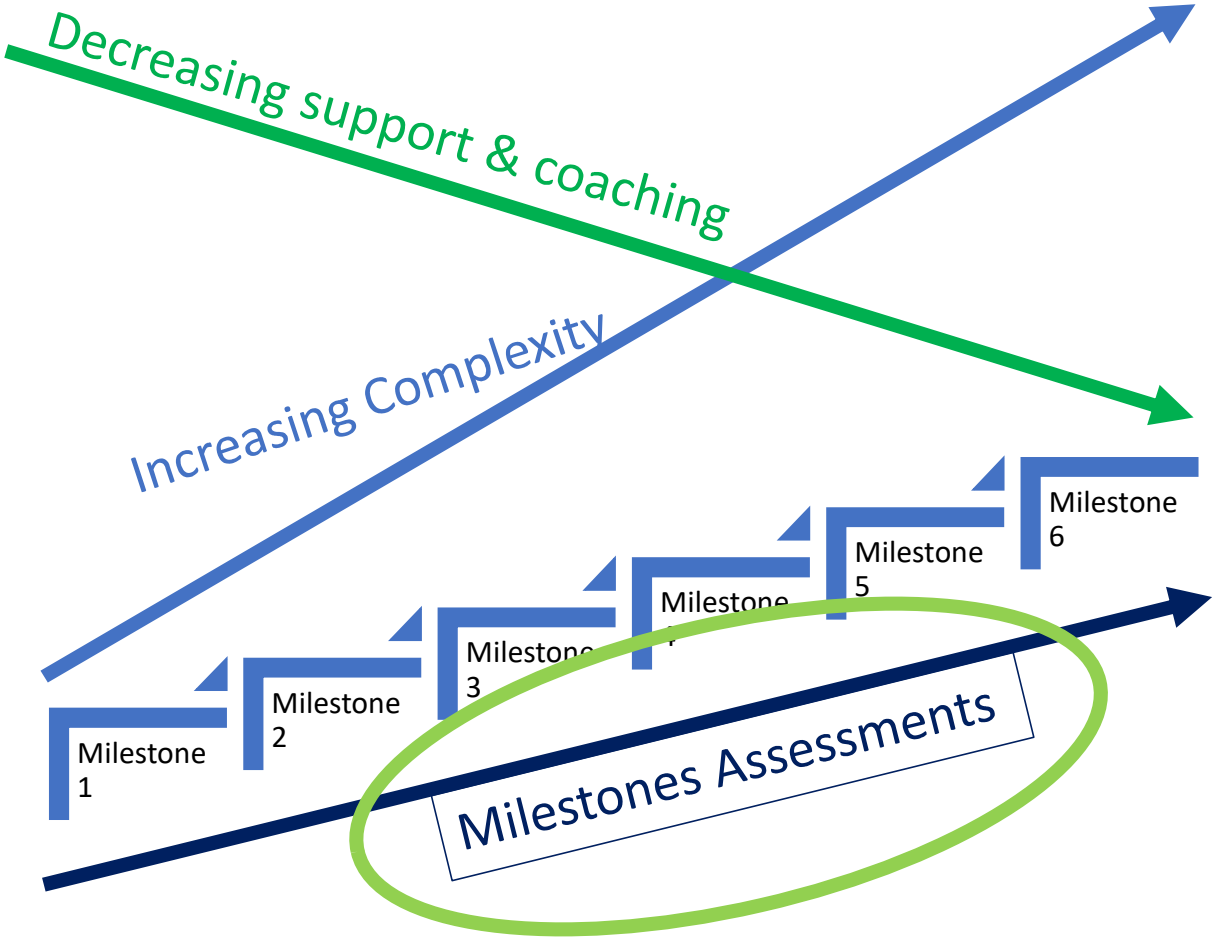


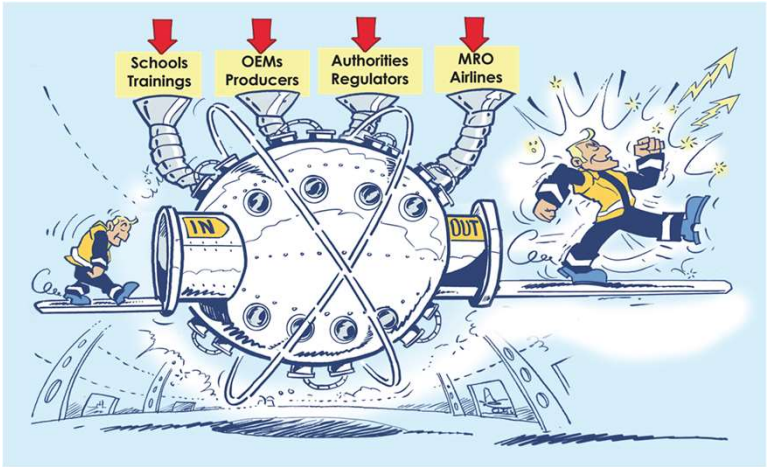
Characteristics of Competencies

Jones, E. (2002) Defining and Assessing Learning: Exploring Competency-Based Initiatives

4. Competency-based Training and Assessment

Course Design





4. Competency-based Training and Assessment

Milestone Assessment

Student carries out **specific task** for (dis)assembly work in which he has to show competency through **performance** with **observable behaviours**

B1-K1-W2 Carries out disassembly and assembly work

Form of Assessment	Assessment Criteria	Assessment F	Assessment P	PTO
Observation: Disassembling and assembling of aircraft systems and/or components	Carries out disassembly and assembly work. Works in accordance with drawings and diagrams and English written information. Carries out any necessary processing techniques skilfully		✓	1,3-7, 10-14, 16,17
	Continues to work together productively and effectively, even under high pressure of work		✓	9
Observation: Use of supplies, safe working	➔ Works in accordance with applicable procedures, company regulations and health, safety and environmental regulations	✗		2,3, 14-17
	Uses the right materials, tools, equipment and (personal) protective equipment. Uses them correctly. Handles them with care		✓	8,14
Number of criteria = 4, of which are Failed and Passed:		1	3	

Work Process Result
Fail = 3 criteria and/or 1 critical criterion have not been met (➔)
Pass = At least 3 criteria including 1 critical criterion have been met (➔)
Distinction = *All* criteria have been met *and* the work process is done excellently

Fail

Comments / Explanation / Justification of the Assessment (required in case of a failed assessment)

Thank you for listening!
Any Questions?

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