



AFI Flight Operations Safety Awareness Seminar (FOSAS)

Flight Data Analysis (FDA) Cases Study

ICAO/Airbus
Nairobi, 19-21 Sep. 2017

AIRBUS

Agenda

➤ T-VASIS

➤ LOC Deviation

➤ Incorrect Pitch at Takeoff

➤ CRM Issue

➤ Runway Excursion

➤ Speed drop below VLS in GA

Agenda

 **T-VASIS**

 **LOC Deviation**

 **Incorrect Pitch at Takeoff**

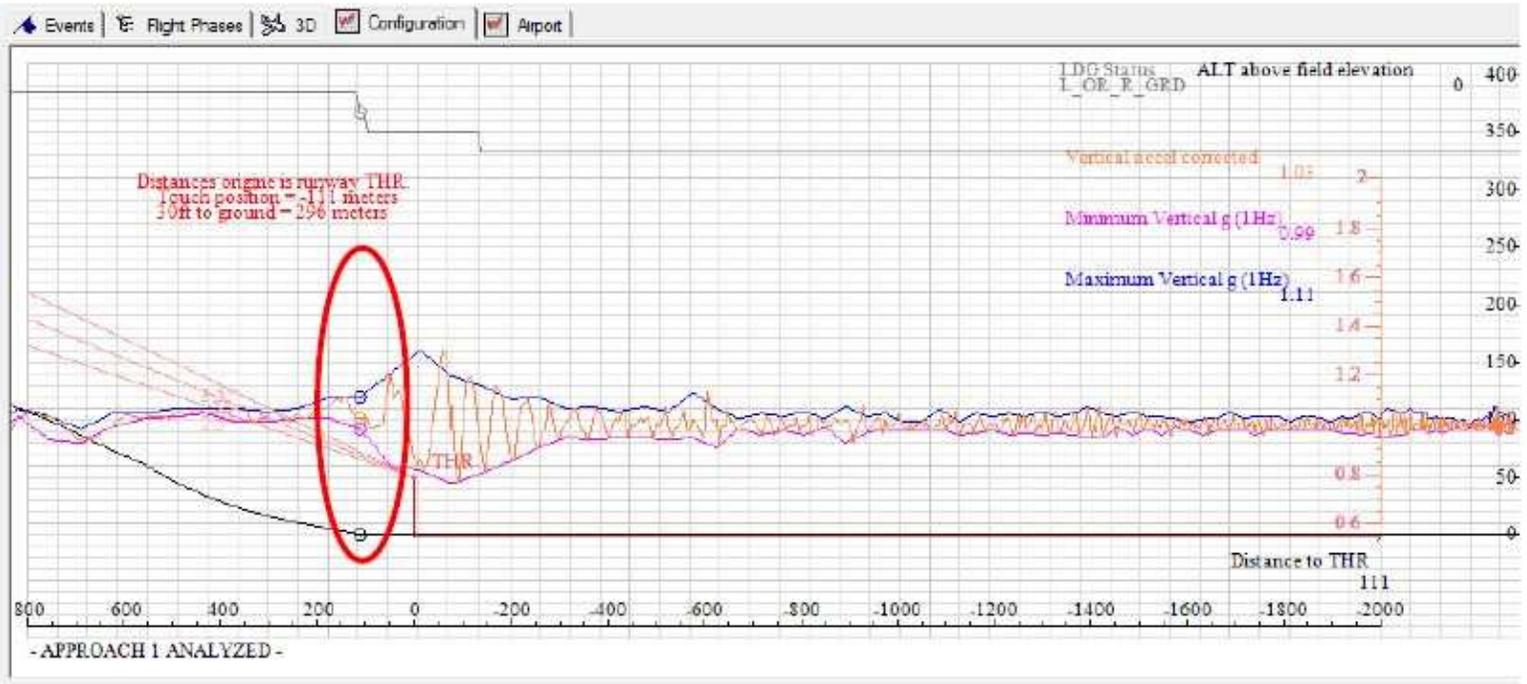
 **CRM Issue**

 **Runway Excursion**

 **Speed drop below VLS in GA**

Case Study 1

T-VASIS



Case Study 1

T-VASIS

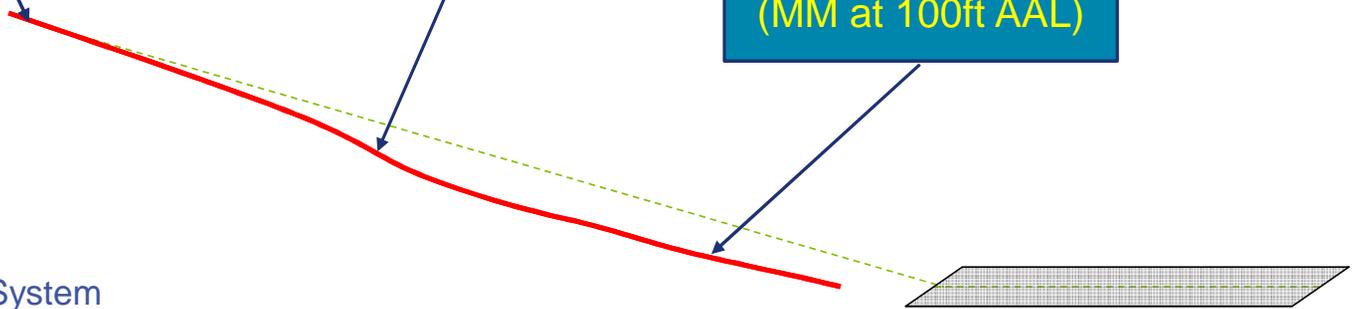
