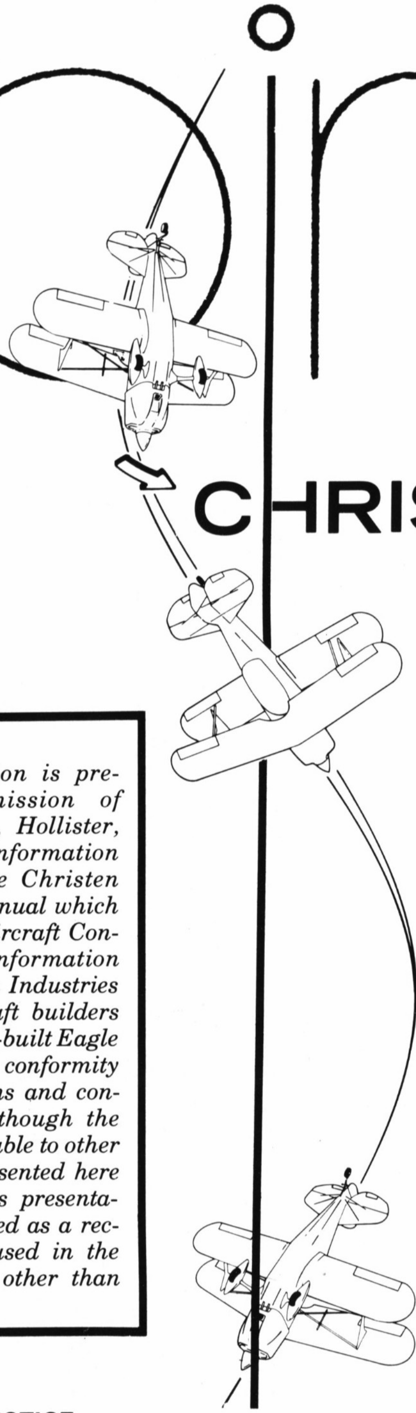
spins IN THE CHRISTEN EAGLE II



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NOTICE

The information in this publication is a selected portion of the Flight Manual for the Christen Eagle II, taken directly from Section 5 of the product manual supplied with the 924 Flight Kit of the Christen Eagle II aircraft construction system.

The general physical principles which cause spins are similar for all small aircraft of conventional design. Standard recovery procedures will generally apply to most of these aircraft types.

However, the **specific proecures described** *in this publication* **apply only to the Christen Eagle II aircraft.** *Other aircraft types may require other specific recovery procedures, and some aircraft types may not respond to standard recovery procedures. For other aircraft types, always refer to the manufacturer's operating or flight manuals for specific information on aircraft spin characteristics and spin recovery procedures.*

Section 5
SPINS
NOTE

Although the general principles involved in spin recovery are similar for all aerobatic aircraft, there may be significant differences in specific procedures for different aircraft types. Specific procedures in this manual apply only to the Christen Eagle II aircraft.

5-1 Introduction

This section of the manual describes spin avoidance and spin recovery procedures for the Eagle II aircraft. Spins of all types are frequently experienced during aerobatic flight: Unintentional spins may occur after faulty performance of some aerobatic maneuvers, and intentional spins are required in competition aerobatic sequences. This section is not an attempt to describe sophisticated spin techniques for competition; it is designed to provide a broad background of safety information for pilots who will be encountering various types of spin situations for the first time.

The Eagle II aircraft has docile and controllable stall characteristics with no tendency to spin: however, the aircraft will spin immediately and well if the proper control inputs are made following stall. It has normal spin recovery characteristics in all four basic spin types. Because both intentional and unintentional spins will be encountered in aerobatic flying, it is essential that pilots understand the four basic spin types and the correct recovery procedure for each spin type. Unintentional spins frequently result during aerobatic practice when certain maneuvers are poorly executed. Accidental spins resulting from maneuvering errors can be of any of the four possible spin types.

All theoretical explanations and all procedures in this section should be studied to develop thorough understanding. All procedures should be memorized and then rehearsed in the aircraft on the ground. Spin recovery procedures must be practiced in flight so that if and when any procedure is required, it can be performed instinctively and unerringly.

Inexperienced aerobatic pilots, in particular, must be extremely careful in learning spin recovery procedures. Although spin recovery procedures will become simple, automatic responses when mastered, do not assume that previous flying experience plus limited study will suffice. **DUAL INSTRUCTION MUST BE CONSIDERED MANDATORY.** Some pilot instincts must be relearned for safe spin recovery, since some control inputs that are instinctively used during normal flight are totally inappropriate for spin recovery.

WARNING

Before attempting any maneuvers that could conceivably deteriorate into a spin, all pilots must receive **dual instruction** from a competent aerobatic instructor in spin recovery techniques including, as a minimum, both **normal upright spins** and **normal inverted spins** (both directions).

