Civil Aviation Authority

Safety Notice

Number: SN–2024/009

Issued: 15 October 2024

Garmin Emergency Autoland

This Safety Notice contains recommendations regarding operational safety.

Recipients must ensure that this Notice is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

Applicability:	
Aerodromes:	All Aerodrome Licence Holders
Air Traffic:	All ANSPs
Airspace:	Not primarily affected
Airworthiness:	Not primarily affected
Flight Operations:	All AOC Holders
Licensed/Unlicensed Personnel:	All ATCO, All FISO, All Pilots

1 Introduction

1.1 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, to assist in the event of a pilot incapacitation. 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 an approach and landing while broadcasting its intentions via radiotelephony.

1.2 The purpose of this Safety Notice is to inform airspace users 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.

2 Information About Emergency Autoland

2.1 EAL is a 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. These 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.

2.2 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 (in the range of 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.

2.3 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.

2.4 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.

2.5 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.

2.6 Once autonomous flight has begun, EAL might climb if it needs to search for a destination. Otherwise, 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. 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.

2.7 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.

2.8 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.

2.9 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.

2.10 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.

2.11 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, D, or E 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 (such as London City),
    - 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.

3 Compliance/Action to be Taken

3.1 ATS staff should familiarise themselves with the nature of operation of EAL.

3.2 ANSPs should review their procedures and training to take account of the operational aspects of EAL.

3.3 Aerodrome operators should ensure that RFFS personnel are made aware of the existence of EAL and its actions on landing.

3.4 When EAL is activated, ATS staff and aerodrome operators should assume that there is a medical emergency on-board the aircraft.

3.5 Further information on EAL can be found here:

https://www.easa.europa.eu/community/topics/emergency-autoland-0

4 Queries

4.1 Any queries or requests for further guidance as a result of this Safety Notice should be addressed to **ats.enquiries@caa.co.uk** and marked for the attention of Airspace & ATM Policy.

5 Cancellation

5.1 This Safety Notice will remain in force until further notice.

Appendix 1 Emergency Autoland Radiotelephony Messages

The system uses the following programmed messages:

Message Number	Transmitted Phraseology	Transmission logic
1	"May-day, May-day, May-day, aircraft <tail number> has activated an emergency automatic landing system. Standby for information."	Upon activation of Emergency Autoland, the system transmits [Message_1] over COM 1 on the pilot's last active frequency.
2	"Aircraft <tail number>, pilot incapacitation, <distance from destination airport> miles <direction from destination airport> of <destination airport>, Emergency Autoland in <estimated time remaining> on runway <runway> at <destination airport>."	Once a destination is selected, the system transmits [Message_2] over COM 1 on the pilot's last active frequency [Message_2] is transmitted over these frequencies before landing. Note: "Approaching the selected airport", is defined as the aircraft flight plan taking the aircraft into an area that is within a 12 nautical mile radius of the selected airport and within 10,000 feet of the selected airport elevation. Note: If there is no CTAF frequency defined, the tower frequency is used. If there is no tower frequency, UNICOM is used. If there is no UNICOM, the automated messages are not sent over COM 1.
3	"Aircraft <tail number>, diverting to <destination airport> on runway <runway>."	Once a destination is selected, the system transmits [Message_3] over COM 2 on the emergency frequency. [Message_3] is transmitted over COM 2 on the emergency frequency [VHF Guard] for any subsequent change to the

		destination runway. The system will periodically transmit automated messages on the emergency frequency over COM 2 every five minutes, and, when approaching the destination, the CTAF frequency for the destination over COM 1 every 90 seconds.
4	"Attention <destination airport> traffic, aircraft <tail number> disabled on runway <runway>."	[Message_4] is transmitted over these frequencies after landing.
5	"Aircraft <tail number>, pilot incapacitation. Searching for a destination."	If a destination cannot be determined, the system will transmit [Message_5] over COM 1 on the pilot's last active frequency one time and then transmit [Message_5] over COM 2 on the emergency frequency every 5 minutes until a destination is determined.

- The time gap between each transmission is 5 minutes.
- If an occupant utilises the push-to-talk functionality, the system will key the occupant microphone and transmit over COM 2 on the emergency frequency, stop any in-progress automated messages, and delay any scheduled automated messages for at least 30 seconds after the occupant releases the push-to-talk button.