Main facts:

- ✓ Unstabilized approach
- ✓ Night time
- ✓ Manual Flight
- ✓ **T-VASIS***

ILS 16
Approach
3° G/S

GPWS "GLIDE SLOPE" (5 sec)

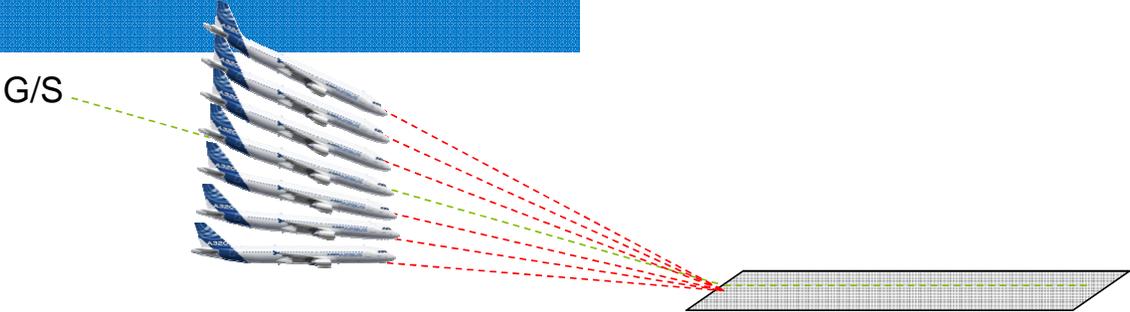
Low Approach slope
(MM at 100ft AAL)



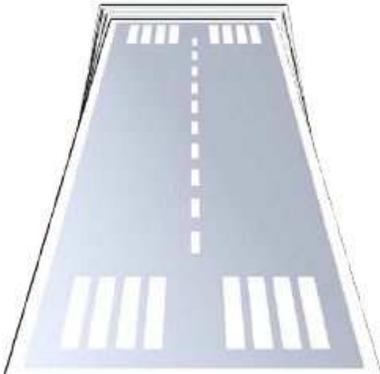
* T-Visual Approach Slope Indicator System

Case Study 1

T-VASIS

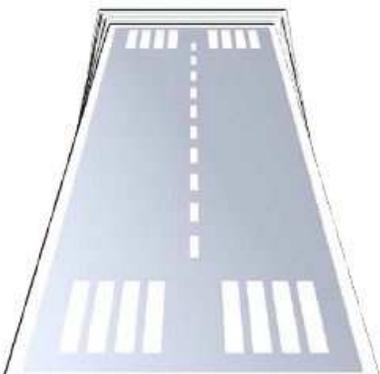


T-VASIS



Too Low

PAPI

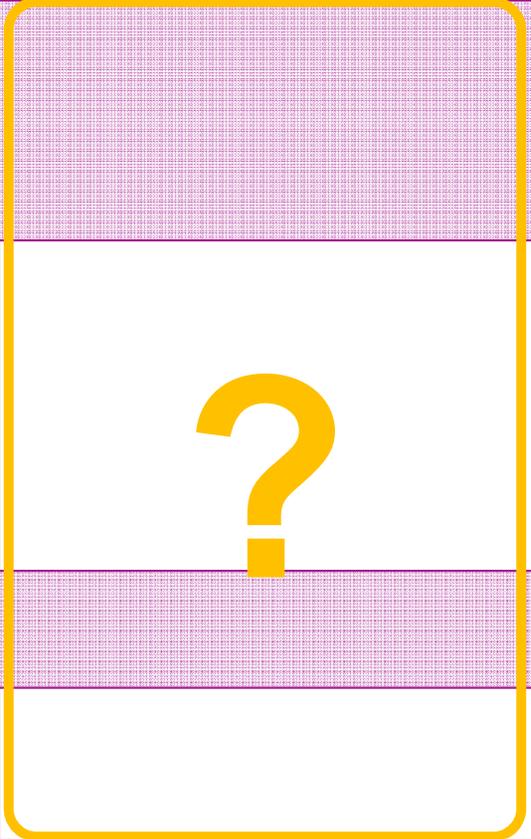


AIRBUS

Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
?				

Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
Flight Path Deviation				
Unstabilized Approach				
Night Flight				
Inconsistency between two visual aids				

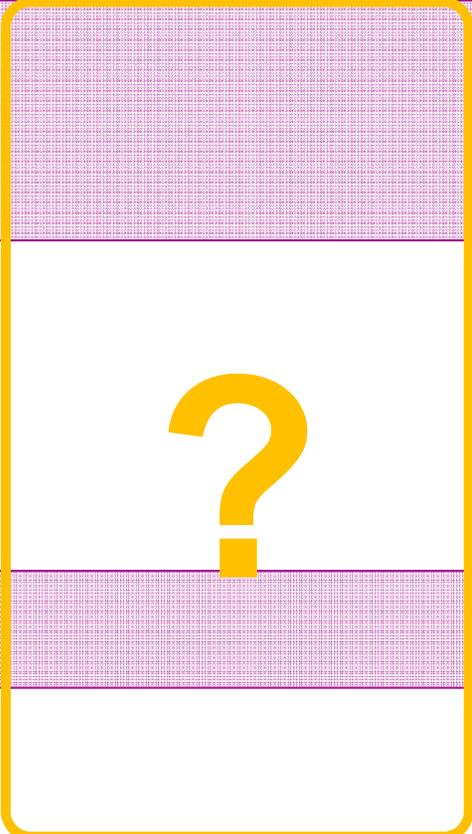
Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
Flight Path Deviation	Controlled Flight Into Terrain (CFIT)			
Unstabilized Approach	<ul style="list-style-type: none"> - Runway Excursion (RE) - Overshoot/ Undershoot (USOS) - Abnormal Runway Contact (ARC) 			
Night Flight	- Crew Fatigue			
Inconsistency between two visual aids	- Misinterpretation			

Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
Flight Path Deviation	Controlled Flight Into Terrain (CFIT)	3A (INTOLERABLE)	?	
Unstabilized Approach	<ul style="list-style-type: none"> - Runway Excursion (RE) - Overshoot/ Undershoot (USOS) - Abnormal Runway Contact (ARC) 	2B (TOLERABLE) 3B (TOLERABLE) 4C (TOLERABLE)		
Night Flight	- Crew Fatigue	2B (TOLERABLE)		
Inconsistency between two visual aids	- Misinterpretation	4A (INTOLERABLE)		

Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
Flight Path Deviation	Controlled Flight Into Terrain (CFIT)	3A (INTOLERABLE)	<ul style="list-style-type: none"> - GPWS - Crew Redundancy - Visual Aids - ILS Signal 	
Unstabilized Approach	<ul style="list-style-type: none"> - Runway Excursion (RE) - Overshoot/ Undershoot (USOS) - Abnormal Runway Contact (ARC) 	<ul style="list-style-type: none"> 2B (TOLERABLE) 3B (TOLERABLE) 4C (TOLERABLE) 	<ul style="list-style-type: none"> - Go Around - Stabilization Policy 	
Night Flight	- Crew Fatigue	2B (TOLERABLE)	- Crew Rostering	
Inconsistency between two visual aids	- Misinterpretation	4A (INTOLERABLE)	<ul style="list-style-type: none"> - Training - Crew redundancy 	

Case Study 1: T-VASIS

Elementary Hazards	Consequences	Associated Risk Index (ICAO Matrix)	Defense Domains	Actions Proposal
Flight Path Deviation	Controlled Flight Into Terrain (CFIT)	3A (INTOLERABLE)	<ul style="list-style-type: none"> - GPWS - Crew Redundancy - Visual Aids - ILS Signal 	<ul style="list-style-type: none"> - SOP: Improved Approach Briefing - Communication on GPWS reliability
Unstabilized Approach	<ul style="list-style-type: none"> - Runway Excursion (RE) - Overshoot/ Undershoot (USOS) - Abnormal Runway Contact (ARC) 	<p>2B (TOLERABLE)</p> <p>3B (TOLERABLE)</p> <p>4C (TOLERABLE)</p>	<ul style="list-style-type: none"> - Go Around - Stabilization Policy 	<ul style="list-style-type: none"> - Information on unstabilized approaches (Improved safety awareness)
Night Flight	- Crew Fatigue	2B (TOLERABLE)	- Crew Rostering	?
Inconsistency between two visual aids	- Misinterpretation	4A (INTOLERABLE)	<ul style="list-style-type: none"> - Training - Crew redundancy 	<ul style="list-style-type: none"> - Visual Aids Info Reminder (Urgent) - Info to Authorities

Case Study 1

T-VASIS

As an Airline, what could be your contribution?

- ▶ You could communicate on GPWS reliability to possibly regain the pilot's confidence in such a case
- ▶ You could provide a note on technical Visual Aids difference (PAPI vs T-VASIS).

