



EASA

European Aviation Safety Agency

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

Panel 3

Addressing the top Risk- Upset Prevention & Recovery

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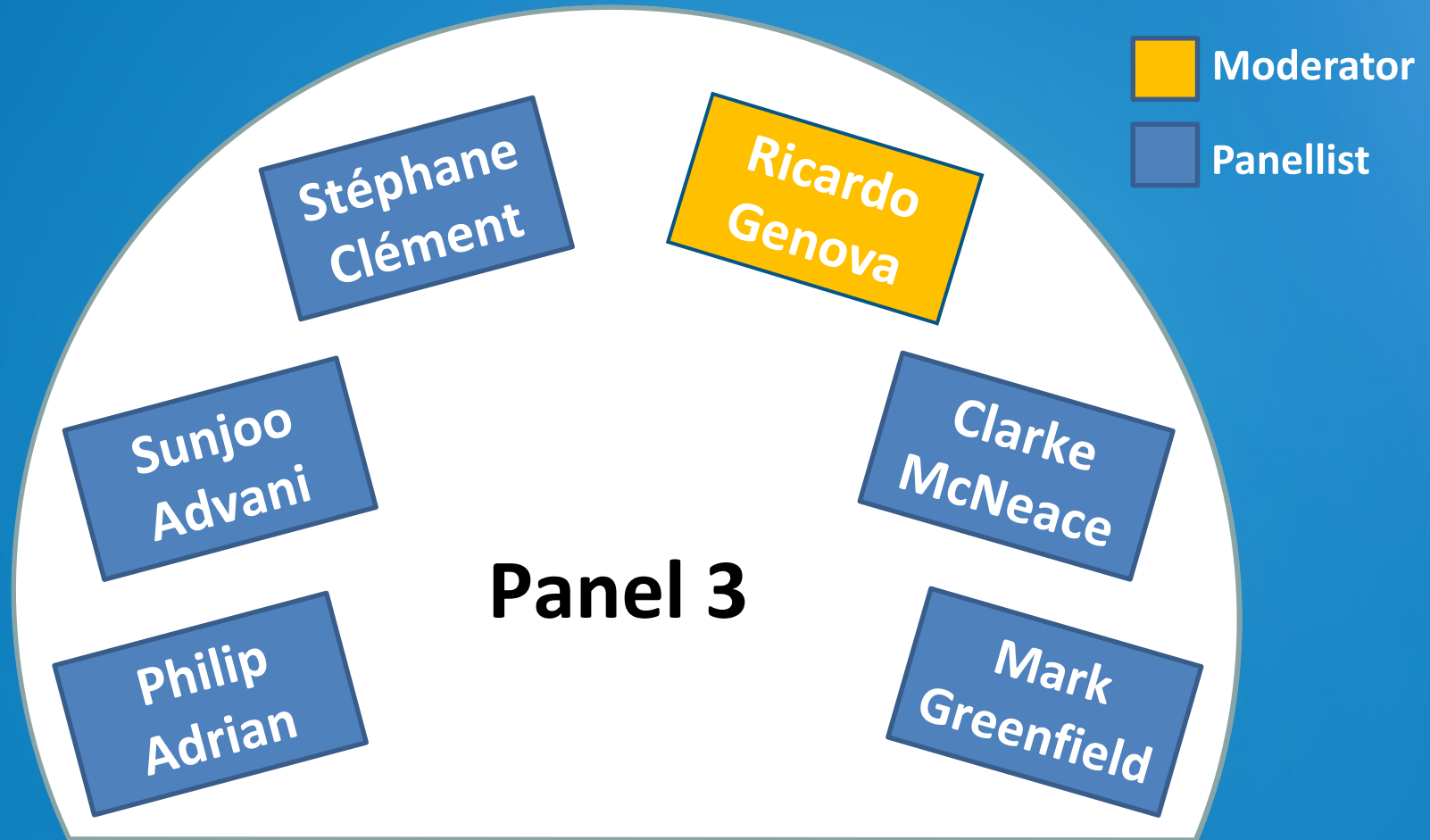




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Addressing the top Risk- Upset Prevention & Recovery



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Addressing the Top Risk Upset Prevention & Recovery

Ricardo Génova Galván
Flight Standards Director - EASA
14/10/2015

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TE.GEN.00409-001



Addressing the Top Risk: Upset Prevention & Recovery

The Three Main Causes of Aircraft Accidents

Type	2003-12			2004-13			2005-14		
	Accidents	Fatalities	% Over Total	Accidents	Fatalities	% Over Total	Accidents	Fatalities	% Over Total
LOC-I	18	1698	38.5	16	1576	39.5	17	1706	41.8
CFIT	17	972	22.1	16	804	20.2	16	804	19.7
LNDG	16	793	18.0	17	796	20.0	16	771	18.9

Totals	75	4408
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72	3986
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72	4045
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LNDG includes RWY excursion after landing, abnormal RWY contact and Undershoot/Overshoot

Source: Statistical Summary of Commercial Jet Airplane Accidents – Worldwide Operations.

