



EASA
European Aviation Safety Agency

EASA Annual Safety Conference
Day 2, 15/10/2015

Panel 6

Fit for the latest teaching technology in aircraft maintenance

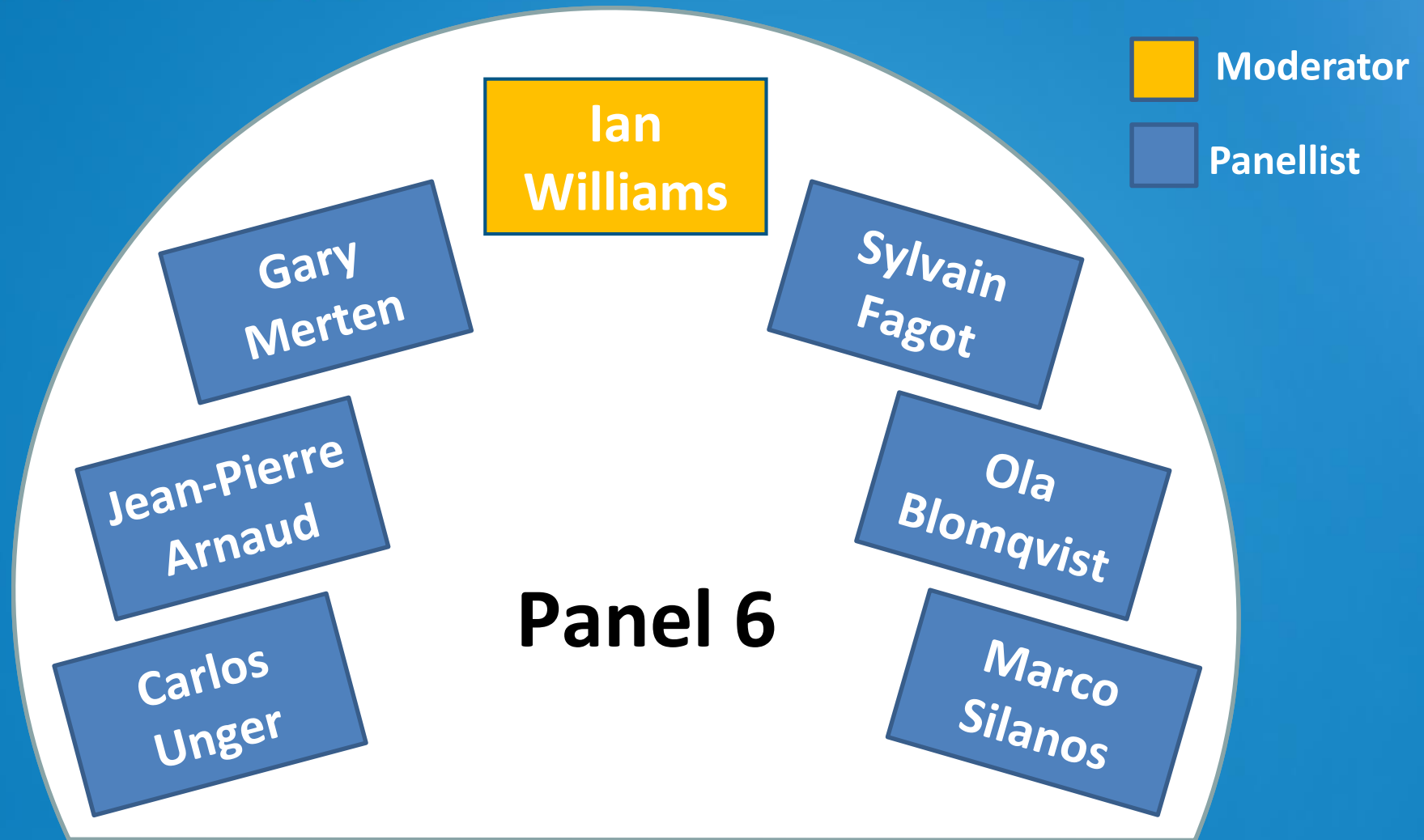
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Fit for the latest teaching technology in aircraft maintenance



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EASA Safety Conference – Panel 6
**Fit for the latest technology in aircraft
maintenance**

Ian Williams

Members



Who we are

European Aviation Maintenance Training Committee

- A pan-“EASA world” industry Foundation dedicated to maintenance training, registered in the Netherlands
- Main objective:
 - Improve safety through training
 - To represent the training industry with EASA

Industry View

EAMTC Guidelines and Recommendations (GR)

- GR 1003 E-Learning
- GR 1004 Synthetic Training Device Levels
- GR 1005 Practical Maintenance Training Devices

- Competence of personnel ↔ Safety



Industry view

Coming together is a beginning; keeping together is progress; working together is success.