All aerobatic maneuvers including spins should be performed at safe altitudes which ensure adequate time for recovery from unanticipated conditions. Minimum altitudes of 3000 to 5000 feet agl are recommended.

WARNING

Until spin recovery from intentionally induced spins has been practiced so that recovery from all spin types can be performed with confidence, pilots must not attempt any aerobatic maneuver which, if poorly executed, could easily result in an unintentional spin. Do not attempt any maneuvers (a) in which low airspeeds are required, (b) which could easily deteriorate into low-airspeed conditions, or (c) which are intended to use stalling within the maneuver. Several commonly performed maneuvers must therefore be avoided until spin-recovery procedures have been mastered: Do not attempt (a) hammerhead turns, (b) tail slides or whip-stalls, (c) vertical rolls, and (d) snap rolls or flick rolls.

5-2 Terminology

Throughout the following text, relative directions are given from the pilot's viewpoint. For example, an inverted spin to the right is toward the pilot's right, even though an exterior observer might think of the spin as being a "left-hand spiral" or "toward the left".

Spin direction is always considered to be the direction of yaw, so a spin to the right can also be described as a right-rudder spin, and a spin to the left can be described as a left-rudder spin. Rudder input which tends to stop the yaw during a spin is called "opposite rudder". For example, during a spin to the right, opposite rudder would be a left-rudder input.

Aileron and elevator position are described in terms of control stick position, such as "stick forward", "stick back", "stick right", or "stick left".

The relative direction toward the spin axis is referred to as "inside", and the relative direction away from the spin axis is referred to as "outside". For example, in a normal upright spin to the left, the left wing (which is toward the spin axis) is referred to as the "inside" wing, and the right wing (which is away from the spin axis) is referred to as the "outside" wing.

NOTE

Because aircraft attitudes, relative directions, and control inputs can be confusing when studying spins, use a model airplane to represent spin conditions while reading the explanations of spin types and spin recovery procedures throughout this section.

5-3 Basic Spin Mechanics

All spin types include two essential and fundamental characteristics: (1) the wings are stalled and (2) the aircraft yaws continuously. For intentional entry into a normal spin, the pilot simply sets up a stall in level flight (upright or inverted) followed by firm rudder input; the spin starts immediately when the aircraft yaws.

During normal spins, the wings on the outside of the spin axis, although stalled, produce a greater lifting force than the inside wings, causing the aircraft to roll as it spins. When the spin becomes stabilized, usually after several turns, all forces acting on the aircraft reach an equilibrium state, and the aircraft yaws and rolls uniformly around the vertical spin axis as it descends.

The spiralling roll that occurs during a normal spin must be clearly understood to be a secondary effect of the spin, even though the roll is a prominent visual feature of normal spins both to ground observers and to the pilot. In a normal upright spin, yaw direction and roll direction are the same (that is, a right-rudder upright spin is accompanied by right roll, and a left-rudder spin is accompanied by left roll). In a normal inverted spin, yaw direction is opposite to roll direction (that is, a right-rudder inverted spin is accompanied by left roll, and a left-rudder spin is accompanied by right roll).

Flat spins result when forces are introduced both to lift the nose of the aircraft and to counteract the roll that occurs during a normal spin: (1) the nose is lifted by gyroscopic precession produced by the engine and propeller as a result of aircraft yaw and (2) the normal-spin roll is stopped by aileron forces. For intentional entry into a flat spin from a normal spin, the pilot simply applies full power and full right stick. After several turns, gyroscopic precession will lift the nose of the aircraft and aileron forces will reduce roll to zero, resulting in a nose-high flat spin. (Gyroscopic precession produces nose-lifting forces only in upright spins to the left and in inverted spins to the right; in either case, right stick stops the roll to flatten the spin.)

5-4 Spin Recovery, General

By making use of inherent aerodynamic stability, the Christen Eagle II will recover from normal upright spins, normal inverted spins, and flat inverted spins simply by (a) cutting engine power and (b) neutralizing the stick and rudder pedals. The application of this procedure is explained further in paragraph 5-6. In the case of a flat upright spin when the aircraft is loaded to produce a CG near the aft limit, power reduction and neutral controls are insufficient; the proper recovery procedure, described in paragraph 5-8, must be used.

The recovery techniques described in paragraphs 5-7 through 5-10 are standard procedures which provide faster, controlled recovery with minimum altitude loss when the spin type is known.

All recovery procedures are based on removing or reversing the forces that originally produced the spin. To appreciate the fundamental principles that are involved, three main points must be understood:

POINT 1. Application of power increases the difficulty of spin recovery. During an inverted right-rudder spin or an upright left-rudder spin, gyroscopic precession tends to lift the aircraft nose, flattening the spin; continued application of full power may hold the nose of the aircraft up, making a normal diving recovery impossible. In a normal unflattened spin, excess power always increases descent rate, thus increasing the hazards of pull-out near the ground.