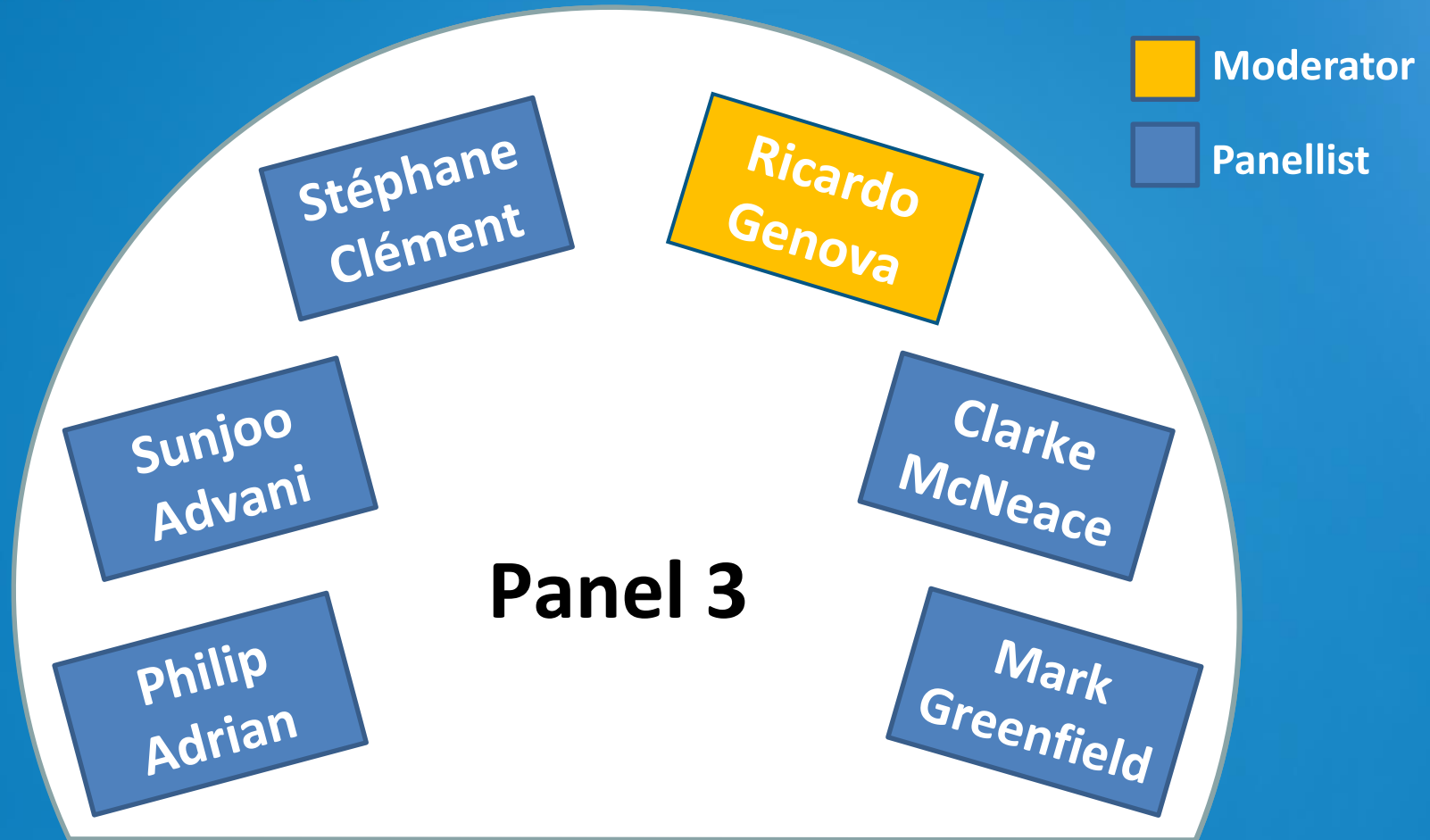
Boeing Commercial Airplane Group



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Upset Prevention and Recovery

A historical perspective into the future

Capt Philip Adrian
Assistant Chief Pilot – Pilot Services
Boeing
ICAO LOCART Chair
Philip.Adrian@boeing.com

History of progress

- **Where did we start?**
 - Upset Recovery trained as maneuver only
 - (Approach to) stalls trained as “precision exercise” with powered recovery
 - No prevention trained for stalls or generic upsets
 - Minimal to no training during Licensing part

- **What was done up to this point?**
 - FAA Stall/Stick Pusher WG
 - FAA ARC 208
 - ICAO LOCART
 - FAA AC publication
 - EASA RMT 0.581/0.582

- **What is next???**

Next Steps

YOU ARE NEXT

- **Pilots:**

- Use well qualified schools with expert instructors

- **Instructors:**

- Standardize, don't experiment

- **Operators:**

- Incorporation of Regulation and recommendations
- Instructor training and standardization
- Train to proficiency regarding techniques and procedures

- **Regulators:**

- Appropriate oversight
- Don't add or redo industry work, there is time and reason behind everything that has been published

Focus areas

- **Prevention is key, however, recovery skills need to be maintained. Don't forget to train both**
- **Scenario Based training needs to supplement recovery skills**
- **Do not start setting artificial requirements such as altitude loss, g-load limitations etc. at any level, either at regulator, management or via instructor expectation**
- **Don't change simulators without OEM cooperation**
- **Share experiences and scenarios. This is an industry problem that cannot be solved by individuals!**
- **Please coordinate with your OEM and do not experiment! OEMs are independent, safety oriented, knowledgeable, and have the expertise and willingness to support**

