



EASA
European Aviation Safety Agency

EASA Annual Safety Conference
Day 1, 14/10/2015

Panel 2

Training for the unexpected

Your safety is our mission.

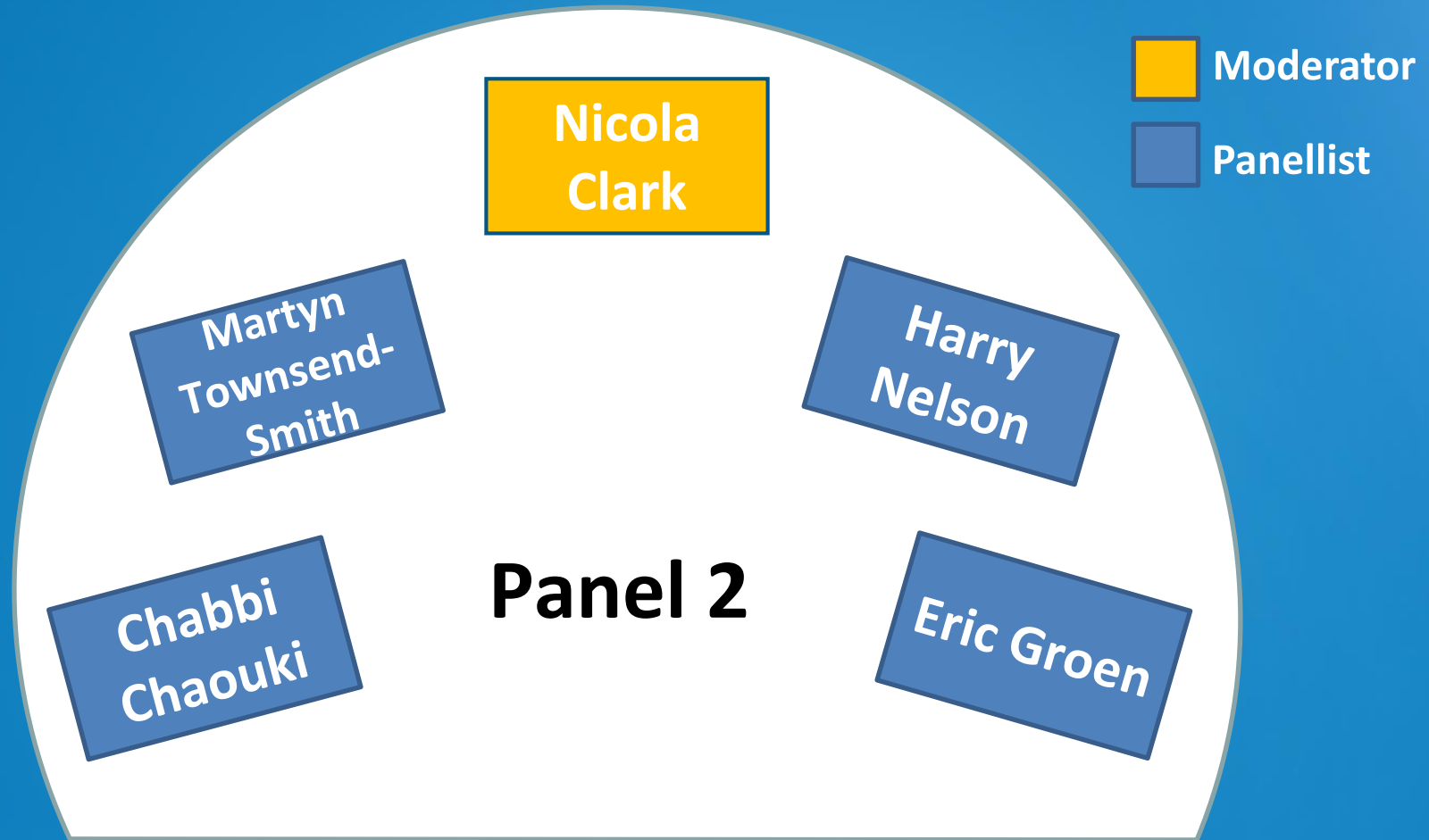
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Training for the unexpected



Your safety is our mission.



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EASA Annual Safety Conference 2015

Training in Aviation: Staying Fit for Safety

Panel 2: Training for the unexpected

Chabbi Chaouki,
Deputy Head of Air Crew & Medical Department, EASA

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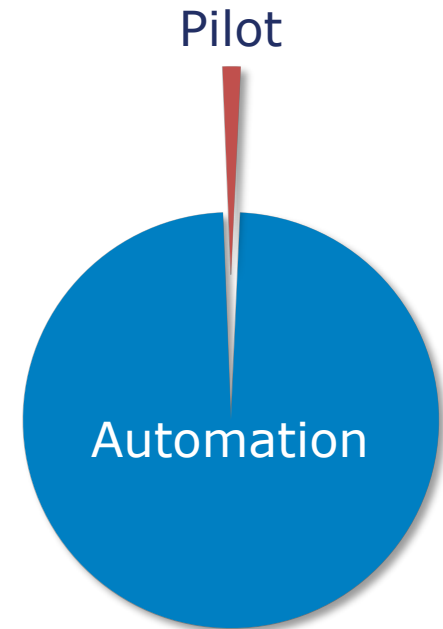
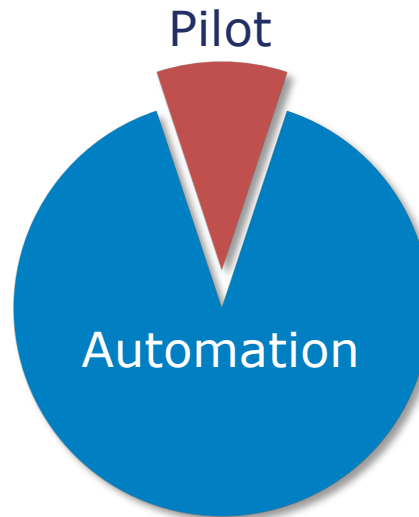
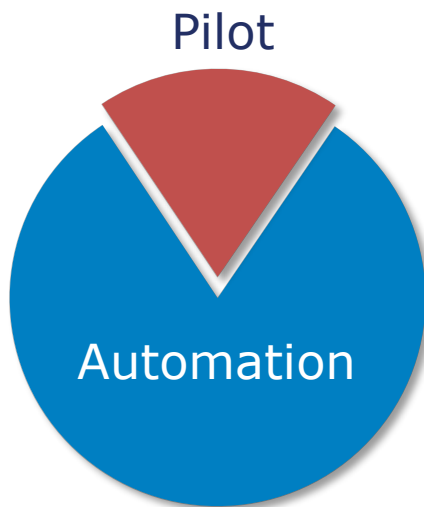