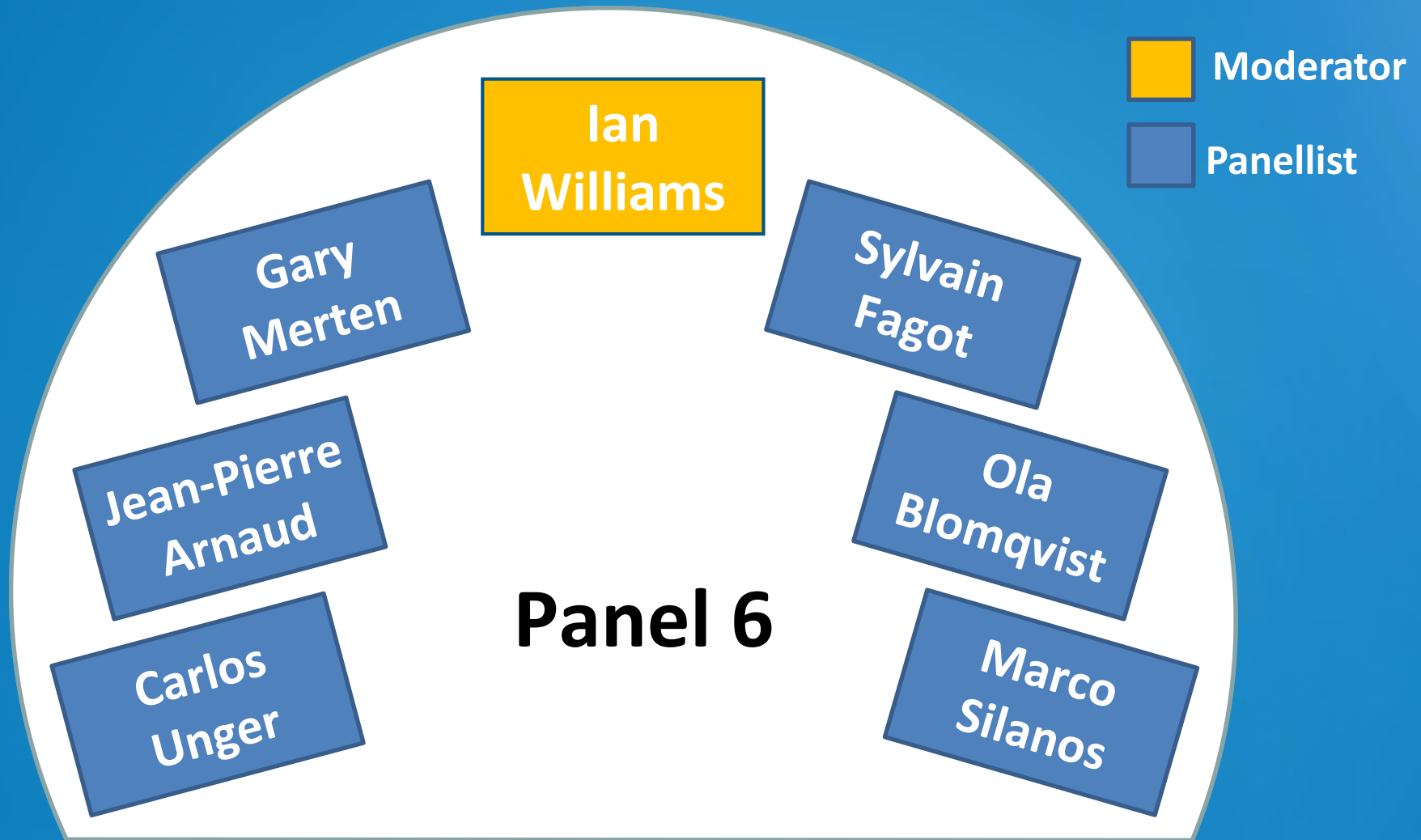
Henry Ford

Thank you



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EASA Safety Conference

October 2015

 **EMBRAER**
Commercial Aviation

Introduction

Methods And Technologies

Proposed changes

Expected Impacts

Conclusion

- Technology Changes

- Aviation Industry/
Training



- Different Training Methods and
Technologies

- Regulatory Aspects

New Teaching Methods And New Training Technologies

Current Rules Scenario

In Appendix III to Part-66 point 3.1. Theoretical element of type training - only a brief text given allowing the use of MBT - no guidance given (AMC or GM).



Proposed Rules Scenario

Amend Part-66 and Part-147 to reflect current and future trends by:

- Introducing new teaching methods for the benefit of maintenance staff training;
- Introducing new technologies to support new teaching methods;
- Providing AMC or GM for all stakeholders

Proposed changes

Part-66

- Minor Changes in the rule;
- Changes to Subpart B (new procedure requirement for competent authorities);
- Changes to Appendices I and III;
- New Appendix VII - Assessment method for Multimedia-Based Training (MBT);
- Extensive changes to AMC and GM.

Part-147

- Changes in the rule;
- Changes to AMC and GM.



NPA 2014-22 – Expected Impacts



- Safety impact
- Economic impact for:
 - Maintenance Training Organizations
 - Maintenance Organizations
 - Individuals
 - Training equipment providers
 - National Aviation Authorities

Conclusion



The Working Group members believe that the proposed changes of RMT.0281 will provide the basis for a comprehensive and modern regulation, allowing for changes in technologies and methods paving the way for the future of all EASA members, and positively setting new standards for the industry.

σας ευχαριστώ

takk

danke

thank you

merci

tack

köszönöm

tak

obrigado

kiitos

dziękuję

grazie

gracias

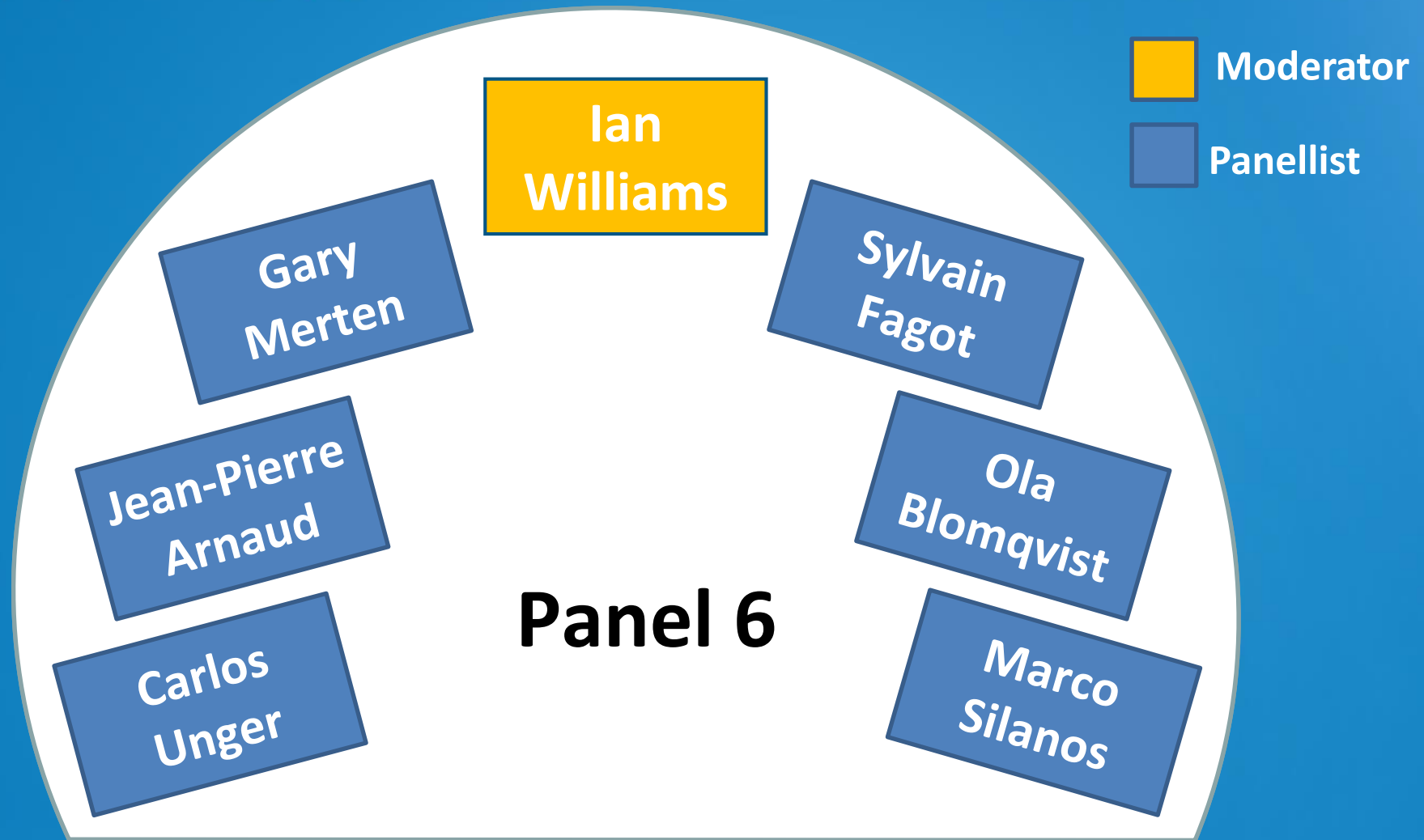
teşekkür ederiz





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Panel 6 – Maintenance and new teaching methods

ARNAUD Jean-Pierre
Regulation officer
15 October 2015

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TE.GEN.00409-001



A modern world....