The first basic rule for spin recovery is this:

CUT THE THROTTLE.

POINT 2. The spin is a yaw maneuver. Yaw-producing forces must be neutralized or reversed to stop the spin. Since the rudder controls yaw, it must be neutralized or reversed ("opposite rudder") to stop aircraft yaw.

The second basic rule for spin recovery is this:

STOP THE YAW.

POINT 3. In all spins, the wings are stalled, and the aircraft is "falling". Stall-producing forces must be neutralized or reversed to stop the spin. Since the elevator controls angle-of-attack and thus the stall condition of the wings, the elevator must be neutralized or reversed to reduce the angle-of-attack and eliminate the stall condition.

The third basic rule for spin recovery is this:

STOP THE STALL.

5-5 Recovery Problems

The Christen Eagle II aircraft will recover from any spin type with proper recovery techniques, provided that the aircraft is loaded within CG limits. In this regard, the spin-recovery characteristics are enhanced when the CG is in the mid-range; therefore pilots flying solo should fly with **full fuel,** if it is desired to simplify spin recovery. Never attempt aerobatic maneuvers with less than 6 gallons of fuel. Never carry anything in the baggage compartment when performing aerobatics. If there is any doubt about aircraft loading, calculate CG location and verify that the CG is within limits before flight.

WARNING

Any particular Christen Eagle II aircraft will recover from any spin type using standard recovery techniques ONLY IF THE AIRCRAFT IS PROPERLY BALANCED. The CG of the aircraft must be within design limits to ensure safe spin recovery. Any aircraft can be dangerously loaded (CG beyond design limits) making spin recovery extremely difficult or impossible. Weight-and-balance considerations must be taken seriously and pilots must be absolutely certain that the flight CG of their aircraft is within design limits.

Each level of pilot experience and training produces somewhat different problems in spin perception and in pilot reaction to his perception of the spin.

For inexperienced aerobatic pilots, as well as experienced pilots who are unfamiliar with the spin characteristics of the particular aircraft type, inadvertant and unanticipated spins may produce a dangerous sequence of events. Severe disorientation is caused by the spin and by the previous maneuver which produced the spin. The spin type then becomes extremely difficult to identify and therefore produces uncertainty as to the correct recovery procedure. The pilot may then, in panic, conclude that the only approach is to experiment haphazardly with various control inputs, hoping to discover the correct combination for fast recovery.

A primary problem in spin recovery is failure of the pilot to identify the true spin type followed by application of erroneous control forces that hold the aircraft in the spin. For example, if controls are set for recovery from a normal **upright** spin when the aircraft is actually in a normal **inverted** spin, the pilot will unwittingly hold the aircraft in the inverted spin, and recovery will be impossible.

All control inputs for recovery from a spin should be gentle but positive. Violent or extreme pressure on the controls must be avoided. For example, if violent control inputs for recovery from a **normal upright** spin are made (that is, violent forward stick and violent opposite rudder), the aircraft will recover from the first spin and immediately transition to a **normal inverted spin with reversed rotation.**

Control inputs should be held long enough for recovery to occur, but not so long as to produce entry into a new spin of opposite direction or type. For example, if correct rudder input is initially made for recovery from a spin (that is, firm application of opposite rudder), but the rudder is not neutralized when the original spin stops, the aircraft may transition to an opposite-direction spin.

Many pilots erroneously consider the spin to be a rolling maneuver. **ALL SPINS ARE YAW MANEUVERS, AND RUDDER IS THE ESSENTIAL CONTROL.** The spiralling-type roll associated with a spin is secondary, and pilots must guard against any temptation to "roll out" of a spin using ailerons.

If the spin is erroneously thought of as a rolling maneuver, there will be a compulsion to use ailerons in the direction opposite to the observed roll. Any aileron input that is opposite to the direction of spin yaw tends to flatten the spin and makes the spin worse (more difficult recovery). That is, during an upright spin the spin will tend to flatten with stick away from the spin axis and in an inverted spin the spin will tend to flatten with stick toward the spin axis. Ailerons must therefore be neutral, or even slightly in a position that rolls the aircraft in the direction of spin yaw, for recovery. Therefore, always use rudder to control the rotational yaw in the spin; NEVER USE AILERON IN AN ATTEMPT TO "ROLL OUT" OF A SPIN.