Why having a pilot on board?

Human pilot → for the unexpected

Automation → for all the rest



Technology ↗



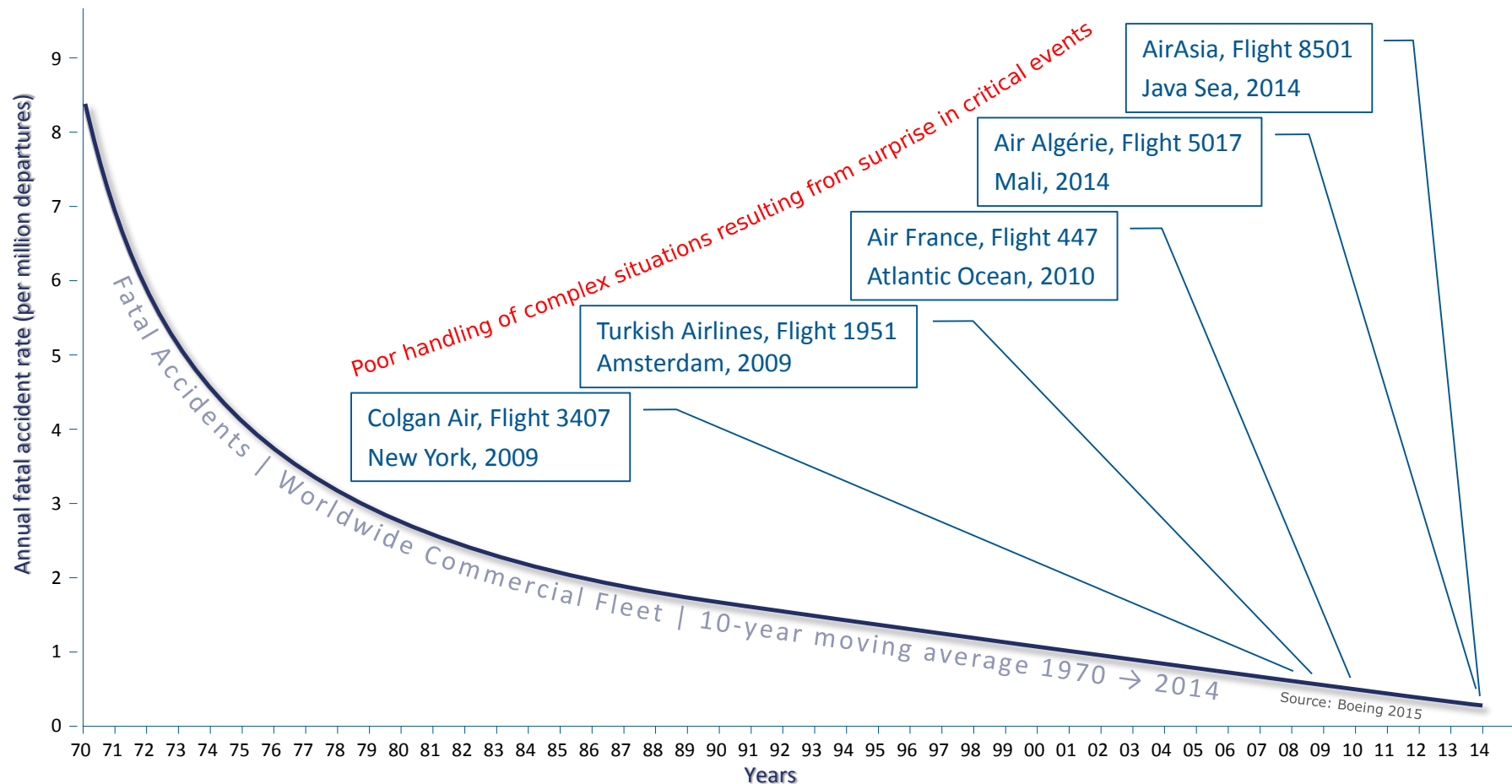
Trends in safety & the unexpected

Aviation system reliability ↗

Safety ↗

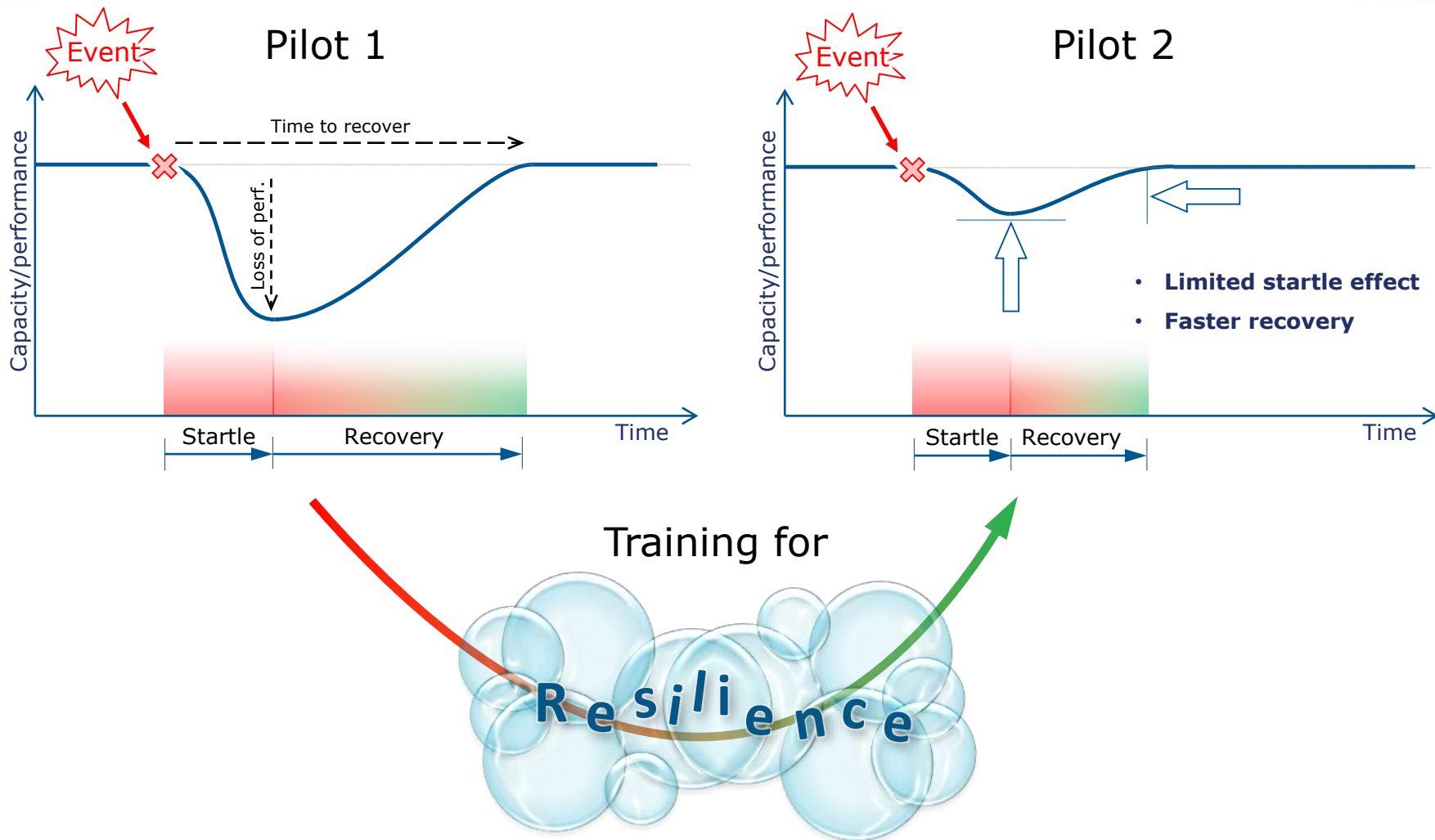
Unexpected ↘

Pilot startle ↗