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➤ CRM Issue

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Case Study 2

▶ LOC Deviation

- ▶ Let's have a look at the following flight and try to understand what happened...



Case Study 2

LOC Deviation

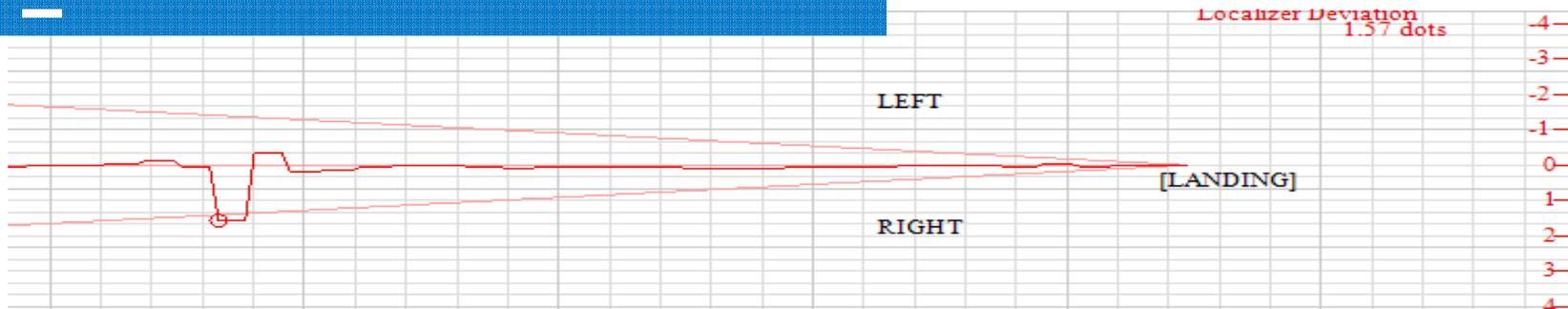
What are your observations?

Could you explain what happened?

What will you do about it?

Case Study 2

LOC Deviation



Case Study 2

LOC Deviation

LOC ground signal disruption?

- **Aircraft safety has not been directly impacted**
- Thus, Event 1803 (LOC deviation) can be disregarded and/or deleted from the database,
- nevertheless...

Operational cleaning ensures that the retrieved events are valuable for analysis and statistics

Case Study 2

LOC Deviation

As an Airline, what could be your contribution?

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Case Study 3

Incorrect Pitch at Takeoff



Case Study 3

➤ Incorrect Pitch at Takeoff

CONTEXT:

Mixed fleet A340-300/500 and A330.

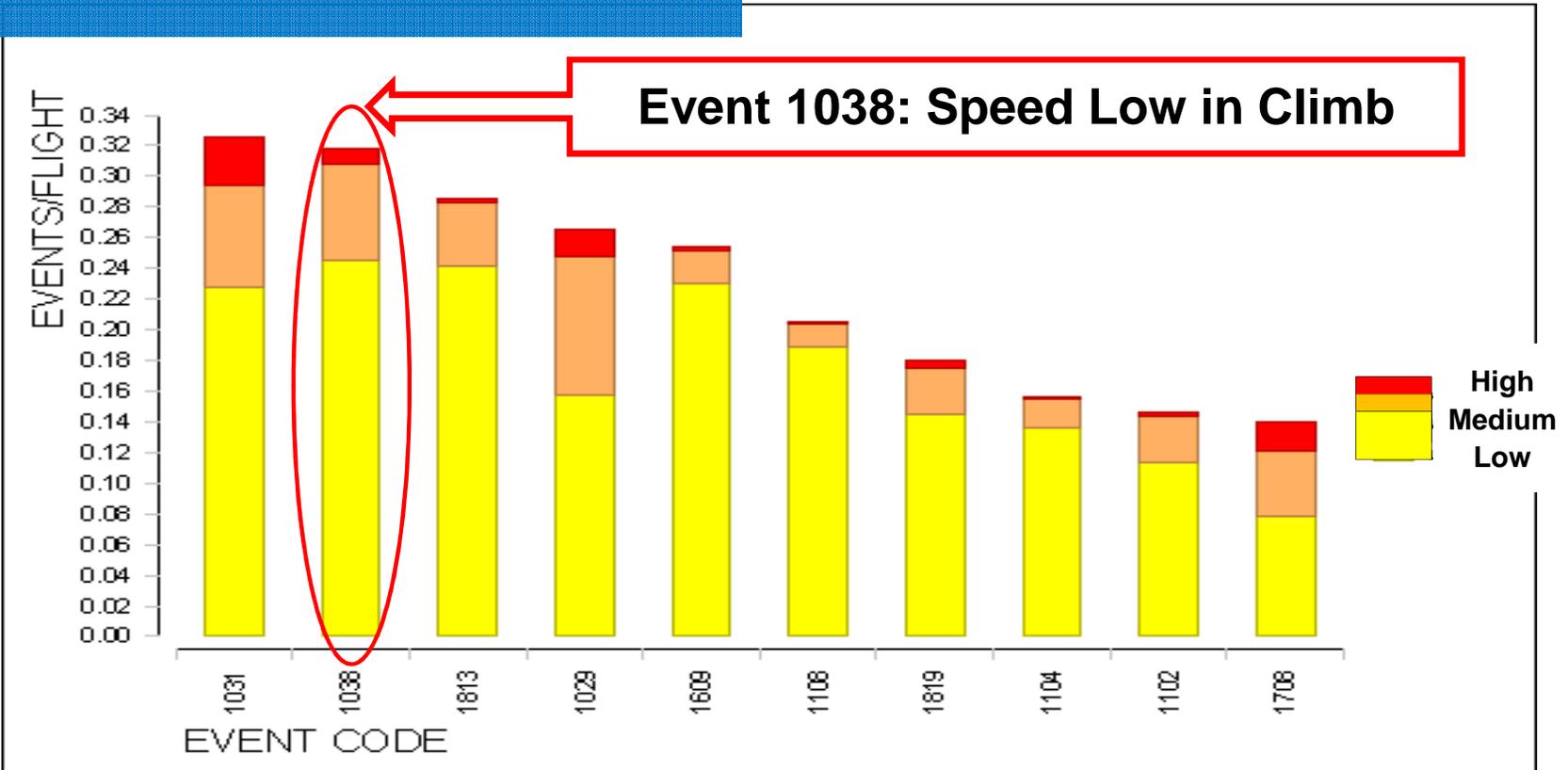
Takeoff CONF3 on A340-500 and CONF2 on A340-300

