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Training to Prevent Upset

Training recommendations

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Symptoms – an introduction.

- Lots of talk today regarding Upset
- Loss of control? Loss of Situational Awareness?
- Some say it is the # 1 killer – not for our aircraft!
- We are proud to have developed envelope protection over 30 years ago to address this very issue and counter the threat of Upset.
- You must all agree that prevention is better than cure!

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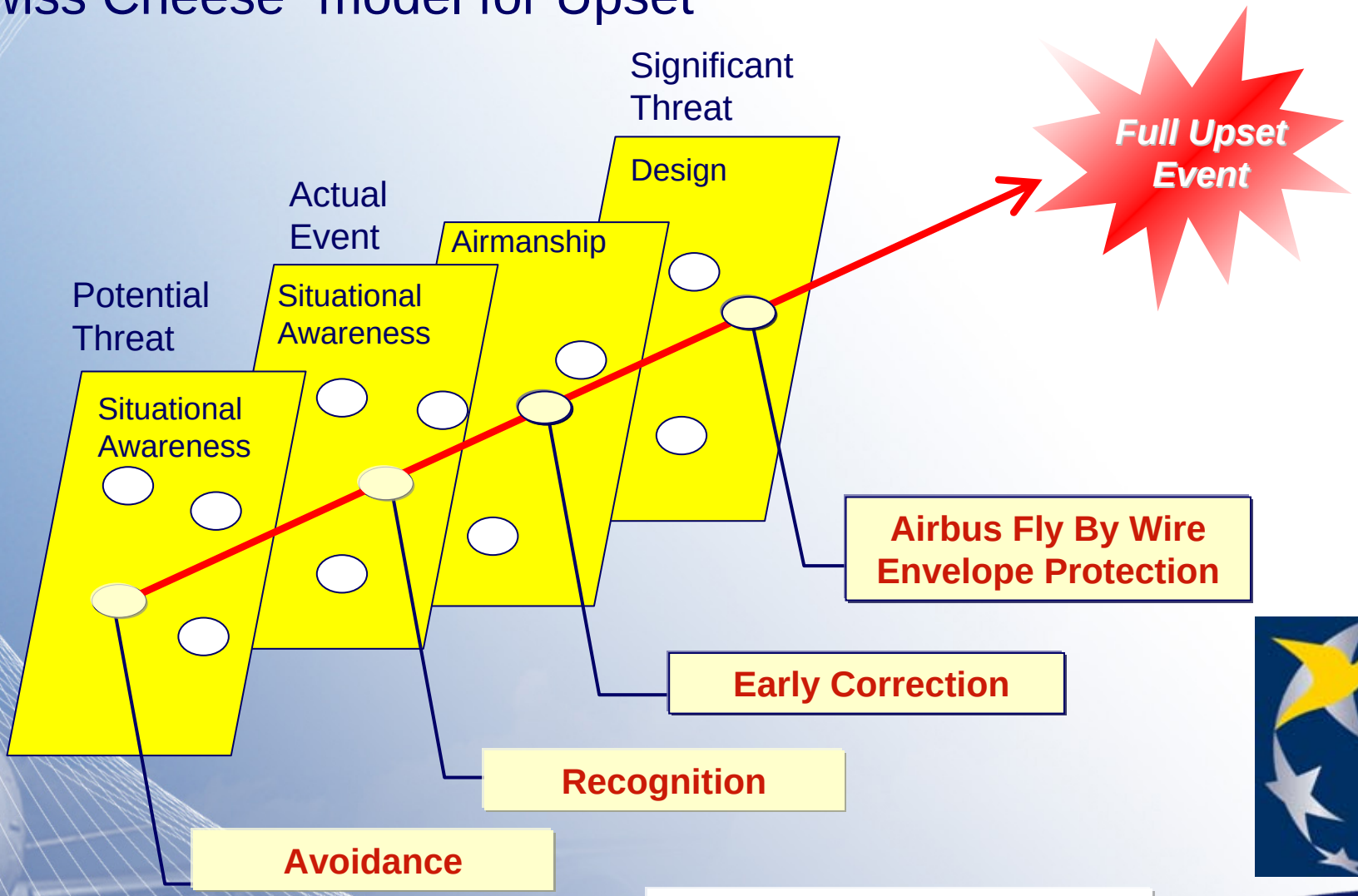
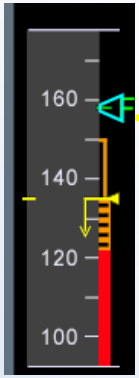
Preventing Upset, the cure?