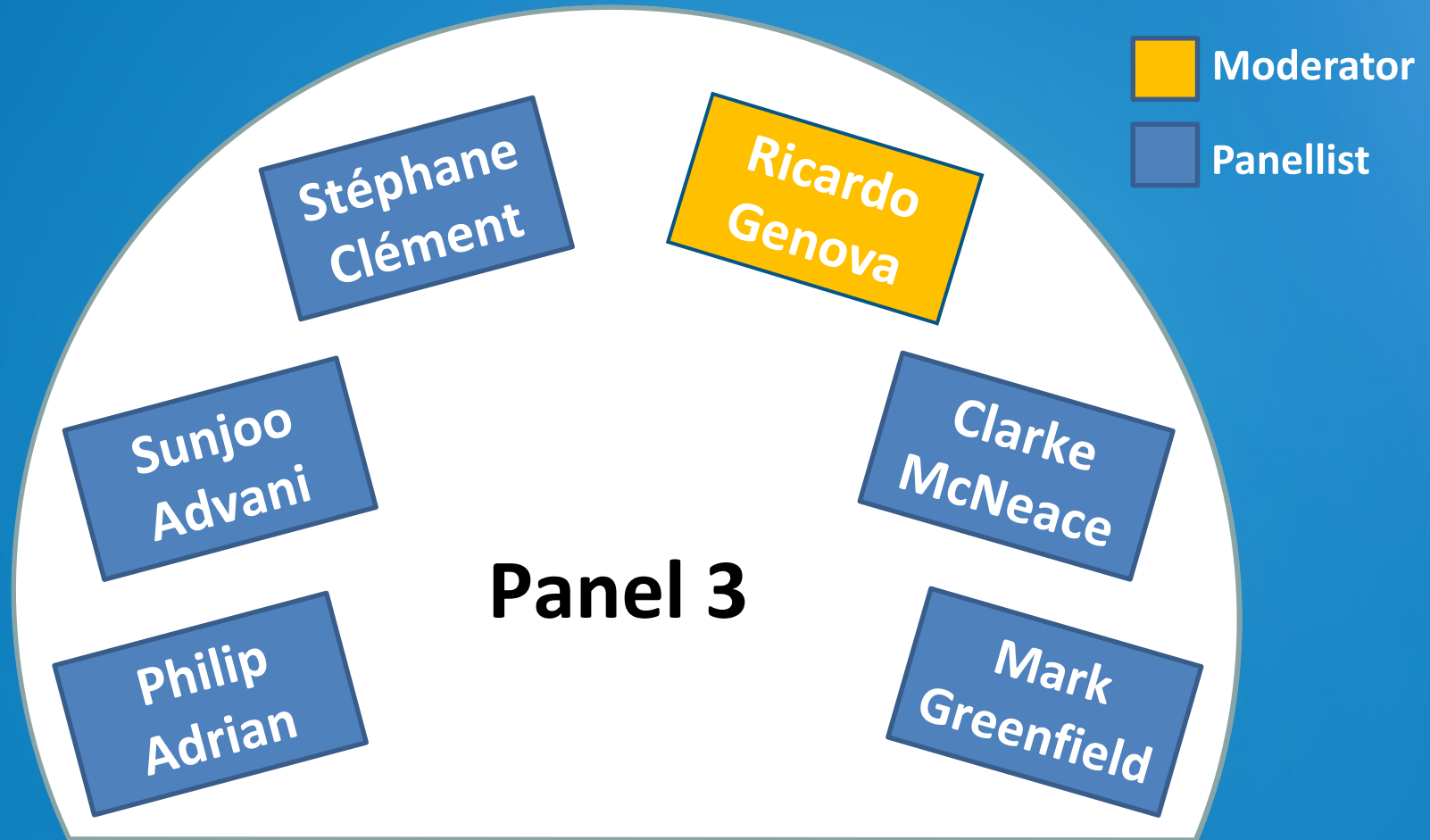
Do no harm!



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ICATEE's Lessons Learned

Dr. Sunjoo Advani - IDT b.v.
Chairman of ICATEE

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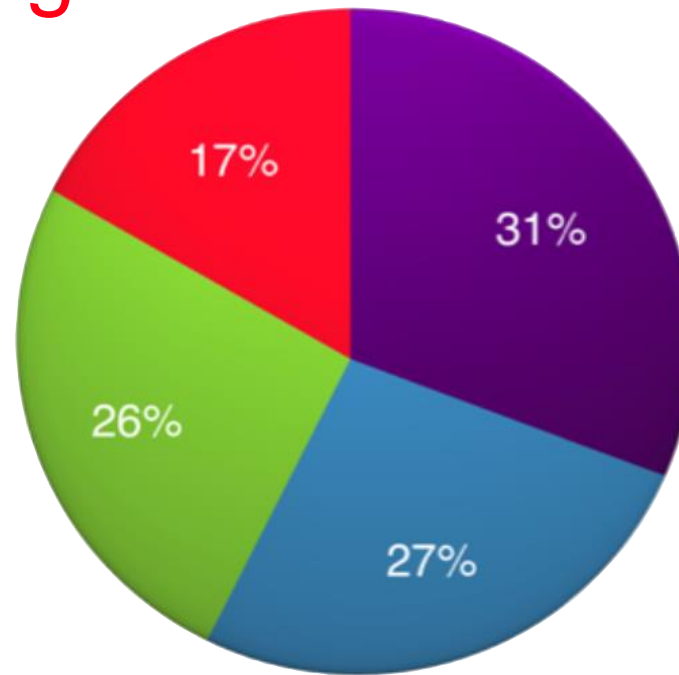


ICATEE UPRT Task Analysis

On-Aircraft
Training

Academics

Enhanced
Simulators



Current-Generation
Simulators



Academic Knowledge Priorities

- Academic knowledge is perishable
- Examples:
 - Stall characteristics of civil transports
 - Thrust available at altitude is a lot less than you think
 - Need to know trim condition and how the airplane trims
 - Stability reductions in speed and roll
 - Pilot monitoring and CRM skills
- *Academics make sense when practiced!*



Practicing Academics in FSTD

- How to invoke surprise (successfully, repeatedly)
- Undoing poor recovery techniques:
 - Temptation of using thrust in stall recovery
 - Leveling wings first
 - Fighting the temptation to pull when overbanked
- The challenge of high-altitude recoveries
- The challenge of using rudder (i.e. don't)