Let's look at FDA events list...



Case Study 3

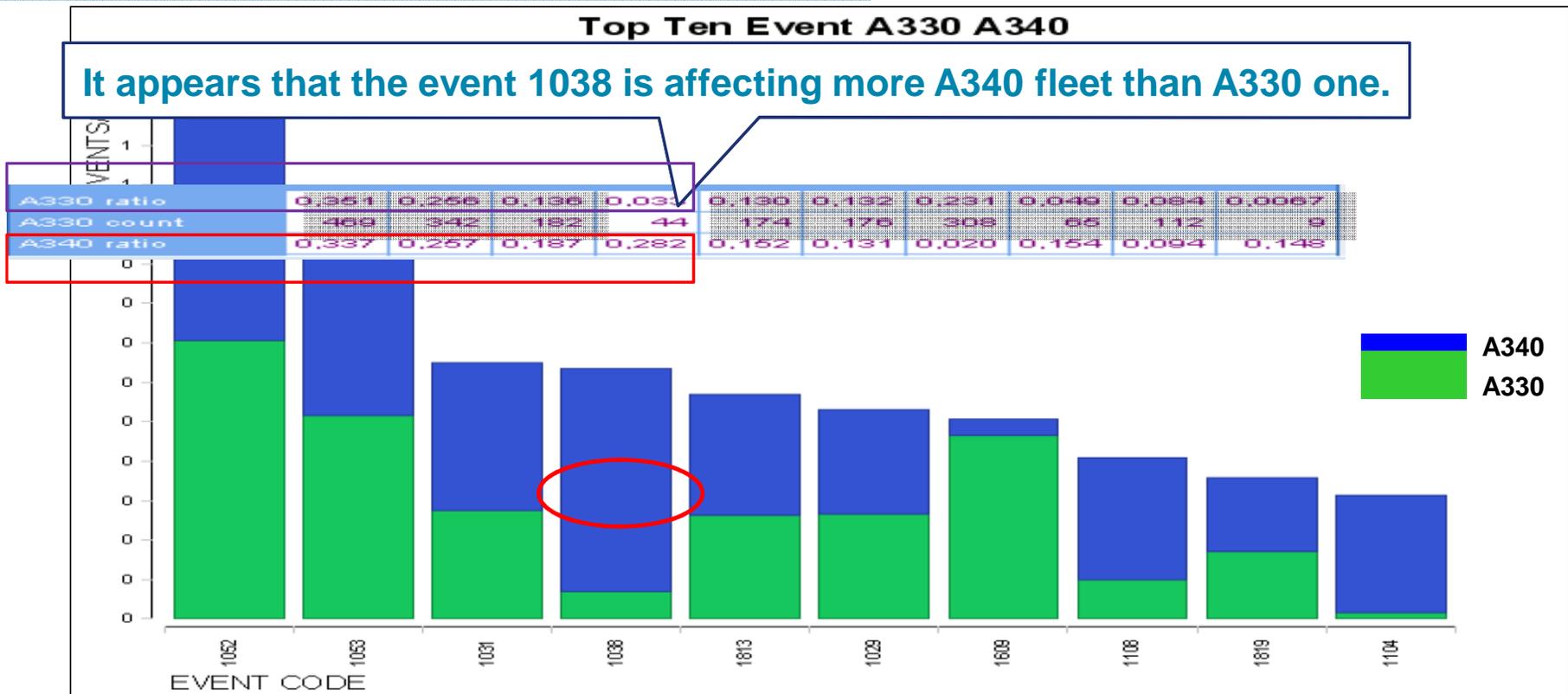
Incorrect Pitch at Takeoff



Case Study 3

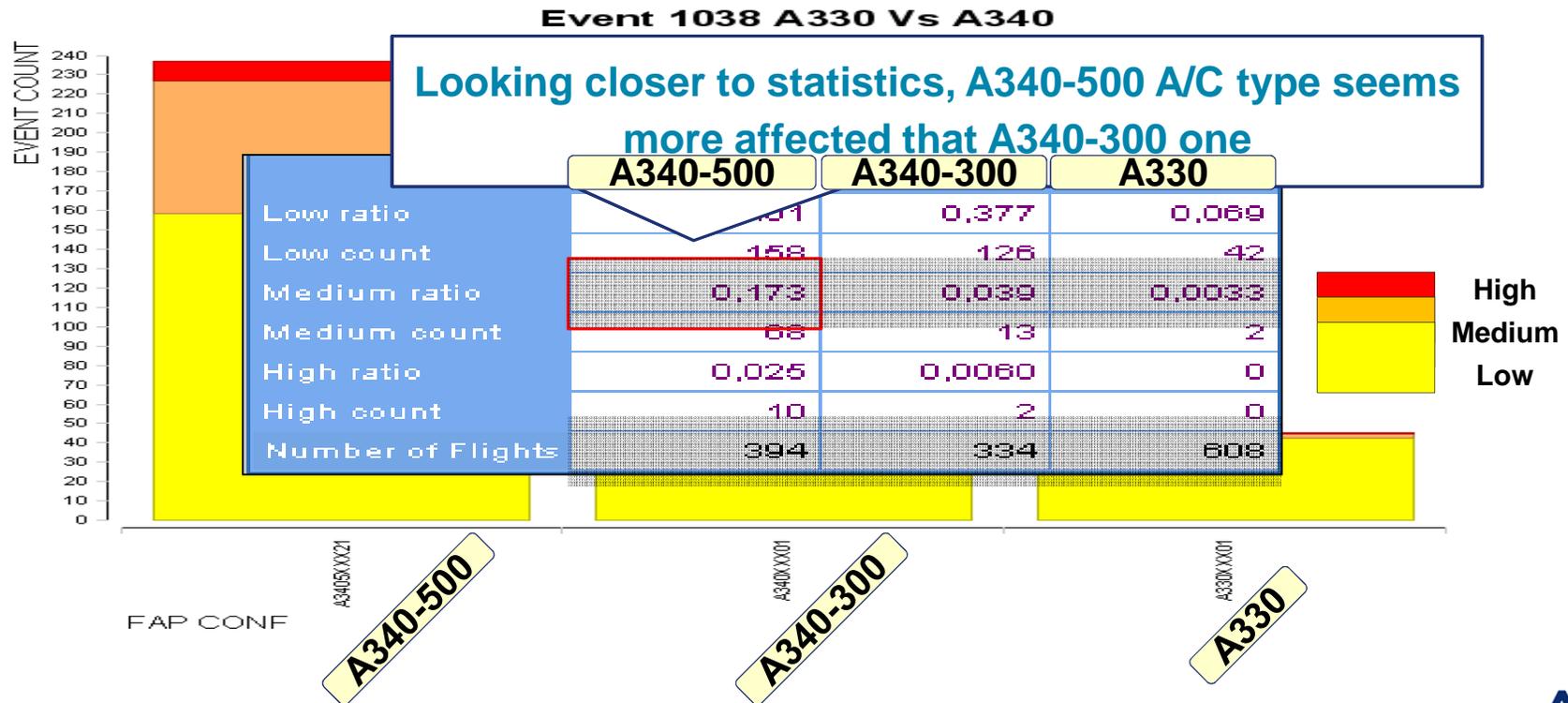
Incorrect Pitch at Takeoff

It appears that the event 1038 is affecting more A340 fleet than A330 one.



Case Study 3

Incorrect Pitch at Takeoff



Case Study 3

Incorrect Pitch at Takeoff

FDA statistics show the following trends:

- **Event 1038** affects **more the A340 fleet** than the A330 fleet
- **Event 1038** concerns **more the A340-500 type** than A340-300 type.

Therefore, what could we do?

- ➔ Transmission to AIRBUS for deeper analysis.

