

ALERT BULLETIN

AB 2006-25/1-2
5/22/06
686541

TO: Embraer-Empresa Brasileira Aeronautic S/A

INFO: FAA (AFS-230, AFS-200, AFS-300, AFS-900, SEA-AEG, ANM-100), AASC, AIA, ALPA, AMFA, ASAP, ATA, IAM, ICASS, NATA, NBAA, NTSB, PAMA, RAA, TWU

FROM: Linda J. Connell, Director
NASA Aviation Safety Reporting System

SUBJ: EMB-140 AIRSPEED AND ALTITUDE INDICATION MALFUNCTION IN HEAVY RAIN

We recently received an ASRS report describing a safety concern which may involve your area of operational responsibility. We do not have sufficient details to assess either the factual accuracy or possible gravity of the report. It is our policy to relay the reported information to the appropriate authority for evaluation and any necessary follow-up. We feel you should be aware of the following:

ASRS received a report from a captain of an EMB-140 who reported the loss of the first officer's airspeed and altitude indication during an encounter with heavy rain.

During cruise at FL290, the captain noted a PFD 'IAS' comparator flag with EICAS 'SPS' advance caution. The captain stated that several airspeed changes were initiated to determine the nature of the problem and found the first officer's IAS indicating 261 regardless of actual airspeed. A maintenance controller observed that, "...this type of failure was known to occur in conjunction with heavy rain...".

The reporter revealed that the flight manual had no warning of this occurrence and that the reporter was concerned that this anomaly could occur to both the captain's and first officer's displays simultaneously.

(Keywords: Airspeed/Altitude Malfunctions)

To properly assess the usefulness of our FYI service, we would appreciate it if you would take the time to give us your feedback on the value of the information that we have provided. Please contact Harvey Hartmann or Don Purdy at (408) 541-2800 or email at hhartmann@mail.arc.nasa.gov, dpurdy@mail.arc.nasa.gov.



Aviation Safety Reporting System
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ACN: 686541

