

The Airbus safety magazine

January 2017

#23

Safety first



Safety first

The Airbus magazine contributing to the enhancement of the safety of aircraft operations by increasing knowledge and communication on safety related topics.

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editorial



YANNICK MALINGE

SVP & Chief
Product Safety Officer

As you no doubt noticed, the front cover of this edition of Safety First magazine shows a photo of our A350-1000 from its first flight on the 24th November last year. This was obviously a proud moment in 2016 for us at Airbus, shared equally with another major achievement - the delivery our 10,000th aircraft.

This deliveries milestone has taken us 42 years to achieve. In comparison, we are planning to deliver our next 10,000 aircraft only within the next 10 years; the same output within a quarter of the time.

This is our challenge as an OEM. Yet the industry as a whole faces similar significant challenges in the years ahead. In the operator's world, most forecasts point to a doubling of air traffic over the next 15 years. As an industry we are fortunate to have these great opportunities, but they also come with associated risks inherent to the growth.

In a world which is ever more turbulent and uncertain, we need to find and train unprecedented numbers of people across all disciplines, and we need to safely operate a higher number of flights than ever before.

Today, we can proudly say that the number of fatal accidents is at an historically low level. But on a per flight basis, the last 10 years have seen us only keep this level almost flat. Since that is the case, a doubling of flights will inevitably lead to accidents happening more frequently.

No accident is acceptable, so our challenge is obvious; we as an industry have to find ways to significantly enhance our capability to manage safety threats.

On pages 32 to 36, you will read a short article about a new Airbus project called 'Air Transport Safety - Destination 10X - Together'. This project is a vehicle, for Airbus and our operators, to efficiently identify and implement our best opportunities for enhancing Safety over the coming decades.

So, whilst wishing you all a very happy new year, I would also like to say that we at Airbus very much look forward to working together with you in 2017 to make Safety our common destination.

A handwritten signature in black ink, appearing to read 'Y Malinge', with a stylized flourish at the end.



Safety first #23



Flight operations



Maintenance



Engineering



Ground operations

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Safety, Our Shared Destination



NEWS

Airbus' 23rd annual Flight Safety Conference is the forum for Airbus and our customers to share Safety lessons learnt and best practices.

It is also a key opportunity to establish operator to operator contact between Safety Officers or Fleet Management Pilots, and to establish contacts for further exchange & support with Airbus representatives from Safety, Flight Test, Training, Flight Ops and Chief Engineers.

SAFETY THEMES IN 2017:

- > Weather Hazards
- > Training to Manage Growth

The Training to Manage Growth theme covers training needs, training evolutions including for multicultural crews, roadmaps for training device evolution, and linking flight data analysis to training.

The Weather Hazards theme will cover incidents where weather has been a key factor, and illustrate what operational policies and safety enhancements are available to help support airlines.

ATTENDANCE & INVITATIONS:

The 23rd Airbus Flight Safety Conference for operators of Airbus aircraft will be held in the Grand Hyatt Santiago hotel in Santiago, Republic of Chile from the 20th to the 23rd March 2017.

Invitations were sent to customers early January 2017.

To nominate an attendee, or change contact information, please contact Mrs Nuria Soler at **nuria.soler@airbus.com**

23rd Flight Safety Conference

Santiago, Republic of Chile
20-23 March 2017





Safely Flying Non-Precision Instrument Approaches

Historically the distinction between flying ILS/_{MLS} and non-precision approaches was very clear. However, many new kinds of instrument approaches are now available and this makes the distinction less obvious.

What remains true today for any approach is that disregarding basic flying techniques and procedures reduces safety margins.

This article clarifies which technologies are available to perform approaches using an Airbus aircraft. It also emphasises the safety messages that are important to remember whenever flying an approach.



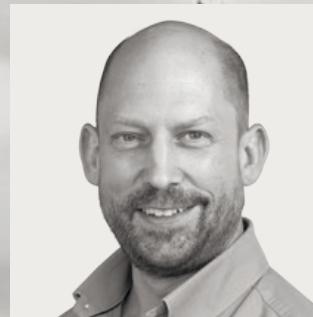
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DE VILLEPIN**

Approach & Landing
Project Leader

OVERVIEW OF NAVIGATION TECHNOLOGIES

Ground based navigation technologies

Development of the earliest radio navigation systems started in the 1920s and 1930s. Initially, only the lateral course was supported by a radio navigation aid through systems such as Localiser (LOC), Non-Directional Beacons (NDB), and VHF Omni-Range (VOR). These systems provided, and continue to provide, guidance data for non-precision approaches.

With the growth of the air-transport system in the 1970s, it became necessary to reduce the number of accidents occurring due to lack of vertical guidance in approach, as well as to enable more consistent operations in poor weather.

Instrument-based Landing Systems (ILS) satisfy the requirement to provide both lateral and vertical (glide-slope)

guidance, and therefore quickly became standard equipment at airports during the early 1970s. The inclusion of glide-slope guidance created what has become known as 'precision approaches'. Later in that decade, the Microwave Landing System (MLS) was developed to reduce ILS -beam distortion and multi-path errors; but although it is in operation today, MLS has never gained a significant commercial aviation foothold and is only in limited service.

Historically, with the ground-based technologies described above providing the guidance, it was easy to differentiate between precision approaches and non-precision approaches simply on the basis of whether glide-slope guidance information was provided or not.

On-board technologies enhance Non Precision Approaches

With the increase in Flight Management System (FMS) capability through the 80's and 90's, and especially with the introduction of Global Positioning System (GPS) equipment into civil aviation, the simple distinction between precision and non-precision approaches used earlier is no longer possible. These on-board technologies have rapidly become very sophisticated and are progressively enabling vertical and lateral approach guidance at a similar level to that of an ILS precision approach.

The first enhancement of these non-ILS/MLS instrument approaches came in the 1980s, with the replacement of the step-down technique ("dive & drive") by Continuous Descent Final Approach (CDFA).

Today, the majority of non-ILS/MLS approaches are flown using a

barometric vertical guidance, for which QNH setting and temperature are key factors and this must be taken into consideration by the crew. The most sophisticated instrument approaches use geometric vertical guidance based on an augmented GPS signal to create 'ILS-like' approaches.

In addition, various new GPS based techniques offer sufficient accuracy, even to the point of taking the industry beyond the traditional 'straight-line' approaches and enabled curved approaches.

As a result of all this development, some airports may have several approach charts available for a given runway as shown in **(fig. 1)**. In addition, each chart can present several minima. Therefore, pilots must be familiar with

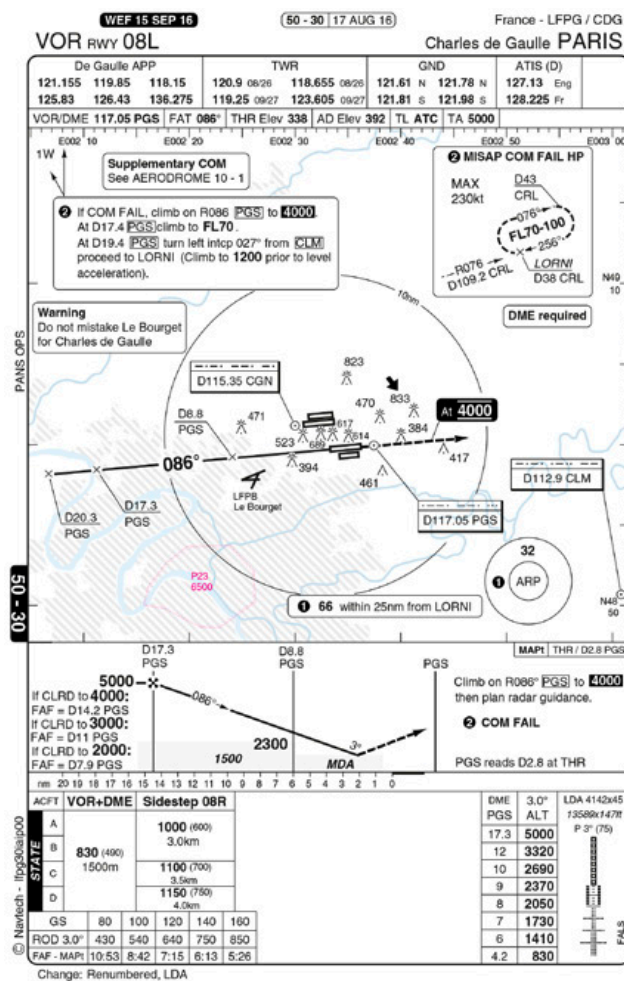
“Historically, it was easy to differentiate between precision approaches and non-precision approaches on the basis of whether glide-slope guidance information was provided or not.”

“Various new GPS based techniques offer sufficient accuracy, even to the point of taking the industry beyond the traditional 'straight-line' approaches and enabled curved approaches.”

the charting from their provider in order to ensure correct understanding of approach charts.

Whatever the type of technology, we can state that with the introduction of the CDFA technique, all approaches now share two common characteristics:

- Descent profiles of instrument approaches have become similar: vertical guidance is provided and there is no level-off required at minima
- If the required visual references are not acquired by the applicable minima, or indeed lost after, a missed approach must be initiated. ■



(fig.1)
VOR and RNAV (GNSS) approach charts
for LFPG RWY 08L.
Source: NAVBLUE

FLYING APPROACHES WITH AN AIRBUS

The importance of vertical guidance

ICAO Controlled Flight Into Terrain (CFIT) studies have shown that once some form of vertical guidance is added to approaches, the safety margin is increased by a factor of 8.

As a consequence, a focus was placed at Airbus in recent years to offer some guidance on the vertical path for all instrument approaches.

If we now discount ILS and MLS approaches, there are different guidance modes available on Airbus aircraft to fly all types of instrument approaches, from TRK/FPA to managed modes offering guidance on both the lateral and vertical trajectory.

Depending on the approach type, the crew has to select the appropriate one (**fig.2**). Managed modes are recommended, but selected mode might be useful in case of system or equipment failures.

It is worth recalling that in selected mode, the Flight Path Angle (FPA) easily permits to follow the published descent gradient, but the pilot must still ensure that the vertical trajectory relative to the touchdown point is precisely followed.

The creation of new approach modes that have lateral and vertical profiles independent of nav aids followed the introduction of the Flight Management System (FMS) in the 1980s and of the GPS in the 1990s. The objective was to standardize the way of flying all approaches down to the published approach minima, whatever the airport, and whatever the equipment on the ground. The FLS (FMS Landing System) is part of that concept and today, it is an Airbus option offering a solution to fly 99% of approaches that are not ILS/MLS, with a barometric vertical profile.

It offers lateral and vertical guidance for a straight-in instrument approach, referenced from the aircraft position, along a trajectory retrieved from the FMS navigation database.