A serious problem in perception of spin direction can result if pilot attention is directed, perhaps unconsciously, to roll direction. In most flight situations, the direction of roll and yaw are the same. That is, in a normal turn in upright flight for example, the aircraft is turned to the left by left roll plus left yaw. Also in normal **upright** spins, the direction of yaw and roll will be the same. For example, an upright spin to the left will be caused by left yaw and will be accompanied by left roll. The frequent correspondence of yaw and roll may cause the pilot to **unwittingly equate** yaw direction with roll direction. However, **IN INVERTED SPINS, YAW AND ROLL DIRECTIONS ARE OPPOSITE.** For example, an inverted spin to the left will be caused by **left yaw** and will be accompanied by **right roll.** Recovery will not occur during an inverted spin if the pilot observes direction of roll, assumes that yaw is in the same direction, and then uses the wrong rudder input for recovery. Always concentrate on determining yaw direction by visual reference between the engine and upper wing, which always permits yaw condition to be sensed accurately and unambiguously.

During inverted flight, it is common for pilots to look "up" through the canopy top over the upper wing, to maintain visual contact with the ground. Another serious problem in spin perception will develop during inverted spin if the pilot attempts to sense yaw direction by looking up through the canopy top because visual ground reference is then made **behind the spin axis,** leading the pilot to misinterpret yaw direction and use the wrong rudder input for recovery. (This condition is discussed further in paragraph 5-9.) NEVER LOOK UP THROUGH THE CANOPY TOP DURING A SPIN; always concentrate on determining yaw direction by observing the ground between the engine and the upper wing.

Recovery problems are easily compounded by combinations of limited pilot experience, possible overconfidence, severe disorientation in the spin, reaction to sensory miscues, and failure to recognize recovery, followed by re-entry into another spin type.

FIGURE 5-1 Example of Overcontrol Spin Reversal

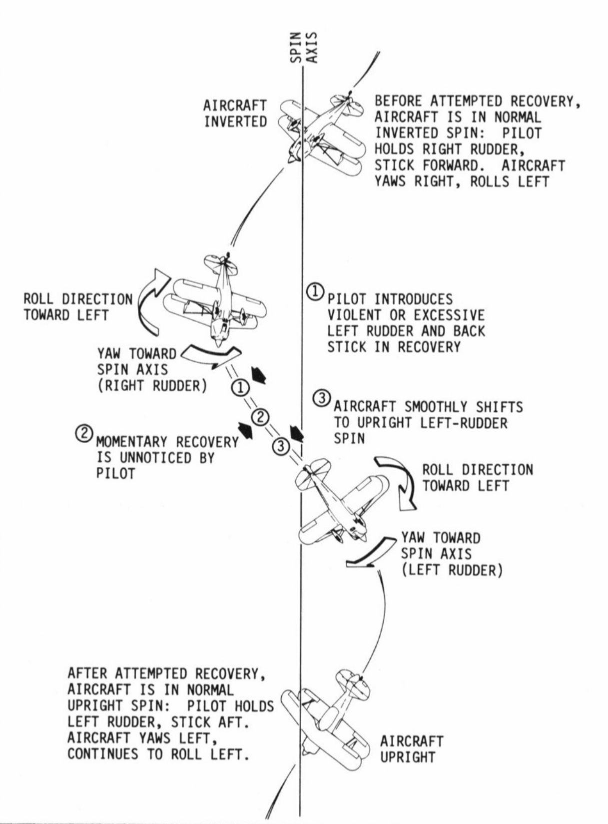


Figure 5-1 illustrates a spin sequence in which overcontrol causes the aircraft to transition to a new spin type. The sensations experienced by the pilot can be extremely disconcerting, and the pilot may conclude that the spin cannot be controlled. At the outset, the aircraft is in a normal inverted spin to the right (right rudder, stick forward). The pilot at this time could mistake the spin for a left spin, because the aircraft is rolling to the left and, if the pilot looks up through the canopy, visual miscues will suggest left yaw.

In this case, the pilot correctly interprets the spin type and direction, but then introduces recovery inputs (left rudder, stick back) violently or holds the inputs too long. The aircraft then stops spinning (no yaw, no stall) but immediately transitions to an upright spin to the left. The pilot has no feeling of abrupt stopping or restarting a spin in the opposite direction. The aircraft is unstalled momentarily, and yaw shifts to the left, but the transition is smooth and goes unnoticed by the pilot. Aircraft pitch also shifts, changing from inverted to upright. Although the aircraft is now upright, the total angular change in pitch is slight and goes unnoticed by the pilot.

Because roll direction is opposite to yaw direction when inverted but in the same direction when upright, the roll direction during the inverted right spin (left roll) is the same as the roll direction during the upright left spin (left roll). The pilot, failing to notice that yaw direction has reversed, while clearly perceiving that the roll condition has continued without change, can easily conclude that nothing has happened. Continued application of the original control inputs for attempted recovery will hold the aircraft in an upright left spin and recovery will be impossible.

