Safety Beyond Standard

Enhancing the Safety of the Airbus Fleet

Issue 1 - 2026

AIRBUS

Dear Customers,

Safety Beyond Standard (SBS) is an initiative Airbus launched 10 years ago to reinforce a proactive approach to product safety.
It focuses on developing solutions to contribute to mitigating top industry safety threats, implementing design-related safety barriers, and further enhancing the resilience capability of our aircraft against abnormal conditions.

The SBS program aims to implement design evolutions beyond requirements.

Therefore, you will find in this document a selection of product evolutions that your fleet might be eligible for. To support your preliminary assessment, some key parameters are provided, related to safety, flight operations and training, engineering, and maintenance. If you have not already done so, we encourage you to launch this assessment involving all these different sectors of your company.

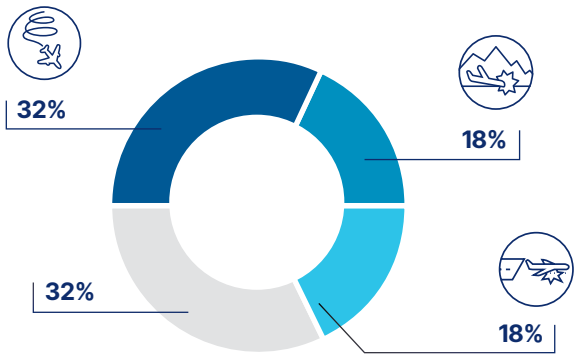
For any questions on these items, or for a full list of solutions developed as part of the SBS initiative, please contact your Field Representative or your Customer Support Director.

Best Regards,

Yannick Malinge
SVP - Head of Aviation Safety
Airbus Commercial Aircraft

Fatal accident distribution per accident category 2005-2025

Top 3 categories	Others
LOC-I	USOS: 5%
CFIT	SCF-PP: 5%
RE	RI: 3%
	FIRE: 2%
	ARC: 5%
	Other categories: 12%



The top 3 categories for fatal accidents in the commercial aviation industry over the last 20 years, representing 68%, remain loss of control in flight, controlled flight into terrain and runway excursion.

Inspired by the design features developed for the latest Airbus A350, Airbus is going above and beyond regulatory requirements by adapting these features to A320, A330, and A380 families aircraft.

Called "Safety Beyond Standard", this initiative marks the latest step in our approach to continuous safety enhancement.

One of the objectives is to raise the level of operational capability, flight crew assistance and resilience against abnormal operations of the A320, A330, and A380 family aircraft to that of our latest aircraft, the A350.

The Safety Beyond Standard initiative will notably help in mitigating major safety risks such as Loss of Control In-flight (LOC-I), Controlled Flight Into Terrain (CFIT) & Runway Excursion (RE).

Safety Beyond Standard aims at developing incremental safety features. These enhancements are proposed for retrofit on the eligible in-service fleet and are basic for new aircraft.

To facilitate the implementation of these enhancements:

- Potential training aspects have been taken into account.
- Time for embodiment is limited.

This brochure outlines the proposed safety enhancements and provides the key information needed to support the decision to implement the solutions.

Do not hesitate to contact Airbus Customer Suppport to assist you further in this initiative.

↘ 90%

Flight envelope protections, introduced with FBW aircraft aircraft, have helped to reduce the LOC-I fatal accident rate by 90% compared with non-FBW aircraft.

LOC-I

Further Preventing Loss of Control in Flight

Why does it matter?

LOC-I has been one of the main categories of fatal accidents since the beginning of commercial jet aviation.

While there have been no fatal accidents in the last 10 years involving an Airbus aircraft, in-service data shows that the threat remains. **Data analysis reveals one significant upset event occurred every 2 years, highlighting precursors to potential LOC-I.**

To know more

Continuous enhancement of aircraft systems, such as increasing the availability of the autopilot and the flight envelope protections, will help to further prevent potential future events.