A new dimension for pilot training





Challenges for better training





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THANK YOU

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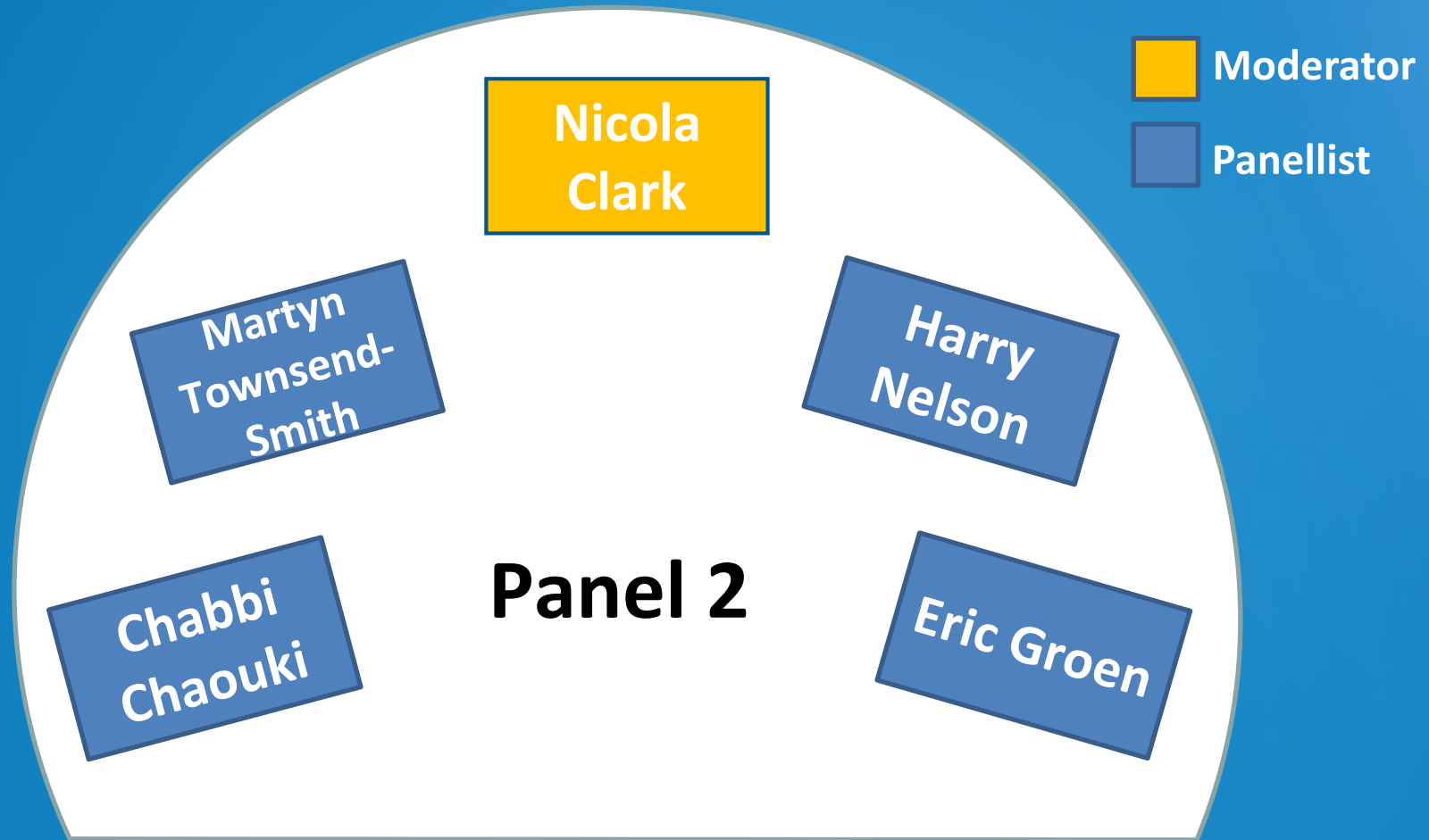
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Training for the Unexpected