Safety Summary

1. Be sure aircraft CG is safe before any flight.
2. Never attempt any maneuvers that could accidentally cause spins until spin recovery procedures are mastered.
3. Do not attempt any spins without first obtaining adequate dual instruction.
4. The first step in all recovery procedures is to cut power (throttle aft).
5. Observe yaw by looking straight ahead, through the cabane struts. Never look above the upper wing.
6. Ignore roll direction during spins.
7. Set ailerons neutral or even slightly in the direction of spin. That is, the stick may be slightly in the yaw direction during upright spins or slightly opposed to yaw direction during inverted spins. Never use ailerons in an attempt to "roll out" of a spin. That is, never use stick opposed to yaw direction during upright spins, and never use stick with the yaw direction during inverted spins.

5-6 Recovery from Unknown Spin Type

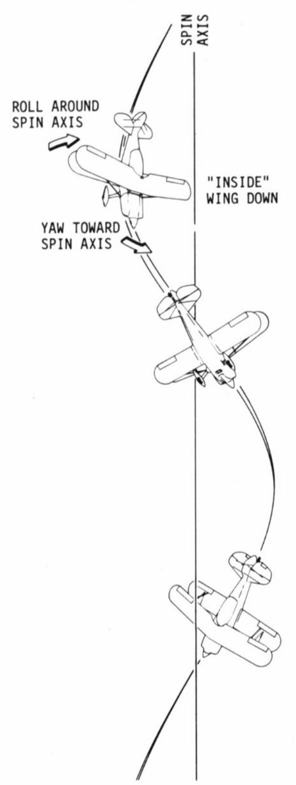
If the aircraft is in an unknown out-of-control spin situation after any disorienting maneuver, the following immediate-action recovery procedure should be used before the spin is fully developed, if possible:

1. Pull the throttle full aft to cut engine power.
2. Neutralize (center) the control stick and rudder pedals.
3. Hold the controls neutral for at least three rotations of the aircraft. While counting rotations, evaluate the nature of the spin to prepare for possible use of the specific recovery procedure for that type of spin.
4. Within three rotations, the aircraft should recover from most spins. That is, the spin will have stopped (no yaw, wings unstalled), but the aircraft will be diving with increasing airspeed, and it may be in an unusual attitude. Simply pull out of the dive smoothly, make other required corrections to aircraft attitude, and reapply power.
5. If the aircraft is within normal CG limits and is aerodynamically similar to Christen factory test aircraft, the aircraft will always recover using the procedure described in steps 1 through 4, unless the aircraft is in a flat **upright spin** with the CG near the aft limit. In this case, the specific recovery procedure for the flat upright spin must be used for recovery (paragraph 5-8). Also, in case of out-of-limit CG conditions or nonstandard aerodynamic conditions on a particular aircraft, it is possible that recovery from other spin types may not have occurred. Therefore, if recovery has not occurred and the aircraft has made three rotations, the specific recovery procedure for the actual spin type must be used.

5-7 Normal Upright Spins (Figure 5-2)

In a normal upright spin (a) the aircraft is nose down, yawing toward the spin axis, rotating with the inside wing distinctly lower than the outside wing and (b) the axis of rotation near the aircraft is **above** the aircraft centerline (that is, on the canopy-side). The aircraft rolls around the spin axis, with roll in the same

FIGURE 5-2 Normal Upright Spin (Part 1 of 2)

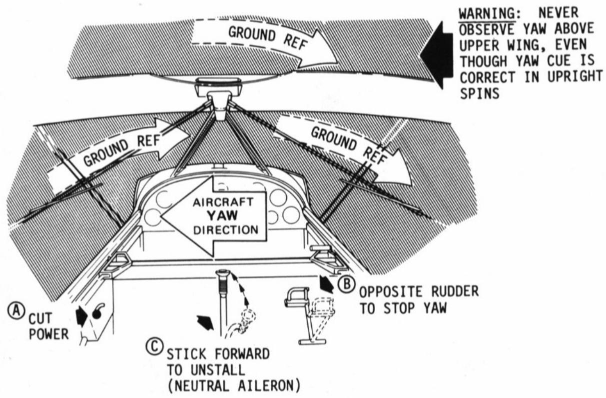


EXTERIOR VIEW: NORMAL UPRIGHT SPIN TO PILOT'S LEFT

direction as yaw. Usually, this type of spin is entered from an **upright** flight attitude, stalling with stick back while applying firm rudder input. The aircraft can rotate either to the right or left.

The spin axis intersects the ground below the aircraft (that is, belly-side). All visual cues permit accurate determination of yaw direction during any upright spin. Safe practice, however, requires that yaw direction be determined only by observation of ground reference cues between the engine and the upper wing.

FIGURE 5-2 Normal Upright Spin (Part 2 of 2)



PILOT'S VIEW: RECOVERY FROM NORMAL UPRIGHT SPIN TO PILOT'S LEFT

If the spin is known to be a normal upright spin, the standard recovery procedure, which places the aircraft into a steep dive, is as follows:

1. Pull the throttle full aft to cut engine power.
2. Push the rudder pedal gently but firmly in the direction **opposite** the spin to stop yaw.