Enhanced Autopilot Availability

Fleet equipped as of date of issue

A320: 52%

A330: 25%

A380: 91%

Industry support | Software | ≤ 5h | Level B

What is the expected safety benefit?

Autopilot is one of the key safety barriers to prevent LOC-I events.

Enhancements have been developed to increase autopilot availability, in particular in the event of system failures.

Increased autopilot availability will reduce crew workload supporting them in managing abnormal situations.

In-service data demonstrates this SBS solution efficiency.

↘ 70%

Loss of autopilot upon system failures is reduced

What is the operational benefit?

Autopilot will remain available in the case of system failures related to Flight Management System, landing gear, or air data systems.

How are the enhancements embodied on the aircraft?

The enhancements are embodied via computer software upgrades.

These enhancements are supported by Airbus monitored retrofits.

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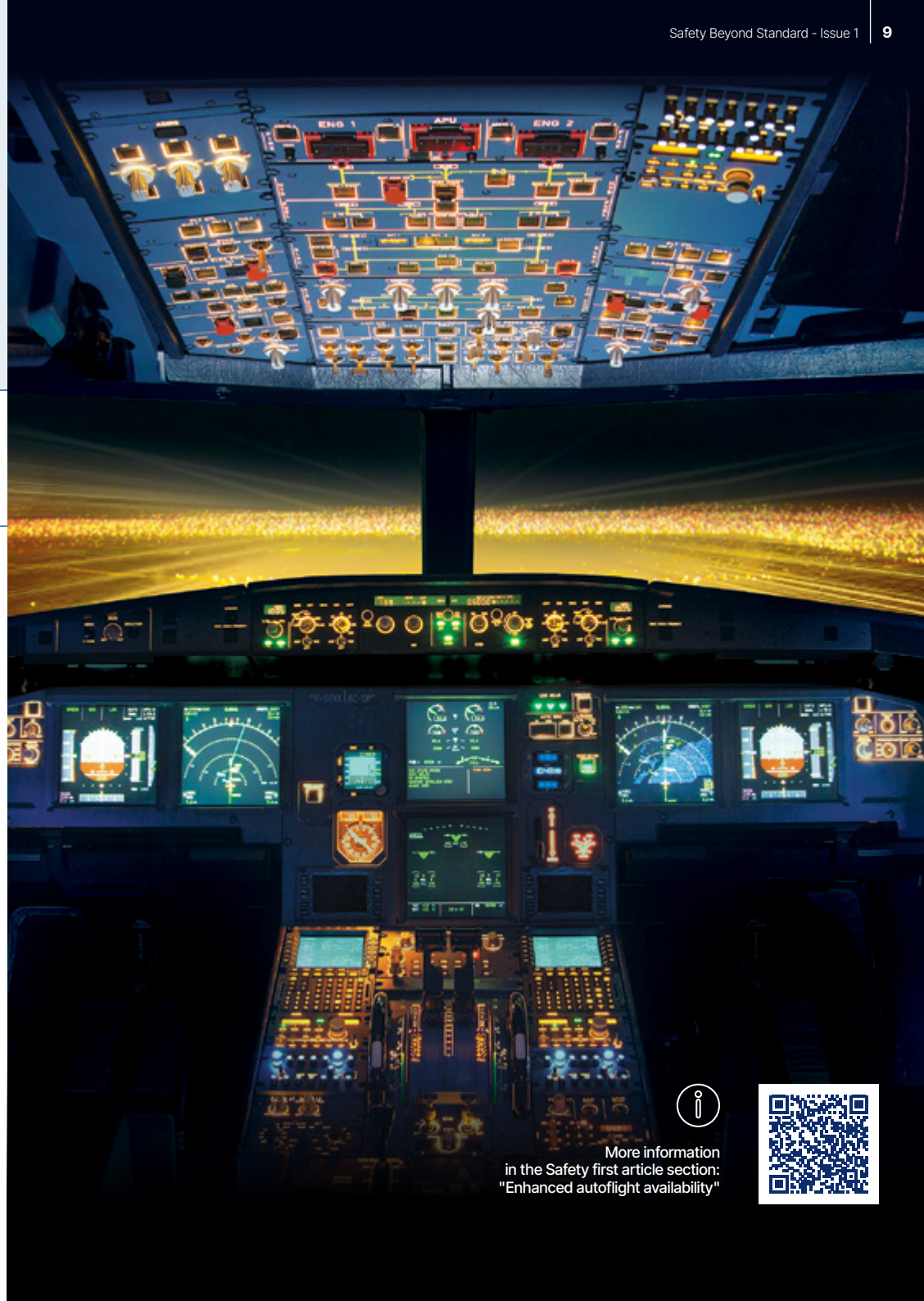