Capt. Martyn Townsend-Smith

Head of Training
Boeing UK

EASA Training Conference
- Panel 2



What is the problem?

- One pilot's "unexpected" event is another's "so what?" event
- What differentiates the 2 pilots?

Is it specific training that targets known threats...(e.g. UPRT)

... or is it general training that reinforces core competencies?



4.7 million Euro funding by European Union



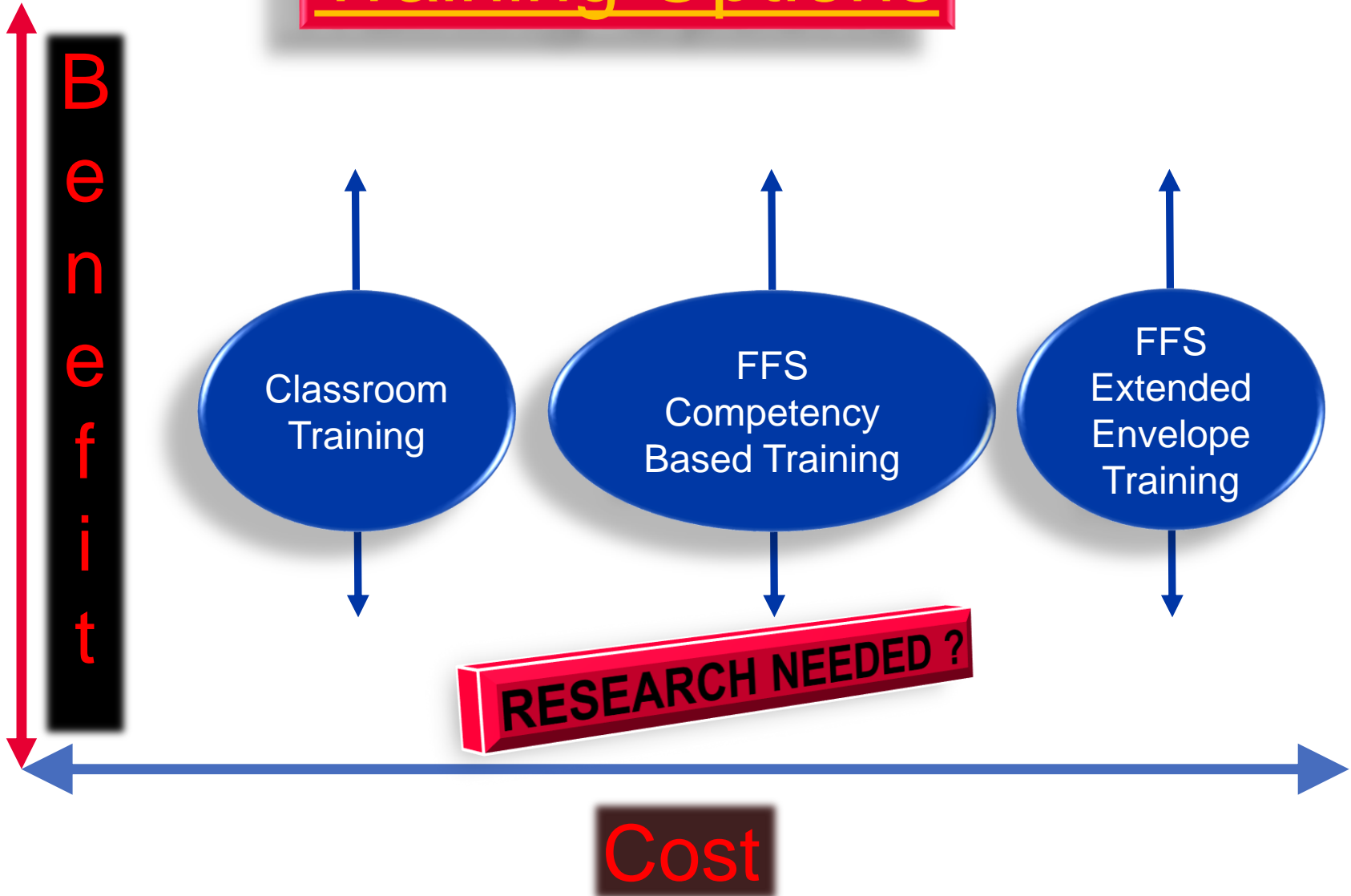
- Research completed
- Results being compiled and due for report soon



Whilst recognising the benefits of automated systems in 4th generation aircraft, evidence indicates that when pilots are faced with the unexpected they have difficulty transitioning from being monitors of aircraft systems to being authoritative decision makers, possibly involving manual control of the aircraft.