WARNING

Excess or violent rudder may cause the aircraft to recover from the original spin and transition to a spin in the reverse direction.

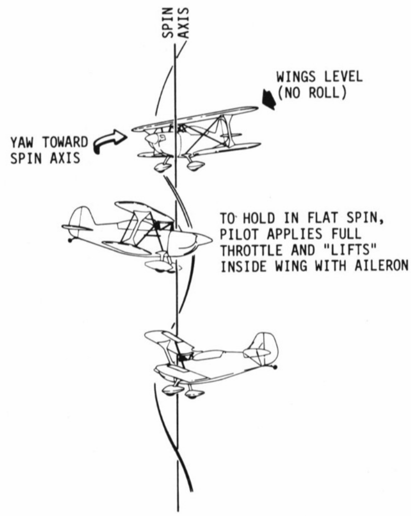
3. **Push** the control stick gently but firmly forward to unstall the wings.

WARNING

Excess or violent forward stick may cause the aircraft to transition to an **inverted** type spin.

4. When the spin stops (rapid build-up of airspeed), complete the recovery by pulling out of the dive, correcting aircraft attitude as required, and reapplying power.

FIGURE 5-3 Flat Upright Spin (Part 1 of 2)



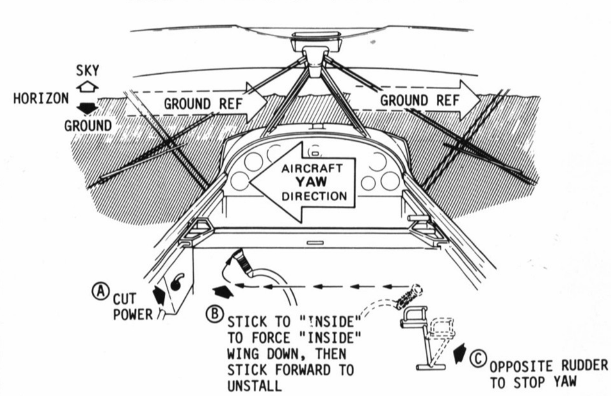
EXTERIOR VIEW: FLAT UPRIGHT SPIN TO PILOT'S LEFT

5-8 Flat Upright Spins (Figure 5-3)

In a flat upright spin (a) the aircraft rotates with the wings approximately level (that is, zero roll), usually with the aircraft nearly horizontal in pitch or slightly nose up and (b) the aircraft is upright. This type of spin is entered from a normal left-rudder upright spin by applying full power while holding right stick (that is, stick away from the spin axis). Gyroscopic precession lifts the nose only during left yaw; in an upright spin to the right, gyroscopic forces are in the wrong direction to lift the nose.

The spin axis intersects the ground under the aircraft (that is, belly-side). All visual cues permit accurate determination of yaw direction during any upright spin. Safe practice, however, requires that yaw direction be determined only by observation of ground reference cues between the engine and the upper wing.

FIGURE 5-3 Flat Upright Spin (Part 2 of 2)



PILOT'S VIEW: RECOVERY FROM FLAT UPRIGHT SPIN TO PILOT'S LEFT

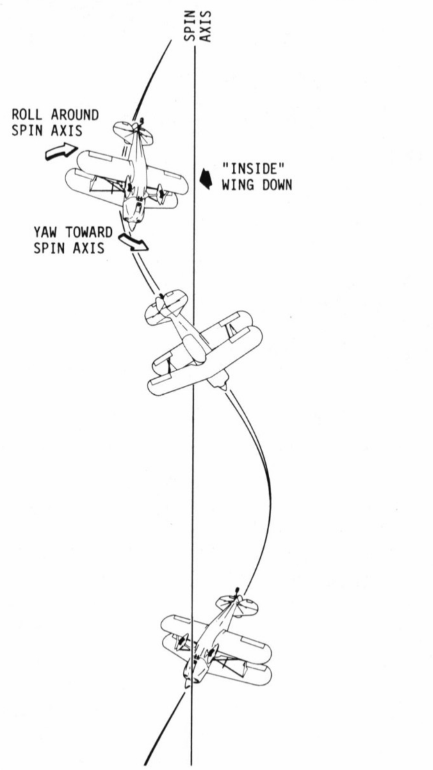
If the spin is known to be a flat upright spin to the left, the standard recovery procedure, which basically places the aircraft into a normal upright spin, is as follows:

1. Pull the throttle full aft to cut engine power.
2. Move the stick full left (that is, toward the spin axis and in the yaw direction), to force the inside wing down.
3. Hold the controls until a normal upright spin has developed (½ to 3 turns, typically less than 1 turn), and then recover from a normal upright spin using moderate forward stick and moderate right rudder (paragraph 5-6). These control inputs are typically introduced at the same time as aileron deflection, producing a smooth single-motion recovery.