More information in the Safety first article section: "Enhanced autoflight availability"

Enhanced Flight Envelope Protection Availability

A320: 20%

A330: 0%

A380: in dev.

Industry support **Software** **≤ 5h** **Level A**

What is the expected safety benefit?

In the event of loss of flight envelope protection (reversion to flight control alternate law), a pitch angle limitation provides an additional safety barrier. This is done by delaying a potential stall situation in the case of prolonged nose-up stick inputs.

How is the enhancement embodied on the aircraft?

The enhancement is embodied via a computer software upgrade.

This enhancement is supported by Airbus monitored retrofit.

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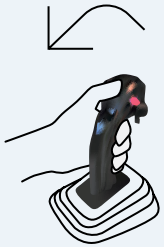
Pitch Attitude Limitation in Alternate Law (PALAL)

θmax is the maximum pitch angle that can be reached with the sidestick maintaining a pitch-up demand



Without Pitch Limitation

With Pitch Limitation

More information in the Safety first article section: "Enhanced flight envelope protection availability"

Enhanced Flight Crew Interface

A320: 31%

A330: 11%

A380: in dev.

Industry support | Software | ≤ 5h | Level B

What is the expected safety benefit?

Anemometric data is one of the key aircraft flight parameters. However, in-service experience has shown that, in some conditions, anemometric data can be lost or become unreliable.

In the event of the loss of anemometric data, an alternative means to display airspeed information, based on angle-of-attack, aircraft weight, and load factor has been developed.

This enhancement will help the crew display the best available speed information, reducing their workload. In-service data shows that the function activates more than one time a day on the current fleet.

What is the operational benefit?

In the case of an Unreliable Airspeed Situation (UAS), back-up information will be available on the primary flight display in the whole flight domain.
The enhanced ECAM procedure will provide a comprehensive status and clear guidance on the optimum information to display.

How is the enhancement embodied on the aircraft?

The enhancement is embodied via a computer software upgrade.

This enhancement is supported by Airbus monitored retrofits.

