ANSV AGENZIA NAZIONALE PER LA SICUREZZA DEL VOLO

Study on occurrences involving passengers falling from the airstairs of the Boeing B737 aircraft

CONTENTS

GLOSSARY

AAIU: Air Accident Investigation Unit, the Irish civil aviation safety investigation authority.
AFM: Aircraft Flight Manual.
AOC: Aircraft Operator Certificate.
ANSV: Agenzia nazionale per la sicurezza del volo, the Italian civil aviation safety investigation authority.
CIAIAC: Comisión de Investigación de Accidentes e Incidentes de Aviación Civil, the Spanish civil aviation safety investigation authority.
ENAC: Ente nazionale per l'aviazione civile, Civil Aviation Authority.
EASA: European Union Aviation Safety Agency.
ICAO: International Civil Aviation Organisation.
PA: Public Address System, passenger communication system.
PRAM: Pre-Recorded Announcement and Music systems.
SIA: Safety Investigation Authority.

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1. Introduction

The ANSV, established by Legislative Decree 66/1999, has the duties set out in Article 3 thereof:

1. Without prejudice to the powers of the Ministry of Defence regarding state aircraft, the Agency shall conduct the technical investigations referred to in Article 826 of the Navigation Code, as replaced by Article 17(1) of this decree, with the sole aim of preventing accidents and incidents, excluding any assessment of fault or liability.

2. The Agency carries out studies and investigations, formulating recommendations and proposals aimed at ensuring the safety of air navigation and preventing aviation accidents and incidents.

In this context, in light of the notifications received in 2025 concerning passengers falling from the integrated stair (airstair) of Boeing 737 aircraft, which led to three safety investigations[1], the ANSV deemed it necessary to examine the issue in greater depth in order to identify any potential critical issues.

2. Definitions

For the purposes of this study, it is considered useful to refer to certain definitions[2] set out in Regulation (EU) No 996/2010.

Accident
"an occurrence associated with the operation of an aircraft which, in the case of a manned, aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

(a) a person is fatally or seriously injured as a result of:
— being in the aircraft, or,
— direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or,
— direct exposure to jet blast,

except when the injuries are from natural causes, self- inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

(b) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except for engine failure or damage,

[1] Final reports B737 marche EI-EBC, EI-DPI ed EI-EFE https://ansv.it/wp-content/uploads/2026/04/3-relazioni-brevi.pdf
[2] The definitions from Regulation (EU) No 996/2010 set out above are equivalent to those in ICAO Annex 13.

when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes) or minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike, (including holes in the radome); or

(c) the aircraft has gone missing or is completely inaccessible."

Serious incident
"an incident involving circumstances indicating that there was a high probability of an accident and is associated with the operation of an aircraft, which in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, [omissis]"

Serious injury
means an injury which is sustained by a person in an accident and which involves one of the following: a) hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received; b) a fracture (except simple fractures of fingers, toes or nose); c) lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; d) injury to any internal organ; e) second or third degree burns or burns, affecting more than 5 per cent of the body surface; f) verified exposure to infectious substances or harmful radiation.

3. Classification and previous investigations by other SIA

Considering the above-mentioned definitions, an apparent contradiction arises: if a passenger falls from an airport staircase, they are already outside the aircraft and the event, regardless of the consequences of the fall, would appear not to be within the scope of Regulation (EU) No 996/2010 and ICAO Annex 13. If, however, the fall occurs from the airstair – which forms part of the aircraft itself – the event should be considered subject to investigation under Regulation (EU) No 996/2010 and Annex 13.
Furthermore, following this logic, a fall from an aircraft's airstair resulting in serious injury or death would be classified as *an 'Accident*', whilst a slip resulting in minor injuries should be considered a *'Serious Incident'*.
This apparent contradiction is also evident in the approach taken by the various SIA in managing these events. A survey on this matter carried out by ANSV found that some do not systematically investigate falls from boarding/disembarking stairs, regardless of whether or not they are integrated into the aircraft. This is due to an interpretation of the definitions in Annex 13 that focuses more on aspects relating to the actual operation of aircraft. Other SIA organisations, namely the CIAIAC and the AAIU, have addressed this issue by publishing, also recently, investigation reports containing safety recommendations. The safety recommendations issued by the CIAIAC following the accident on 17 October 2024 involving a Boeing 737-8200, registration EI-HAY, operated by Ryanair, are therefore shown below:

- REC 25/25: it is recommended that Boeing, as the manufacturer of the airstair optional (p/n S141A648-s), consider redesigning it to decrease the slope and riser and increase the footprint, with the objective of decreasing the risk of a fall during use.
- REC 26/25: it is recommended that Boeing, as the manufacturer of the airstair optional (p/n S141A648-s), together with the Ryanair Group, as the main operator of B737 aircraft

with the airstair option in Europe, implement additional mitigation measures to minimise the risk of a fall inherent to the geometry of the airstairs during use.