- Research presently suggesting low performing crews weak on...
 - *Manual flying skills*
 - *Application of procedures when workload low*
- Research presently suggesting high performing crews strong on...
 - *Communication skills*
 - *Problem Solving and DM*
 - *Leadership and Team Working*
 - *Workload Management*

Training Options



Way Forward?

- What is the problem ?
- Develop and validate required competencies
- Define performance markers
- Identify the best methods to train them
- Develop guidance for instructors
- Engage operators and regulators to implement and approve validated training.

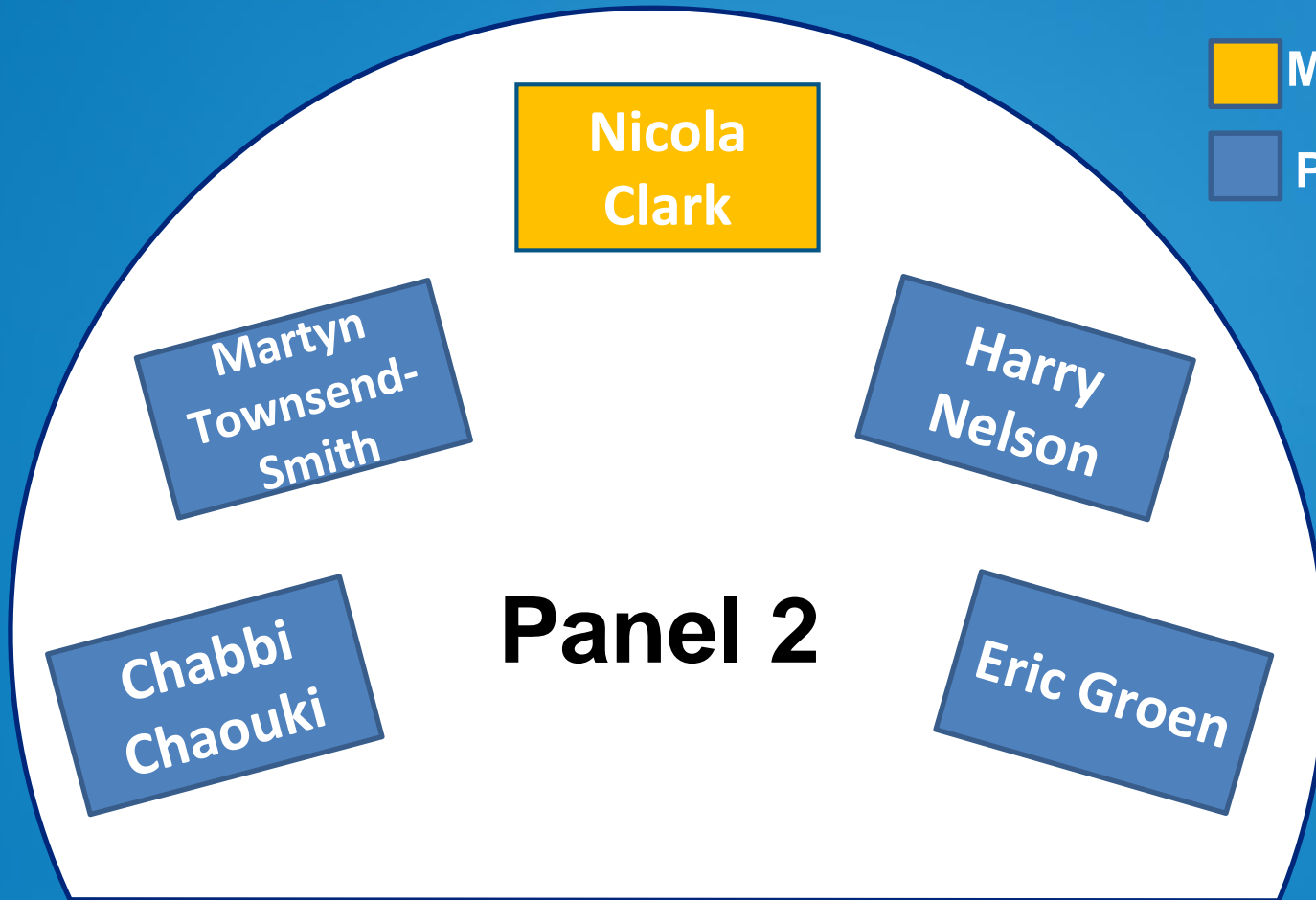




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Training for the unexpected



 Moderator
 Panellist

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EASA Training Conference 2015