UPRT in practice today

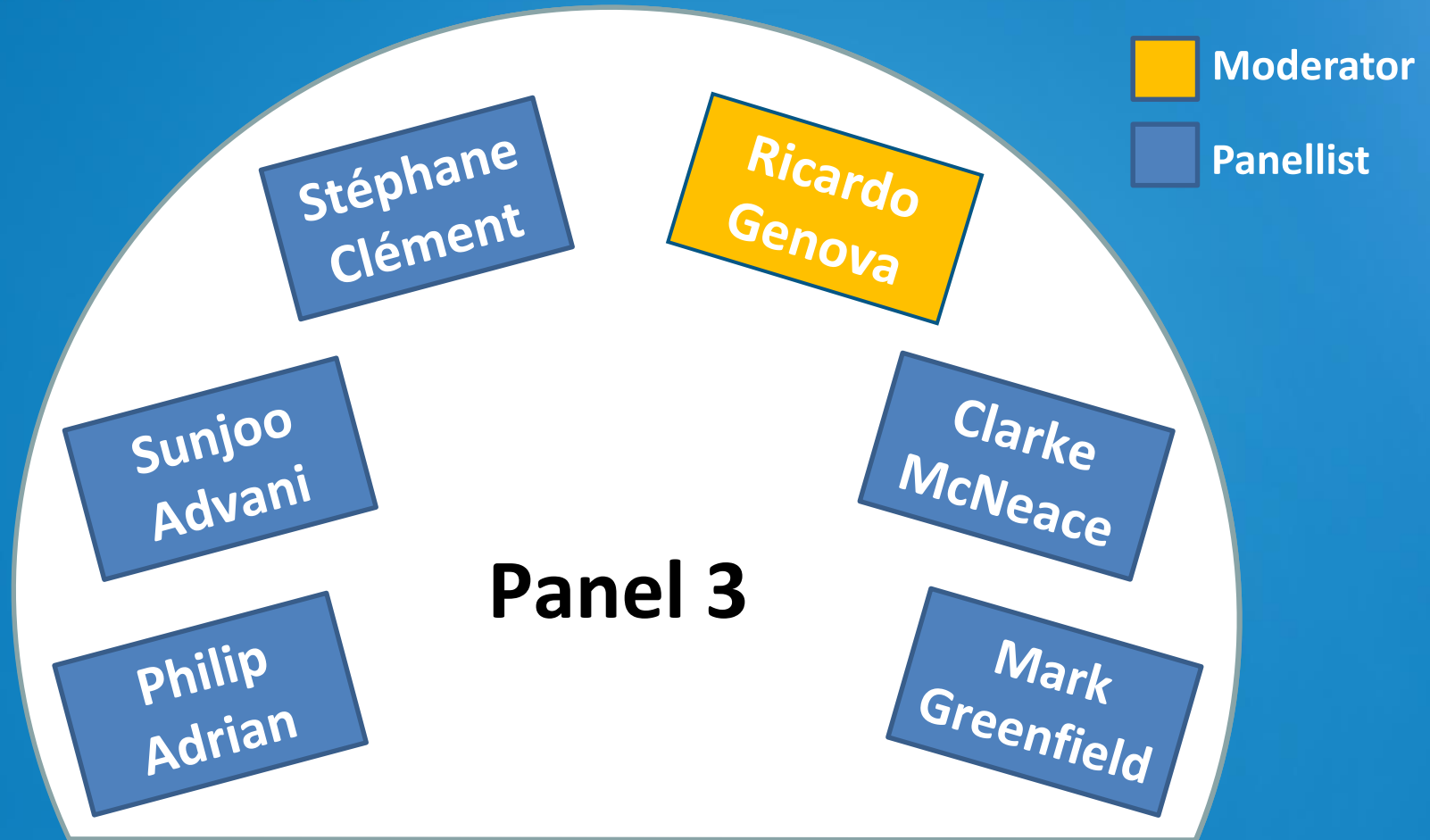
- Develop a company UPRT strategy
- Academic and on-aircraft training
- Instructor training
- Simulator training:
 - A lot can be done now before full stall training
 - Proper simulator use
- Goal: train for unexpected events (even if no SOP)
 - Task prioritization
 - Apply strategies
 - Situation analysis



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EASA ANNUAL SAFETY CONFERENCE

UPRT PANEL

Stéphane Clément

Director of Regulatory, Aviation Safety and
QA

Luxembourg, October 14th, 2015



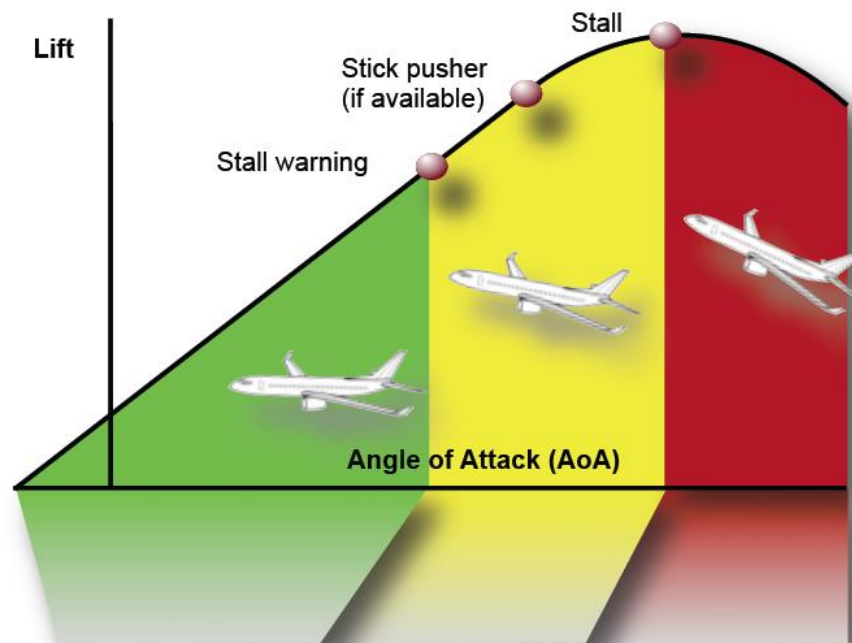
CAE'S HIGH-LEVEL POSITION ON UPRT

- **CAE welcomes new UPRT regulations**
 - To address the leading cause of fatalities in com. aviation.
- **CAE participated** in UPRT working groups in recent years
 - **Global effort** with ICAO, EASA, FAA, OEMs and others
 - **Output: ICAO Manual** on Aeroplane Upset Prevention and Recovery Training (ICAO Doc. 10011)
 - CAE supports it.
 - “The use of FSTDs...complements the application of knowledge and techniques introduced through on-airplane UPRT at the CPL or MPL licensing level...”
 - CAE hopes that all Civil Aviation Authorities will **harmonize their regulations** with it.



