



EASA Safety Information Bulletin

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Subject: **Erroneous Low Range Radio Altimeter (LRRRA) indications on Boeing 737 aircraft**

Ref. Publications: Boeing Flight Operations Technical Bulletin 737-09-2

Description: An erroneous Low Range Radio Altimeter (LRRRA) indication has been identified in connection with a recent 737-800 accident and there are reports of further incidents attributed to the same cause.

Two LRRRA systems provide height above ground data to Boeing 737 aircraft systems which include the displays, autothrottle (A/T), autopilots and configuration/ground proximity warning. Data from the left LRRRA are used on some Boeing 737 aircraft for the autothrottle logic, regardless of the autopilot selected. When the autothrottle logic senses that the airplane is in landing flare, the thrust levers are retarded to the idle stop.

If one LRRRA provides erroneous altitude readings, the associated flight deck effects may typically include:

- **Inappropriate Flight Mode Annunciation (FMA) indication of autothrottle RETARD mode during approach phase with the airplane above 27 feet Above Ground Level (AGL). There will also be corresponding thrust lever movement towards the idle stop. The FMA will continue to indicate RETARD after the thrust levers have reached the idle stop rather than change to ARM.**
- Large differences between displayed radio altitude.
- Inability to engage both autopilots in dual channel approach (APP) mode.
- Unexpected removal of the Flight Director Command Bars during approach on the pilot's side with the erroneous radio altimeter display.
- Unexpected Configuration Warnings after takeoff, during approach, or during go-around.

Recommendations:

Whether in automated or manual flight, flight crews should carefully monitor primary flight instruments (airspeed, attitude etc.) for aircraft performance and the FMA for autoflight modes.

When autothrottle mode is selected during critical phases of flight, the pilot flying (PF) may consider to keep a hands-on position on the engine throttles to guard against and correct any abnormal behaviour.

General Guidelines

1. Condition:

- Inability to engage both autopilots in dual channel approach (APP) mode.
- Unexpected removal of the Flight Director Command Bars during approach on the pilot's side with the erroneous radio altimeter display.
- **Inappropriate Flight Mode Annunciation (FMA) indication of autothrottle RETARD mode during approach phase with the airplane above 27 feet AGL. There will also be corresponding thrust lever movement towards the idle stop. The FMA will continue to indicate RETARD after the thrust levers have reached the idle stop rather than change to ARM.**

Automatic systems give excellent results in the vast majority of situations. Faults can occur at any point during an automatic approach. Many abnormal situations or scenarios are possible. The flight deck is designed so that a quick analysis and decision can be made for virtually all abnormal or fault situations using the autopilot/autothrottle indicators, FMAs, master caution system and, for fail operational airplanes, autoland status annunciations. Deviations in intended flight path or unexpected thrust lever movement may also be an indication of an automation fault.

If the flight crew is aware of a degraded Autopilot Flight Director Systems (AFDS) mode, special recognition should be given during the Approach Briefing as to how to manage the use of the automatic features.

Note: Early intervention prevents unsatisfactory airplane performance or a degraded flight path.

When the automatic systems as described above do not perform as expected, the pilot flying (PF) should reduce the level of automation to ensure proper control of the airplane is maintained.

The PF should not attempt to restore higher levels of

automation until after aircraft control is assured.

2. Condition:

- Large differences between displayed data.

Crew Resource Management (CRM) involves the effective use of all available resources to operate a flight safely. It is important that all flight deck crewmembers identify and communicate any situation that appears potentially unsafe or out of the ordinary. Experience has proven that the most effective way to maintain safety of flight and resolve these situations is to combine the skills and experience of all crewmembers in the decision making process to determine the safest course of action.

Situational awareness, or the ability to accurately perceive what is going on in the flight deck, requires ongoing questioning, crosschecking, communication, and refinement of perception.

3. Condition:

- Unexpected Configuration Warnings after takeoff, during approach, or during go-around.

Flight crew must ensure the proper configuration for the phase of flight. Time may be required in order to assess the situation, take corrective action and resolve the discrepancy; therefore a go-around, holding, or additional maneuvering may be necessary. Flight path control and monitoring of instruments must never be compromised.

Abnormal Situation Guidelines

When an abnormal situation occurs, the following guidelines apply.

- **ABNORMAL RECOGNITION:**
The crewmember recognizing the malfunction calls it out clearly and precisely.
- **MAINTAIN AIRPLANE CONTROL:**
It is mandatory that the Pilot Flying (PF) fly the airplane.
- **ANALYZE THE SITUATION:**
Any further action should only be initiated after the malfunctioning system has been positively identified.

Additional Information

Any occurrences of erroneous display data, even if intermittent, should be reported to maintenance.

More information can be found in the Boeing 737 Flight Crew Training Manual and Flight Crew Operations Manual and in

Boeing Flight Operations Technical Bulletin 737-09-2.

Applicability: All operators of Boeing 737 aircraft

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