

The <b>CIX</b> VFR Club	Flight Training Notes	Exercise <b>11</b>
For Simulation Purposes only. Not to be used for real World flight	<b>SPIN AVOIDANCE</b>	Issue 1.1 15/08/12

## 1 INTRODUCTION

This series of tutorials for the **CIX** VFR Club are based on real world flight training. Each document focuses on a small part only of the necessary skills required to fly a light aircraft, and by echoing real world training, you will be a better Flight Simulator pilot and get more enjoyment out of the hobby as a result.

These tutorials are written specifically for the Flight Simulator Default Cessna 172. Some details will be different for other aircraft.

## 2 OBJECT

This document explains the mechanism of spinning in real aircraft why spinning is not realistically possible in Microsoft Flight Simulator. Spinning is therefore not taught nor tested.

## 3 DEFINITION

When one wing stalls and the other doesn't the aircraft begins to rotate about an axis perpendicular to the plane of the wings. The flying wing is imparting lift but little drag, and the stalled wing is imparting no lift but a lot of drag. This is what causes the rotation. If a stall does not occur, a spin cannot occur.

The aircraft also descends rapidly because it has lost 50% of its designed lift, but naturally still has 100% of its weight. The rotation is self energising and will continue until the pilot takes appropriate corrective action. In some aircraft, the rate of rotation increases as the spin "develops". Uncorrected, most spins result in the aircraft crashing.

## 4 TYPES OF SPIN

### 4.1 Incipient Spin

An incipient spin is that portion of a spin from the time the airplane stalls and rotation starts, until the spin becomes fully developed. An incipient spin that is not allowed to develop into a fully developed spin is commonly used as an introduction to spin training and spin recovery techniques.

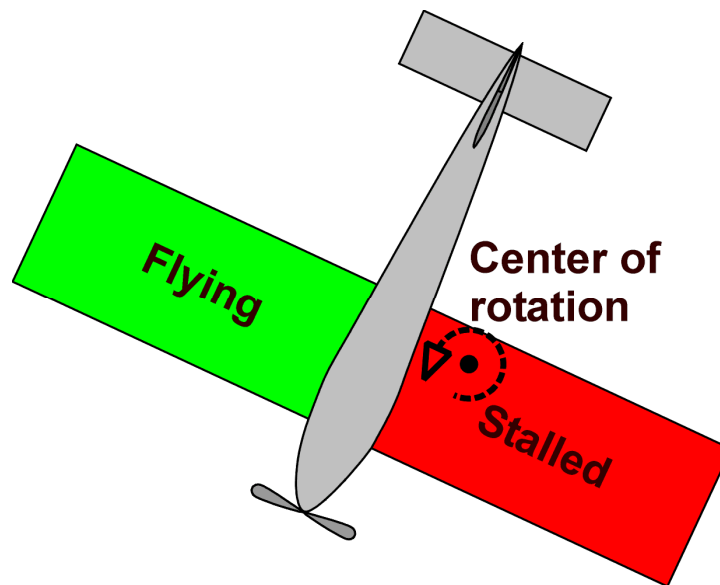
### 4.2 Fully Developed Spin

A fully developed spin occurs when the aircraft angular rotation rates, airspeed, and vertical speed are stabilized from turn-to-turn in a flight path that is close to vertical.

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### 4.3 Flat Spin

A flat spin is characterised by a near level pitch and roll attitude with the spin axis near the Centre of Gravity of the airplane. Recovery from a flat spin may be extremely difficult and, in some cases, impossible.



*Simplified Dynamics of a Spin*

## 5 MSFS AIRCRAFT CANNOT SPIN

Microsoft Flight Simulator treats the two wings of all its aircraft as a single element, producing lift centred at or near the centre of gravity of the aeroplane. As a consequence, aircraft in MSFS cannot spin because the whole wing acts as one lift-producing element, not two as in real life. X-Plane is more realistic in this regard and treats the wings as separate lift elements.

Whilst it is useful to understand the mechanism of spinning, it will not feature in any practical Club training. However, although accidental spinning is impossible in MSFS, the pilot can avoid this part of the flight envelope in the simulator by avoiding flight at very slow airspeeds, and by avoiding full movement operation of the flight controls in an abrupt manner.

In the real world, spin recovery is achieved by closing the throttle if necessary and applying opposite rudder to the direction of spin. When rotation stops, the aircraft is carefully pulled out of the ensuing dive and power applied when the nose approaches the horizon. Spin recovery can be simulated in Flight Simulator, but it is not as realistic in all but very few third party created aircraft.