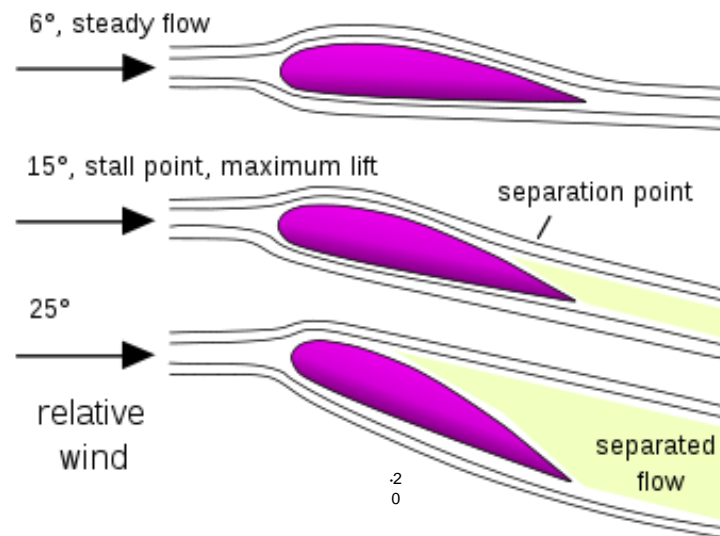
MYTH VERSUS REALITY – A FEW EXAMPLES

"Myth"	"Reality"
Approach to stall training is good enough for stall training.	<ul style="list-style-type: none">• Not good enough as a number of recent high-profile accidents went beyond approach to stall.• Much value in training at higher angles of attack, to familiarize pilots with their specific airplane characteristics at stall onset.



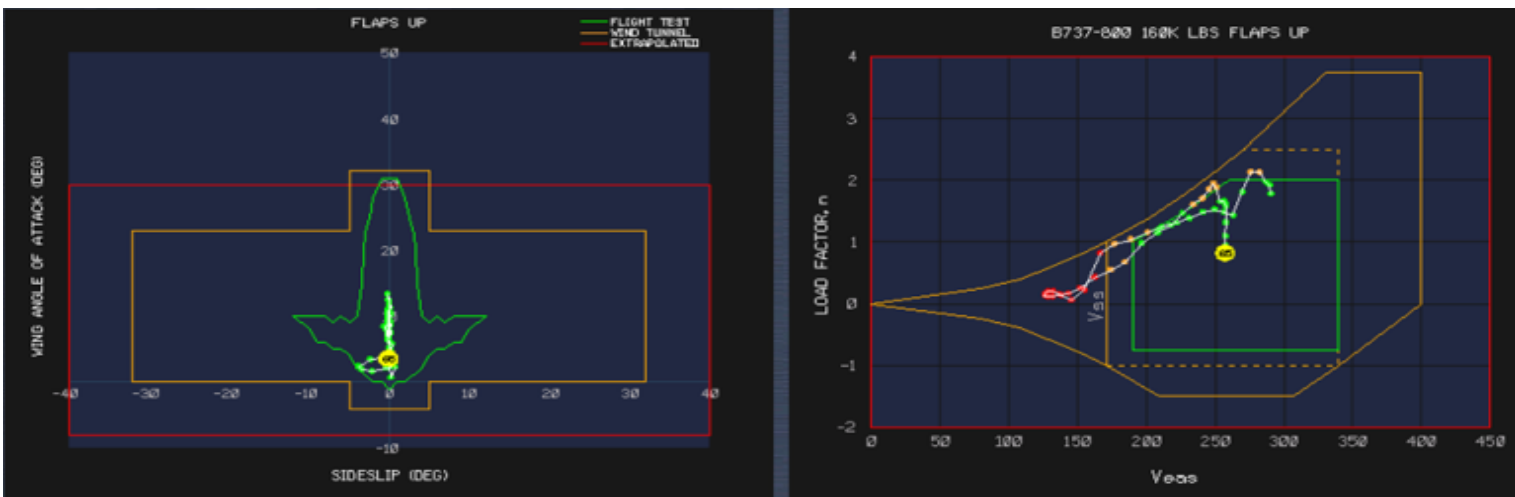
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From an aerodynamics point of view , stall cannot be simulated well in a simulator.	<ul style="list-style-type: none">• With the necessary data, aerodynamic stall can be modeled.• Both the longitudinal and lateral aircraft specific characteristics should be modeled.



MYTH VERSUS REALITY – A FEW EXAMPLES

"Myth"	"Reality"
UPRT cannot be trained in a simulator because the VTE will be exceeded.	A properly executed LOC-I recovery remains in the Validated Training Envelope (VTE).
Simulator instructors cannot compensate for missing cues in the simulator during UPRT.	<ul style="list-style-type: none"> Instructor tools can help compensate for missing cues (e.g. displays for acceleration cues, angle of attack, V-n diagram.) The instructor may convey this info to the pilot.