- REC 27/25: it is recommended that EASA review the use of the integrated folding and retractable airstair as a passenger boarding and disembarkation element.
- REC 28/25: it is recommended that Ryanair, as the main operator of B737 aircraft with the airstair option in Europe, only use certified airport equipment for passenger boarding and disembarkation.

It seems the CIAIAC position, given the severity of the injuries sustained by passengers, is to regard falls from the B737's integrated airstairs as accidents. The report identifies the manufacturer and the European regulator as the Parties capable of implementing mitigation measures. It also focuses on the operator, in relation to aircraft which, also due to the policies about how they are operated, have indeed experienced events of passengers falling from the forward airstair.
The Irish AAIU has also investigated the same issue in relation to the serious incident involving the Boeing 737-800, EI-EMM, on 11 December 2021, operated by Ryanair. The final investigation report concludes with a safety recommendation addressed to EASA:

- IRLD2023001: it is recommended that EASA undertakes a safety promotion campaign to highlight to passengers and crew, the behaviours which will minimise their personal risk of falling whilst embarking or disembarking an aircraft.

The ANSV's position on this issue notes that categorisation based strictly on the definitions set out in EU Regulation 996/2010 and ICAO Annex 13 leads to events being classified as "accident" which may be of relatively minor severity and have little connection to flight operations, except within the limits of the certification criteria used for the airstair. In any case, the number of falls reported in 2025 from airstairs led the ANSV to decide to produce this study, based both on investigations opened in 2025 concerning events that resulted in serious injuries to passengers and on the statistics and information available on the phenomenon as a whole: falls that did not result in serious injuries and falls from airport stairs, were therefore also taken into account.
Based on the evidence gathered, the study identifies an issue with the airstairs of the B737 in relation to flights operated by Ryanair: it is the main airline operating in Italy that uses on a regular basis airstair for passenger boarding and disembarkation. In this framework, it is worth to highlight millions of passengers use the disembarkation stairs and only a few dozen fall: the cause of such events can be attributed primarily to individuals losing their balance. At the same time, identifying a higher frequency in a specific context (type of stairs and disembarkation procedures) suggests that organisational or operational aspects may mitigate exposure to risk.

4. Statistics for 2023–2025

The study carried out by ANSV between 2023 and 2025, using the Eccairs 2 system, reveals the following: the majority of falls occur from the airstair of Boeing B737 aircraft.
In particular, in the three-year period 2023–2025 in the E2 database in Italy, there were 104 events of falls during passenger boarding and disembarkation, of which 85 (approximately 82%) involved falls from the airstair of the B737. The operator involved is Ryanair, which, in fact, operates exclusively B737 aircraft and uses the airstair for disembarkation from the aircraft front (for disembarkation from the rear of the aircraft, the external staircase provided by the airport operators).
The majority of reports in Eccairs 2 (including those relating to falls from airport stairs) originate from the operator's crews and are transmitted via the Irish, Maltese and Polish civil aviation authorities (countries where Ryanair holds its AOC) in accordance with EU Regulation 376/2014.

Ryanair is the operator with the highest number of movements in Italy; therefore, the scale of the phenomenon cannot be properly assessed without considering the ratio between falls from the airstair and the number of passengers carried, also in relation to passengers using different types of staircases or the jet bridge connecting directly to the terminal:

- 2023 – 51.6 million[3] Ryanair passengers, approximately 26% of the total 197 million total passengers travelling in Italy by means of all the operators;
- 2024 – 57.8 million[4] Ryanair passengers, approximately 26.5% of the total 218 million total passengers travelling in Italy by means of all the operators;
- 2025 – 62 million[5] Ryanair passengers, approximately 27% per cent of the 229 million total passengers travelling in Italy by means of all the operators.