Harry Nelson

Panel 2 -

Training for the unexpected

Luxembourg – 14th, 15th Oct 2015

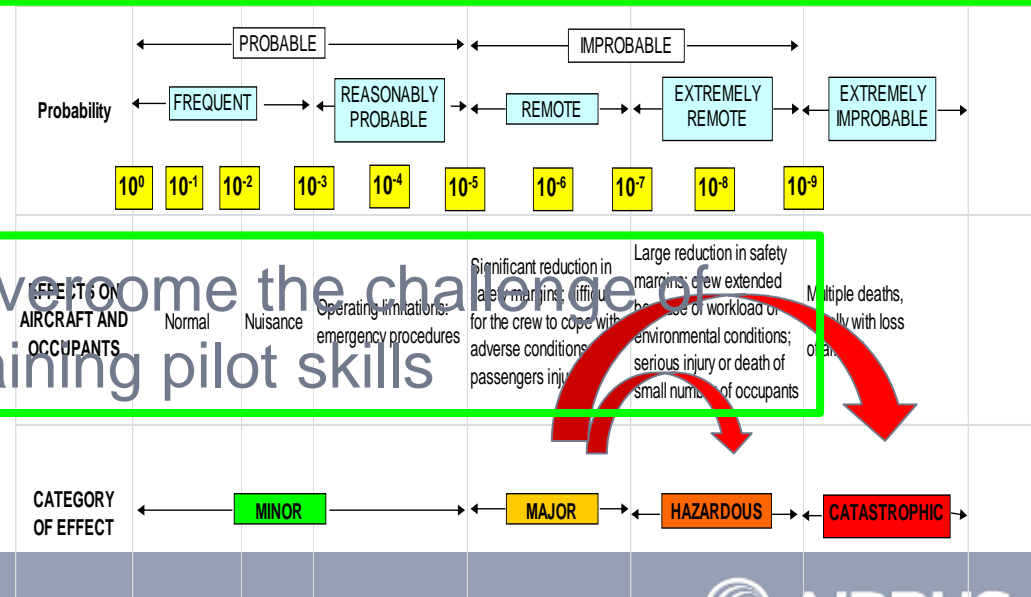
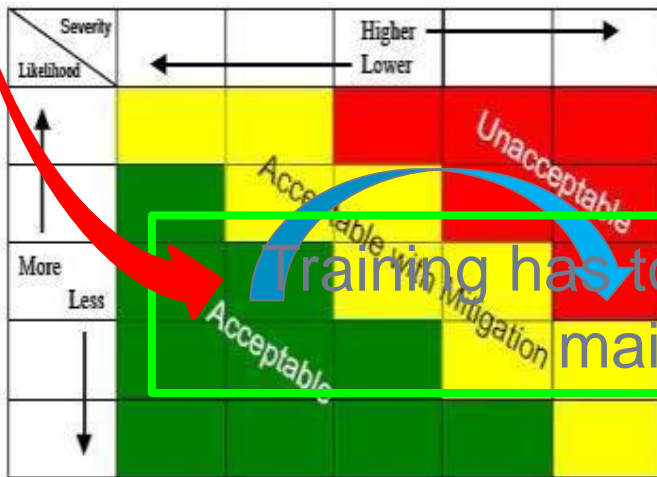
The training challenge

Flying is safe because it is based on the combination of 4 pre-requisites

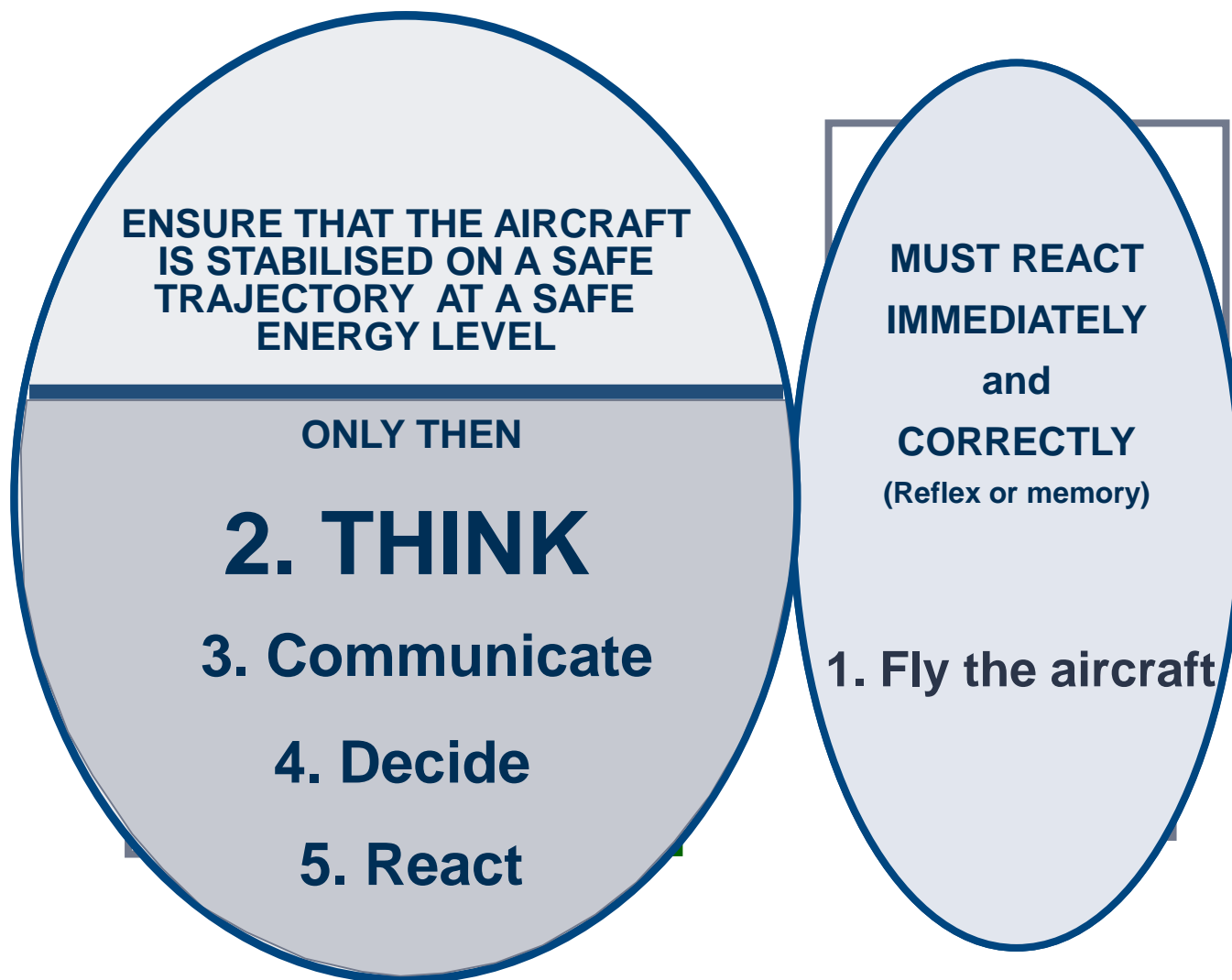
1. Safe design according to certification requirements
2. Aircraft maintained according to approved procedures
3. Aircraft are flown within a safe ATM on-route and airfield environment
4. Aircraft are operated by skilled and current pilots