► New generation of :

1. **Digital aircraft**
2. **Digital training tools**
3. **Digital learners**





Training can be delivered in:

1. Controlled environment (Part-147)

- Basic Knowledge for the issuance of a licence;
- Type Rating to be endorsed on the licence
 - Both courses subject to formal examination (certificate)

2. Uncontrolled environment (Part-145)

- EWIS course; Fuel tank safety; HF courses...
 - Subject to evaluation (no approved certificate)
- Continuous training
 - Up-to-date knowledge of relevant technology and HF issues



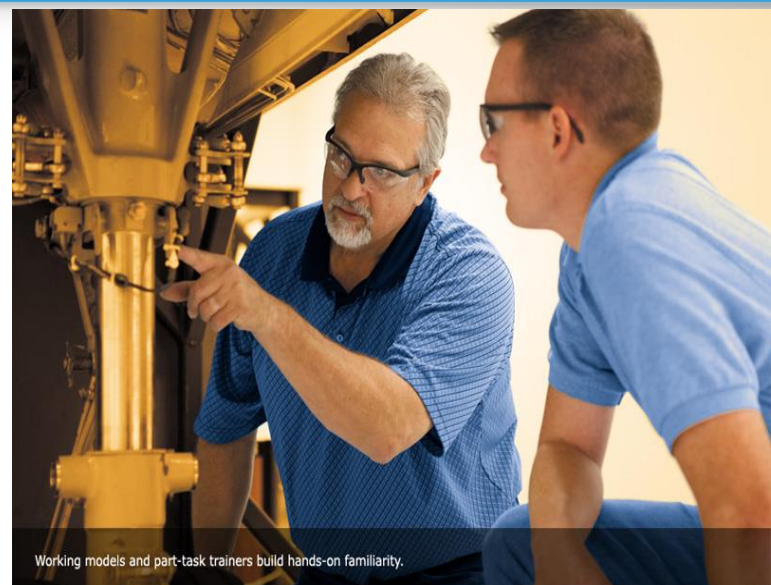


Some consequences

➤ 1 - Distance learning

➤ Offset the loss of the controlled environment by mitigation factors

1. Learning objectives;
2. Instruction design;
3. Tracking of trainee's progress;
4. Examination – keep the controlled environment



➤ 2 - Simulation devices

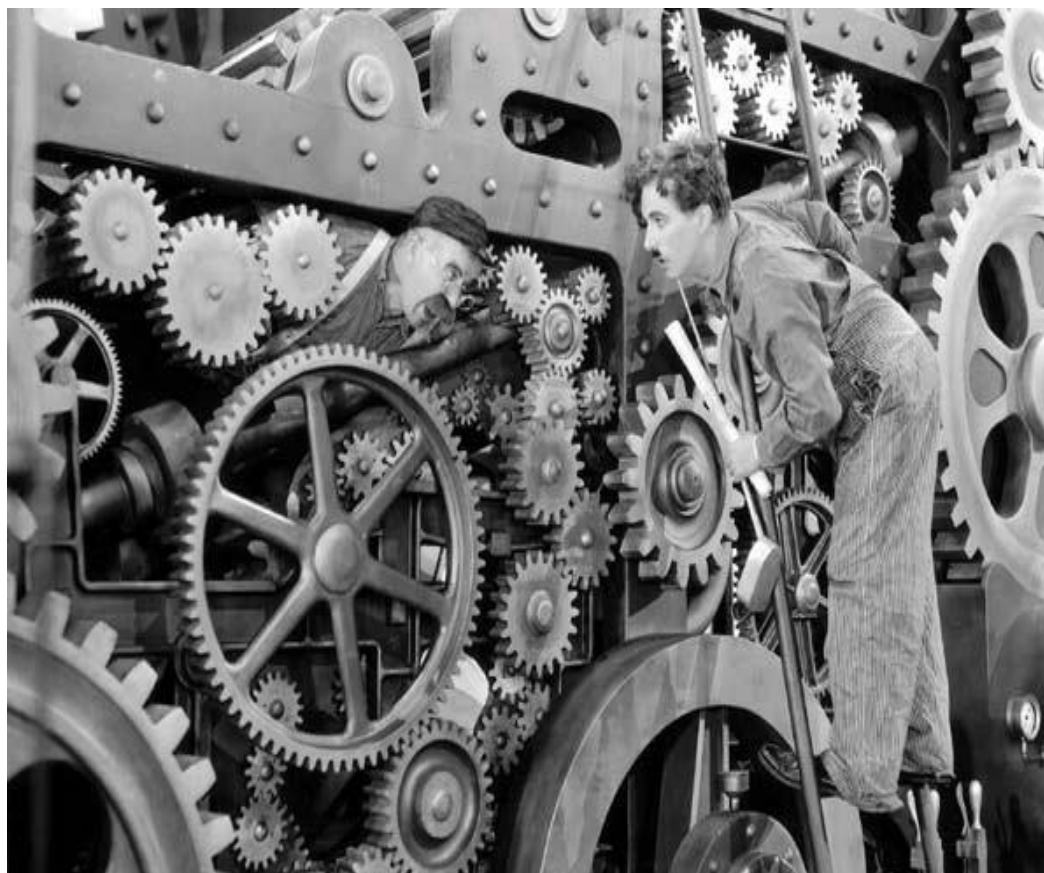
1. Fidelity serving the learning objectives
2. “Virtual” v Reality





Further thoughts

1. Reduction of training duration = clear limits
2. “Shared learning” = benefit for “standardisation”





Conclusion

- Needs to modernize the training-related rules by introducing newly designed teaching technologies:
 - Seen as complementary;
 - Welcome when proven efficient;
 - Assessment is essential.