The “Swiss Cheese” model for Upset



Adapted from Reason,1990

Upset Root Cause



Direct?

Recognition
-Monitoring
- S.A.

Prevention
-Recovery
- Avoidance

Full Upset

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The Right Stuff?

- **EASA Conference on pilot training for a safe aviation today and tomorrow: "Are pilots trained to meet the challenge?"**

- **Pilots must be given the Knowledge, Skills and Attitudes to avoid full upset events.**
- Airbus believes that early recognition of the situation and correct decision making prevents upset.
- Better to avoid and/or recover early rather than utilize exceptional flying skills later.

The Wrong Stuff….

- Airbus does not support the use of full flight simulators to conduct upset recovery training.
- Potential for negative training once outside the established envelope.
- Accelerations and rotations felt by pilots become totally unrealistic compared to real flight.
- In certain cases, the validity of the aerodynamic model is questionable; it comes from extrapolations of the real measurements.
- ***Risk of producing significant negative training.***

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Total Loss of Situational Awareness?

- We must also address the many Loss of Control incidents where pilots were unaware of their loss of Situational Awareness – upset recovery training will never help in such situations.

- And the opposite – thinking the Aircraft is upset when it is not – WAKE ENCOUNTERS.

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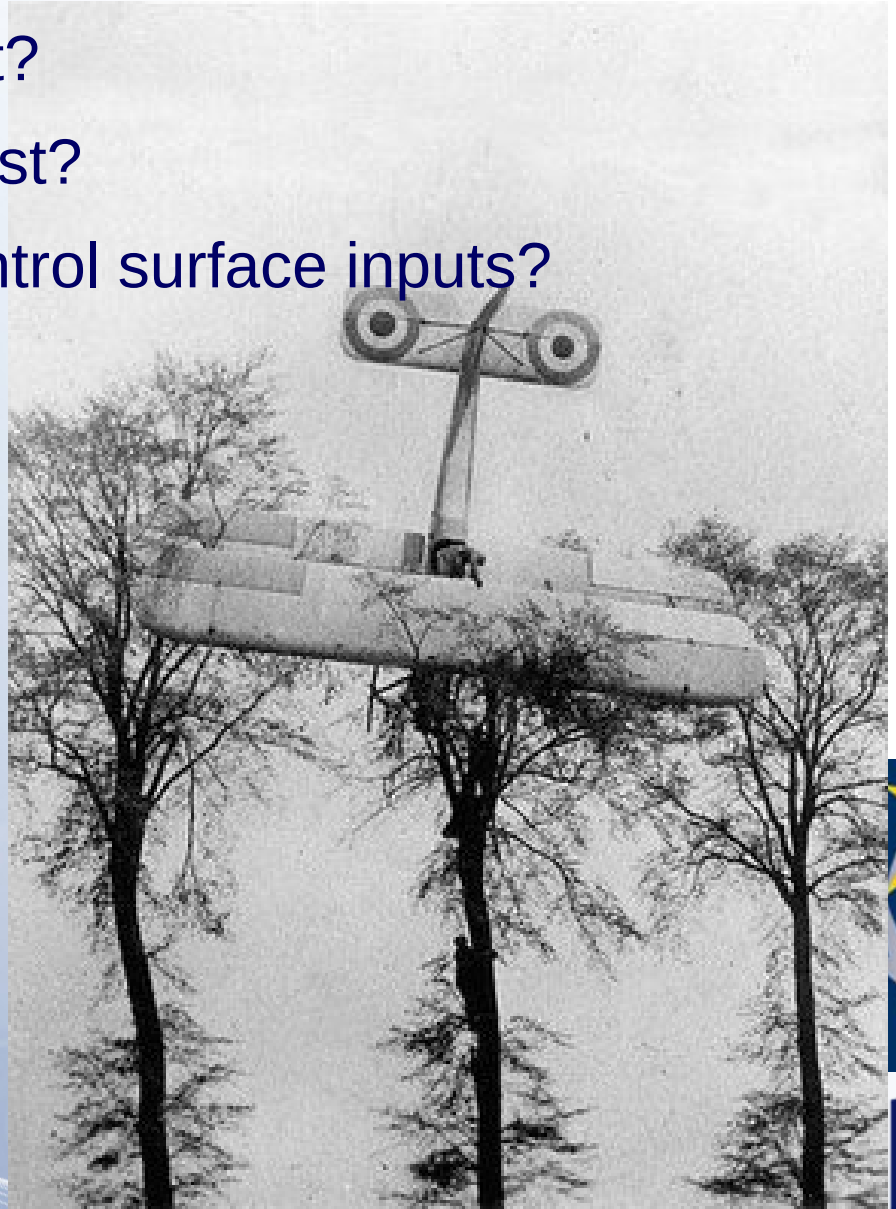
Industry Recommendations.

