

SAFETY INFORMATION 1/2021

19 January 2021



IN-FLIGHT LOSS OF CONTROL SAFETY AWARENESS

Introduction

Loss of Control In-flight (LOC-i) has been one of the most significant contributors to fatal accidents worldwide. LOC-I refers to accidents in which the flight crew are unable to maintain control of the aircraft in flight, resulting in an unrecoverable deviation from the intended flight path. Loss of control usually occurs because the aircraft enters a flight regime which is outside its normal envelope, usually not always at a high rate, thereby introducing an element of surprise for the flight crew involved.

The cause of in-flight Loss of Control, whether transitory or terminal, are many and can be categorised as follows:

Significant Systems or Systems Control Failure

A significant system or systems control failure, which interferes with normal flight management and/or directly with aircraft control may lead to loss of control. This would include multiple engine failure, loss of correct function or control of a significant element of the flying controls, especially asymmetric spoilers/slats/flaps/thrust reversers, major electrical failure and loss or malfunction of critical flight instrument displays.

Structural Failure and/or Loss of Power

The secondary result of structural failure and/or loss of power arising from a range of circumstances including mid-air collision, explosive decompression, fire on board or a wing fire, and contaminated or otherwise abnormal engine fuel feed may all lead to loss of control.

Crew Incapacitation

Pilot Incapacitation such that neither pilot is able to maintain control the aircraft may lead to loss of control. This would include smoke and/or fumes in the flight deck and malfunction or incorrect control of the pressurisation system. It might also occasionally include the consequences of a deterioration in the physical or mental condition of just one of the pilots.

Flight Management or Control Error

Loss of control may occur as a result of a flight management or control error or inappropriate intervention by or under the supervision of one or both of the pilots. This would include incorrect aircraft performance calculations, unintentional pilot mis-management of critical systems including engine(s) controls and fuel transfer, fuel exhaustion, pre-flight fuel loading, pilot dis-orientation under IMC or night VMC conditions and unintended operations outside the requirements of the Airplane Flight Manual. It particularly also includes inappropriate or absent responses or inattention to otherwise relatively minor abnormalities which would not normally prejudice the safety of the aircraft.

Environmental Factors

Environmental factors external to the aircraft which interfere with the normal use of engines, flight controls or critical flight instruments or lead to their capability being exceeded or cause other serious damage, can lead to loss of control. This would include ice accretion on the airframe or sensors before take-off or during flight, microburst/severe wind shear, severe wake vortex, severe air turbulence, the effects of ice entering or otherwise accreting within the engines and the effect on multiple engine function of passage through volcanic ash or an encounter with flocking birds resulting in bird strike. It could also include the effects of damage caused by runway surface debris (FOD) of any origin which did not become apparent until after V1.

Aircraft Loading

Loading is, or becomes, contrary to the limits of the allowable flight envelope or any restrictions on what can be loaded have been breached. Loss of control can occur if the aircraft is loaded for flight in such a way that it is outside of the flight envelope or is mis-trimmed because the actual loading of the aircraft is not as documented. Flight outside the flight envelope may also arise after take-off because of in-flight load shift or fuel transfer effects.

Malicious Interference

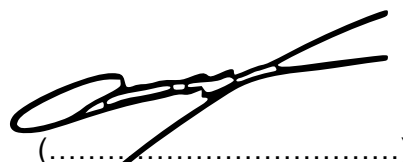
Malicious Interference in a flight by persons on board, unaccompanied explosives or external attack leading to a loss of controls because of loss of aircraft structural integrity or direct interference with aircraft control.

The recommended preventions and solutions are to address the following

- Improve awareness of or competence in procedures for recovery from unusual aircraft attitudes through recurrent training.
- Increase situational awareness
- Weather avoidance techniques and procedures.
- Security measures
- Proficient in Standard Operating and Non-normal procedures.

Summary

While it is not possible to envisage every scenario that can lead to a loss of control in flight, studies have shown that maintaining good situational awareness, maintaining good crew communications and adhering to all prescribed recommended procedures will in general assure the safe conduct of flight.



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