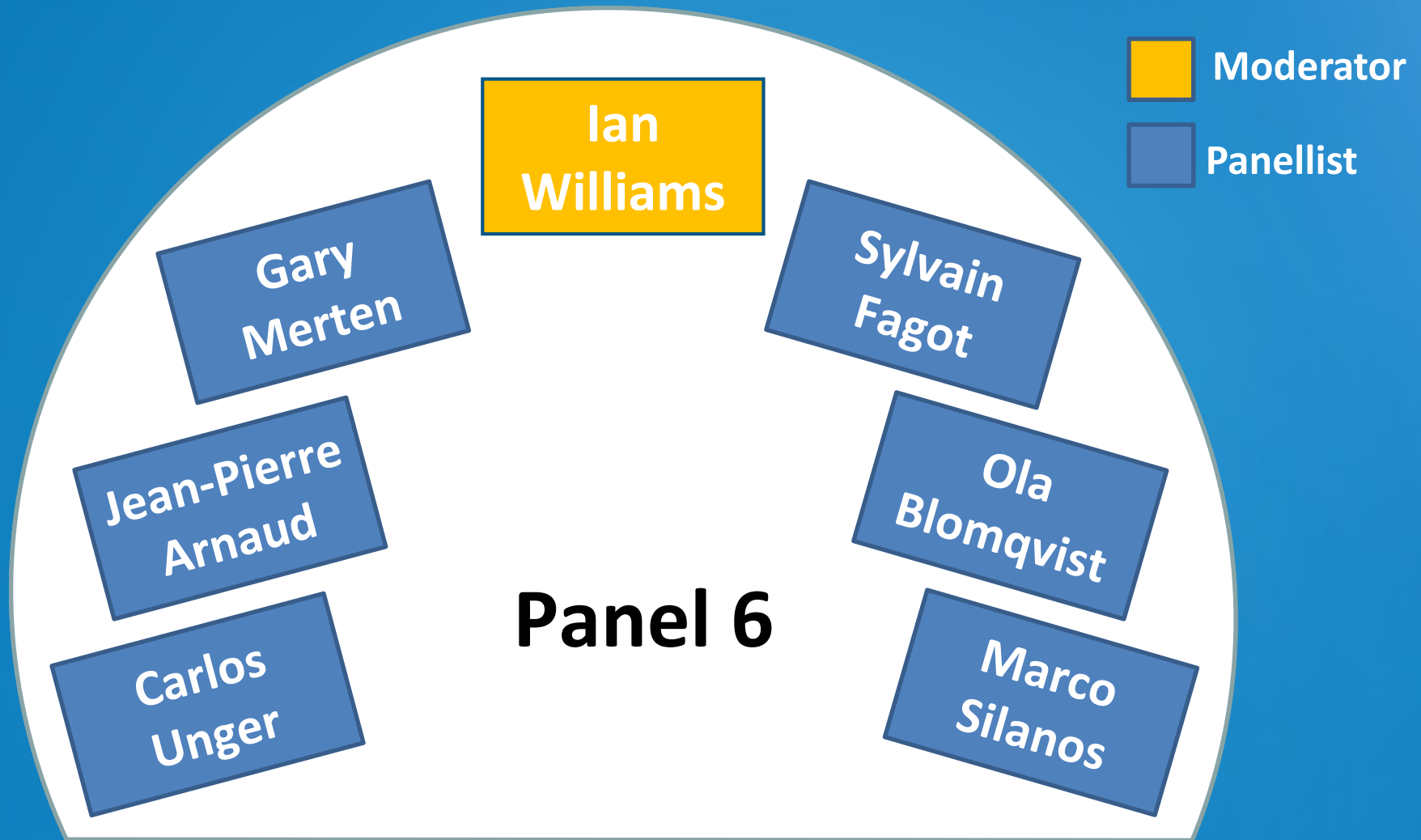
Balanced and pragmatic approach is needed safety-wise.





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AIRCRAFT ACCESS AND ALTERNATE MEANS OF ACCOMPLISHING PRACTICAL TRAINING TASKS AND ASSESSMENTS

- “Conventional” Practical Training Approach



AIRCRAFT ACCESS AND ALTERNATE MEANS OF ACCOMPLISHING PRACTICAL TRAINING TASKS AND ASSESSMENTS

- “Conventional” Practical Training Approach

- some of the typical challenges

- Availability of equipment
(Aircraft and/or GSE)
 - Proper configuration of equipment
(Accessibility or Pwr'On'/Pwr'Off')
 - Groups of students requiring
repeated performance of task(s)
 - Consumption of consumables
 - 'Return to Service' effort & cost
 - Risk of ...
 - damage to equipment
 - inquiry to personnel
(especially with larger classes)

AIRCRAFT ACCESS AND ALTERNATE MEANS OF ACCOMPLISHING PRACTICAL TRAINING TASKS AND ASSESSMENTS

Theoretical Training Categories...

LOC – Location

FOT – Functional Operational Test

SGH – Servicing & Ground Handling

R/I – Removal / Installation

MEL – Minimum Equipment List

T/S – Trouble Shooting

Selected Training Tool Options (Note: List is NOT exhaustive)

1 (Slideshow), 3 (CBT), 4 (App), 7 (Mock-up), 8 (Virtual Reality), 12 (Augmented Reality)

3 (CBT), 4 (App), 6 (MSTD), 7 (Mock-up), 9 (MTD), 11 (Aircraft Component), 12 (Augmented Reality)

3 (CBT), 4 (App), 6 (MSTD), 7 (Mock-up), 8 (Virtual Reality), 9 (MTD), 11 (Aircraft Component), 12 (Augmented Reality)

3 (CBT), 4 (App), 6 (MSTD), 7 (Mock-up), 8 (Virtual Reality), 9 (MTD), 11 (Aircraft Component), 12 (Augmented Reality)

2 (Manuals)

3 (CBT), 4 (App), 6 (MSTD), 7 (Mock-up), 8 (Virtual Reality), 9 (MTD), 11 (Aircraft Component)



<https://www.youtube.com/watch?v=ChjpnZPsu-Y>



AIRCRAFT ACCESS AND ALTERNATE MEANS OF ACCOMPLISHING PRACTICAL TRAINING TASKS AND ASSESSMENTS

■ “Alternate” Practical Training Approach

some typical advantages

- ~~Availability of equipment~~
~~(Aircraft and/or GSE)~~
- ~~Proper configuration of equipment~~
~~(Accessibility or Pwr'On'/Pwr'Off')~~
- ~~Groups of students requiring repeated performance of task(s)~~
- ~~Consumption of consumables~~
- ~~'Return to Service' effort & cost~~
- Risk of ...
 - damage to equipment
 - inquiry to personnel~~(especially with larger classes)~~

