SAFETY INFORMATION 10/2022

11 April 2022

UNRELIABLE AIRSPEED INDICATIONS

Purpose:

This Safety Information (SI) serves to alert flight crew and operators on unreliable airspeed indications, and the corrective and mitigative actions to be taken.

Background:

An incident occurred recently where the aeroplane loss altitude during cruise. Following an initial safety investigation, it was found that the Captain's Pitot Probe heating system had failed. This may have caused ice build-up and blockage of the Pitot Probe resulting in a disagreement between the Captain's and First Officer's Indicated Airspeed.

Discussion:

Water, ice, dust, ashes, etc. may partially or totally block pitot probes and static ports. This may lead to erroneous pressure measurements. The consequences of this erroneous pressure information, once used by aeroplane air data processors will result in the display of unreliable speed and/or altitude.

Although instrument failures are infrequent, they do occur. All aeroplane operations manuals provide flight instrument system information, such that when instrument failures do occur, the flight crew can analyse the impact and select the correct procedural alternatives. Aeroplane certification require that flight crew have the minimum information needed to safely control the aeroplane, in the event of instrument failure. Studies on past accidents have shown that flight crew are not always prepared to correctly analyse the alternatives in case of failure. This may result in an aeroplane upset. Civil Aviation Directives (CAD) 6 Part 1 – Commercial Air Transport Aeroplane, Para 9.3.1.2 f) requires flight crew member training programme to include aeroplane upset prevention and recovery training.

Unreliable Airspeed Identification

Identifying an unreliable airspeed indication is not always obvious. No single rule can be given to conclusively identify all possible erroneous indications and the display of contradictory information may confuse the flight crew. Flight crew should therefore be aware of unreliable airspeed symptoms and consequences by referring to the appropriate aeroplane manufacturer manual.

Erroneous speed or altitude indications can be suspected, among others, in the following cases:

1. Speed discrepancy between primary and standby indicators,
2. The fluctuation of the Indicated Air Speed or of the Pressure Altitude,

3. Abnormal correlation between basic flight parameters (IAS, attitude, pitch, thrust, climb rate),
4. Abnormal Auto flight crew/Flight Director/Auto thrust behaviour,
5. Unexpected stall warning, an unexpected overspeed warning or simultaneous stall and overspeed warnings

Response to an Unreliable Airspeed Indication

Erroneous flight instrument indications caused by pitot and static system anomalies can confuse an unprepared flight crew. A crew's failure to respond correctly and in a timely manner can result in an aeroplane accident or incident. With knowledge of pitot and static systems, an understanding of the types of erroneous flight instrument indications that can occur, and the mindset to fly the approximate pitch and power, the flight crew can establish and maintain the aeroplane in a safe condition. The crew can determine which instruments are reliable and develop a strategy for recovery by following basic airmanship and checklist guidance to land the aeroplane safely.

1. Remain calm, disconnect all automation and maintain control of the aeroplane with basic pitch and power skills.
    - Establish a pitch attitude and power setting that are appropriate to the situation until it is discovered which (if any) system is indicating correctly or the problem is resolved
    - Allow sufficient time for problem solving.
2. Take an inventory of reliable information.
    - Compare pitch and power indications with settings recommended for the phase of flight.
    - Consider available instrument information recommended by the aircraft manufacturer to determine reliability.
3. Find and/or maintain favourable flying conditions, such as daylight visual conditions.
4. Obtain assistance from others.
    - Air traffic control can help with position and ground speed.
    - Be aware that air traffic control communication of transponder information could be erroneous.
5. Use checklists.
    - Do not entirely trust previously suspected instruments, even if they appear to be operating correctly.
    - Review unreliable airspeed or other appropriate checklists.

Recommended Action:

Operators are to ensure flight crew's proficiency in handling Unreliable Airspeed by:

1. Ensuring flight crew proficiency in non-normal procedures particularly memory items as required by the aeroplane manufacturer.
2. Enhanced Upset Prevention and Recovery Training (UPRT) programme to emphasise on initial reaction and time taken to respond to the abnormal situation.
3. Human Performance training on the effects and managing of startle.
4. To include 'Unreliable Airspeed' training in the current and following proficiency check syllabus to ensure all flight crew receive the training.

For further information, please refer to the following resources:

Unreliable Airspeed - Flight Safety Foundation

Startle Effect Management - EASA

Without warning: the startle factor – Flight Safety Australia

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