The above data show that, whilst Ryanair passengers accounted for approximately 26–27% of the total travelling in Italy by means of all operators, the number of falls was significantly higher (85 falls from the airstair alone) than for the remaining 73% of passengers (19 falls from the airport operator's staircase). These findings confirm the prevalence of the phenomenon, despite the relatively low number of falls in proportion to such a large number of passengers carried.
In order to verify the above data, a similar survey was conducted by contacting airport operators directly. A numerical comparison between the reports in Eccairs 2 and those collected from airport operators for the 2023–2025 period highlights two aspects:

- a lack of perfect correspondence between the data reported by airport operators and that contained in the Eccairs 2 database relating to Italy. This is likely attributable to the previously mentioned ambiguity in the interpretation of case studies in terms of the definitions set out in ICAO Annex 13 and EU Regulation 996/2010;
- beside the differences regarding the exact numerical value, there is confirmation of the order of magnitude of the phenomenon and the type of aircraft involved in relation to the airstair.

Indeed, although in the data provided directly by the airport operators, the number of falls recorded by the airport operators' staircases is higher and that of falls for the airstairs of B737s operated by Ryanair is lower, the rates, calculated on the basis of the number of passengers actually carried, confirm higher values for the airstairs of B737s operated by Ryanair by at least a factor of 2 and, on average, much higher. Therefore, even though numerical values may not perfectly coincide, the conclusions that can be drawn regarding the higher rate of falls from the airstairs of the B737 compared to those at airports remain the same.
Furthermore, in support and confirmation of the observations regarding the higher rate of falls from the airstairs of B737 aircraft operated by Ryanair, there are statistics relating solely to that specific operator (overall, not limited to the traffic in Italy): below is the information submitted to ANSV by the accredited Irish representative (State of the operator: Ryanair is an Irish operator) as part of the ANSV safety investigations, opened in 2025 following falls from the airstair of B737 aircraft.

[3] ENAC – Traffic data 2023.
[4] ENAC – Traffic data 2024.
[5] ENAC – Traffic data 2025.

Sum of Unique	Column Labels		
Row Labels	Airstairs	Mobile	Grand Total
2021	38	6	44
2022	60	30	90
2023	111	27	138
2024	84	33	117
2025	67	33	100
Grand Total	**360**	**129**	**489**

The results[6] show that since 2021 the operator has had overall 489 events of falls from boarding stairs, of which 360 were from the airstairs, 73% (falls from the airstairs were approximately three times higher than those occurring from airport operators' stairs).

5. Boeing 737 airstair

Boeing offers an airstair as an optional system for the B737 model, which can be extended at the parking bay, allowing passengers to disembark independently without requiring assistance from the airport operator. The airstair consists of 12 steps, approximately 61 cm wide, 20 cm high and with a tread width of approximately 25 cm. The airstair is inclined at an angle of approximately 35°, is electrically operated and can be controlled from inside or outside the aircraft. The airstair is stored in a compartment just below the front entrance door. The airstair (diagram in Figure 1), when compared to those typically used by airport operators (photos 1–3), is narrower, steeper (photo 4) and has a first step that differs from the others: it is approximately 19 cm high and trapezoidal in shape, following the fuselage shape (photo 5).

The standard *EN 12312-1:2024 – Aircraft ground support equipment – Passenger stairs*, applicable to airport operators' stairs, stipulates in paragraph 5.3 (Stair Flight) that the steps must have uniform dimensions and that the staircase pitch must be between 24° and 40°, with an optimal angle considered to be between 30° and 38°. The typical height is between 14 cm and 21 cm. For the tread, typical values range from 25 cm to 32 cm, with a general criterion for step geometry stipulating that the sum of the step height and the tread width must be 46 cm ± 1 cm.

Finally, 100 cm is considered the minimum width.

Photo 1: example of a disembarkation staircase supplied by airport operators.

[6] The table was provided by the AAIU on 5 September 2025, so the statistics for that year are incomplete.