Time

Date : 200602

Day : Wed

Local Time Of Day : 1801 To 2400

Place

Locale Reference.ATC Facility : ZHU.ARTCC

State Reference : TX

Altitude.MSL.Single Value : 29000

Environment

Flight Conditions : IMC

Aircraft / 1

Controlling Facilities.ARTCC : ZHU.ARTCC

Make Model : EMB ERJ 140 ER&LR

Person / 1

Function.Oversight : PIC

Function.Flight Crew : Captain

ASRS Report : 686541

Person / 2

Function.Flight Crew : First Officer

Events

Anomaly.Aircraft Equipment Problem : Critical

Anomaly.Inflight Encounter : Weather

Anomaly.Other Anomaly.Other : Loss Of Flt Instruments

Independent Detector.Aircraft Equipment.Other Aircraft Equipment : EICAS Warning

Independent Detector.Other.Flight CrewA : 1

Independent Detector.Other.Flight CrewB : 2

Resolatory Action.Flight Crew : Overcame Equipment Problem

Consequence.Other : Company Review

Narrative

FLT WAS CONDUCTED AT NIGHT. WX RADAR AND FORECASTS INDICATED HVY RAIN AND MODERATE TURB ALONG RTE OF FLT. ELECTED LOWER CRUISE AT FL250 (PLANNED FL330), DUE TO RPTED BETTER RIDES. INITIAL CRUISE WAS OCCASIONAL TO INTERMITTENT LIGHT CHOP IN LIGHT TO MODERATE RAIN. APPROX 40 MINUTES INTO FLT, TURB AND RAIN BEGAN TO INCREASE. RPTS INDICATED BETTER RIDES HIGHER, SO CREW OBTAINED CLRNC AND CLBED TO FL290. ONCE ESTABLISHED IN CRUISE AT FL290 WITH CAPT AS PNF, PFD 'IAS' COMPARATOR FLAG CAME INTO VIEW ON BOTH PFD'S, ALONG WITH EICAS 'SPS ADVANCED' CAUTION. USING THE STNDBY INSTRUMENTATION (ISIS), IT WAS EVIDENT THAT FO'S IAS (INDICATING 261) WAS INCORRECT (CAPT'S AND ISIS READ 237 IAS). CHANGED AIRSPD SEVERAL TIMES, BOTH INCREASE AND DECREASE, TO DETERMINE WHAT THE NATURE OF THE PROBLEM WAS AND DETERMINED THE FO'S IAS READ 261 IAS REGARDLESS OF ACTUAL ACFT SPD. IAS COMPARATOR AND SPS FUNCTIONS RESPONDED PREDICTABLY DURING EACH CHANGE OF AIRSPD, EXTINGUISHING WHEN ACTUAL SPD, AS JUDGED BY REMAINING INSTRUMENTATION, NEARED 261 IAS AND ILLUMINATING WHEN SPD DISCREPANCY AGAIN EXISTED. BEFORE WE COULD BEGIN TO ACCOMPLISH AOM PROCS, ATC DIRECTED DSCNT, SO CAPT ASSUMED PF DUTIES WHILE FO REFERRED TO AOM. DURING DSCNT, FO'S IAS INDICATION DECREASED WITH ACFT ALT UNTIL IAS READ LESS THAN 95 KIAS. SHORTLY THEREAFTER, EICAS 'CAS MESSAGE' CAUTION APPEARED, FOLLOWED BY AUTOPLT DISENGAGEMENT AND 'AUTOPLT FAIL' EICAS WARNING AND AURAL WARNING (YD REENGAGED SUCCESSFULLY). FO OBSERVED RED X OVER IAS, ALT, AND VS DISPLAYS ON HIS PFD. FO SELECTED REVERSIONARY MODE, AND SUCCESSFULLY REGAINED VALID INSTRUMENTATION FROM ADC1. NO ADC-RELATED MESSAGE EVER APPEARED ON THE EICAS. MAINT CTLR ASKED WHETHER THE FLT HAD BEEN OPERATING IN HVY RAIN. UPON LEARNING THAT IT HAD, THE CTLR OBSERVED THAT THIS TYPE OF FAILURE WAS KNOWN TO OCCUR IN CONJUNCTION WITH HVY RAIN. IT APPEARS, PENDING MAINT TROUBLESHOOTING, THAT ONE CONTRIBUTING FACTOR MAY BE A WEAKNESS OF THE ACFT IN DEALING WITH HVY RAIN. THE WEAKNESS SHOULD BE KNOWN TO PLTS SO THEY CAN BE AWARE OF THE POTENTIAL FOR THIS TYPE OF FAILURE AND BE PREPARED TO TAKE ACTION. ALSO, THE AOM COVERAGE OF THE IAS INDICATION PROBLEMS SEEMS VERY SKETCHY. IT ALSO DOES NOT PREPARE THE CREW FOR POTENTIAL LOSS OF THE AUTOPLT. IT IS NOT READILY EVIDENT WHEN REVERSIONARY MODE SHOULD BE SELECTED.

CALLBACK CONVERSATION WITH RPTR REVEALED THE FOLLOWING INFO: THE FLT MANUAL WAS OF LITTLE HELP IN SOLVING THE EQUIP FAILURE. ADDITIONALLY, THERE IS NO WARNING THAT THIS MAY OCCUR IN HVY RAIN IN THE MANUAL. HE WAS PARTICULARLY CONCERNED THAT IF ONE SIDE FAILED DURING HVY RAIN, THE CHANCE OF BOTH FAILING WAS GOOD WITH POTENTIAL SERIOUS CONSEQUENCES, ADDING THE FACT THAT MAINT INDICATED IT HAS HAPPENED BEFORE.

Synopsis

EMB140 FLT CREW HAS THE LOSS OF FO'S AIRSPD AND ALT INDICATION DURING ENTRY INTO HVY RAIN. EICAS WARNINGS FOR SPD COMPARISON, AUTOPLT LOSS AND YAW DAMPER ILLUMINATED. THE FO, PF, SHOWED RED X'S (FLAGS) ON THE IAS AND ALT INDICATION.