MSTDs/MTDs availability not impeded by operational priorities

By design this is not an issue when MSTDs/MTDs, CBT etc are used

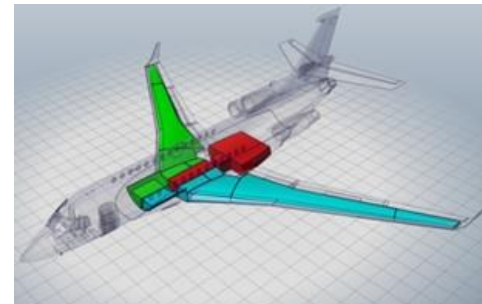
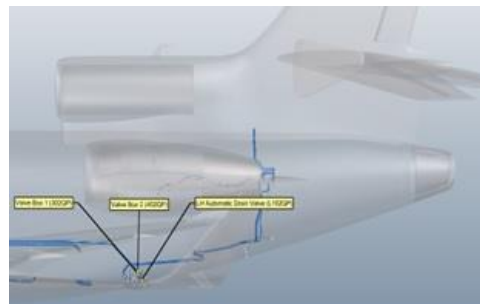
Students perform tasks in parallel

No consumption of consumables

No 'Return to Service' cost/effort

Exposure to risk is virtually* eliminated

Exposure to risk is virtually* eliminated
(* pun intended)



POSSIBLE TRAINING-TIME REDUCTIONS THROUGH BLENDED THEORETICAL & PRACTICAL TRAINING

Theoretical Training Objectives... (excerpts)

Level 1 ...

(b) identify aircraft manuals, maintenance practices important to the airframe, its systems and powerplant;

(e) identify special tooling and test equipment used with the aircraft.

Level 2 ...

b) recall the safety precautions to be observed when working on or near the aircraft, powerplant and systems;

(d) identify the locations of the principal components;

(f) perform the procedures for servicing associated with the aircraft for the following systems: Fuel, Power Plants, Hydraulics, Landing Gear, Water/Waste, and Oxygen;

Level 3 ...

(b) perform system, powerplant, component and functional checks as specified in the aircraft maintenance manual;

(c) demonstrate the use, interpret and apply appropriate documentation including structural repair manual, troubleshooting manual, etc.;

(d) correlate information for the purpose of making decisions in respect of fault diagnosis and rectification to maintenance manual level;

(e) describe procedures for replacement of components unique to aircraft type.

Practical Training Synergies:
LOC FOT SGH R/I MEL
T/S

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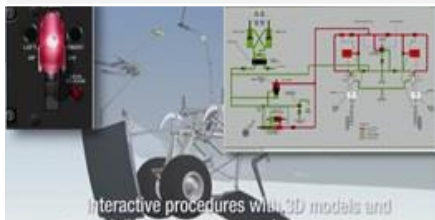
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Practical Training Synergies: LOC FOT SGH R/I MEL T/S



	LOC	FOT	SGH	R/I	MEL
		X	X		X
		X	X		X
X	X	X	X		X
X	X	X	X		X
		X			
	X				
					X
				X	X
			X		



CAE's Virtual Maintenance Trainer (VMT)



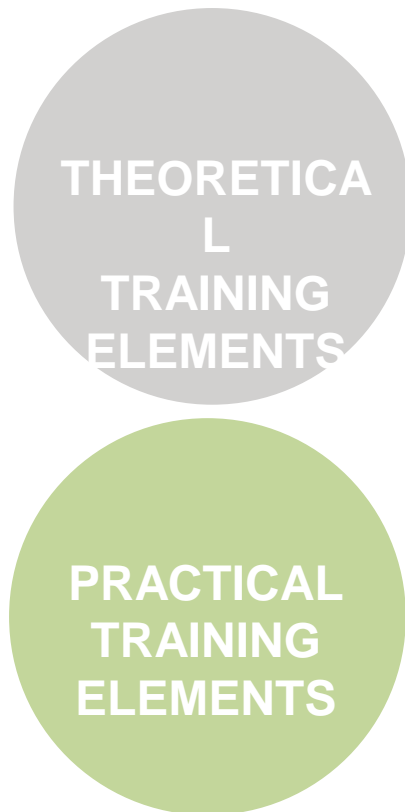
Use of aircraft-specific ground support equipment