These 4 pre-requisites are intrinsically linked together.

➔ Not fulfilling even one of these 4 pre-requisites may lead to a change from an acceptable risk into an unacceptable situation



What is expected – Reaction in terms of Time and Decision Making



... but what was “expected” is now the “unexpected”

→ Training has to overcome the challenge of maintaining pilot skills

→ Future training has to overcome the challenge of maintaining and also continually improving a relevant set of pilot knowledge and skills

1. Share best practice in Selection
2. Ensure relevance of advanced Ab Initio training
3. Ensure relevance of all examination requirements
4. Drive home CBT (Competency Based Training)
5. Develop the basis for “Pilot Full Career Training”
6. Review links between certification and training

Anticipate “the unexpected”
- it is now “Normal”

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Thank you for listening



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Nicola
Clark

Martyn
Townsend-
Smith

Harry
Nelson

Chabbi
Chaouki

Eric Groen

Panel 2

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Simulation of “zero-exposure events”

Panel 2: Training for the unexpected

Dr. Eric Groen
Senior scientist at TNO
Aerospace physiologist



“Zero exposure” events

- Events normally not encountered by pilots because they are:
 - Extremely rare (in-flight operations)
 - Difficult to simulate (training)
- Potential to cause “startle”
- We focus on 2 cases:
 - Spatial Disorientation
 - Upsets, including aerodynamic stall

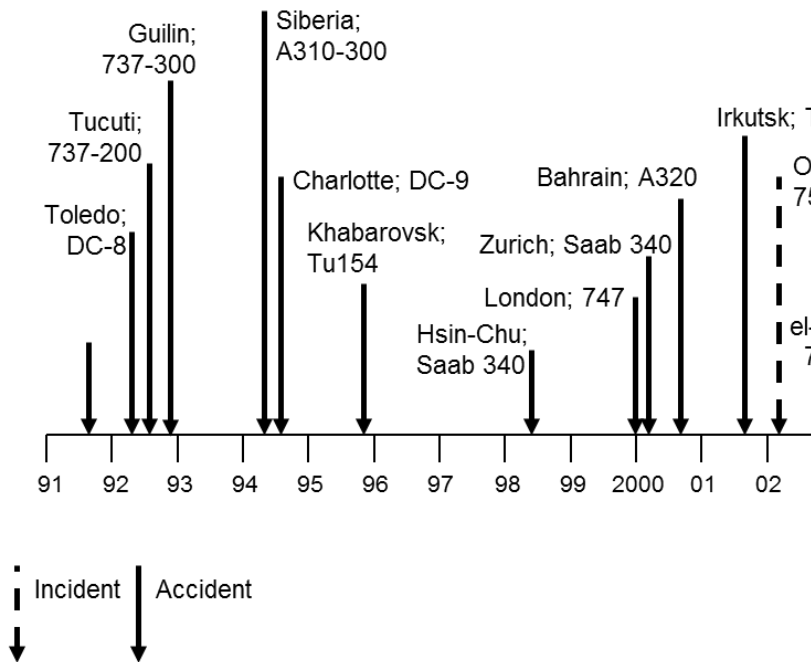
Spatial Disorientation

- Type I - Unrecognized
 - Type II - Recognized
 - **Type III – Incapacitating (=startle)**
- CFIT
- LOC-I
- Example: startle in F-16 pilot



Spatial Disorientation

- Suspected SD events in commercial aviation (Boeing study)
- 17 + 1 cases between 1991 – 2008; ~ 1 per year
- Development of “SD Investigation Tool” with TNO



