



FAA
Aviation Safety

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SUBJ: Navigation; Degraded Attitude and Heading Reference System (AHRS) Performance When Operating in Areas of Unreliable or Unavailable Global Positioning System (GPS) Signal **SAIB:** CE-16-23
Date: September 7, 2016

This is information only. Recommendations aren't mandatory.

Introduction

This Special Airworthiness Information Bulletin is being issued to alert Title 14 of the Code of Federal Regulations (14 CFR) part 91, 91 Subpart K, and 135 operators of an airworthiness concern on **Embraer S.A. Model EMB-505** airplanes. Specifically, operators should be aware of possible degraded attitude and heading reference system (AHRS) performance when operating in areas of unreliable or unavailable global positioning system (GPS) signal.

In addition, this SAIB is being issued to alert operators of the Brazilian Agencia National De Aviacao Civil (ANAC) Special Airworthiness Bulletin (SAB) No. 2016-01 dated April 13, 2016, Embraer S.A. Operational Bulletin (OB) No. 505-002/16 dated April 13, 2016, Embraer S.A. Flight Operations Letter No. FOL PHE505-006/16 dated July 01, 2016, and recent changes (Revision 13) to EMB-505 Quick Reference Handbook (QRH)-2668-02. All of these items relate to the subject matter of this SAIB.

At this time, this airworthiness concern is not considered an unsafe condition that would warrant airworthiness directive (AD) action under 14 CFR part 39.

Background

The United States (U.S.) Department of Defense regularly conducts tests on GPS signals in different regions around the U.S. national airspace system (NAS). A published Notice to Airmen (NOTAM) precedes these tests. The NOTAM advises pilots that the expected level of service may not be available. The FAA has become aware of situations where Model EMB-505 airplanes operating in areas where GPS was unreliable or unavailable have resulted in AHRS 1 and 2 FAULT crew alerting system (CAS) messages, which were shortly followed by ventral rudder control (VRC), yaw damper (YD), and Autopilot (AP) FAIL CAS messages, and a stall warning protection system (SWPS) FAULT CAS message. The airplane flight manual (AFM) and QRH procedures for these failures require descending the airplane to flight level (FL) 250 or below. The AFM and QRH procedures also indicate that lateral/directional oscillations may occur. This combination of system failures, the required descent, and the Dutch roll exhibited by the airplane have caused Model EMB-505 airplane pilots to declare an emergency and divert to unplanned airports.

The ANAC SAB No. 2016-01 and Embraer S.A. OB No. 505-002/16 specified a new flight crew procedure for simultaneous AHRS 1 and 2 FAULT white CAS messages. This information was incorporated in a recent revision to the Model EMB-500 QRH, which resulted in Embraer removing the OB from the online publication. The procedure requires the pilot to reduce airplane airspeed to MAX 240 knots indicated airspeed (KIAS) / 0.63 Mach (M), which is intended to prevent the consequent failure of the VRC, YD, and AP, and fault of the SWPS. This prevention of consequent failures and associated CAS messages would alleviate the requirement for abnormal procedures involving descents and Dutch roll mitigations. ANAC has indicated that if the AHRS 1 and AHRS 2 FAULT messages clear, then normal airspeed can be resumed.

In addition, to minimize possible disruptions to air traffic control (ATC) resulting from unplanned airspeed reductions, Embraer S.A. has now released Flight Operations Letter (FOL) No. FOL PHE505-006/16 to recommend that pilots limit their airspeed to 375 knots true airspeed (KTAS) when filing their flight plans for areas outlined in the NOTAMs for GPS interference testing. It is noted that this instruction is for flight planning only and the airspeed limits of 240 KIAS/0.63 M should be observed when actually flying in the areas outlined in the NOTAMs for GPS interference testing.

Recommendations

The FAA recommends the following:

- Become familiar with the recently added QRH procedures for AHRS 1 and 2 FAULT CAS messages, which are referenced within the ANAC Special Airworthiness Bulletin No. 2016-01 and the now incorporated, Embraer S.A. OB No. 505-002/16.
- Before operating any Model EMB-505 airplane, become familiar with GPS NOTAMs applicable to your route of flight and determine what level of service is available for the planned flight as indicated in FAA Advisory Circular AC 90-105A, Chapter 9.
- During flight planning, become familiar with Embraer S.A. Flight Operations Letter No. FOL PHE505-006/16 and plan to limit your airspeed to 375 KTAS when operating in NOTAM testing areas during the testing hours.
- During flight operations, remain vigilant for AHRS 1 FAULT and AHRS 2 FAULT CAS messages displayed simultaneously and, if this happens, then immediately follow the QRH procedure as indicated.
- If any CAUTION CAS message is displayed, follow the appropriate QRH procedure.
- Report unexpected GPS anomalies, including degraded operation and/or loss of service, as soon as possible, following Aeronautical Information Manual paragraph 1-1-13.

For Further Information Contact

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