“ FLS is an Airbus option offering a solution to fly 99% of approaches that are not ILS/MLS, with barometric vertical profile. ”

(fig.2)

Guidance modes available to fly non-ILS/MLS approaches not based on augmented GPS signal

	Lateral & Vertical Managed	Lateral Managed Vertical Selected	Lateral & Vertical Selected
FLS Function	A350 XWB A380 A320 / A330] Option	F-G/S F-LOC F-G/S LOC	A320 / A330 / A340 / A350 / A380 FPA -3.0° NAV FPA -3.0° LOC
	A320 A330 A340	FINAL APP	FPA -3.0° TRK
	A350 XWB RNP AR	APP-DES NAV	

Navigating through approaches: key characteristics

Ultimately, what is needed to safely fly an approach is a clear picture of what it represents in terms of:

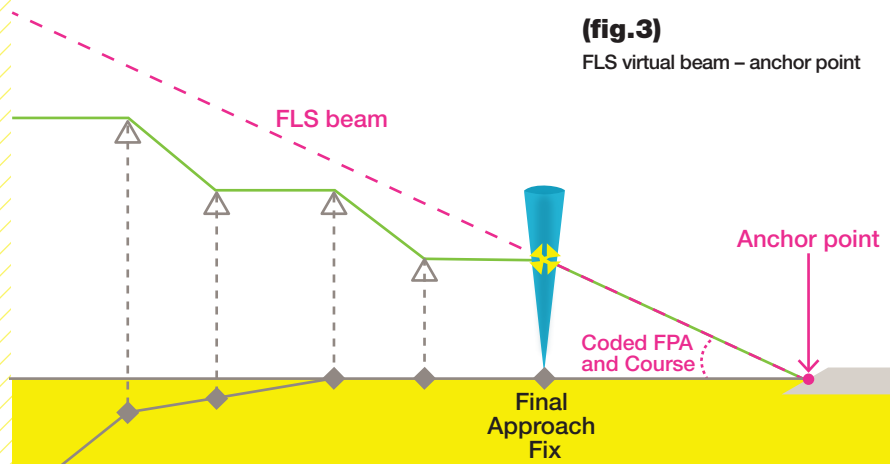
- The aircraft capabilities and crew qualifications (e.g. RNP-AR)
- The approach type
- The approach lateral axis, including potential offset with the runway axis

(or FLS anchor point position)

- Vertical profile (barometric and temperature considerations)
- Applicable minima
- Aircraft guidance mode
- The recovery scenario in case of system failures or deviations exceedance. ■

THE FMS LANDING SYSTEM (FLS) GUIDANCE MODE

FLS replicates the ILS beam concept, but using only the onboard navigation sensors with no need for additional ground aids. The FMS constructs a “pseudo beam” which has an anchor point (not necessarily aligned with the runway threshold), approach course and Flight Path Angle (FPA) **(fig.3)**, and which overlays the final segment of an instrument approach with a temperature compensation on final segment for the indicated altitude.

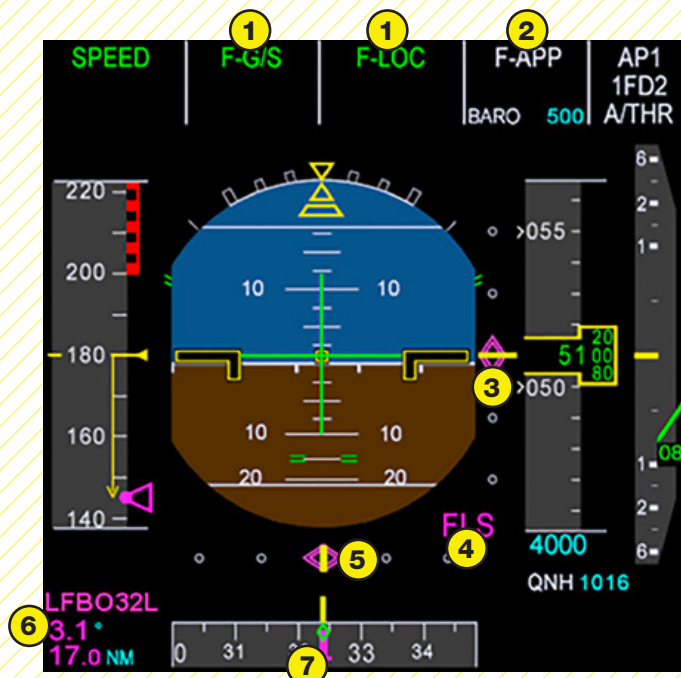


(fig.3)

FLS virtual beam – anchor point

FLS allows a pilot to fly an approach down to minima as an ‘ILS-alike approach’ thanks to the CDFA technique. In addition, the human / machine interface has been designed similar enough for the crew to capitalize on their current techniques but different enough for the

crew not to mistake a non-precision approach flown with FLS for an ILS thanks to a distinctive symbology **(fig.4)**. In the end, this concept makes these approaches more simple to fly, thereby contributing to an increase in safety.



(fig.4)

FLS distinctive symbology

- 1 AP/FD modes
- 2 FLS approach capability
- 3 Pseudo G/S deviation scale and index
- 4 FLS message
- 5 Pseudo LOC deviation scale and index
- 6 FLS information
- 7 FLS course pointer

A characteristic of the FLS is that it can only be used for straight-in approaches but it is not compatible with curved RNP-AR approaches. Indeed, for curved approaches, crews need to undertake specific training and checking, and use

the FINAL APP (or APP-DES on A350 aircraft) mode. Nevertheless, Airbus is working towards co-existence of the two modes so that all non-ILS/MLS approaches are flown in FLS and the FINAL APP mode remains available for RNP-AR.



INFORMATION

Not all aircraft are technically capable of ensuring F-G/S, F-LOC or FINAL APP guidance. FINAL APP and F-G/S or F-LOC guidance modes availability depends on the actual configuration of the aircraft and the airline approach options chosen in the catalogue (i.e FLS or FINAL APP).

The FLS mode is basic on A380 and A350 aircraft. It is available as an option on A320 and A330 families.

The coexistence of FINAL APP and FLS modes is already available for A330 aircraft with Honeywell FMS. It is expected by end 2018 for the remainder of the A330 fleet, as well as A320 family aircraft.



FLYING AN INSTRUMENT APPROACH SAFELY

A well trained and briefed crew: why preparation is key to a successful approach, whatever its type

For a flight crew, after possibly long hours of flight or a busy day's flying schedule, the objective is to perform the most appropriate approach available at the airport according to the weather, aircraft capability, crew knowledge and training.

To fly a non-ILS/_{MLS} approach using managed guidance requires a valid FMS data base. If not, then selected guidance must be used.

The FMS data base is considered validated if the provider is compliant with Regulatory requirements and/or validated by the Operator (depending on FMS standards and approach types).

In addition, because instrument approaches that are not ILS/_{MLS} may not be flown on a daily basis they

require good preparation both on ground and in flight.

Before the flight commences, GPS coverage (Receiver Autonomous Integrity Monitoring (RAIM) / Autonomous Integrity Monitored Extrapolation (AIME)) at destination must be checked if approach requiring GPS only is expected.

When in flight, the crew should ensure that the status of the aircraft is compliant with the technical requirement to fly the approach. In accordance with SOP, the FMS waypoints have to be checked versus the applicable chart to ensure that the correct approach has been selected and that the aircraft will fly the charted trajectory. During the descent

“ FLS allows a pilot to fly a non-ILS approach down to minima as an ‘ILS-like approach’ thanks to the CDFA technique. ”

“ Managed guidance to fly a non-ILS/_{MLS} approach can be used only if the FMS database has been validated. ”

(fig.5)

Example of a cross-reference table, as available in A320 FCOM PRO-NOR-SOP-APPROACH-APPROACH GENERAL.

preparation, the crew must define and agree on the aircraft guidance mode depending on the approach type and applicable minima. For this purpose, the cross-reference table published in FCOM is helpful (fig.5).

The action plan to fly the approach must also consider threats and errors

management, e.g. vertical profile, visual segment after minima and offset.

During the descent, the flight crew should check that the navigation accuracy is compliant with the approach type and use the guidance mode that was intended to be flown, as per SOP.

Guidance Modes per Approach Type					
	LOC G/S	FINAL APP	LOC FPA or LOC B/C FPA	NAV FPA	TRK FPA
ILS / MLS / GLS	Refer to FCOM 'APPR using LOC G/S'	N/A	N/A	N/A	N/A
LOC ONLY ILS G/S OUT	N/A	N/A	Refer to FCOM 'APPR using FPA guidance'	N/A	N/A
LOC B/C	N/A	N/A	Refer to FCOM 'APPR using FPA guidance'	N/A	Refer to FCOM 'APPR using FPA guidance'
RNAV (GNSS) with LNAV/VNAV minima	N/A	Refer to FCOM 'APPR using FINAL APP'	N/A	Not authorised	Not authorised
RNAV (GNSS) with LNAV minima	N/A	Refer to FCOM 'APPR using FINAL APP'	N/A	Refer to FCOM 'APPR using FPA guidance'	Not authorised
RNAV (GNSS) with LPV minima	N/A	Not authorised	N/A	Not authorised	Not authorised
VOR, VOR-DME, NDB, NDB-VME	N/A	Refer to FCOM 'APPR using FINAL APP'	N/A	Refer to FCOM 'APPR using FPA guidance'	Refer to FCOM 'APPR using FPA guidance'

“ Any “negotiation” with the visibility requirement from the minima and below for any approach is a drift into danger. ”

Minima must be respected

With the increasing precision of the navigation means used to fly any approach (e.g. GPS positioning) and the improved reliability of aircraft on-board systems, there is an observed tendency of crews to delay the go-around decision perhaps because of increased confidence in the aircraft automation to guide them below the published minima. This tendency translates into a significant reduction of the safety margins, especially with respect to flying without visual references below the minima.

Data has shown that if visual conditions were not achieved at the minima but

were still expected, some crews waited a little bit longer, hoping for visibility to improve before they made the decision to go-around. This means that they were now flying unsafely below minima with no visual references. Likewise, if visibility is good at minima but it then reduces, some crews may decide to continue the approach, hoping for an improvement in the visibility. This tendency could also be reinforced if pilots are not go-around minded.

In reality, any “negotiation” with the visibility requirement from the minima and below for any approach is a drift into danger. ■



GLOSSARY

CDFA	Continuous Descent Final Approach	LNAV	Lateral Navigation
DME	Distance Measuring Equipment	LOC	Localizer
FAF	Final Approach Fix	LPV	Localizer Performance with Vertical guidance
FLS	FMS Landing System	NDB	Non-Directional Radio Beacon
FMA	Flight Mode Annunciator	RNAV	Area Navigation
FPA	Flight Path Angle	RNP	Required Navigation Performance
GLS	GBAS (Ground Based Augmentation System) Landing System	RNP-AR	Required Navigation Performance Authorization Required
GNSS	Global Navigation Satellite System	SLS	Satellite Landing System
GPS	Global Positioning System	VNAV	Vertical Navigation
G/S	Glideslope	VOR	VHF Omnidirectional Range
ILS	Instrument Landing System		

The most important safety messages to keep in mind to fly any kind of instrument approach are:

- Know which procedure your company allows
- Prepare the approach well in advance; on ground and in flight
- Know which parameters and deviations or systems failures should trigger a go-around decision
- Brief, share and understand the intended approach technique to be used
- Fly as you are trained. Fly the brief
- Respect the minima; from the minima and below, visual references are primary references. If they are not there or don't remain there, go-around!
- From the minima, ensure the aircraft can continue with a normal rate of descent and bank angle, to land within the touchdown zone.

Finally, the Pilot Monitoring (PM) has a vital role to play in all instrument approaches. The PM must understand what the Pilot Flying (PF) has planned to do, what the PF is doing right now and what the PF will do in the near future. The PM supports the PF in using the SOP callouts and ultimately ensuring that the minima are respected. He/she also assists the PF in monitoring the appropriate arming and engagement of guidance modes at the right time.



Introduction to the Soft Go-Around Function

The “all engines” go-around is a very dynamic procedure with high accelerations created by the application of TOGA thrust. Yet in-service experience has shown that as long as both engines are operating, a lower thrust can still be sufficient to perform a safe go-around.