CAE'S KEY STEPS ON UPRT IMPLEMENTATION



- **From ab-initio to advanced pilot training**
 - Ensure clear understanding with OEMs.
 - OEMs to provide UPRT info, flight data / models to simulator manufacturers and training providers.
 - Update courseware and get course approvals
 - Train our UPRT instructors
 - Update simulators (as appropriate, for aerodynamics and instructor tools) and evaluate their suitability for training.
- Continue co-operation with EASA and other Aviation Authorities
 - Should EASA choose to further investigate simulator requirements for UPRT, CAE would be willing to support.
- Share CAE's UPRT experience with UPRT stakeholders
- Promote global UPRT regulatory harmonization.



THANK YOU

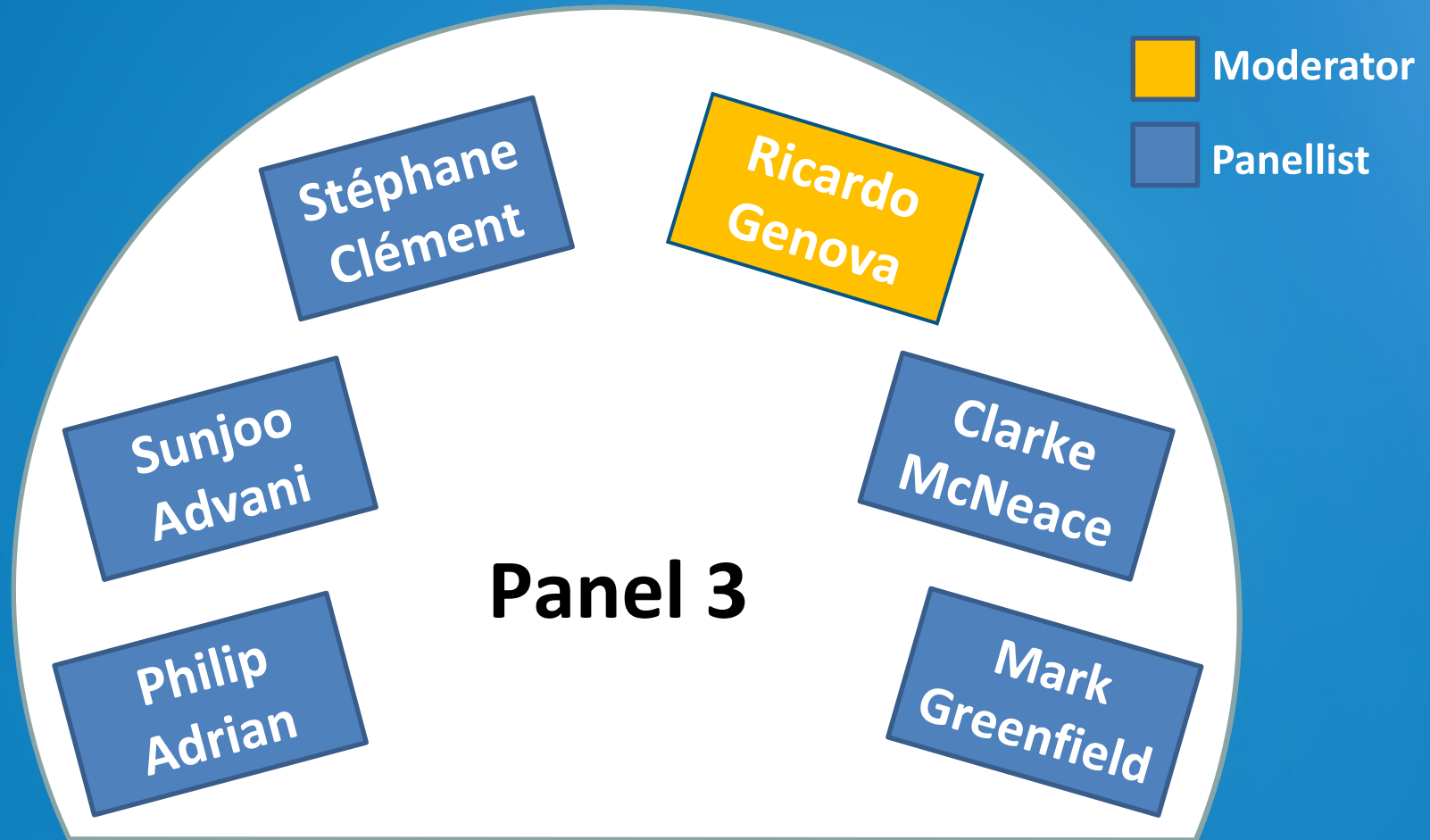




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UPRT Safety Concerns & Considerations