<https://www.youtube.com/watch?v=ChjpnZPsu-Y>

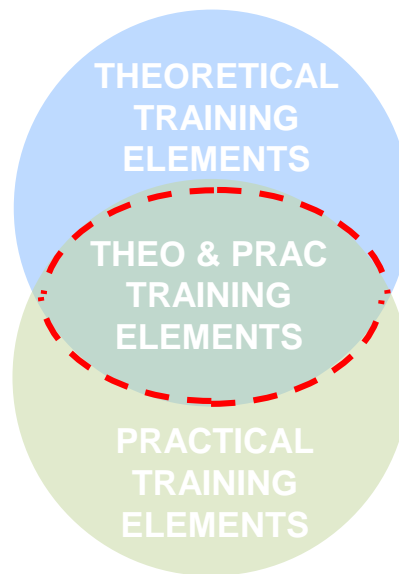


POSSIBLE TRAINING-TIME REDUCTIONS THROUGH BLENDED THEORETICAL & PRACTICAL TRAINING

“Stand-alone”
Training



“Blended”
Training



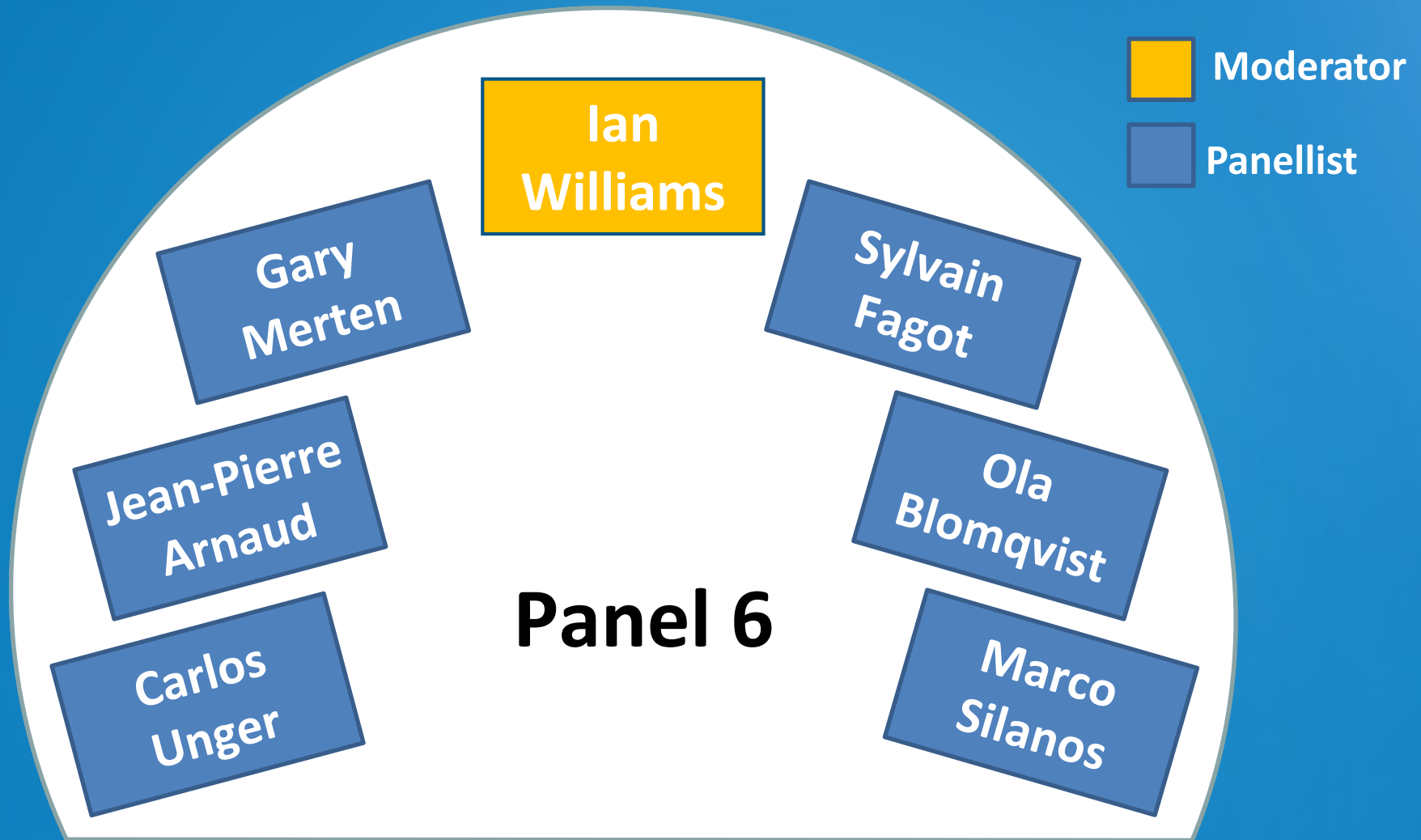
Synergies / “Congruence”^{*}

^{*} Synergies / “Congruence” could equate to overall training time reductions, if properly supported by TNA and delivered in a conjunctive course.



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Sylvain FAGOT

VP Base Maintenance – Air France Industries

New teaching technologies : MROs' point of view ?

- New generation of aircrafts
Great technological leap in recent years
- Need for flexibility in teaching methods
Keep pace with technologies on the aircraft
Motivation (balance between generations)
Stay focus / attendance
Interactivity
Bring information through connected tools
Reduce training time period
Engineers more available
Economy

Major goal :





- Stay “practical” !

Virtual is good ... but engineers will go back on the ground !

Need to “touch” the plane

“Blended” as a key solution

Impact on OJT’s periods



- E-Learning

AFI already uses E-learning methods (LMI)

Target of reaching 20%

Reduction of minimum training time ?

“Who’s talking ?”



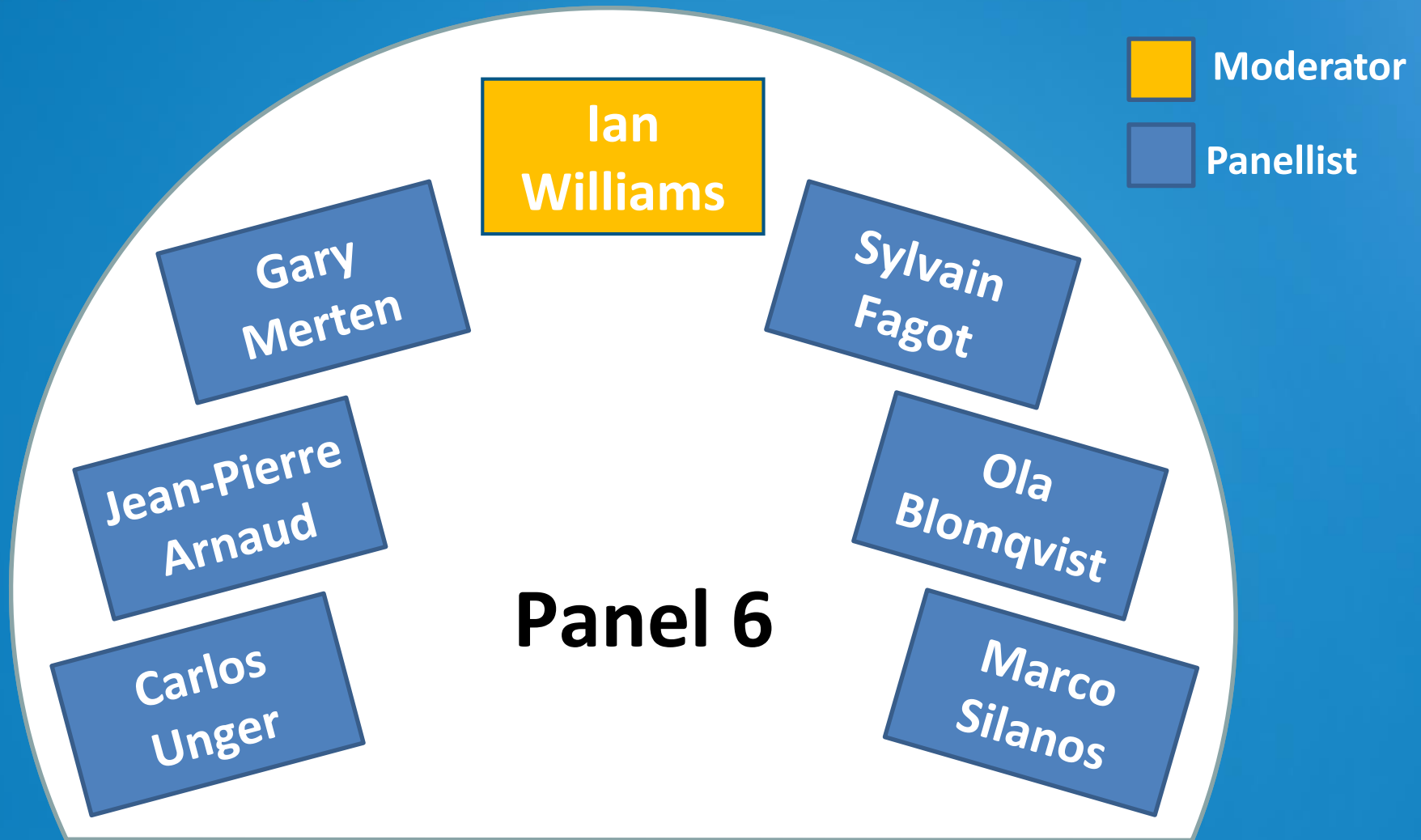
- AFI : part of AF/KL group = strength
Training built on mother airline experience
Instructors coming from Part 145
- Option 3 = opportunity for Part 145, “open the door” ...
Enlargement of scope (HF, EWIS, FTS ...)