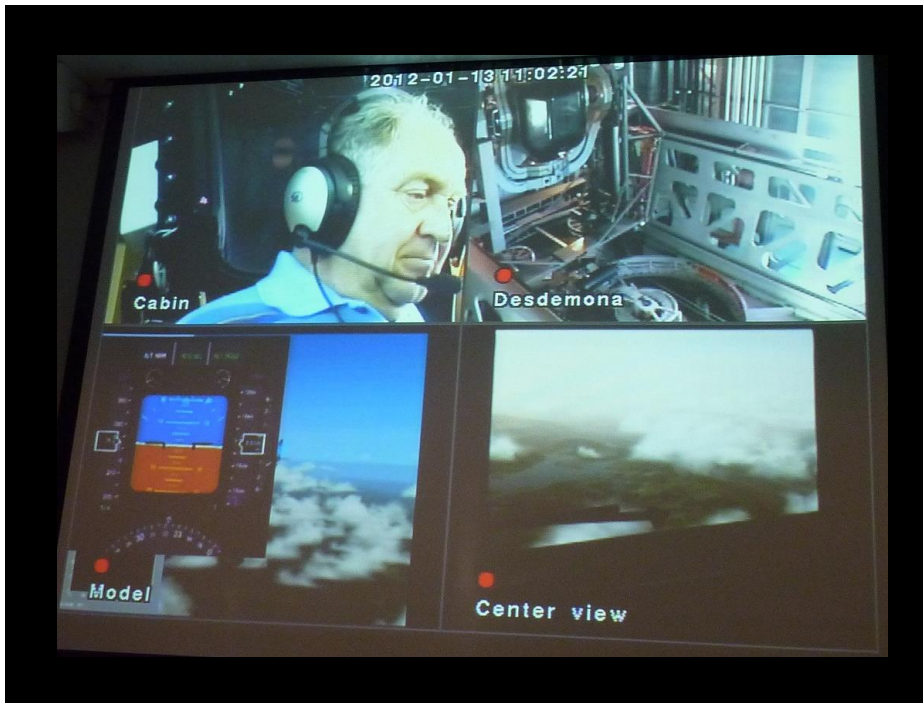
Upsets, including stall

- FP-7 project SUPRA:
 - Extended aerodynamic model
 - Full motion simulation in DESDEMONA (including g-loads)
- Model capabilities at large angle-of-attack
 - Lateral/directional instabilities, e.g., wing-drop
 - Altered control response
 - Randomness



Upsets, including stall

- Test pilot evaluation of SUPRA (N=11)
 - “Representative stall behavior of transport aircraft”
 - “Valuable for pilot training”



Conclusion

- Prepare pilots for the unexpected by “awareness training”:
 - Reproduction of zero-exposure events
 - Self-experience is important (“Know Thyself”)
 - When prevention fails

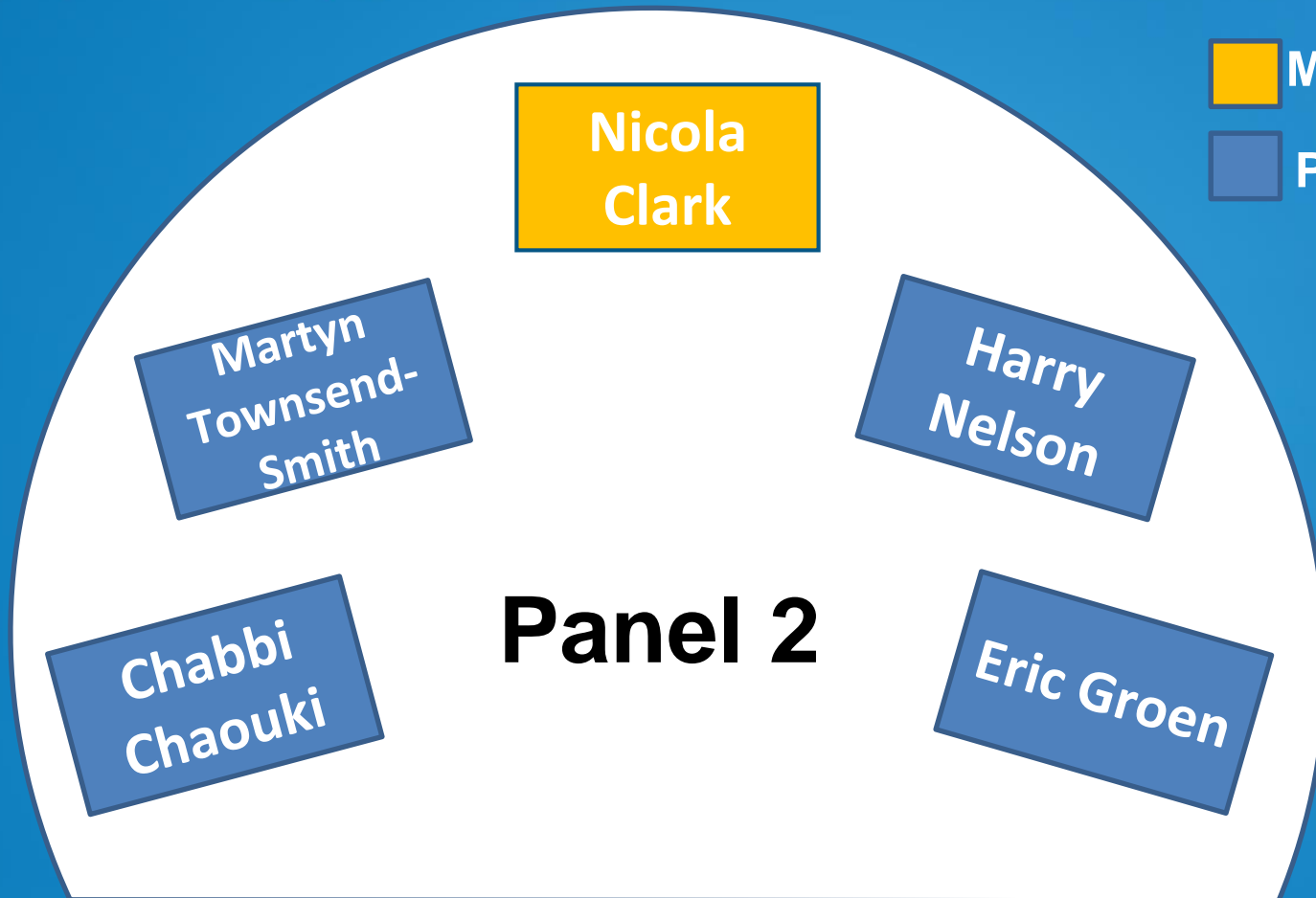




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