WARNING

Recovery from flat spins must be initiated no lower than 2500 feet agl to allow for altitude loss during the pull-out phase of recovery.

FIGURE 5-4 Normal Inverted Spin (Part 1 of 2)



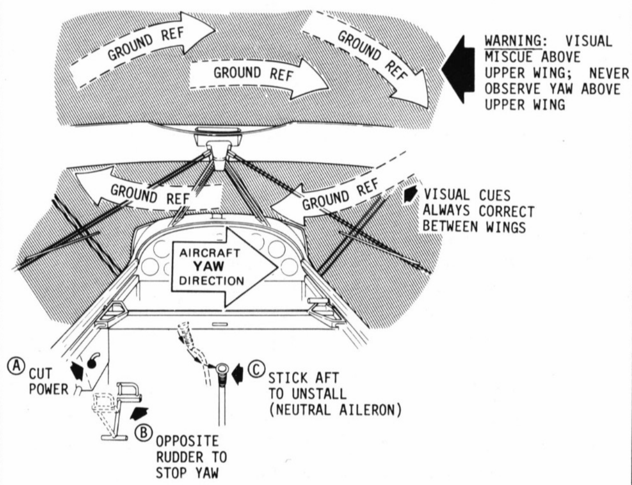
EXTERIOR VIEW: NORMAL INVERTED SPIN TO PILOT'S RIGHT

5-9 Normal Inverted Spins (Figures 5-4, 5-5)

In a normal inverted spin (a) the aircraft is nose down, yawing toward the spin axis, rotating with the inside wing distinctly lower than the outside wing and (b) the axis of rotation near the aircraft is **below** the centerline of the aircraft (that is, on the belly-side). The aircraft rolls around the spin axis with the roll direction opposite to yaw direction. Usually, this type of spin is entered from an **inverted** flight attitude, stalling with the stick forward while holding firm rudder input. The aircraft can rotate either to the right or left.

The spin axis intersects the ground above the aircraft (that is, canopy-side). Usually the point of intersection is behind or slightly over the upper wing. Visual cues between the engine and the upper wing always permit accurate determination of yaw direction.

FIGURE 5-4 Normal Inverted Spin (Part 2 of 2)



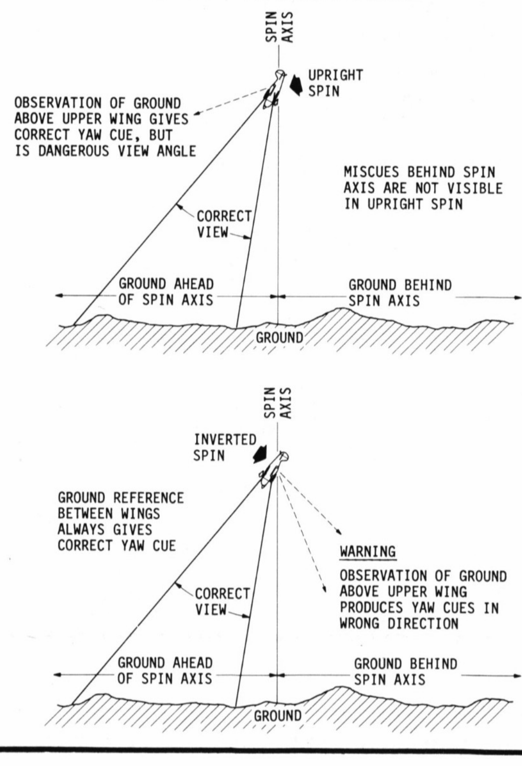
PILOT'S VIEW: RECOVERY FROM NORMAL INVERTED SPIN TO PILOT'S RIGHT

WARNING

Visual cues **above the upper wing (that is, canopy-side) are misleading,** because the ground reference cues are behind the spin axis. Such miscues produce an illusion that can lead to the erroneous conclusion that the spin direction is opposite to the true direction. **Always observe ground reference cues between the engine and the upper wing** to provide unambiguous determination of yaw direction.

If the spin is known to be a normal inverted spin, the standard recovery procedure, which basically places the

FIGURE 5-5 Yaw Reversal Illusion



aircraft into an inverted dive, is as follows:

1. Pull the throttle full aft to cut engine power.
2. Push the rudder pedal gently but firmly in the direction **opposite** the spin.

WARNING

Excess or violent rudder may cause the aircraft to recover from the original spin and transition to a spin in the opposite direction.

3. **Pull** the control stick gently but firmly aft.

WARNING

Excess or violent back stick may cause the aircraft to transition to an **upright** type spin.

4. When the spin stops (rapid build-up of airspeed), complete the recovery by pulling out of the dive, correcting aircraft attitude as required, and reapplying power.