**Maintain maximum level of skills,
although training time is reduced**



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Panel 6 – Maintenance and new teaching methods



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Ola Blomqvist, Vice President, AEI



Knowledge is paramount
- for safe decision making

- Don't lose sight of the purpose of training
- Cost cuts must not be the main driver for changes in maintenance training

What kind of frontline safety professionals do we want in aviation?

Why do we use different training tools?

→ To enhance the learning process?

or...

→ To save time and money on training?





The learning environment: Type Rating Training

→ Feedback from colleagues

- Training at the normal workplace or at home is not efficient
- Feedback and discussion is a part of a good learning situation
- Computer based systems and simulators can be a good complement to classroom training and to the practical part of type training but it doesn't replace the need for instructor lead theory class and practical training
- Today's examinations are definitely not a good indicator of what you learned
- *"The teacher gave us more in 10 minutes than the CBT did in two hours"*





The learning environment: Continuation Training

→ Feedback from colleagues

- Many don't get any CT except from some of the mandatory courses
- Some get a huge amount of bulletins to read but don't have the time.
- Everything is done via an internet based system, even the HF training. Totally useless..
- A combination of classroom training and web info on new aircraft systems and problem areas. Very appreciated
- Some get no procedure training what so ever...



Maintenance and new teaching methods

Conclusion

- Distance learning can not replace classroom training – the controlled environment
- Simulator- and training devices can be used to enhance training but not to replace classroom theory hands-on practice. Most important to be able to “handle” an aircraft and its systems in a safe way





Thank you!

For More Information Contact:

Aircraft Engineers International (AEI),

Ola Blomqvist, Vice President

Email: **ola.blomqvist@srat.se**

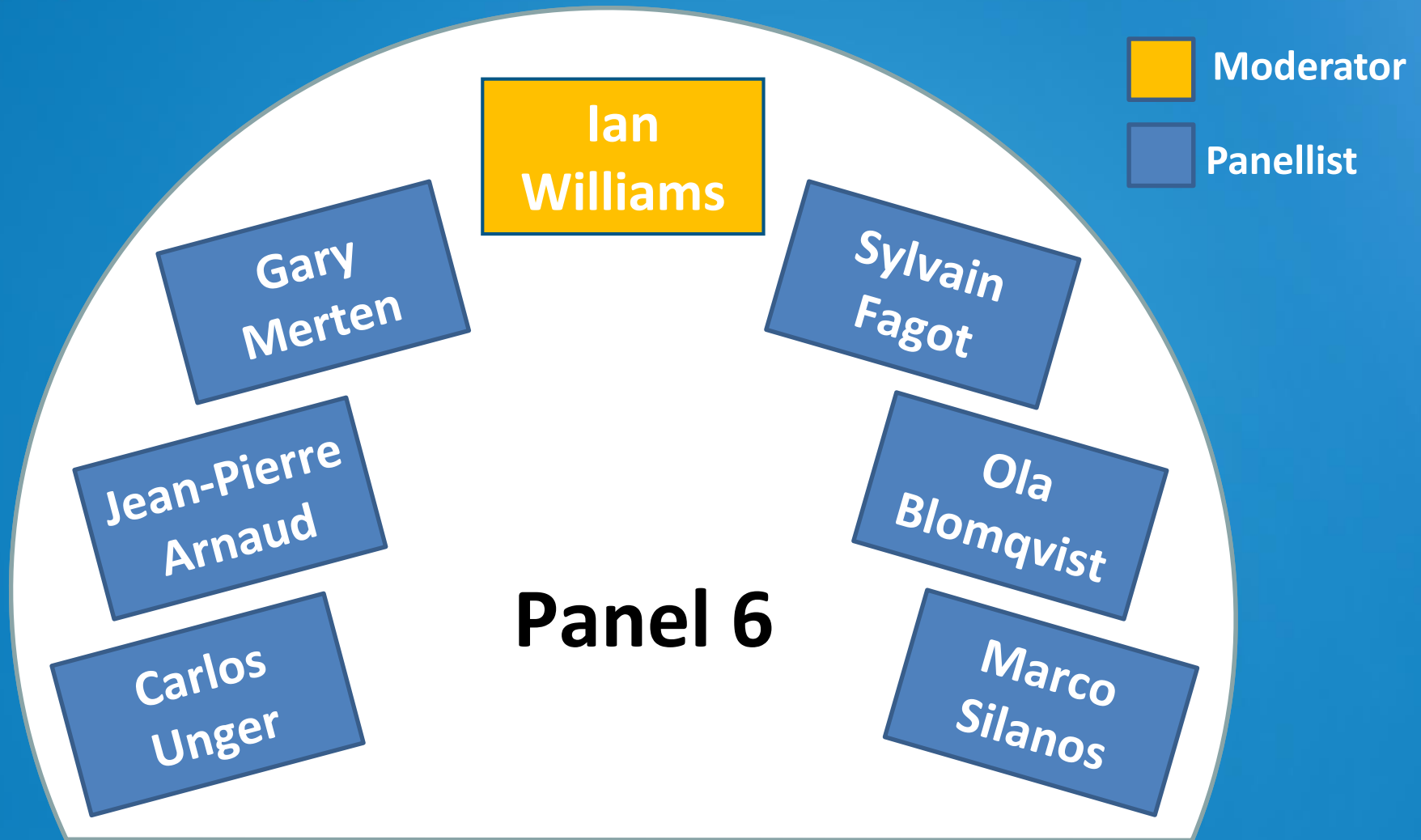
Web: **www.airengineers.org**





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Maintenance and new teaching methodology