As a safety enhancement, Airbus has introduced the Soft Go-Around (SGA) function, which provides a reduced go-around thrust and associated operating procedures.

This article will review how the Soft Go-Around function works, how it is activated, on which aircraft it is installed, and how to deal with a “mixed” fleet composed of aircraft with and without the function.

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Certification &
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Flight Operations Support
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Safety Enhancement



GO-AROUNDS & SOMATOGRAVIC ILLUSION

Go-arounds can be performed in various conditions (aircraft weight, speed, altitude...). However, even if these parameters are known to vary significantly from one go-around to another, up until recently only one level of thrust has been available to perform this manoeuvre: the TOGA thrust.

Go-arounds usually take place when an aircraft's weight is well below the Max Landing Weight, and of course, when flying at a low speed close to the Approach speed (VAPP). Application of the TOGA thrust under these conditions creates an unusually strong longitudinal acceleration. Such a strong acceleration is rarely experienced by flight crew since the only other time TOGA thrust is applied is at take-off when the aircraft is heavy.

Flight crew are not used to the feeling of such a strong acceleration, so this may lead to them being surprised. The strong longitudinal acceleration induced by the TOGA thrust may ultimately lead to Spatial Disorientation (SD) of the flight crew caused by a Somatogravic Illusion (SI). SI is a suspected element in several fatal accidents.

As a means to reduce the likelihood of SI occurring, Airbus developed a function that allows crews to perform a go-around with a reduced thrust, adapted to the aircraft weight, speed and altitude: the Soft Go-Around Function (SGA). ■

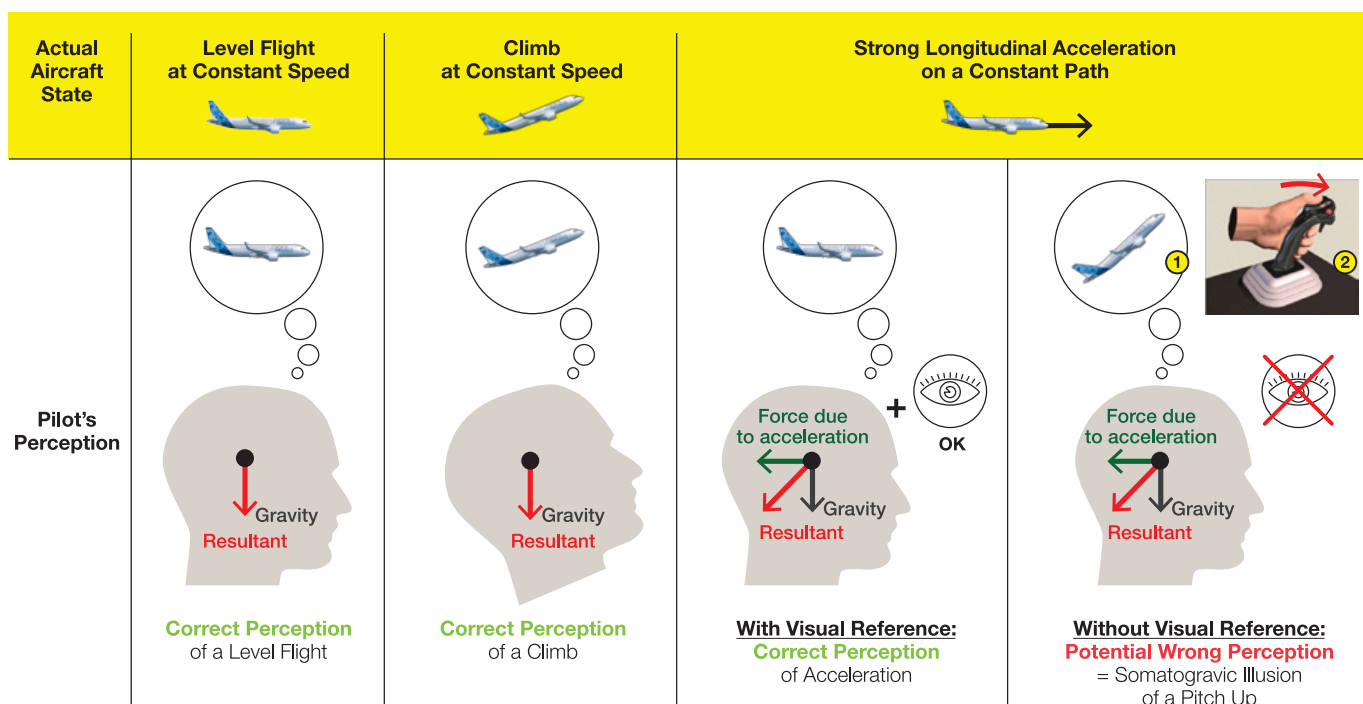
WHAT IS THE SOMATOGRAVIC ILLUSION?

Somatogravic Illusion (SI) is a spatial disorientation phenomena which is caused by a mismatch between different signals from our senses and the brain. It is generated by a strong longitudinal acceleration or deceleration. The brain interprets acceleration as a pitch up and this may lead to inappropriate pitch down command. **(fig.1)**

Pilots can be especially susceptible to SI when performing a go-around at night or in poor visual conditions. The strong longitudinal accelerations combined with a lack of visual references lead to the mistaken perception of excessive pitch up.

(fig.1)

Explanation of the Somatogravic Illusion



“ The SGA function provides a lower than TOGA initial thrust level, such that it ensures a reduced acceleration and requirement to pitch up and a lower but constant final rate of climb whatever the aircraft weight, speed, altitude and Slat/Flaps configuration. ”

PRINCIPLE OF THE SOFT GO-AROUND FUNCTION

The SGA function provides a lower than TOGA initial thrust level, such that it ensures a reduced acceleration and requirement to pitch up and a lower but constant final rate of climb whatever the aircraft weight, speed, altitude and Slat/Flaps configuration.

Airbus has designed the SGA climb capability to be sufficient to be able to deal with the world's most demanding missed approaches. The target rate of climb is either 2000 or 2300 ft/min, depending on the aircraft model.

To put 2000 ft/min into context, if a go-around is performed by an A330-300 at a weight of 150 tons, at sea level, the rate of climb obtained with the TOGA thrust is 3500 ft/min.

Performance of the SGA function is demonstrated to be at least as good as if the go-around was performed with TOGA thrust with One Engine Inoperative (OEI).

The Soft Go-Around function is only available when all engines are operating:

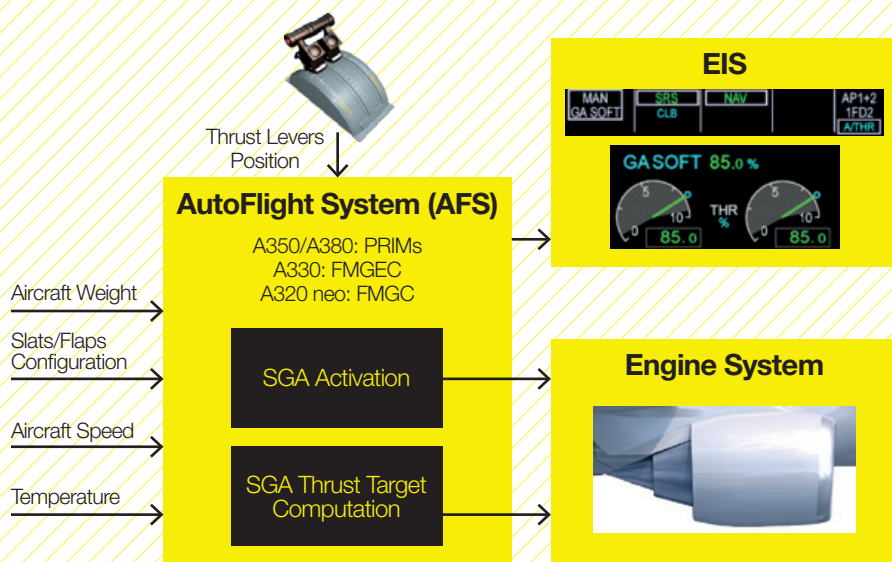
- If the go-around is performed with one engine inoperative, TOGA thrust must be used
- In the case of an engine failure during a soft go-around, the flight crew must also select TOGA thrust.

At any time during a soft go-around, the TOGA thrust can be applied if needed by setting the thrust levers to the TOGA position. ■



HOW DOES THE SGA WORK?

Based on the environmental conditions, the aircraft weight, altitude, speed and slats/flaps configuration, the Auto Flight System (AFS) via the PRIMs (A350/A380) or FMGECs (A330) or FMGCs (A320) computes a thrust target that will enable the aircraft to climb at 2000 (or 2300 ft/min) **(fig.2)**. This thrust target is then sent to the engines FADEC that will apply the optimized thrust as soon as the function is activated via the thrust levers.



SGA is only available when all engines are operating. The TOGA thrust can be applied at any time by setting the thrust levers to the TOGA position.

(fig.2)

SGA functional description

SOFT GO-AROUND ACTIVATION AND DEACTIVATION

When the go-around is initiated, the flight crew sets the thrust levers to TOGA position, as usual, to trigger all the logics (approach modes disengagement, FMS FPL sequencing...), and then activates the SGA by moving back without delay the thrust lever to the FLX/MCT detent. Like any mode, the flight crew checks the engagement of the SGA via the FMA **(fig.3)**:

1. The flight crew first sets the thrust lever to the TOGA detent to:
 - Disengage the approach modes
 - Engage the go-around guidance mode (SRS GA TRK or SRS NAV)
 - Engage the go-around phase of the FMS to insert the missed-approach procedure in the FMS flight plan.
2. Without delay, the flight crew sets the thrust levers back to the FLX/MCT detent to engage the SGA mode (MAN GA SOFT displayed on the FMA)
3. If the flight crew follows FD orders or if AP is ON, a 2000 ft/mn (or 2300 ft/mn) is maintained
4. At the Go-around thrust reduction altitude, the flight crew sets the thrust levers to the CLB detent:
 - MAN GA SOFT disengages
 - The CLB guidance mode engages
 - The Autothrust activates. ■