Clarke “Otter” McNeace, Aviation Performance Solutions

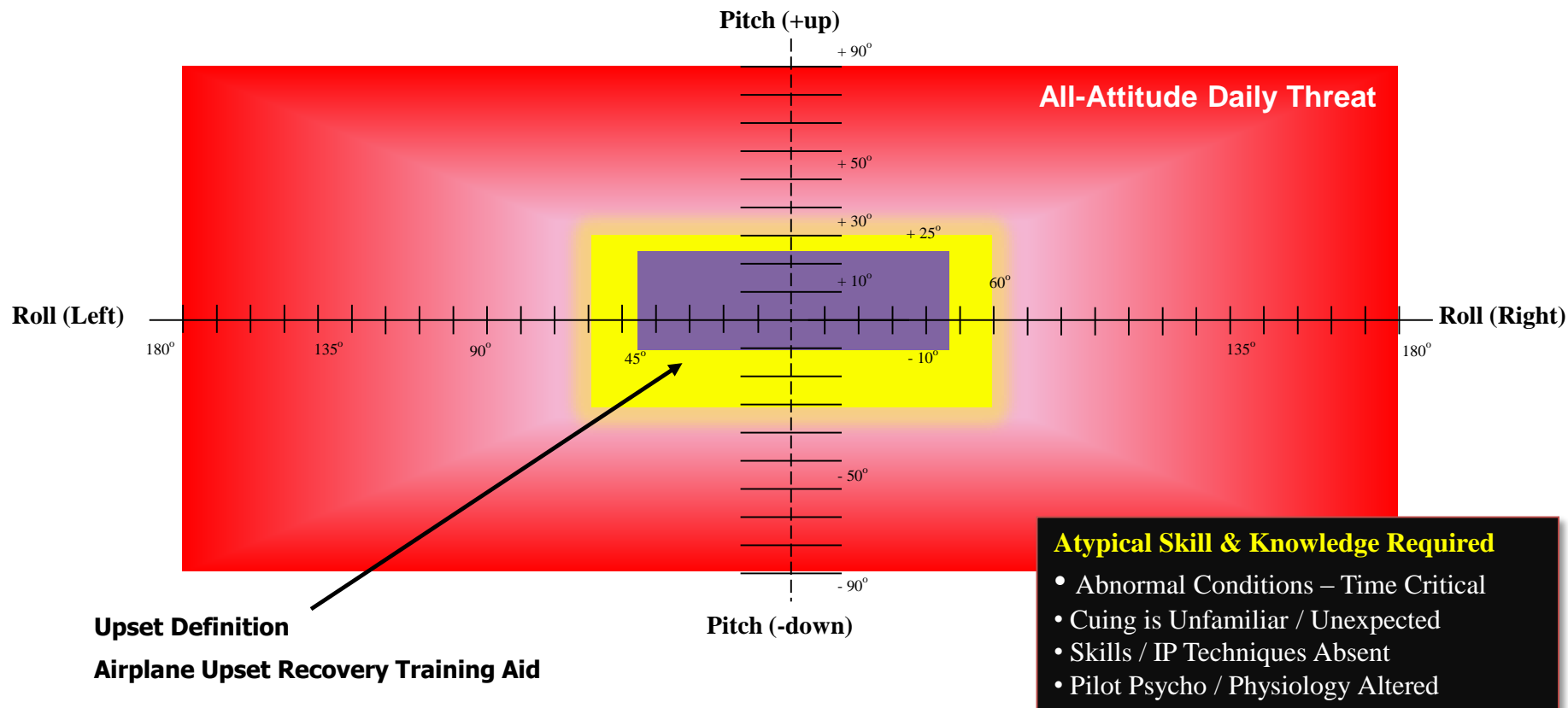





UPRT NPA Safety Concerns

1. ATO & Airline limitations to develop safe & transferable UPRT program

- ***Who has trained them?*** They have no experience in comprehensive UPRT as prescribed by ICAO & EASA

All-attitude Perspective & Analogy



	100 %	All-Attitude Training (180 AOB, +/- 90 Pitch)
	11.1 %	Max Licensing Limits (60 AOB, +/- 30 Pitch)
	4.9 %	Upset Definition (45 AOB, +25 & -10 Pitch)



FEAR

It won't help you get right-side up

UPRT NPA Safety Concerns

1. ATO & Airline limitations to develop safe & transferable UPRT program
2. **Twin-engine margin of safety during stall training**
 - ATOs are currently being required by NAAs to demo aerodynamic stalls on rating rides

Light Twin Stall Margin of Safety

- What is the certified spin margin of safety?
 - Approved for intentional spins? -No
 - Unintentional spin protection? -No
 - Same as SP? -No
 - CS-23: No undue tendency to spin in a stall with the critical engine failed
- Are there any risks in:
 - Accelerated Stall? / Prolonged Stall? -Yes
- Margin of safety after the stall?

