	Aeronautical Services **Advisory Memorandum** **(ASAM)** **Focal Point: GEN**	**ASAM** **No: 049** **Issue 1.0** **Date 22.11.24**
Title	**Advisory on Garmin Emergency Autoland**	

1. Introduction

Garmin has developed an Emergency Autoland (EAL) system that attempts to save an aircraft that might otherwise be lost through pilot incapacitation. It is designed to activate manually or automatically.

Automatic EAL activation events include cabin depressurization, unstable flight requiring LVL (level) mode for a time, and inactivity of the pilot for a length of time. Once activated, the system attempts to identify a suitable destination aerodrome and autonomously flies the aircraft to execute an approach and landing whilst broadcasting its intentions via radiotelephony.

2. Purpose

The purpose of this ASAM is to inform ANSPs and air traffic services (ATS) staff of the existence of EAL, outline its method of operation, and highlight considerations that should be made in the event of activation.

3. Scope

This ASAM applies to all ATM/ANS service providers, ATCO training organisations, ATCO licence holders, and other empolyees who come within the scope of Regulation (EU) 2018/1139 of the European Parliament and Commission Implementing Regulation (EU) 2017/373.

4. References

- Regulation (EU) 2018/1139
- Commission Regulation (EU) 2017/373.
- Commission Regulation (EU) 2015/340.

5. Information

EAL is currently a feature of Garmin´s integrated flight decks (i.e. G1000 NXi, G3000). It has been fitted to more than 800 new aircraft across six single- and multi-engine types as of the middle of 2024, but hese numbers will increase.

It was included in type avionics approvals by the Federal Aviation Administration and the European Aviation Safety Agency in 2020. To date, outside of manufacturer testing, it has not been activated in response to a pilot incapacitation.

EAL is activated by pressing a clearly marked button that is within reach of pilot and passengers. After activation, visual and verbal instructions are then given to passengers.

Before autonomous control begins, there is a short delay, depending on the airframe specific configuration (0 to 10 seconds for manual activation and 2 minutes for automatic activation) to allow cancellation in the event of accidental activation. Operation of EAL can be cancelled at any time by pushing the red autopilot disconnect button located on the yoke or pressing the AP button on the autopilot controller.

EAL uses Garmin's navigation database to determine a suitable destination aerodrome within a 200 NM radius, or within the aircraft's remaining endurance, whichever is less, and a route/profile to reach it. Potential destination aerodromes are ranked by suitability according to a number of factors. EAL is unlikely to select Government aerodromes, or civilian aerodromes handling more than 15 million passengers per year.

If EAL is fitted to a pressurised aircraft, the aircraft's autopilot must also have an Emergency Descent Mode (EDM). When decompression is detected during flight, EDM will be activated. EDM is programmed by default to turn the aircraft left by 90 degrees and descend the aircraft at the manufacturer-determined rate to the default altitude of 15,000 feet AMSL. However, aircraft manufacturers may program EDM to turn the aircraft in a different direction, turn by a different amount, and to descend to a different level to that of Garmin's defaults. Once EDM has reached 15,000 feet AMSL or the aircraft manufacturer's programmed level, and EDM has not been deactivated, EAL will be automatically activated.

Once activated, EAL will take the following actions:

- Select transponder code 7700.
- Make automated radiotelephony calls on the active frequency and on 121.500 MHz, announcing its intentions.
- Select a suitable destination aerodrome.
- Inform Garmin of its activation via satcom datalink.
- Fly straight and level for 25 seconds, unless in close proximity to terrain or obstacles.
- Begin autonomous turns and descent towards the destination aerodrome.

Once autonomous flight has begun, EAL might climb if it needs to search for a destination. The maximum level to which EAL might climb the aircraft is set by Garmin to a default of 12,500 feet AMSL, however, aircraft manufactures may determine and program EAL with a different maximum level to that of Garmin's default.

When the aircraft is within 12 NM of the destination aerodrome, and below 10,000 ft above aerodrome altitude, it will change frequency to the destination aerodrome's published tower frequency and broadcast intentions every 90 seconds. If more than one frequency is published, it will use the first published frequency found.

EAL will develop and follow a flight plan that provides at least a 1,000 feet vertical buffer towards the final approach fix (FAF) of the automatically selected destination airport and will begin the descent to arrive at the FAF for an approach to the system's preferred runway at the destination aerodrome at the published minimum safe level for the FAF.

If EAL is activated close to the FAF, it will position the aircraft into a left-hand hold, unless obstructed by terrain/obstacles (which would allow this to be a right-hand hold), and begin

descent once aligned vertically, laterally, tracking the approach speed, and coupled to the glide path.

Once the aircraft has reached the FAF at a suitable level, EAL will fly a system-determined required navigation performance (RNP) approach to the system's chosen runway. It uses data from global navigation satellite systems (GNSS) and the radio altimeter to manage the aircraft's vertical profile and to schedule the flare and landing.

EAL will complete the landing roll by using data from GNSS to keep the aircraft on the runway centreline and it will apply the aircraft's brakes. Once the aircraft has halted, it could shut down the engine(s) depending on the aircraft configuration.

ATS personnel and airspace users should be aware of the following factors:

- EAL will not consider FIR boundaries when selecting a destination aerodrome and route and may cross them accordingly.
- EAL will avoid Prohibited Areas.
- EAL will not avoid Class A, C airspace, restricted areas, or danger areas.
- EAL will not be aware of other aircraft. An aircraft under the control of EAL cannot take avoiding action or comply with related Rules of the Air such as rights of way.
- EAL will not respond to a Traffic alert and Collision Avoidance System (TCAS) Resolution Advisory (RA). This means that the other aircraft receiving a complementary TCAS RA may experience an RA reversal.
- EAL is unlikely to select a destination aerodrome that:
    - is a Government aerodrome,
    - does not have an Air Traffic Service Unit,
    - handles more than 15 million passengers per year,
    - has a steep glidepath requirement,
    - does not have published RNP approaches.
- Recent software versions of EAL support Digital NOTAM and will not select destination aerodromes that are unambiguously NOTAMed as being closed. Not all EAL-equipped aircraft have these more recent software versions installed.
- Depending on the version of software installed (the SysRel number), EAL might inadvertently select an aerodrome with a closed runway.
- EAL might select a landing runway that is not the runway-in-use at the destination aerodrome.
- EAL is capable of avoiding weather if suitable data is received by datalink.
- EAL might be capable of activating airframe and engine de-icing systems – this function is aircraft type-dependent.
- EAL flies a system-created RNP approach, based on a published procedure to the specific runway.
- An aircraft under the control of EAL will not go around if the runway it intends to use for landing is blocked.
- After landing, EAL will stop the aircraft on the runway and depending on the airframe configuration it might shut down the engine(s).

- Passengers may communicate with ATS via radiotelephony. The system will transmit on 121.500 MHz and will pause automatic transmissions on this frequency when doing so.

6. Guidance

- ATM/ANS SPs and ATCO training organisations should assess the impact of this notice under their management systems (including safety) and where appropriate update their procedures and training to take account of the operational aspects of EAL.
- ATCOS should familiarise themselves with the nature of operation of EAL
- When EAL is activated, ATS staff should assume that there is a medical emergency on-board the aircraft.

7. Further information/Queries

Further information on EAL can be found at:
https://www.easa.europa.eu/community/topics/emergency-autoland-0

For any questions or further enquiries please email 'To whom it concerns' at ansdinfo@iaa.ie

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