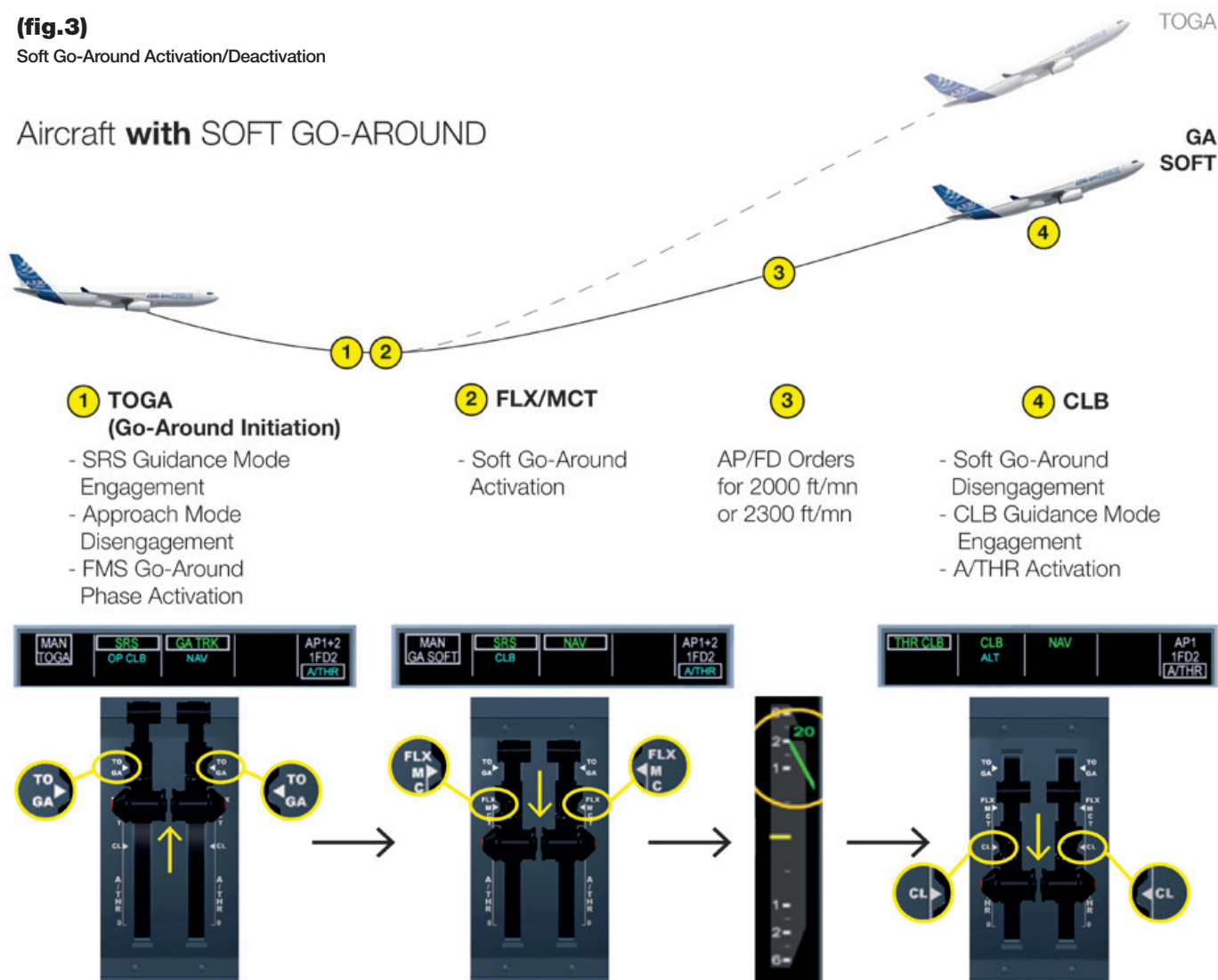
OPERATIONS

Introduction to the Soft Go-Around Function

(fig.3)

Soft Go-Around Activation/Deactivation

Aircraft **with** SOFT GO-AROUND



UPDATED FCOM GO-AROUND PROCEDURE

On aircraft equipped with the SGA function, SGA is now fully part of the Standard Operating Procedures (SOPs). The FCOM and QRH have been updated accordingly.






Example of FCOM GO-AROUND procedure with SGA

GO-AROUND		
GO-AROUND INITIATION		
Simultaneously apply the following three actions:		
THRUST LEVERS.....	TOGA THEN FLX/MCT	PF
Set the thrust levers to the TOGA detent to ensure engagement of SRS GA mode. Then, set the thrust levers to FLX/MCT to engage the GA SOFT mode.		
At any time, if TOGA thrust is required, set the thrust levers to TOGA detent.		
ROTATION.....	PERFORM	PF
GO-AROUND.....	ANNOUNCE	PF
FLAPS.....	RETRACT ONE STEP	PNF
FMA.....	CHECK/ANNOUNCE	PF
If the FMA does not display MAN GA SOFT or MAN TOGA, immediately set the thrust levers to the TOGA detent.		
POSITIF CLIMB.....	ANNOUNCE	PNF



SOFT GO-AROUND FUNCTION AVAILABILITY

The SGA function is, or will be, available for the following aircraft:

A320 neo	A330 ceo + neo		A350	A380
				
<input checked="" type="checkbox"/> Optional	<input checked="" type="checkbox"/> Optional	<input checked="" type="checkbox"/> Basic	<input checked="" type="checkbox"/> Basic	<input checked="" type="checkbox"/> Optional

PROCEDURES FOR AIRCRAFT WITHOUT SOFT GO-AROUND

On aircraft not fitted with the Soft Go-around function, if the TOGA thrust is not required for a go-around, the flight crew can apply the procedure introduced in the FCOM/FCTM in 2013 (**fig.4**).

1. To initiate the go-around, the flight crew must set the thrust levers are set momentarily to the TOGA detent in order to ensure proper activation of the Speed Reference

System (SRS) guidance mode and of the FMS Go-Around phase.

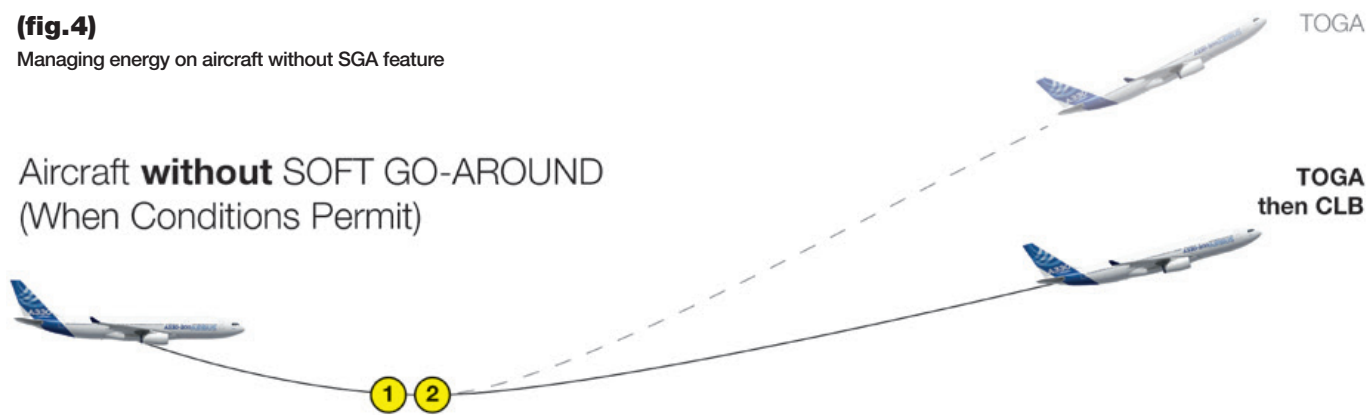
2. Then, the flight crew should set the thrust lever to Climb (CL) detent to take advantage of the autothrust (A/THR).

Refer to the article: “Flying a Go-Around – Managing Energy”, published in the issue 17 of the Safety First magazine. ■

(fig.4)

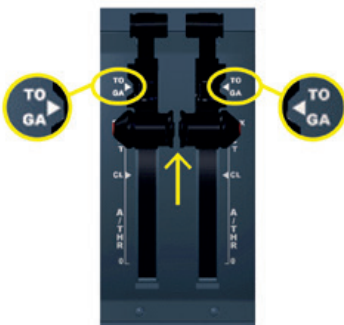
Managing energy on aircraft without SGA feature

Aircraft **without** SOFT GO-AROUND
(When Conditions Permit)



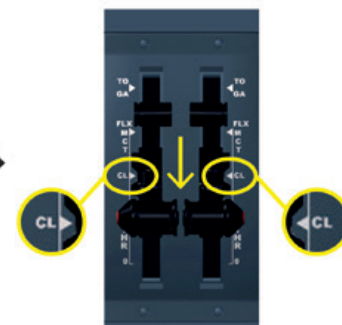
1 TOGA (Go-around initiation)

- SRS guidance mode engagement
- FMS Go-Around Phase Activation



2 CLB (only if TOGA not required)

- A/THR activation
- CLB guidance mode engagement



WHAT ABOUT MIXED FLEETS?

Due to the recent introduction of the SGA function and its fleet-wide availability status, it is likely operators will have to deal with mixed fleet operations where some aircraft will be equipped with SGA and others will not. The key is to make sure that the flight crew is aware of the SGA / Non-SGA capability of the aircraft they are flying.


During the descent preparation, the flight crew can check the SGA capability of the aircraft using the Aircraft Configuration Summary of the QRH.

During the Approach Briefing, the PF

should brief the PM on the go-around thrust strategy based on the availability of the SGA (function installed and not inoperative).

In any case, the Go Around initiation is always done by setting the thrust levers to the TOGA detent to engage the SRS guidance mode and the GO-AROUND phase of the FMS. Then, depending on the aircraft SGA capability and on the possibility to use a reduced go-around thrust, the thrust lever may be set either to the FLX/MCT for SGA activation or to the CLB detent, if conditions permit. ■

1 Check of SGA capability in the ACS table of the QRH



AIRCRAFT CONFIGURATION SUMMARY		
ROW/ROPS	SURV	No
Soft Go-Around Function	ENG	Yes

2 Explain go-around strategy during the approach briefing

In the case of a go-around, I will use soft go-around thrust. If an unexpected situation occurs, I may use TOGA thrust if required.



“ The Go Around initiation is always done by setting the thrust levers to the TOGA detent to engage the SRS guidance mode and the GO-AROUND phase of the FMS. ”

PREVIOUS ‘SAFETY FIRST’ ARTICLES DEVOTED TO THE GO-AROUND PROCEDURE:

- “Go-around Handling” issue 10, August 2010, highlighted that on Airbus Fly By Wire aircraft the go-around flight guidance modes of the Auto Flight System are triggered by setting the thrust levers to TOGA.
- “The go-around Procedure” issue 12, July 2011, insisted on the need to fly and maintain the proper pitch and on the necessity to retard the thrust levers from TOGA to CL
- detent without delay in the event of an early capture of altitude.
- “Flying a Go-Around Managing Energy” issue 17, January 2014, presented the refined go-around procedure to set the thrust levers to CL detent just after the TOGA detent selection when conditions permit, and introduced the discontinued approach technique.

The Soft Go-Around function represents a significant safety and operational improvement. It softens the go-around manoeuvre with optimized thrust to improve go around handling by the flight crew.

No matter whether the aircraft is or isn't fitted with the SGA function, the go-around initiation is always performed by setting the thrust levers to the TOGA detent. On aircraft equipped with the SGA, an updated FCOM go around procedure enables the flight crew to benefit from the function by setting the thrust lever to the MCT detent after the go-around initiation to activate the function, with the possibility at any time to set the thrust lever to TOGA, should the situation request it.

On aircraft not equipped with the SGA, the flight crew can apply FCOM procedure described in the “Flying a Go-Around – Managing Energy” article, published in the issue 17 of the Safety First magazine. This procedure provides the flight crew with the possibility to set the thrust lever to the CLB detent after the go-around initiation, when conditions permit.



Preparing Flight Crews to Face Unexpected Events

During an approach at night-time into Glasgow Airport, the crew of an easyJet A319 experienced a strong cross-wind and turbulent conditions, which created a WINDSHEAR alert and led them to perform a go-around.

As they did this, PFD information including Flight Modes Annunciator, Flight Director bars, and characteristic speeds all disappeared from both PFDs. In addition, the rudder travel limiter function became unavailable, and the auto-thrust disconnected. The crew was facing a very challenging situation, and needed to use their training in back-to-basics flying and efficient Crew Resource Management.