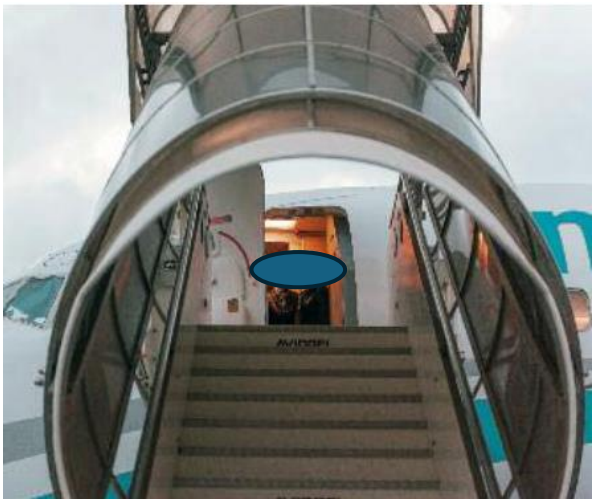

Photo 2: example of a passenger boarding staircase used by airport operators.

Photo 3: example of a passenger boarding staircase used by airport operators.

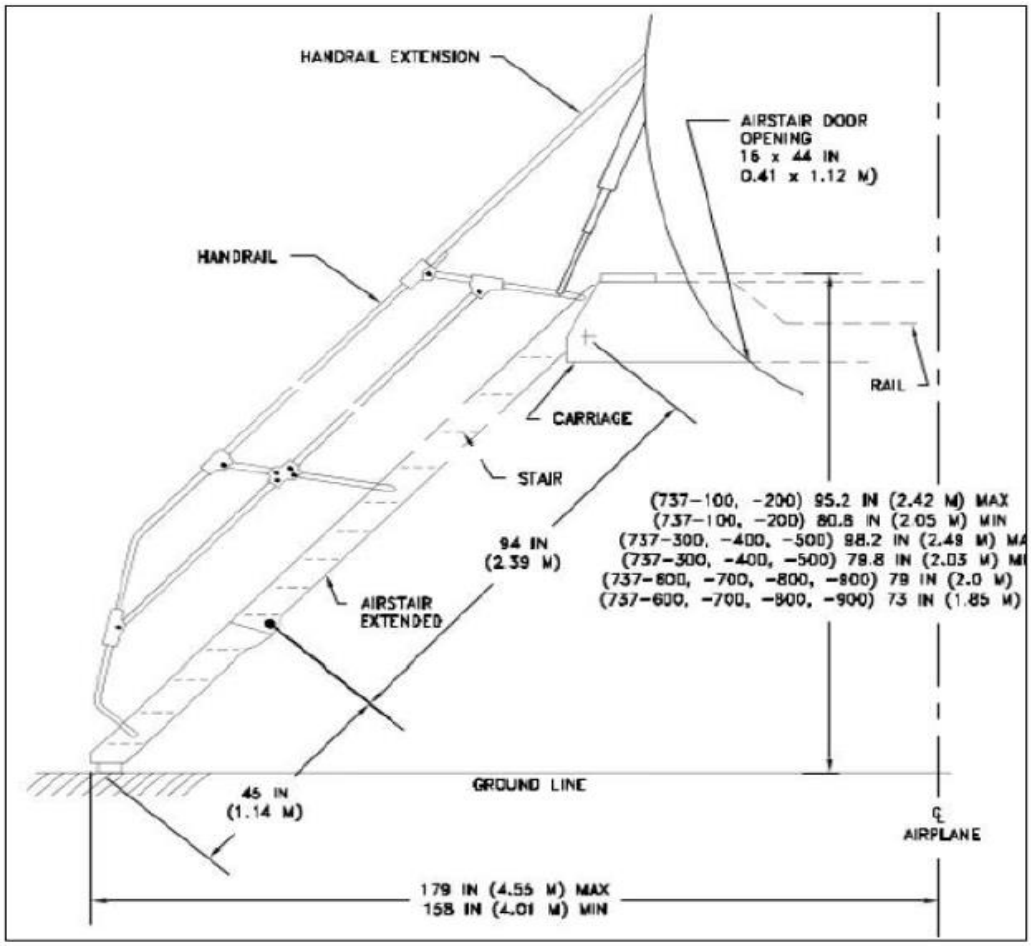

Figure 1: diagram of the integrated boarding staircase on the B737 aircraft (source: AFM).

Photo 4: side view of the B737's airstair.