Marco Silanos
Personnel Licensing & Operations
Director



15 Oct 2015

Oversight of STDs

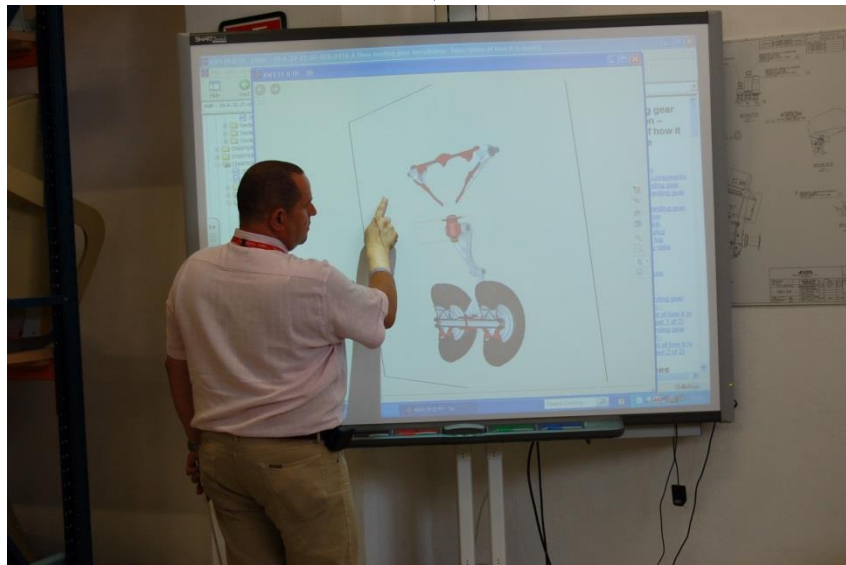
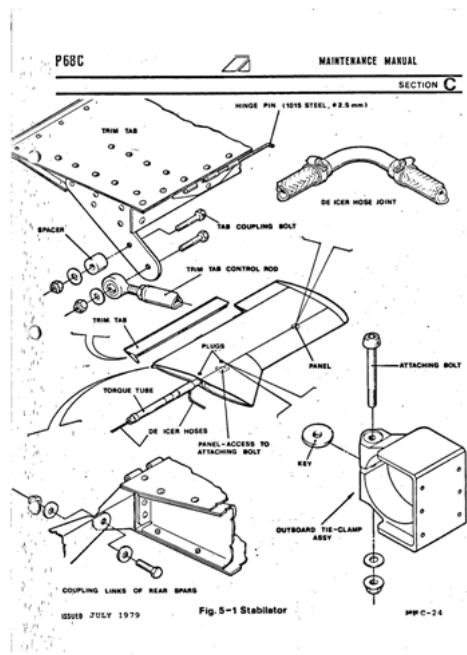
type training implementation

large range of apps

advantages / disadvantages

minimum time => adaptive approach





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FSTD vs MSTD

level of realism vs task capability

EASA Cert Spec vs EAMTC Guidelines

ab initio/recurrent vs OJT/work statement

costs vs safety benefits



AML vs FCL



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A vertical blue bar on the left side of the slide, featuring a white cloud pattern.

THANK YOU

Marco Silanos
Director of Personnel Licensing &
Operations Regulations Dept.

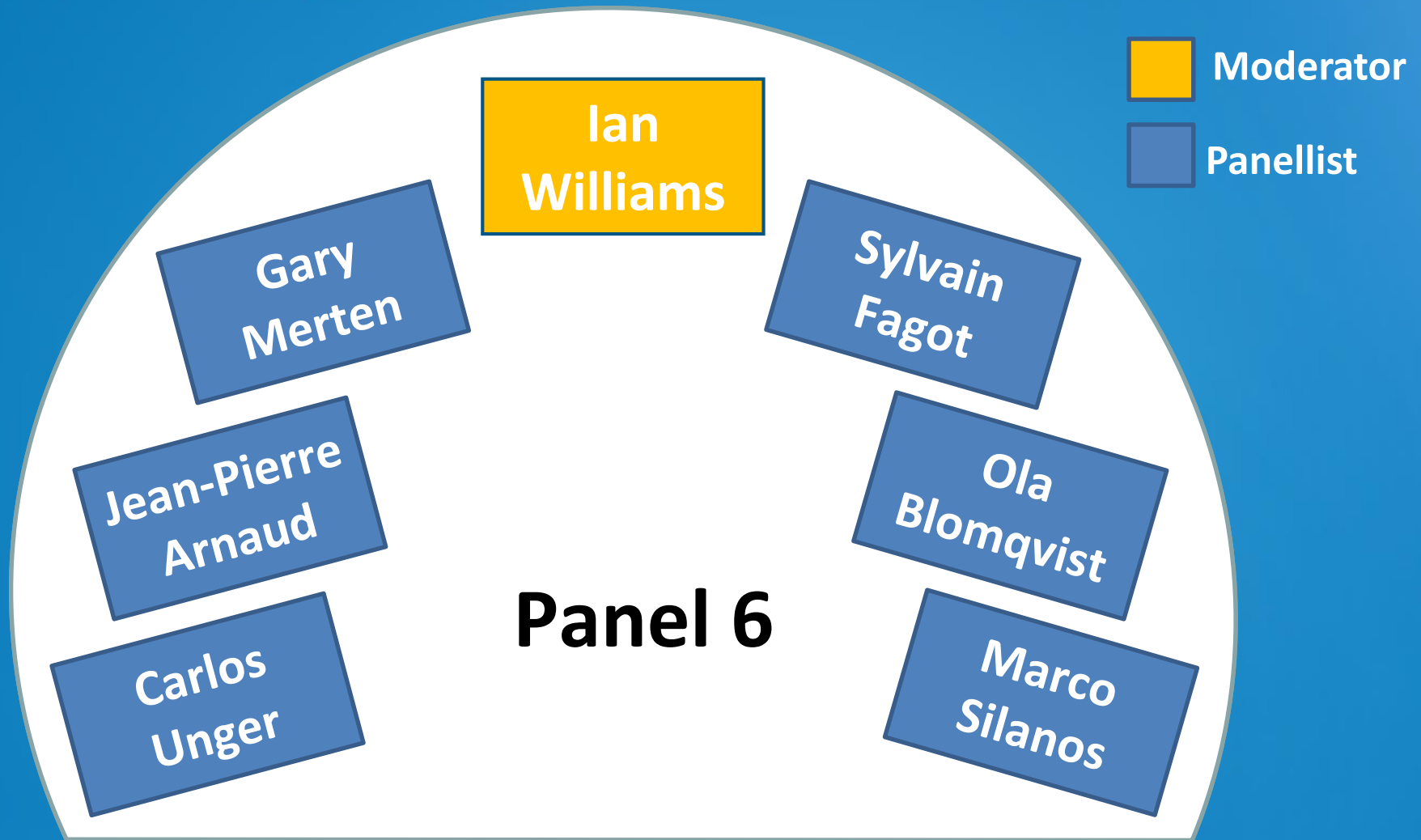
A blue horizontal bar at the bottom of the slide, with three white diagonal stripes on the left side.

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