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CHARALAMBIDES**
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BRIAN TYRRELL
Head of Flight
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**CAPT. CHRISTIAN
NORDEN**
Director Flight Operations
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This article describes the event, and provides analysis of its root cause. It also explores the training, oversight and cultural objectives in place at easyJet that have contributed to the crew's effective handling of an unforeseeable combination of factors. These were all key elements that helped the crew achieve a safe outcome.

A CREW EXPERIENCED A COMBINATION OF FACTORS THEY HAD NOT TRAINED FOR

It was the crew's first sector of the day departing from London Gatwick for Glasgow. From the weather reported for Glasgow Airport, they were expecting turbulent conditions with cross-wind of approximately 26 knots and a wet runway.

The First Officer's Probe Heat Computer was inoperative prior to the departure from Gatwick and so the aircraft was operated under an MEL

for the flight to Glasgow. The MEL procedure required the crew to select the Air Data selector to [FO ON 3] and set the ADR2 pushbutton switch to [OFF] prior to entering icing conditions. Icing conditions were expected during the flight, and so the ADR2 was set to [OFF] before the departure. The procedure also states that when the ADR2 has been switched [OFF], the ADR2 must remain set to [OFF] for the remainder of the flight **(fig.1)**.

Each ADR is part of the ADIRU, and provides anemometric parameters which they compute from their associated air data probe outputs. The system architecture of A320 family aircraft includes three ADRs, called ADR1, ADR2 and ADR3.

30-31-01B	Probe Heat Computer (PHC)
Applicable to: ALL	
<u>DURING COCKPIT PREPARATION</u>	
AIR DATA selector.....	F/O 3
<u>IN FLIGHT</u>	
● If icing conditions are encountered:	
ADR 2 pb-sw	OFF
CAUTION When ADR 2 is set to OFF, - takeoff in CONF 1+F is not permitted, and - maximum landing capability is CAT 3 SINGLE.	
The ADR 2 pb-sw must remain set to OFF for the remainder of the flight.	

(fig.1)

Application of MEL 30/31/01B for First Officer's Probe Heat Computer (PHC) inoperative.

Instructions are to select the AIR DATA to [F/O ON 3] and set the ADR2 pushbutton switch to OFF prior to entering icing conditions.



(fig.2)

Primary Flight Display.

[FD] and [SPD LIM] flags are displayed in red text. They respectively indicate the loss of Flight Director bars and the characteristic speed information.



“ Upon reaching 850 feet a reactive WINDSHEAR warning was triggered for 15 seconds. The crew evaded the WINDSHEAR and then conducted the go-around. ”

“ The crew handled this difficult situation well, performing efficient Crew Resource Management (CRM), and applying back-to-basics in flying attitude and thrust to manage the go around phase. ”

After an uneventful flight from Gatwick, the crew reported turbulent conditions on the approach into Glasgow. They disconnected both auto-pilots while crossing one-thousand feet. The Captain was the pilot flying. Upon reaching 850 feet a reactive WINDSHEAR warning was triggered for 15 seconds.

The crew evaded the WINDSHEAR and then conducted the go-around as per standard operating procedures. However in the same instant the FMA became blank, the Flight Director (FD) bars disappeared from the Primary Flight Displays (PFD) and were replaced by the red [FD] flag (**fig.2**). The characteristic speed information were also no longer displayed on either PFD, and were replaced by the red [SPD LIM] flag, which was displayed at the bottom of the airspeed scale. The only information displayed on the airspeed scales were the current speed and the speed bug.

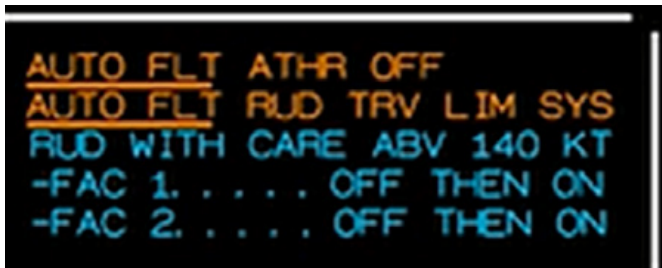
Additionally, two ECAM messages with the associated single-chime and master caution indicated they lost the Auto-Throttle (ATHR) as well as the rudder travel limitation functions. As shown in Figure 3, the ECAM messages indicated were the AUTO FLT ATHR OFF and AUTO FLT RUD TRV LIM SYS amber messages (**fig.3**).

As illustrated in (**fig.4**), the combination of the windshear, chimes and alerts

created a startle effect on the crew. With the increased workload, the crew missed the AUTO FLT RUD TRV LIM SYS ECAM warning and hence did not apply the associated procedure shown on the ECAM display (**fig.3**).

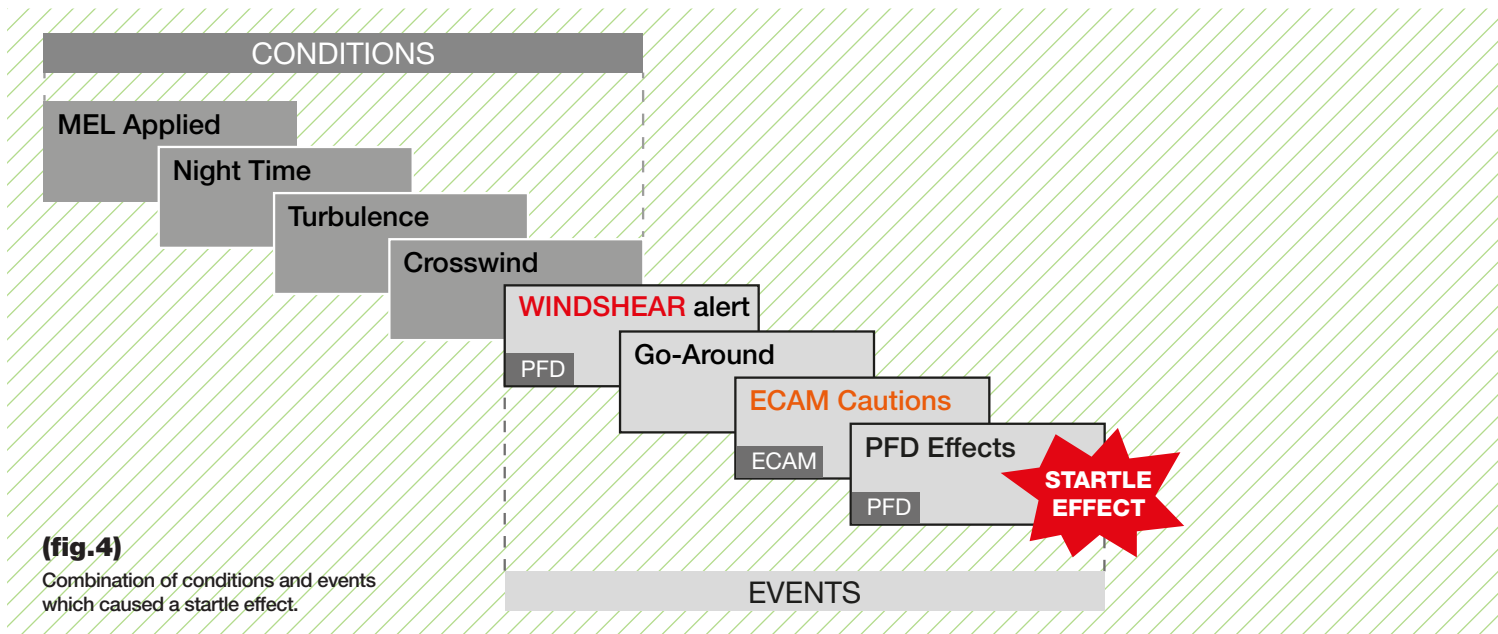
In retrospect, if the crew had applied the procedure displayed on the ECAM they would have reset FAC1 and FAC2, and recovered all of the functions previously lost. However, on the climb from 1900 feet through to 2300 feet, during the slats and flaps retraction, three VFE (maximum allowable airspeed with flaps extended) OVERSPEED warnings sounded within 20 seconds. At the time of the second VFE triggering, the crew switched the ADR2 to [ON], which was not part of the operating procedure but resulted in the characteristic speeds and rudder travel limiter function being available again in the FAC2. This also made the Flight Director (FD2) available and it reengaged automatically on both PFD as it was still selected. Similarly the auto-thrust (ATHR) was also now available and later reengaged by the crew.

The crew successfully conducted the remainder of the flight and landed safely. Overall, the crew handled this difficult situation well, performing efficient Crew Resource Management (CRM), and applying back-to-basics in flying attitude and thrust to manage the go around phase. ■

**(fig.3)**

ECAM messages 'AUTO FLT ATHR OFF' and 'AUTO FLT RUD TRV LIM SYS'.

Associated operating procedure to reset FAC 1 & 2 displayed with master caution and single chime.

**(fig.4)**

Combination of conditions and events which caused a startle effect.

TECHNICAL ANALYSIS OF THE EVENT

easyJet and Airbus conducted a joint investigation into this event. Analysis of the Digital Flight Data Recorder (DFDR) showed a significant discrepancy between the AOA1 and AOA3 measurements at

the same time that the WINDSHEAR alert was triggered. Why did the measured AOA3 increase significantly more than the AOA1 at that time? What are the consequences of this?

Angle of Attack and the Sideslip Effect Explained

This aircraft is fitted with three Angles of Attack probes that deliver three separate Angle of Attack measurements, so called AOA1, AOA2 and AOA3. The sensor vanes delivering AOA1 and AOA2 measurements are located symmetrically on the left and right sides of the aircraft close to the horizontal axis of symmetry. As illustrated in **(fig.5)**, these locations give them a low sensitivity to sideslip.

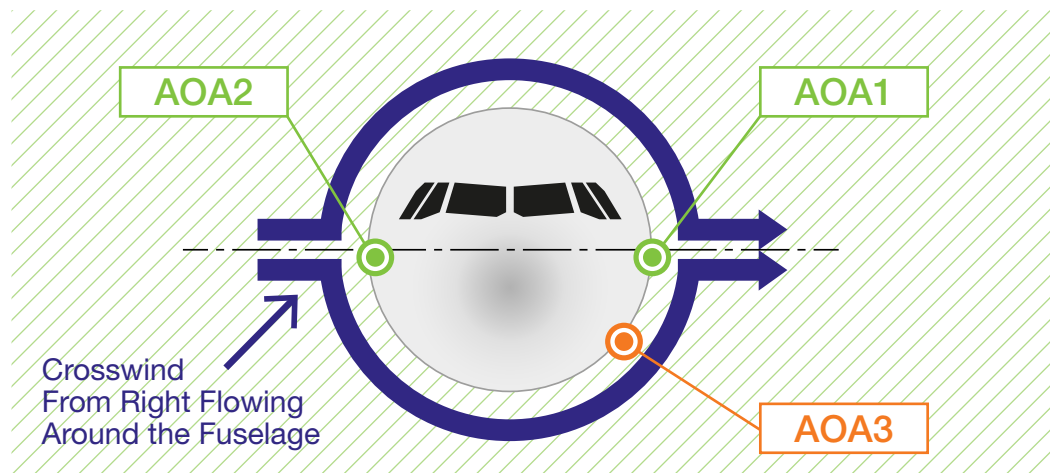
The AOA3 is located below the aircraft's horizontal axis of symmetry. This position makes it more susceptible to sideslip because it is mainly exposed to the part of the lateral airflow which flows below the aircraft **(fig.5)**. This is why the crosswind gust that occurred at the same time as the triggering of the WINDSHEAR alert caused there to be a discrepancy between the measured deflections of the AOA1 and AOA3 sensor vanes.