Case Study 3

Incorrect Pitch at Takeoff

Answer from AIRBUS:

→ Performance studies: 15° pitch > equilibrium 12.5° pitch



**Before 15°,
now 12.5°**



Case Study 3

Incorrect Pitch at Takeoff

- ▶ SOP updated

Applicable to: A340-300, A340-500

AT VR

ROTATION..... ORDER
ROTATION..... PERFORM

- At VR, initiate the rotation with a positive sidestick input to achieve a continuous rotation rate of about 3 °/s, towards a pitch attitude of 12.5 °.
- Minimize lateral inputs on ground and during the rotation, to avoid spoiler extension. In strong crosswind conditions, small lateral stick inputs may be used, if necessary, to aim at maintaining wings level.
- After lift-off, follow the SRS pitch command bar.

Case Study 3

Incorrect Pitch at Takeoff

As an Airline, what could be your contribution?

- ▶ You could share the “WHY” with the pilot’s community
- ▶ You could follow-up Airline’s SOP update in accordance with the latest Airbus recommendations.

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➤ **CRM Issue**

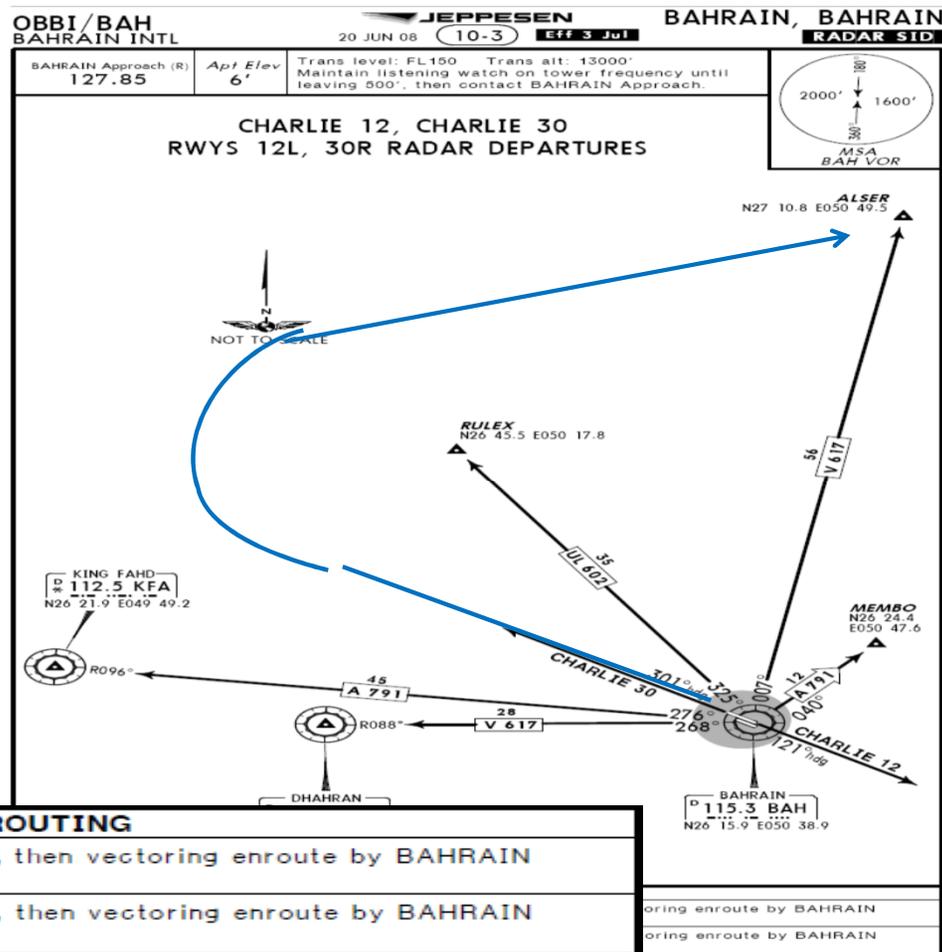
➤ **Runway Excursion**

➤ **Speed drop below VLS in GA**

Case Study 4

CRM Issue

- ✈ The departure is flown manually by the First Officer
- ✈ Let's look at the flight replay with FDA tool



Case Study 4

CRM Issue

What are your observations?

Could you explain what happened?

What will you do about it?

- Slat speed exceeded:
 - Request maintenance inspection

- Dual Stick input:
 - Ask for a Flight Crew interview or Report...
 - Communication to Pilot's community, Training, ...