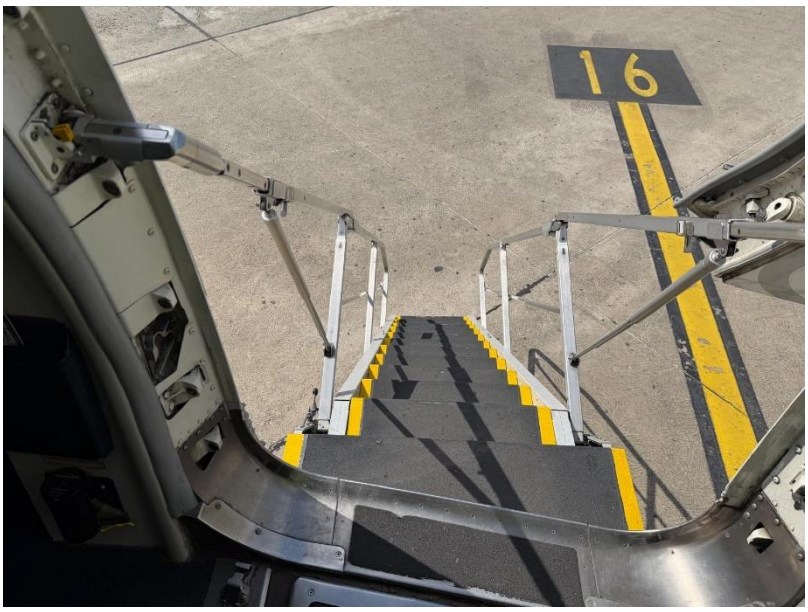

Photo 5: view from inside the cabin of the B737's airstair. Note the asymmetrical first step for passenger disembarkation.

Photo 6: front view of the B737's airstair.

6. Boeing's position on the matter[7]

December 2024: *Boeing is not aware of US operators that use built-in airstairs as a replacement for ground based airstair equipment. This option appears to be used predominantly in Europe. The incidents related to airstairs have been reported almost exclusively by one operator based in Ireland.*

7. Problems encountered in gathering information

Following falls from boarding stairs, injured passengers are often taken to hospital for treatment and examination. In some cases, it has been difficult assessing their medical condition to determine the severity of their injuries and, consequently, assign the correct classification of the event in accordance with EU Regulation 996/2010.

This is likely due to the position of healthcare authorities to protect the privacy of those involved. However, to facilitate these aspects, the ANSV's requests made at a preliminary stage and therefore prior to the formal opening of the safety investigation, did not concern the request for detailed data, but only information regarding the severity of injuries, and whether or not they fell within the definition of 'serious injuries' as per EU Regulation 996/2010.

Despite this, there have been instances where no response was received from the relevant health authorities. This suggests that there may have been further cases of serious injuries resulting from falls from stairs, for which, however, there is insufficient evidence to allow for proper classification.

8. Operator procedures for passenger disembarkation

The Boeing B737 is a very common aircraft and it is used by several airlines operating in Italy; however, as noted in paragraph 4, the events discussed in this study concern the operator Ryanair, likely due to the fact that it uses B737s equipped with an airstair and it is the main operator in Italy. Many other airlines operating regularly in Italy with B737s do not use the aircraft airstairs. In fact, the airstairs are not standard equipment, and it has been found that they are not used by all operators.

In this context, it should be noted that Ryanair's operating procedures valid during the development of this safety study was:

Update 6, Rev. 5, dated 14 August 2025, of the OM Part 'A' states, in section 2.4.9, regarding announcements over the on-board public address system:

'Before Disembarking: *"Ladies and Gentlemen, you may now disembark the aircraft using both the forward and rear doors. All passengers should use the handrail provided when walking down the stairs. For passengers travelling with children, please hold their hands as you walk down the stairs and until you are inside the terminal building. Walk around the wing and not under the wing. Thank you and good morning/afternoon/evening".*

Note 1: *The announcement shall be made once disembarkation begins. It must be immediately followed by the same announcement in the languages of the departure and arrival countries on all aircraft where the announcement is available via the PRAM system.*

Note 2: *Passengers intending to use the forward stairs without a free hand should be reminded to use the handrail whilst descending the stairs*.

[7] Strategy and Safety Management Directorate, Safety Intelligence and Performance Department, Airworthiness domain, European safety risk management portfolio, working document, Issue 03, dated 9 December 2025.