“ The AOA3 is located below the aircraft's horizontal axis of symmetry and is therefore more susceptible to sideslip. ”

(fig.5)

Lateral wind gusting across the fuselage during sideslip.

AOA3 is more sensitive to sideslip deflection, when compared to AOA1 and AOA2, due to its position below the horizontal symmetry axis of the aircraft.



What were the consequences of the sudden AOA3 increase?

» In the Flight Augmentation Computers (FAC)

Both FAC1 and FAC2 monitor certain ADR parameters, and in particular they monitor the AOA by performing a cross-comparison monitoring of all three AOA measurements provided by their respective ADR (refer fig. 6). In this event, where the applied MEL procedure called for the ADR2 to be switched to [OFF], the FACs were only monitoring for a difference between the measured values of AOA1 and AOA3.

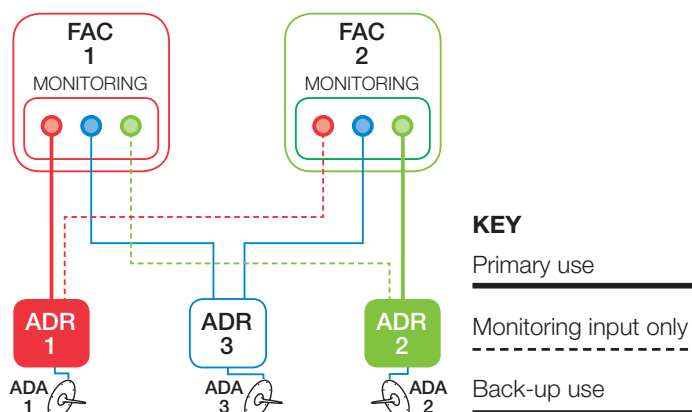
The discrepancy between AOA1 and AOA3 measurements at the time of crosswind gust led to AOA1

and AOA3 ADR parameters being rejected by both FACs. When one ADR parameter is rejected by the FAC monitoring, then all parameters of its corresponding ADR are also rejected. Therefore, ADR1 and ADR3 were rejected by both FAC1 and FAC2. Consequently, there was now no ADR information available in either FAC.

In this condition, both FAC were no longer capable of computing the characteristic speeds, the FD bars, the auto-thrust, auto-pilot or rudder travel limiter function.

(fig.6)

Simplified schematic diagram showing the system configurations for ADR1, ADR2 and ADR3 with the cross-comparison monitoring of ADR by FAC1 and FAC2 in a normal configuration.



» In the Elevator & Aileron Computers (ELAC)

The sudden AOA3 increase had no consequences in the ELAC because the ELAC's monitoring is slightly different to the FAC one due to different architecture. Therefore data

from both ADR1 and ADR3 remained valid in the ELAC, and normal laws including all flight envelope protections, continued to be computed throughout the flight.

» On both PFD

The fact that ADR1 and ADR3 were rejected in FAC1 and FAC2 had no impact on the display of ADR parameters on the primary flight displays (PFD). Indeed, as the ADR1 and ADR3 were selected on the Captain's and First

Officer's sides respectively, the current speed, Mach and altitude parameters delivered by these computers were respectively displayed on both the Captain's and First Officer's PFD until the end of the flight.

What are the consequences of turning ADR2 to [ON]?

At the time of the second V_{FE} overspeed warning, the crew switched the ADR2 to [ON]. This led ADR2 parameters to be available again for functions computation in FAC2. Therefore the characteristic speeds, the rudder travel limiter function, the

Flight Director (FD2) and the auto-thrust (ATHR) became available again from channel 2.

However, the autopilot remained unavailable since FAC2 had only information from one ADR available. ■

“ADR1 and ADR3 remained valid in the ELAC, and normal laws including all flight envelope protections, continued to be computed throughout the flight.”

THE EASYJET FORMULA FOR AN ENHANCED SAFETY BENEFIT

easyJet continues to learn from events like the one analyzed in this article in order to prepare its pilots to face unexpected events and manage situations to have a safe outcome. It has a specific structure that it has put in place for managing

remote bases and this reinforces the dissemination of safety, technical and training materials. Through the development of its “Just” culture, crews have confidence to report events so that their experience can be shared.

The importance of encouraging pilots to practice manual flying skills

Practicing manual flying in various conditions and to use automation appropriately

easyJet recommends that all of its pilots regularly disengage the automation and practice their manual flying skills in various weather conditions. It is at the pilot's discretion to choose when to fly without the auto-pilot or without auto-pilot and auto-thrust. easyJet places emphasis on using automation appropriately to reduce workload, and for the crew to fly manually when they feel they have the right conditions to do so without reducing their overall capacity. Manual handling skills are further reinforced in the easyJet simulator sessions.

The aim of encouraging regular practice of manual flying skills, both on the aircraft and in the simulators, is to ease the management of any unexpected events that could lead to less aircraft automation being available. Additionally, this reinforces the confidence of the pilots in their manual flying capabilities, which can help them to minimize the startle effect from unexpected events. In the flight described in this article, it was evident that the Captain was confident to manually fly the aircraft in the turbulent conditions on the approach into Glasgow as he disconnected the auto-pilot from one-thousand feet.

“easyJet recommends that all of its pilots regularly disengage the automation and practice their manual flying skills in various weather conditions.”

The importance of “Just Culture”

Encouraging the reporting of events to share the lessons learned and enhance safety

easyJet promotes a “Just Culture” for reporting events, which ensures that they can be objectively resolved and with a standardized recorded outcome. The reporting of an event by the crew and the subsequent investigation allows easyJet to collect all of the relevant facts in order to accurately rebuild the scenario. The aim is to share these experiences with other pilots, and to

recognize positive behaviors that the crew exhibited when faced with a rare and unpredictable event. For easyJet, a “Just culture” means that when their crews are capably acting with their best intentions, to the capacity of their knowledge and experience levels, they can perform their responsibilities without the worry of an inconsistent reproach from the easyJet management.

WHAT IS “JUST CULTURE”?

“A culture in which front-line operators or other persons are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but in which gross negligence, willful violations and destructive acts are not tolerated.”

This definition of “Just Culture”

was formally enacted by European Commission Regulation for the reporting, analysis and follow-up of occurrences in civil aviation.

The meaning is that under “Just Culture” conditions, individuals are not blamed for ‘honest errors’, but are only held accountable for willful violations and gross negligence.

“Base Standards Captains foster a supportive atmosphere at the base in which pilots can operate, share their experiences and report events, or seek out knowledge if required.”

Role of the Base Standards Captains in supporting event reporting and knowledge sharing amongst the pilots at a remote base

For the pilots who are located at bases away from the easyJet headquarters, a network of Base Standards Captains (BSCs) are in place. These BSCs distribute new procedures into each base in the easyJet route network, to ensure the procedures and other safety related changes are understood and adopted.

A BSC will carry out regular performance

monitoring and standards assessments to ensure the continued capabilities of all pilots operating in their base. All of easyJet’s BSCs are line training Captains who are embedded within the day to day front line operation and therefore are best placed to engender a supportive atmosphere at the base in which pilots can operate, share their experiences and report events, or seek out knowledge if required.

Importance of operators updating their training packages

Enhancement of training with the lessons shared from event reports to train for outcomes rather than from specific tasks

easyJet invests significantly in providing both remedial and supportive training packages for all of its crew and has over 10 years’ experience in using Alternative Training and Qualification Program (ATQP). This has provided more effective,

operations specific training packages. The packages are designed using data from both industry wide and specific company safety events, as well as statistical analysis of data in order to identify additional areas that need to be trained.

With over 400,000 sectors a year flown across the fleet, easyJet has a rich stream of internal flight data to analyze. Their training team can define additional training priorities based on what they see in both the operations and in simulator sessions. They also draw upon the available industry information, including the lessons learned and recommendations from accident and incident reports. These are made available to all easyJet pilots for review.

Reinforcing safety of operations through training enhancements

easyJet's training highlights the importance of crews going back-to-basics to ensure a positive outcome for the safety of their flights, and the importance of efficient Crew Resource Management (CRM) when facing unexpected events.

For the event described by this article, it was clear for the First Officer as the pilot monitoring that his priority was to closely monitor the parameters, and in particular to always remain aware of the aircraft pitch attitude and bank angle during the go-around phase. The Captain as the pilot flying followed the standard operating procedures and

The easyJet system is designed to “train for outcomes” rather than for specific scenarios. It includes training for upset recovery in normal law and multiple training cases for unreliable airspeed, which are opportunities to emphasize importance of “pitch and thrust” flying. All of the easyJet pilots are immersed in this training philosophy.

applied back-to-basics attitude and thrust flying with the priorities to “Fly, Navigate and Communicate”. This allowed them to manage the situation and have a positive outcome to this startle effect event.

It is impossible to train every pilot in scenarios that will cover every potential threat. However, easyJet believes that by training their crews to ‘manage outcomes’ and to manage complex failures as a team for events, such as upset recovery or unusual attitude, they get an enhanced safety benefit across their entire fleet for all of their customers and crews. ■

“ The easyJet system is designed to ‘train for outcomes’ rather than for specific scenarios. It includes training for upset recovery in normal law and multiple training cases for unreliable airspeed. ”

“ It is impossible to train every pilot in scenarios that will cover every potential threat. ”





EVIDENCE BASED TRAINING FOR AIRBUS PILOTS

“ Airbus is a strong supporter of EBT and has started to include EBT elements in its pilots’ type rating courses. ”

The example of the easyJet event shows how a well-trained crew working in just-culture managed a challenging situation that had not been trained before. easyJet has practiced the UK CAA’s ‘Advanced Training & Qualification Programme’ (AQTP) for several years. The described event demonstrates the merits of this competency based training system compared to the conventional task based training philosophy.

Evidence Based Training (EBT) takes the concepts of the FAA’s Advanced Qualification Program (AQP) and EASA’s ATQP program further by structuring recurrent assessment and training according to evidence-based priorities, based on a comprehensive analysis of safety and training data from a wide variety of sources¹. EBT was introduced by EASA in 2016 by ED Decision 2015/027/R for recurrent training.

Airbus is a strong supporter of EBT and has started to include EBT elements in its pilots’ type rating courses, even if it is not yet mandated by regulation.

The Airbus A350 Type Rating courses have been the first to receive EBT elements, making them competency and not task centered. EBT places emphasis on scenario-based training, adding the ‘surprise’ element, and

particularly focusing on the most critical training topics identified by EBT².

One of these critical training topics is the Go-Around, which was found through analysis of data from multiple operational and training sources to be a procedure with operational risks. The data indicated that crews may face challenges when conducting a Go-Around³. These findings highlighted to industry the need to raise flight-crew skills in performing Go-Arounds, through more and different training types.

Accordingly, starting with the A350, Airbus has intensified Go-Around training to cover a much broader scope. Besides training the still necessary one-engine inoperative manoeuvres, the training also assigns the following:

- “Unexpected” go-arounds
- Go-arounds from various altitudes different from MDA/DH
- Go-arounds with relatively low gross weight, combined with low MISAP level off altitudes
- Go-arounds in VMC with revisions to the (managed) flight path (“Join visual downwind”)

Type Rating training will receive a major revamp when the new EASA regulation currently under design will introduce EBT for the type training phase. This step beyond ICAO DOC 9995 can be expected for 2018. ■

¹ IATA Evidence-Based Training Implementation Guide, 1st Edition Pg. 38

² IATA Data Report for Evidence-Based Training – Montreal 2013 Appendix 16

³ IATA I.c. Pg. 85



In the event described by this article, the crew clearly faced a scenario with a significant startle effect due to a combination of factors for which they had not been specifically trained. Despite this, the crew worked as a team and managed this challenging situation very well thanks to their general training.

easyJet's training philosophy to "train for outcomes" is one element that was key in achieving a safe outcome when faced with such events. easyJet's training program, which evolves with new data, highlights the importance of crews performing efficient crew resource management, to use automation appropriately, and to regularly practice manual flying skills.