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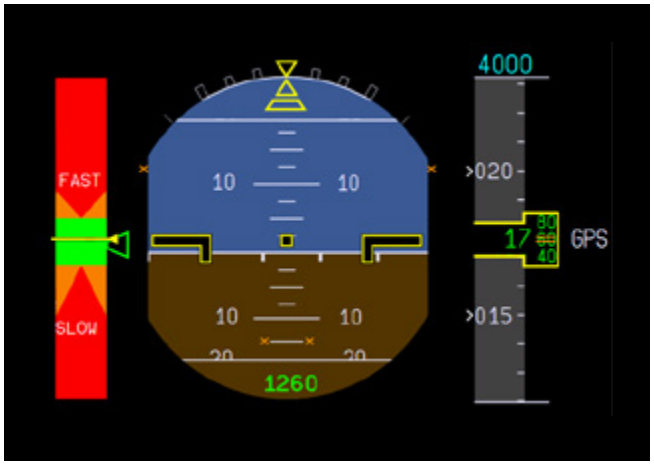
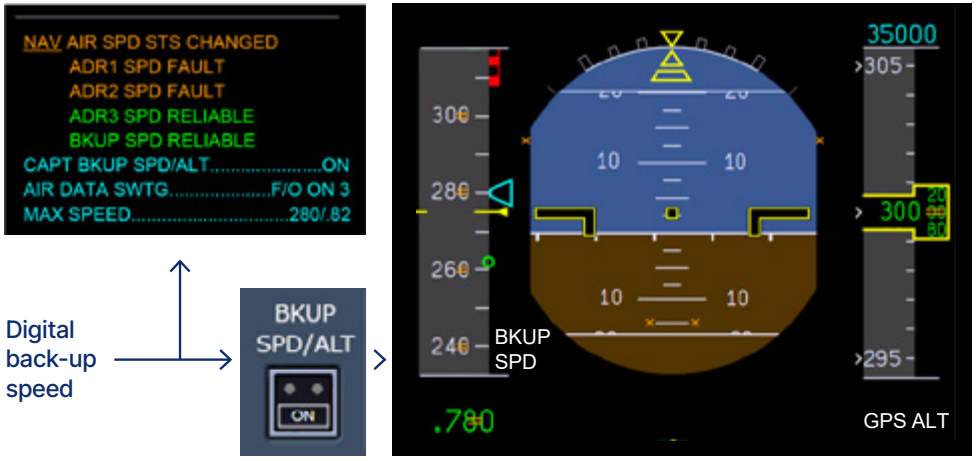
Without Digital Back-Up Speed (Available below FL 250)



With Digital Back-Up Speed (Available in all flight domain)



More information on Digital Back-Up Speed indication and other crew awareness enhancements (Stall message on PFD and Excessive Bank Angle Alert) in the Safety first article section: "Enhanced crew awareness"

CFIT

Further Preventing Controlled Flight Into Terrain

Why does it matter?

There have been no fatal CFIT accidents in the last 10 years involving an Airbus aircraft, **but reported in-service data shows on average one high-risk event every year.**

This is illustrated by several incidents, including runway undershoot events that led to hull losses.

While glass cockpits, the Flight Management System (FMS), and the Terrain Awareness Warning System (TAWS) have significantly reduced CFIT accidents, the continuous enhancement of aircraft systems and operations will help to further prevent potential future accidents.

The enhancements proposed on the next pages enhance the resilience of the aircraft for the most exposed flight phases, which are:

- Approach and landing phases, especially when flying a non-precision approach,
- Go-around phase.

Enhanced Guidance during Landing

FMS Landing System (FLS)

A320: 17%

A330: 17%

Industry support | Software | ≤ 5h | Level B

What is the expected safety benefit?

Every day, around the world, the vast majority of final approaches flown by commercial jet aircraft are Instrument Landing System (ILS) approaches with which flight crews are very familiar.

90% of daily landings on Airbus aircraft are precision approaches. However, the 10% of non-precision approaches account for over 85% of CFIT accidents.

In most of the reported events, the identified contributing factors included:

- Lack or loss of situational awareness (lateral or vertical)
- Difficulties to efficiently control, monitor or adjust the vertical flight path
- High crew workload.

The FLS function reduces the risks of unstabilised approaches, loss of situational awareness, flight path excursions, and excessive crew workload.

What is the operational benefit?

The FLS function:

- Enables the flight crew to fly straight-in Non-Precision Approaches (NPAs) with an ILS-look-alike interface
- Provides an angular vertical guidance based on the baro reference with compensation for cold temperature
- Is independent of any external means (such as satellite constellations), is available worldwide, and does not require any specific operational approval
- Provides higher operational flexibility:
  - Beam capture independent of flight plan
  - Flexible with ATC constraints (vectoring) or approach optimisation strategies

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Is simulator training needed?