- Disengage the Autopilot?
- Disengage the Autothrust?
- Use Rudder and full control surface inputs?



Often the wrong thing to do!

- Smooth inputs.
- Avoid rudder.

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Airbus policy

- Train an understanding of the principles of aircraft upsets and how to avoid such situations.
- Upset recovery training is encouraged in the context of awareness training but absolutely not in the context of procedural recovery training from full upset.
- High altitude exercises aimed at recognizing a developing situation rather than recovering from a subsequent event.

- The use of simulators for such training is appropriate.

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Academic Training

- Airbus Jet-ELT basic flying techniques
  - Jet Aerodynamics Briefing
  - Jet Handling Briefing
  - Pitch/Thrust
  - High Altitude Aerodynamics

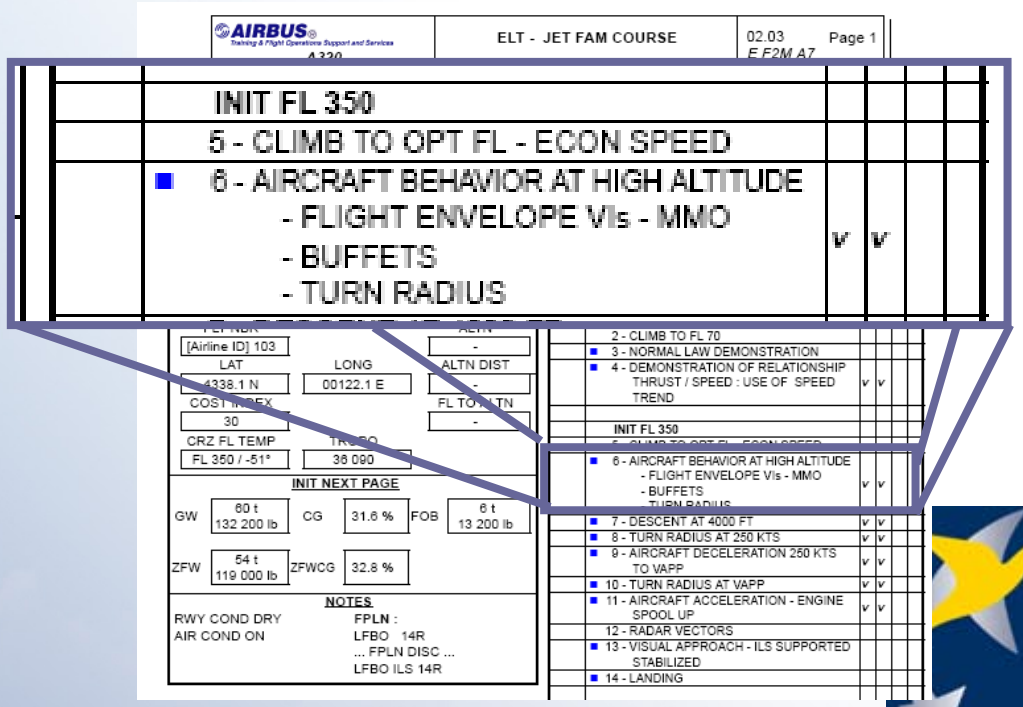
- APT2 Unreliable Speed Indication exercise

- Turbulence
- E-briefing / FCOM/FCTM

- FOBN
- Upset Recovery Training Aids Issue 2

Academic Training

- **Airbus JET Entry Level Training:**
  - High Altitude Operations
  - Maneuvering Stability
  - Optimum/Maximum Altitudes
  - Thrust Limit Conditions
  - High Alt Threats
  - Buffet Limited Max Altitude
  - Mach Buffet and Tuck
  - High / Low Speed Stalls



03 - SESSION GUIDE

INSTRUCTOR ONLY

During the entire session the instructor will provide the trainee with pitch attitude and power setting using the unreliable speed indication tables.