Their supportive professional structure, which promotes "Just Culture" for reporting and sharing knowledge or experience is also a key element driving the evolution of their training programs, using reported experiences to prepare crew to face unexpected events.

Approaches to training are evolving across industry, with Evidence Based Training (EBT) for recurrent training being introduced by EASA in 2016. Rather than measuring a pilot's performance during individual events or manoeuvres, EBT develops and assesses the overall capability of a pilot across a range of core competencies.

Starting with the A350, Airbus is evolving type rating courses to include elements of Evidence Based Training (EBT).



GENERAL TOPIC

Safety, Our Shared Destination



Safety, Our Shared Destination

As professionals, working in an industry with annual growth rates between 5 & 6%, we must ask ourselves the question ‘what could be the impact on Safety of a doubling of air traffic?’.

Without industry-wide action to lower the accident rate, by 2030 we will be experiencing accidents more frequently.

This article looks at an Airbus initiative called Air Transport Safety Destination 10X Together, which is a platform upon which Airbus and our operators can collaborate to propose pragmatic solutions to key identified safety issues.



YANNICK VANHECKE

Head Of Safety
Enhancement



COMMERCIAL AVIATION'S RECORD ON SAFETY

Our industry can be very proud of its record on safety. Our combined efforts have reduced the fatal accident rate to about only 1 fatal accident per 10 million departures on the fourth generation of airplanes **(fig.1)**.

Yet despite this success, the fatal accident rate for 4th generation jets has been consistent for the last 10 years, barely decreasingly.

Even if these abstracted statistics show a low and stable accident rate, we at Airbus believe we must still address the real-world meaning of fatal accidents and their impact on people, since any accident is an unacceptable tragedy. ■

“ The fatal accident rate of 1 per 10 million departures for 4th generation jets has been consistent for the last 10 years, barely decreasingly. ”

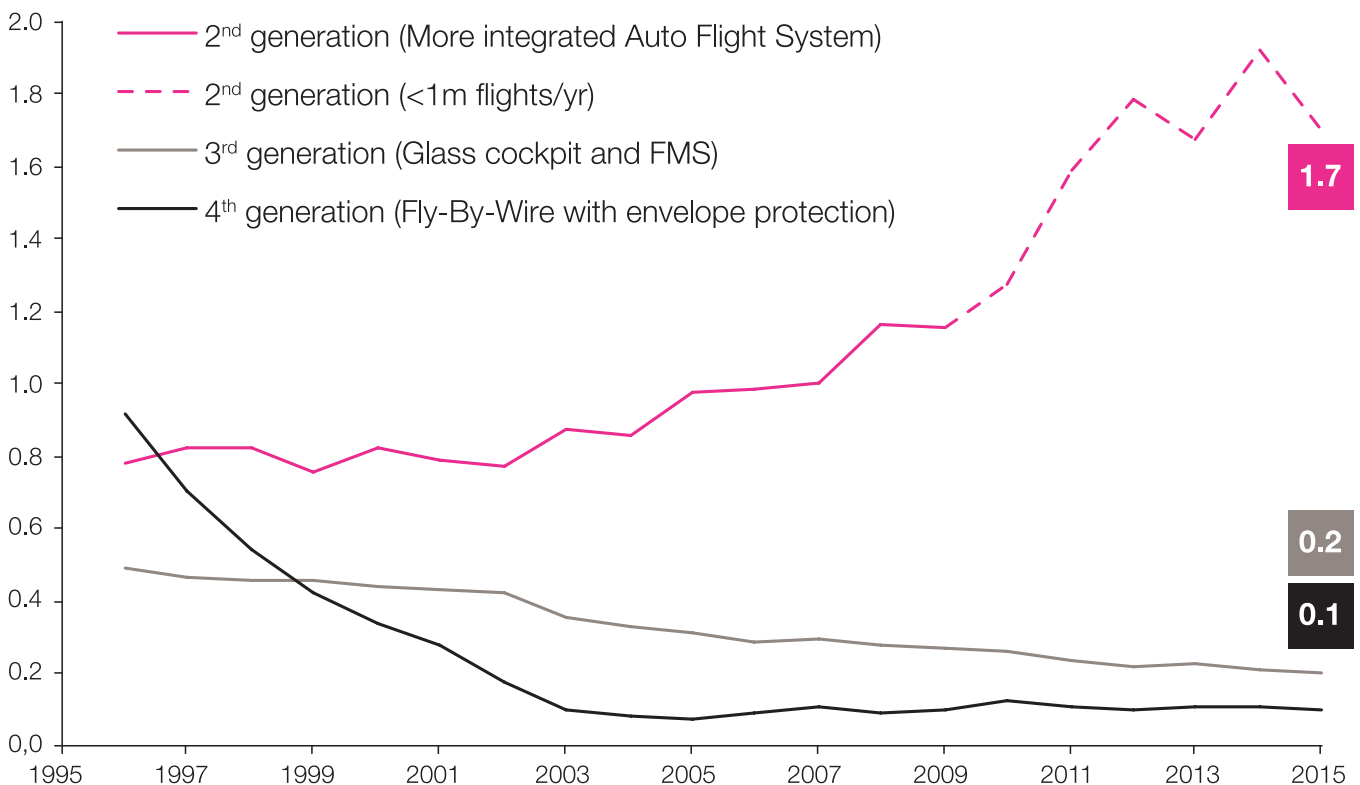
(fig.1)

Accident rate per million by aircraft generation (ten year moving average).

The accident rate for 4th generation jets is very low but has barely decreased over the last 10 years.

Fatal accident rate 1996-2015

Accidents per million flights (Source: Airbus Accident Statistics brochure 1958-2015)



“ If the fatal accident rate remains at today’s level, the doubling of flights forecast to occur by 2030 will inevitably lead to double the number of accidents in numerical terms. ”

(fig.2)

Airbus Global Market Forecast for annual traffic (trillion RPKs per year).

Air traffic is resilient to external shocks, and is forecast to double over the next 15 years.

SAFETY IN THE FUTURE

What do we know about the future of our industry?

In terms of the volume of activity we need to manage, we know that our industry’s output (RPKs) continues to grow at a global rate of between 5 & 6% per year. We also have the proof from history which shows that this growth is resilient to external shocks over the long-term. We can therefore be reasonably confident in the consensus of forecasts which anticipate a doubling of air traffic over the next 15 years **(fig.2)**.

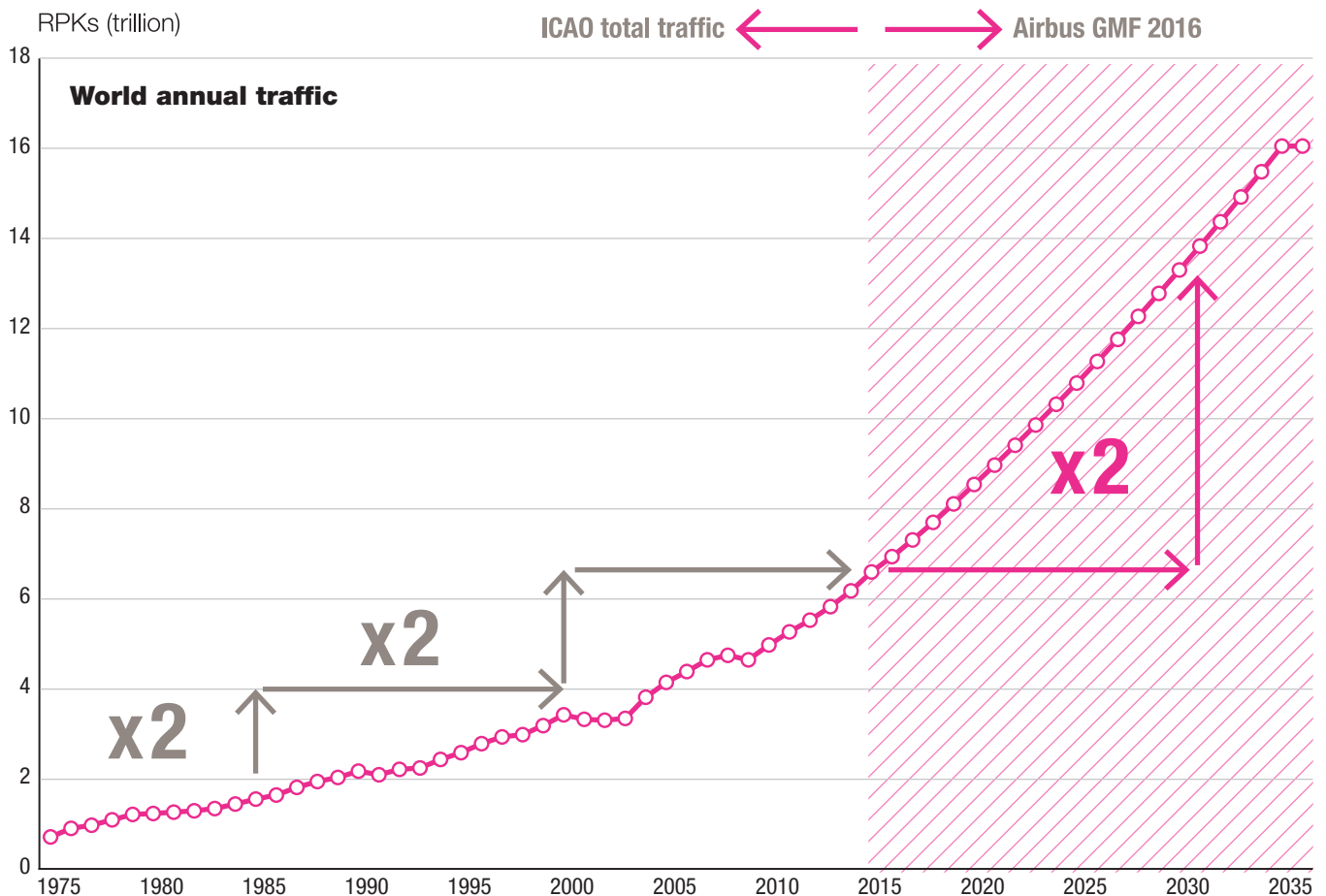
As professionals, we must ask ourselves the question, ‘what could be the impact on Safety of a doubling of air traffic?’

If we assume a scenario where our fatal accident rate remains at today’s level, the doubling of flights forecast to occur by 2030 will inevitably lead to double

the number of accidents in numerical terms. This must surely be something which we all find unacceptable.

Furthermore, rapid global development of the industry may generate increased operational pressures at all areas of the air transport system. It will also require a significant expansion of the number of newly certified personnel, potentially causing a decrease in the overall level of experience and causing new threats to emerge.

The conclusion from these considerations seems clear: we need to launch co-ordinated actions with all actors of air transport system to address upcoming threats and drive the rate of accidents lower than it has ever been. ■



DESTINATION 10X

With this in mind, Airbus has launched a project called 'Air Transport Safety Destination 10X Together', or Destination 10X for short. The objective of the Destination 10X project is to identify and implement different initiatives to enhance Air Transport Safety, in cooperation with our operators.