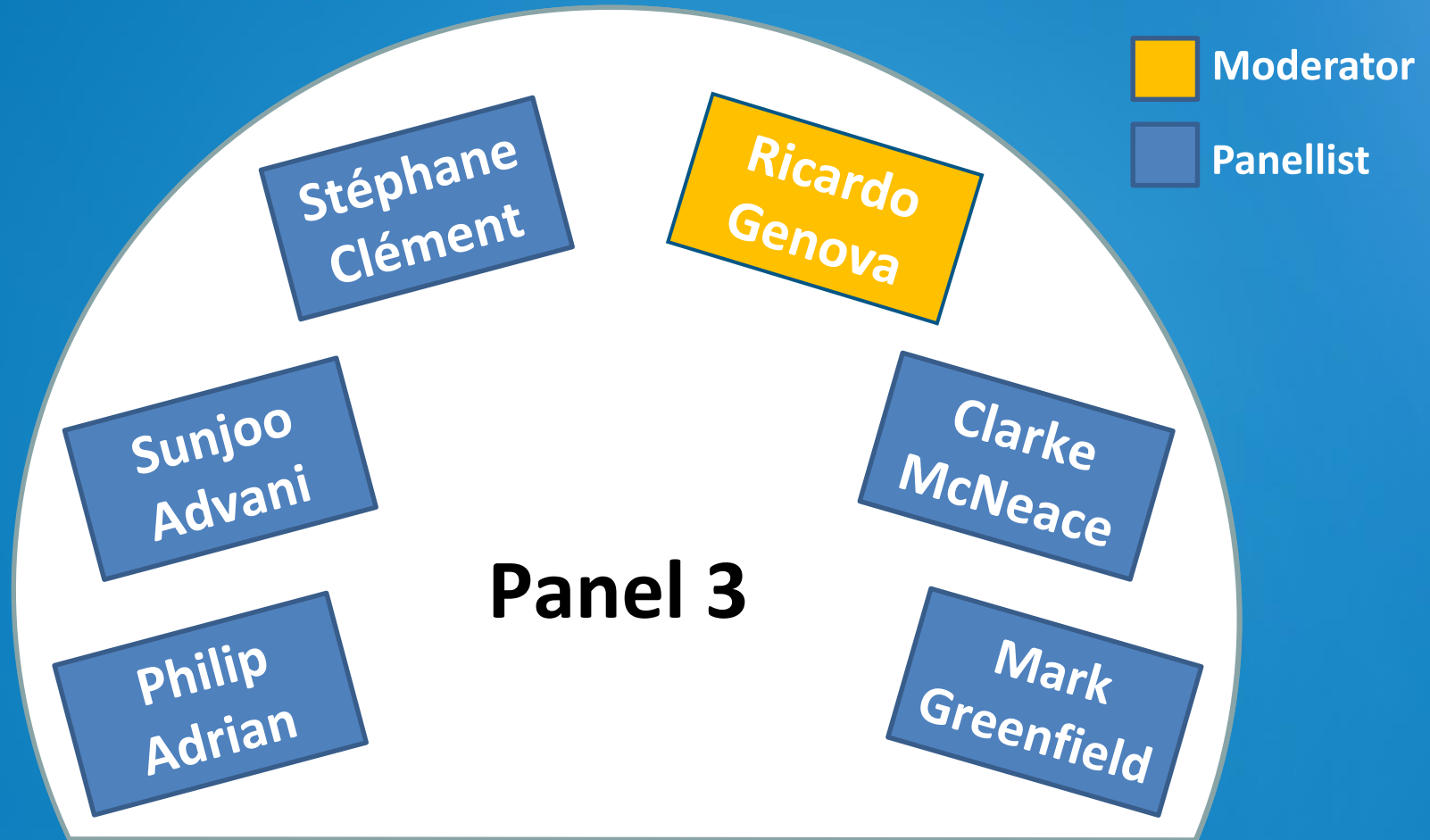




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The role of on-aircraft UPRT



Avoid – Recognise – Recover

Integrated Academic, On-Aircraft and FSTD UPRT

Stand alone UPRT v Full integration with ATO



'STARTLE' – OR FEAR?



KISS -Keep It Simple Stupid!

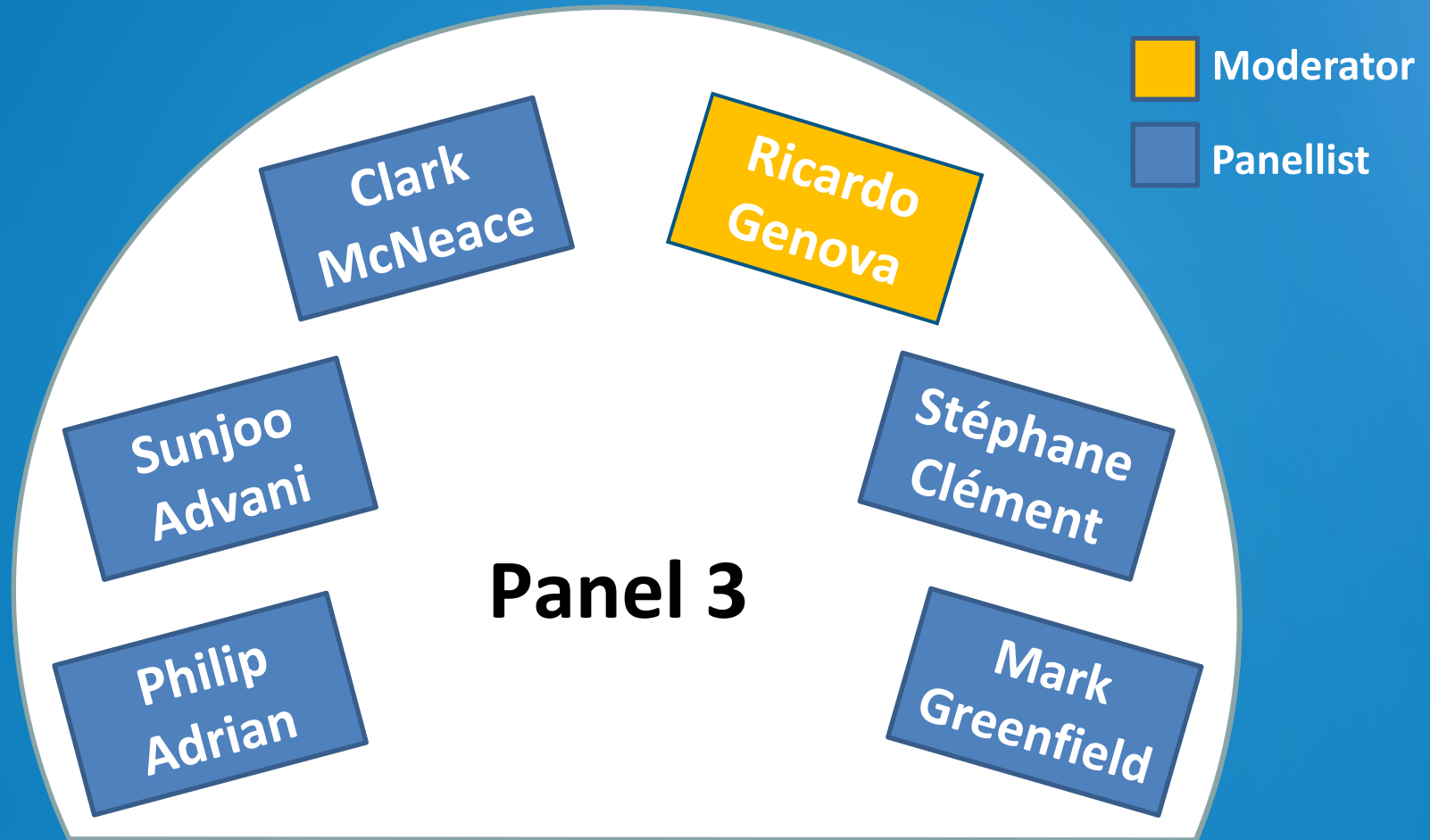




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