In this framework, it seems the announcement does not adequately highlight the need for caution when descending for those using the airstair, which is not mentioned at all; the only specific point is that (as per Note 2) the cabin crew should remind passengers disembarking via the airstair (forward stairs) to comply with the announced procedure. Moreover, it has been verified that the announcement can be made only in English language, limiting the effectiveness of the communication. At the same time, statistical data show that even after the update in August 2025, there were 18 falls during disembarkation via the airstairs over a four-month period, consistent with the situation prior to the update.

9. Considerations

The statistics presented highlight a higher rate of falls from the airstairs of the B737 aircraft used by Ryanair compared to other operators using airport staircases.

Taking into account the high number of passengers, as well as the ANSV investigation reports, the cause of the falls is attributable to human factors relating to the passengers: it happens that during disembarkation they do not pay adequate attention, do not follow the prescribed procedure of holding onto the handrail or, in some cases, are not in perfect physical and mental condition.

The statistics examined – drawn from the E2 database, airport operators and the AAIU in relation to Ryanair operations – whilst not directly comparable, nevertheless highlight a higher rate of events on the airstairs. This prompts consideration of what measures might be put in place to mitigate the risk of falls from the airstair on B737 aircraft. With regard to the structure of the airstair, when compared with the applicable criteria for airport stairs, it is noted that it is at the limits in terms of step height and slope, making it, obviously, less comfortable than the stairs used by airport operators, which have lower steps and usually a less steep slope, as well as a considerably larger landing and tread. Furthermore, on the B737 airstair, the first step is asymmetrical for the passenger during descent due to the shape of the fuselage in relation to the step. In this framework, the safety recommendations already issued by the CIAIAC and the AAIU on this matter appear to be reasonable. However, to date, these have not had the desired effect. Given that the airstair is used almost exclusively in Italy by Ryanair, it is considered that the operator itself is the best entity to take action to mitigate the risk of falls. It would therefore seem appropriate for cabin crew, during boarding and disembarkation operations, to exercise even greater control over passengers using the aircraft's airstair, in particular by drawing their attention to the fact that they must keep one hand free to hold onto the airstair handrail. Finally, the announcements over the on-board public address system should be always played in the language of State of departure and State of destination.

10.Safety actions by the operator

The procedure mentioned in paragraph 8 has been updated as set out below slightly before the publication of this safety study, on 23.07.26, to read as follows (main changes are underlined):

Before Disembarkation

- *The following announcement shall be completed when disembarkation begins. It must be immediately followed by the same announcement in the language of departure and arrival country on all aircraft where the announcement is available on PRAM.*
- *Passengers intending to descend the stairs without a free hand should be reminded to use the handrail.*
- *Passengers travelling with children should be reminded to hold their hands until they are inside the terminal building.*
- *Repeat the announcement(s) regularly throughout the disembarkation process.*

"Ladies and Gentlemen you may now disembark the aircraft using both the forward and rear doors. All passengers should use the handrail provided when walking down the stairs. For passengers travelling with children please hold their hands as you walk down the stairs and until you are inside the terminal building. Walk around the wing and not under the wing. Thank you and good morning/afternoon/evening."

***Note 1:** Where the language of departure or arrival country is not available on PRAM, Cabin Crew should make verbal announcement(s) in those languages, if possible.*

***Note 2:** If required, the PRAM announcement may be substituted/complemented with a verbal PA, depending on conditions (e.g. one door/airbridge in use, adverse weather conditions outside etc.).*

The new procedure does not change the essence of the announcement. However, compared to the previous, it requests the cabin crew to verbally provide the passengers with the announcement in the language of departure and arrival country, if languages different from English are not available on the PRAM. This should lessen the probability an only English announcement, which in the past could happen. The above, in addition to the repetition of the announcement, is expected to rise higher attention to the disembarking procedure by the airstair as well as by the normal airport operator stairs.

Furthermore, the operator adopted a separate training module dedicated to the disembarkation procedure which is covered during recurrent training of the cabin crew and which has started from the 21st of August 2026.

11.Safety recommendations

In light of the evidence gathered and the analyses carried out, the ANSV expresses its substantial agreement with the recommendations already issued by CIAIAC and AAIU.

However, the operator took some recent safety actions in the course of development of this safety study: changing the disembarking procedure and making it hopefully more effective in addition to a dedicated training module for the cabin crew to be covered during the recurrent training, should actually help in rising the appropriate attention for passengers during disembarkation, especially by the airstair. Therefore, the ANSV does not deem necessary to issue an additional safety recommendation on the topic.