By sharing information and exchanging ideas, the project aims to identify 'quick-wins' for Safety enhancement and then move quickly into pragmatic implementation.

The Destination 10X project is integrated into Airbus' strategy for continuous Safety Enhancement. The annual Airbus Flight Safety Conference (FSC) is a key component in this activity, since it offers Airbus and airlines a unique opportunity to share information and ideas. In 2016 the FSC was attended by 267 airline delegates from 117 different operators, and it was with this community that Airbus launched the first wave of activity on the project.

The airlines were surveyed in order to identify the areas in which they believed the industry needed to focus attention in order to improve Safety.

Based on this survey, as well as from the existing safety plans from EASA, ICAO and FAA, four key areas were identified as the top priorities; Training, Weather, Safety Data, and Safety Enhancement Promotion.

At this point in the project, Airbus is running workshops with some operators on these key priority areas, to identify quick-win enhancement projects, and has chosen the top two priorities of Weather and Training as the key themes of this year's Airbus Safety Conference in Santiago. Airlines at this conference will have the opportunity to collaborate with Airbus by participating in workshops to propose priorities to be launched for implementation in Wave 1, as well as to identify priority areas for Wave 2 (**fig.3**).

Similar waves will be run at every FSC, with a second wave already scheduled for the 2017 event in order to identify the next areas of focus for the project.

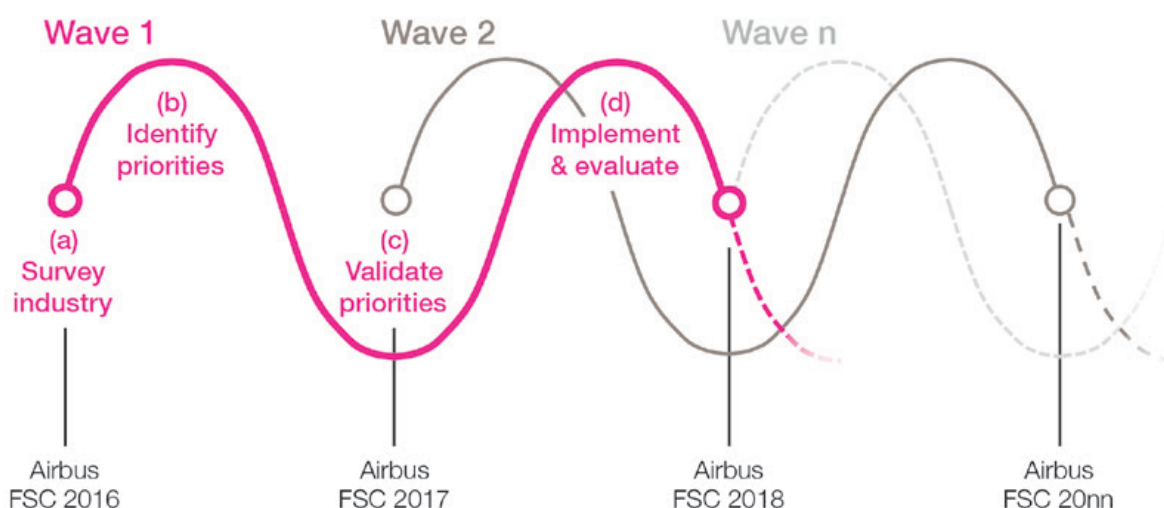
In addition, in order to promote a continually collaborative working mode for the project, Airbus will release a Destination 10X app and website in Q1 2017. Users will be able to receive project updates, as well as be able to vote on project priorities. ■

“ By sharing information and exchanging ideas, the project aims to identify 'quick-wins' for Safety enhancement and then move quickly into pragmatic implementation. ”

(fig.3)

Destination 10X Timeline.

Project waves are integrated into Airbus' strategy for continuous Safety Enhancement. Each wave involves four key phases of (a) surveying industry, (b) Identifying priorities for action, (c) Validating priorities, and finally (d) Implementing solutions and evaluating the result.



FSC: Flight Safety Conference

“ Airbus and our airline customers are already in co-operation on the Destination 10X project. We encourage more airlines to join us. ”

DESTINATION 10X TOGETHER

The Destination 10X project is a platform upon which Airbus and its operators can collaborate to propose pragmatic solutions to key identified safety issues.

As mentioned, Airbus and our airline customers are already in co-operation in the current first wave of the project. We certainly encourage more airlines to join us as we progress into the selection of solutions, whether at the Airbus Flight Safety Conference (see pages 4-5), or through the app / website.

As we identify together quick win initiatives, we aim at sharing them across industry. The concept is to create initial momentum amongst those whose businesses are most immediately impacted by Safety, and then to continue to build momentum across other industry actors in a 'snowball effect'.

This is a pragmatic approach to building consensus from the ground up, with a focus on action. ■



INFORMATION



From the beginning of March 2017, scan the QR code in order to download your copy of the Destination 10X app. This will be your way to engage in the Destination 10X project, to make sure your ideas are captured and priorities are implemented for finding the most effective ways to enhance Safety.

Despite our industry's success on preventing accidents, the fatal accident rate of 1 accident per 10 million flights for 4th generation jets has been consistent for the last 10 years, barely decreasingly.

When we combine increased operational pressures arising from the forecast doubling of flights over the next 15 years, with the rapid intake of newly certified personnel which is needed to achieve growth, it is likely that we will experience accidents more frequently. This is clearly unacceptable.

The goal of Airbus' Destination 10X project is to quickly identify and implement different initiatives to enhance Air Transport Safety and share them at industry level.

Airbus and our airline customers are already in co-operation together, and we encourage all our operators to get involved.



ARTICLES PUBLISHED IN PREVIOUS 'SAFETY FIRST' ISSUES

Issue 22

July 2016

- Pitot Probe Performance Covered On the Ground
- 180° turns on runway
- Optimum use of weather radar

Issue 21

January 2016

- Control your speed... in cruise
- Lithium batteries: safe to fly?
- Wake vortices
- A320 Family Aircraft configuration

Issue 20

July 2015

- Control your speed... during climb
- Lateral runway excursions upon landing
- Fuel monitoring on A320 Family aircraft
- Hight-altitude manual flying

Issue 19

January 2015

- Tidy cockpit for safe flight
- Landing on contaminated runways
- Understanding weight & balance
- Wind shear: an invisible enemy to pilots?

Issue 18

July 2014

- Control your speed... at take-off
- Safe operations with composite aircraft
- Learning from the evidence
- A320 Family cargo Containers/ pallets movement
- Parts Departing from Aircraft (PDA)

Issue 17

January 2014

- Airbus Brake Testing
- Hard Landing, a Case Study for Crews and Maintenance Personnel
- Aircraft Protection during Washing and Painting
- Flight Data Analysis (FDA), a Predictive Tool for Safety Management System (SMS)
- Flying a Go-Around, Managing Energy

Issue 16

July 2013

- **Performance Based Navigation:** RNP and RNP AR Approaches
- **Atlantic Airways:** Introduction of RNP AR 0.1 Operations
- Flight Crews and De-Icing Personnel – Working together in Temporary Teamwork for safe Skies
- Low Speed Rejected Take-Off upon Engine Failure
- Late Changes before Departure

Issue 15

January 2013

- The Golden Rules for Pilots moving from PNF to PM
- Airbus Crosswind Development and Certification
- The SMOKE/FUMES/AVNCS SMOKE Procedure
- Post-Maintenance Foreign Objects Damage (FOD) Prevention
- **Corrosion:** A Potential Safety Issue

Issue 14

July 2012

- Thrust Reverser Selection means Full-Stop
- Transient Loss of Communication due to Jammed Push-To-Talk A320 and A330/A340 Families
- **A380:** Development of the Flight Controls - Part 2
- Preventing Fan Cowl Door Loss
- Do not forget that you are not alone in Maintenance

Issue 13**January 2012**

- A320 Family / A330 Prevention and Handling of Dual Bleed Loss
- The Fuel Penalty Factor
- The Airbus TCAS Alert Prevention (TCAP)
- **A380:** Development of the Flight Controls - Part 1
- Facing the Reality of everyday Maintenance Operations

Issue 10**August 2010**

- **A380:** Flutter Tests
- **Operational Landing Distances:** A New Standard for In-flight Landing Distance Assessment
- Go Around Handling
- **A320:** Landing Gear Downlock
- Situation Awareness and Decision Making

Issue 7**February 2009**

- **Airbus AP/FD TCAS Mode:** A New Step Towards Safety Improvement
- Braking System Cross Connections
- Upset Recovery Training Aid, Revision 2
- Fuel Pumps Left in OFF Position
- **A320:** Avoiding Dual Bleed Loss

Issue 12**July 2011**

- Airbus New Operational Landing Distances
- The Go Around Procedure
- The Circling Approach
- VMU Tests on A380
- Automatic Landings in Daily Operation

Issue 9**February 2010**

- **A320 Family:** Evolution of Ground Spoiler Logic
- Incorrect Pitch Trim Setting at Take-Off
- Technical Flight Familiarization
- Oxygen Safety

Issue 6**July 2008**

- **A320:** Runway Overrun
- FCTL Check after EFCS Reset on Ground
- **A320:** Possible Consequence of VMO/MMO Exceedance
- **A320:** Prevention of Tailstrikes
- Low Fuel Situation Awareness
- Rudder Pedal Jam
- Why do Certain AMM Tasks Require Equipment Resets?
- Slide/raft Improvement
- Cabin Attendant Falling through the Avionics Bay Access Panel in Cockpit

Issue 11**January 2011**

- What is Stall? How a Pilot Should React in Front of a Stall Situation
- Minimum Control Speed Tests on A380
- Radio Altimeter Erroneous Values
- Automatic NAV Engagement at Go Around

Issue 8**July 2009**

- The Runway Overrun Prevention System
- The Take-Off Securing Function
- **Computer Mixability:** An Important Function
- Fuel Spills During Refueling Operations

Issue 5**December 2007**

- New CFIT Event During Non Precision Approach
- **A320:** Tail Strike at Take-Off?
- Unreliable Speed
- Compliance to Operational Procedures
- The Future Air Navigation System FANS B

ARTICLES PUBLISHED IN PREVIOUS 'SAFETY FIRST' ISSUES

Issue 4

June 2007

- Operations Engineering Bulletin Reminder Function
- Avoiding High Speed Rejected Take-Offs Due to EGT Limit Exceedance
- Do you Know your ATC/TCAS Panel?
- Managing Hailstorms
- Introducing the Maintenance Briefing Notes
- **A320:** Dual hydraulic Loss
- Terrain Awareness and Warning Systems Operations Based on GPS Data

Issue 3

December 2006

- Dual Side Stick Inputs
- Trimmable Horizontal Stabilizer Damage
- Pitot Probes Obstruction on Ground
- **A340:** Thrust Reverser Unlocked
- Residual Cabin Pressure
- Cabin Operations Briefing Notes
- **Hypoxia:** An Invisible Enemy

Issue 2

September 2005

- Tailpipe or Engine Fire
- Managing Severe Turbulence
- Airbus Pilot Transition (ATP)
- Runway Excursions at Take-Off

Issue 1

January 2005

- Go Arounds in Addis-Ababa due to VOR Reception Problems
- The Importance of the Pre-flight Flight Control Check
- **A320:** In-flight Thrust Reverser Deployment
- Airbus Flight Safety Manager Handbook
- Flight Operations Briefing Notes