While training in a full flight simulator is not required (Level B), a simulator standard data package is available.

How is the enhancement embodied on aircraft?

The FLS function can be embodied on aircraft via an optional SB.

> Safety benefits are clear. SOPs are very intuitive and almost identical to ILS.
>
> **Airline Testimony**

To know more

Enhanced Trajectory & Energy Management during Go-Around

Soft Go-Around function

A320neo: 98%

A330: 19%

No industry support | Software | ≤ 5h | Level A

What is the expected safety benefit?

A go-around is a highly dynamic procedure characterized by high acceleration after the application of TOGA thrust. This may lead to flight crew spatial disorientation caused by a somatogravic illusion. Somatogravic illusions are a suspected contributor to several fatal accidents.

As long as all engines are operating, reduced thrust can still be sufficient to perform a safe go-around, while ensuring sufficient climb capability for the world's most demanding missed approaches.

As a safety enhancement, the Soft Go-Around function provides reduced go-around thrust.
The function minimizes the risk of spatial disorientation and reduces crew workload.

What is the operational benefit?

As a safety enhancement, the Soft Go-Around function targets a computed thrust level to meet the vertical speed target, minimizing the risk of spatial disorientation and reducing crew workload during this dynamic maneuver.

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This enhancement also reduces the risk of overspeed during go-around altitude capture.

How is the enhancement embodied on aircraft?

The Soft Go-Around function is embodied via computer software upgrades.

To know more

> The Soft Go-Around function introduced an intuitive means to select reduced thrust during the go-around phase for crew perception. It has significantly reduced crew workload during the go-around maneuver and level bust events.
>
> **Airline Testimony**

Per year

2 Runway overruns at landing

RE

Further Preventing Runway Overrun

Why does it matter?

Most longitudinal runway excursions (runway overruns) are related to aircraft energy management during approach and landing, with environmental conditions as a contributing factor.

Runway overrun is the second cause of fatal accidents with CFIT and the first cause of hull losses.

ICAO identifies 2 major runway overruns per year.

Runway overrun can also occur during takeoff, the main contributing factor being human errors.

MANDATED

Enhanced Runway Overrun Risk Awareness

Runway Overrun Prevention System (ROPS)

A320: 35%

A330: 22%

Industry support | Software | ≤ 5h | Level B

What is the expected safety benefit?

The ROPS function is a real-time energy and landing performance based warning system, that mitigates the risk of longitudinal runway excursions.

ROPS is a key contributor to the reduction of runway overrun events at landing observed over the last 20 years.

What is the operational benefit?

ROPS performs a real-time computation of the aircraft's distance-to-stop.
It provides visual and aural alerts to encourage a go-around or the application of all deceleration means available once on the ground.

Mandated by EASA from 2026

ROPS has undergone continuous evolution, leading to the latest Step2+ and Step 3 standards. In alignment with ICAO recommendations, several mandates (including from EASA) have been issued requiring its installation on newly delivered aircraft starting in 2026.

How is the enhancement embodied on aircraft?

The ROPS function can be embodied via an optional SB.

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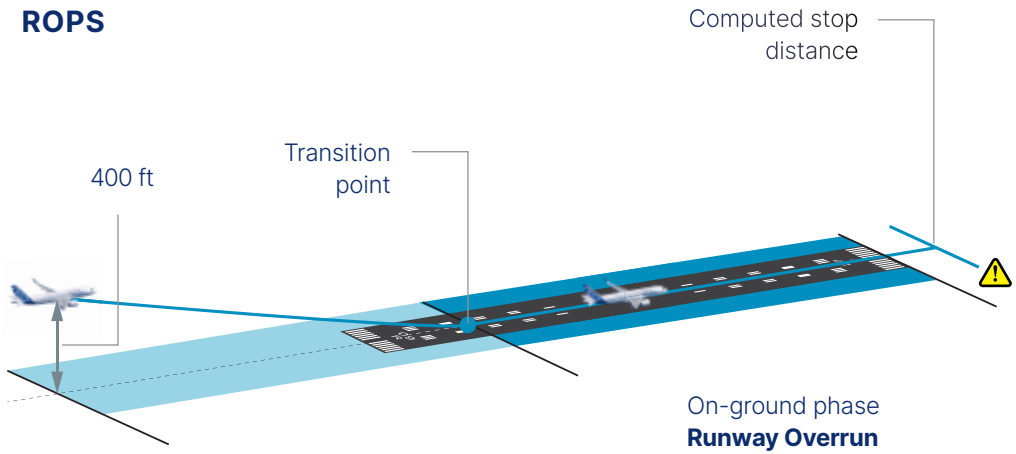
ROPS