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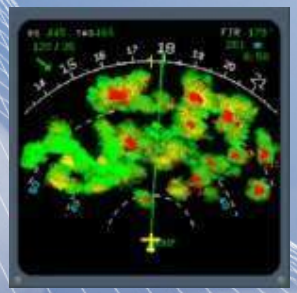
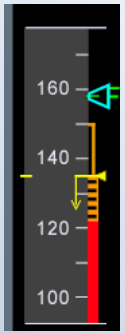
Simulator Training

- Unreliable Speed Indication Simulator (Low Altitude / High Altitude)
- High Altitude Flying Techniques
- Early recognition of potential upset and early correction
- Optimum Use of Weather Radar





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Recurrent Training

Handling of A318/A319/A320/A321 and A330/A340 aircraft in Alternate Law at high altitude and unreliable airspeed issues

- Airbus recommends to **Reinforce Flight Crew Training** during Recurrent Training for aircraft handling at high altitude, for example.
  - The aim is to **Consolidate Pilots Confidence in Aircraft Handling in Alternate Law including Stall Warning response.**

CLEAN				
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 250	240 kts	5.0 / 66.6	3.5 / 62.0	2.5 / 59.7
FL 250 – FL 360	260 kts	3.5 / 79.1	2.5 / 75.4	2.0 / 73.1
Above FL 360	M 0.78	3.5 / 84.3	3.0 / 81.6	2.5 / 78.4

We believe in more practice of manual aircraft handling skills in simulators.

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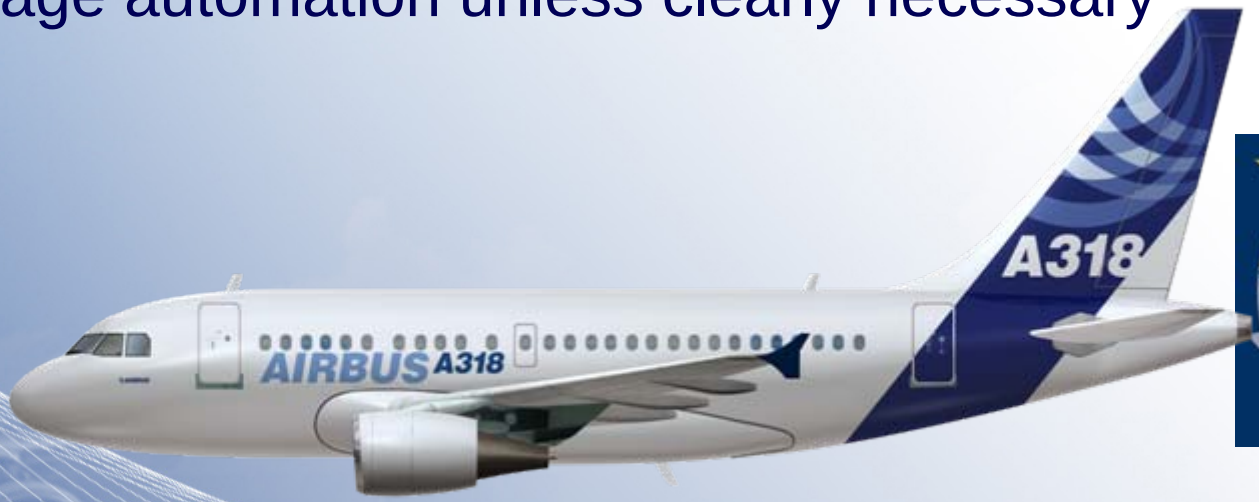
Conclusion

- Avoidance, Correct Recognition and early prevention are essential.
- Contain the Startle Factor - Do Not Overreact - Act Smoothly on the Control Inputs.
- Fly Pitch/Thrust.
- Do not disengage automation unless clearly necessary



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Conclusion; best use of simulators?

Theory of Upset	no
Recognition and early prevention	yes
Prevention up to normal maneuver limits	yes
Full Upset Recovery techniques	*no!*

Today's Full Flight Simulators?

Create an avoidance culture rather than recovery attitude.

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