EASA Safety Information Bulletin

SIB No.: **2014-07**

Issued: **25 March 2014**

Subject: **Unexpected Autopilot Behaviour on Instrument Landing System (ILS) Approach**

Ref. Publications: Dutch Safety Board Safety Alert, dated 18 November 2013.

Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (BEA) Serious Incident Report dated March 2013.

Applicability: Owners and operators of aeroplanes equipped with an automatic flight control system (AFCS, autopilot) and ILS capability; and Air Navigation Service Providers (ANSP).

Description: Following reports of at least three occurrences that the Agency is aware of, in 2012 and 2013, involving different manufacturers and operators on unexpected autopilot behaviour while intercepting the ILS glide slope (G/S) signal from above, the Agency would like to raise operator and ANSP awareness on the subject and the recent issuance of a Dutch Safety Board (DSB) Safety Alert.

The main issue of these occurrences is that, while intercepting the ILS G/S signal from above the 3 degree flight path with the AFCS engaged, the aeroplane can capture a false G/S resulting in a sudden and rapid change in aeroplane pitch without any crew warning which may lead to or approach stall conditions.

Currently, the DSB is investigating a severe and sudden pitch-up upset during an ILS approach to Eindhoven Airport in 2013, involving a Boeing 737-800. The airspeed dropped rapidly to a near stall situation and the crew carried out a go-around. The preliminary findings from the occurrence investigation made the DSB decide to measure the M-array antenna signal and determine the ‘glide slope field’ characteristics above the 3 degree glide path while established on the localizer.

Analysis of these measurements showed that between the 3 and 9 degree glide paths, signal strength changes. For the pilot this can result in observable movement of the ILS glide

slope marker on the primary flight display. Depending on the G/S field, signal reversal occurs occasionally at the 6 degree glide path and always at the 9 degree glide path. This reversal activates the G/S capture mode, after which the autopilot follows the G/S signal without restrictions.

During subsequent flight tests, the reversal resulted in the AFCS commanding a severe pitch-up. Immediate flight crew intervention was required to regain aircraft control. This investigative information prompted the DSB to issue the referenced Safety Alert.

The Italian National Agency for the Safety of Flight (Agenzia Nazionale per la Sicurezza del Volo – ANSV) is currently investigating an incident involving another Boeing 737-800, on approach to Treviso-San Angelo Airport that occurred in 2013. During final approach at high altitude, in bad weather conditions, the crew tried to capture the G/S from above in autopilot and experienced an aggressive pitch-up. The crew immediately disconnected the autopilot and executed a go-around.

In 2012, the French BEA investigated a pitch upset of an Airbus A340 on approach to Charles de Gaulle airport. During this incident the crew followed ATC guidance. They had been cleared for ILS when they were well above the ILS G/S (non-compliant approach). The crew performed G/S capture in autopilot in spite of their altitude and their distance to the runway. The G/S mode was engaged on an ILS signal of a side lobe defining a descent slope of about 10 degrees. The autopilot interpretation of the ILS signal led to an increase in pitch. This pitch-up increase continued until it reached 26°, the airspeed dropped rapidly and the crew disconnected the autopilot and performed a go-around.

Other cases have also been investigated by operators resulting in similar findings.

At this time, the safety concern described in this SIB is not considered to be an unsafe condition that would warrant Airworthiness Directive (AD) action under EU 748/2012, Part 21.A.3B.

Recommendation(s): EASA recommends operators to take the following actions:

- develop procedures that define explicit operational limits in their documentation, providing pilots with guidance to make a decision before intercepting the G/S from above;

- report any similar occurrences to their State of Registry National Aviation Authority (NAA), and to the State Investigation Authority of the country where the occurrence took place, and provide any relevant information of the event;

- make their flight crews aware of the ILS G/S signal characteristics and the risks involved when flying with the autopilot engaged in the area above the 3° glide path during ILS approach.

In addition, EASA recommends ANSPs to ensure that their air traffic controllers use prescribed navigation procedures that would reduce the flight crew workload and allow positioning the aeroplane in intercepting the G/S from below.

Contact(s):

For further information contact the Safety Information Section, Executive Directorate, EASA. E-mail: ADs@easa.europa.eu.

For further technical information or advice:

- Dutch Safety Board at www.safetyboard.nl
- BEA at: www.bea.aero
- More information at: Unstabilised Approach: Vectoring Resulting in Intercepting the Glidepath from Above.