> ROPS is a terrific advance in safety management. There is a great deal of interest in making this one of the standard features of the industry.
>
> **Airline Testimony**

To know more

Enhanced Runway Overrun Risk Awareness

Takeoff Surveillance (TOS) functions

A320: 10%

A330: 5%

A380: in dev.

Industry support **Software** **≤ 5h** **Level A**

What is the expected safety benefit?

The Takeoff Surveillance functions (TOS1 and TOS2) provide an additional safety net by mitigating the risk of runway overrun or tailstrike at takeoff that may occur due to:

- Errors in takeoff performance computation, or errors when entering takeoff data in the Flight Management System
- Takeoff starting from an incorrect position.

Last 15 years reports

50 events

Impact on takeoff performance

What is the operational benefit?

TOS functions alert crew through messages displayed on the MCDU (or MFD) and ECAM alerts throughout the different phases from cockpit preparation, taxi to takeoff thrust application.

How is the enhancement embodied on aircraft?

The enhancement is embodied via a computer software upgrade.

This enhancement is supported by Airbus monitored retrofit (from mid 2026).

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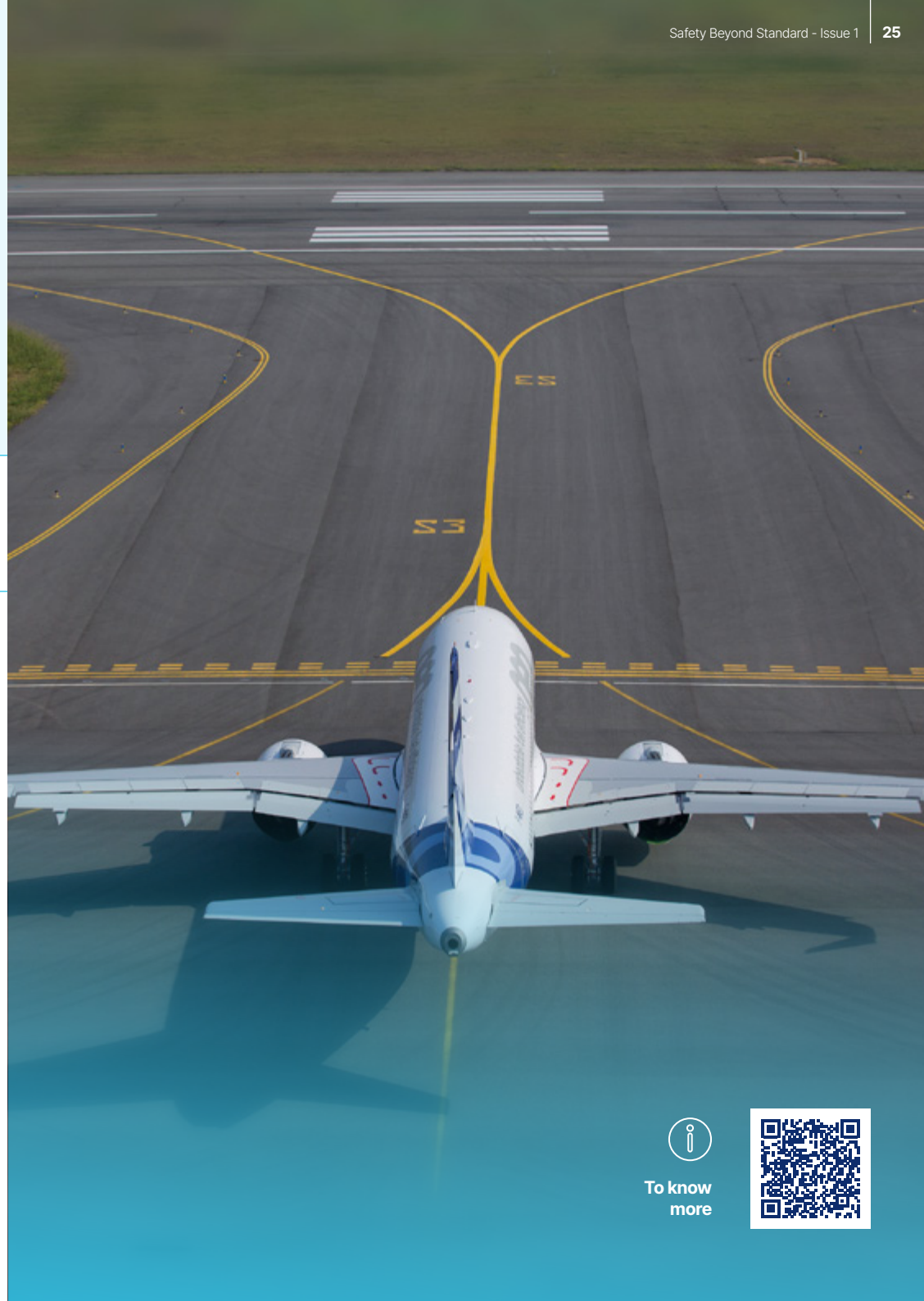