- Use of automation (Policy):
 - Communication to training department...
 - Golden Rules reminder

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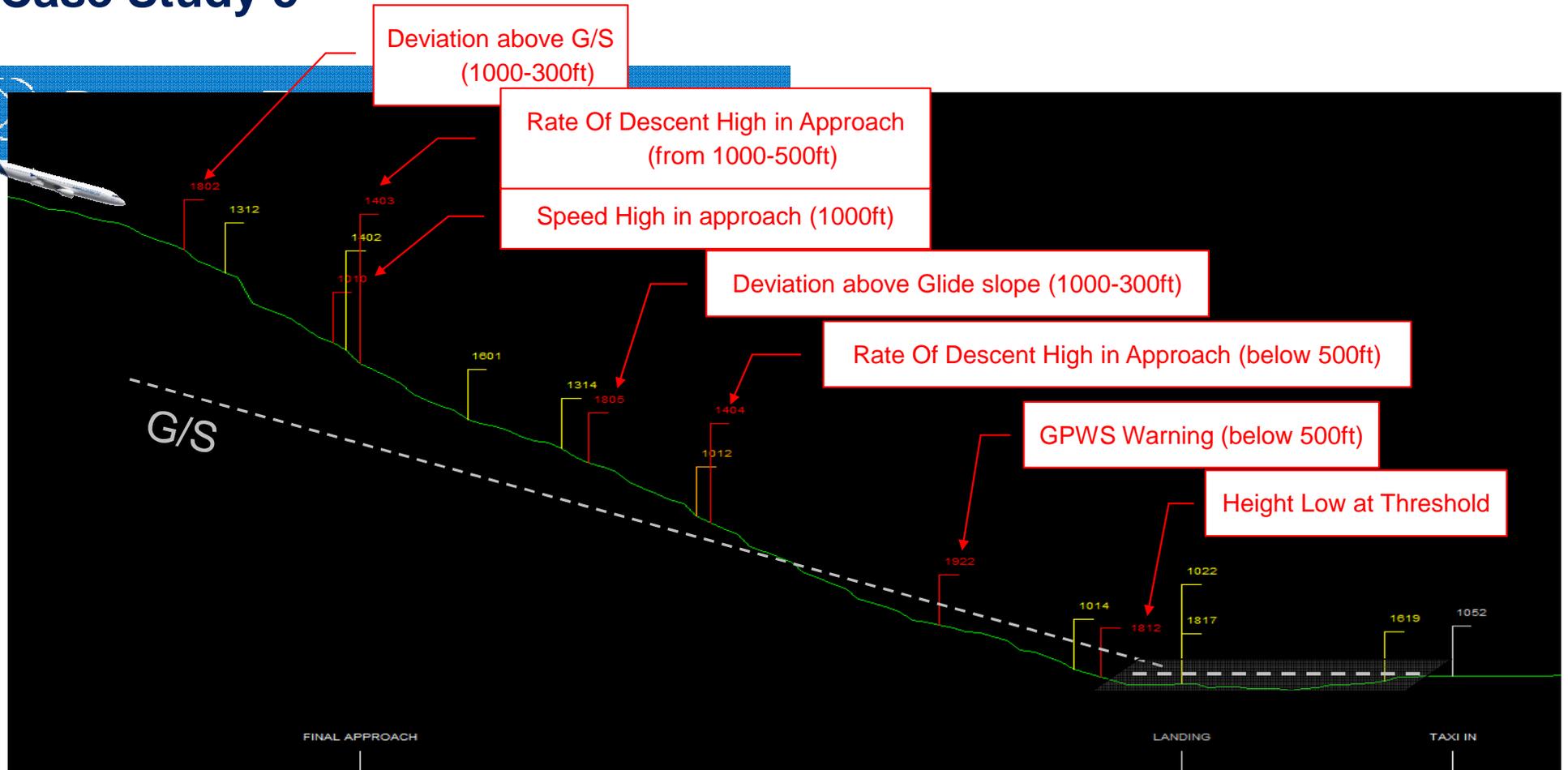
Case Study 5

➤ Runway Excursion

Let's have a look at the following flight within FDA tool...



Case Study 5



Case Study 5

Runway Excursion

What are your observations?

- An unstabilized approach is observed with a lot of flight parameters deviations (speed, G/S, V/S, etc)

Could you explain what happened?

- FDA allowed the Airline to realize that some crews do not demonstrate the minimum required handling skills level...

What will you do about it?

- FDA analysis could also be completed by a flight crew report and/or a crew interview
- Training concern?

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➤ Speed drop below VLS in GA

Case Study 6

➤ Speed Drop below VLS in GA



Case Study 6

Speed Drop below VLS in GA

CONTEXT:

A/C type: A330

Flight phase: Approach

Configuration: CONF3, Speed brakes extended and L/G down

Let's have a look at the following flight within FDA tool...



Case Study 6

Speed Drop below VLS in GA

What are your observations?

- Go Around was performed without TOGA selection, not following Airbus SOP (Thrust levers still in CLB detent)

Could you explain what happened?

- FDA allows Airline to take into consideration that some pilots did not properly understand the Go Around philosophy and associated SOP.

What will you do about it?

- Reminder of standard Go-Around Procedures must be considered (e.g. Briefing note, refresher training for Flight crew, ...)

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