To know more

Glossary

ARC	Abnormal Runway Contact
ATC	Air Traffic Control
BUSS	Back-Up Speed Scale
CFIT	Controlled Flight Into Terrain
ECAM	Electronic Centralized Aircraft Monitor
FBW	Fly By Wire
FLS	FMS Landing System
FMS	Flight Management System
FOC	Free of Charge
ILS	Instrument Landing System
LOC-I	Loss of Control in flight
MCDU	Multipurpose Control & Display Unit
MFD	Multi Function Display
NPA	Non Precision Approach
PALAL	Pitch Attitude Limitation in Alternate Law
RE	Runway Excursion
RI	Runway Incursion
RIL	Retrofit Information Letter
RNP	Required Navigation Performance
ROAAS	Runway Overrun Awareness and Alerting System
ROPS	Runway Overrun Prevention System
SARP	Standards and Recommended Practices
SB	Service Bulletin
SBS	Safety Beyond Standard
SCF	System/Component Failure or Malfunction
SGA	Soft Go-Around
SOP	Standard Operating Procedures
TAWS	Terrain Awareness and Warning System
TOS	Take-off Surveillance
UAS	Unreliable Airspeed Situation
USOS	UnderShoot/OverShoot

Icon Key Information

Industry Support	Material Free Of Charge or at an attractive price for eligible fleet (refer to relevant Retrofit Information Letter or SB conditions, or contact your Customer Support Representative). Man-hours are not compensated. Industry support is defined in the Retrofit Information Letter (RIL) and might evolve after the end of the monitored retrofit campaign.
Software	Enhancement is embodied via a computer software change on the aircraft already fitted with the prerequisite hardware.
Level B	Flight crew training is level B (Aided instruction).
< 5 hours	Implementation time requires less than 5 hours (maybe higher pending the aircraft configuration).
A320: xx%	xx% of the A320 family fleet equipped at date of issue.
A380: in dev.	Enhancement currently in development on A380 model.

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Reference 20252081.
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