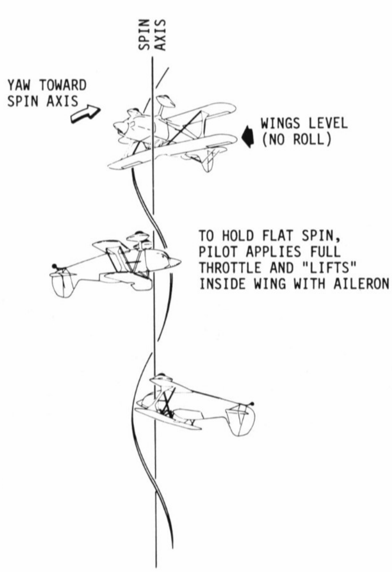
The condition that produces the illusion of yaw reversal to a pilot who looks up through the canopy is caused by observation of relative ground movement behind the spin axis, as shown in Figure 5-5.

The tendency for a pilot to look up (canopy side) to maintain ground reference during many inverted maneuvers can produce a dangerous psychological trap that must be avoided during any spin. The relative movement of the ground behind the spin axis will be easily misinterpreted as yaw reference ahead of the spin axis, and the pilot will erroneously conclude that the spin yaw direction is the reverse of the true yaw direction. The resulting **misapplication of rudder input will then hold the aircraft in the original spin, and recovery will be impossible.**

Yaw cues must therefore always be taken ahead of the spin axis; this can be assured during all spin types only if ground reference for yaw determination is always made between the wings.

NEVER LOOK ABOVE THE UPPER WING (CANOPY SIDE) FOR GROUND REFERENCE DURING SPINS.

FIGURE 5-6 Flat Inverted Spin (Part 1 of 2)



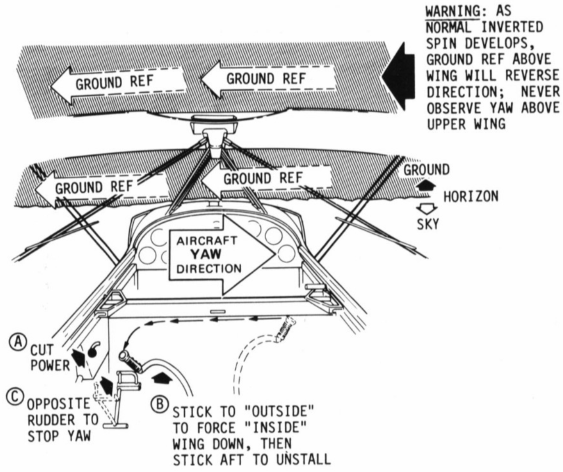
EXTERIOR VIEW: FLAT INVERTED SPIN TO PILOT'S RIGHT

5-10 Flat Inverted Spins (Figure 5-6)

In a flat inverted spin (a) the aircraft rotates with the wings approximately level (that is, zero roll), usually with the aircraft nearly horizontal in pitch or slightly nose up and (b) the aircraft is inverted. This type of spin is entered from a normal right-rudder inverted spin by applying full power while holding right stick (that is, stick toward the spin axis). Gyroscopic precession lifts the nose only during right yaw; in an inverted spin to the left, gyroscopic forces are in the wrong direction to lift the nose.

The spin axis intersects the ground well above the aircraft (that is, canopy-side). The point of intersection is normally beyond the pilot's visual scan during the flattened portion of the spin. However, the point of intersection moves to its normal position behind or near the upper wing during the recovery procedure, as the spin transitions to a normal inverted spin. This may create the illusion that the spin has reversed direction if ground reference cues are taken above the upper wing. Visual cues between the engine and the upper wing always permit accurate determination of yaw direction.

FIGURE 5-6 Flat Inverted Spin (Part 2 of 2)



PILOT'S VIEW: RECOVERY FROM FLAT INVERTED SPIN TO PILOT'S RIGHT

WARNING

Always observe ground reference cues between the engine and the upper wing to provide unambiguous determination of yaw direction.

If the spin is known to be a flat inverted spin to the right, the standard recovery procedure, which basically places the aircraft into a normal inverted spin, is as follows:

1. Pull the throttle full aft to cut engine power.
2. Move the stick full left (that is, toward the outside of the spin, away from the spin axis and opposite to yaw direction), to force the inside wing down.
3. Hold the controls until a normal inverted spin has developed (½ to 3 turns, typically less than 1 turn), and then recover from a normal inverted spin using moderate back stick and moderate left rudder (paragraph 5-9). These control inputs are typically introduced at the same time as aileron deflection, producing a smooth single-motion recovery.

WARNING

Recovery from flat spins must be initiated no lower than 2500 feet agl to allow for altitude loss during the pull-out phase of recovery.

Because high negative-g forces (as great as 2 to 2½ g) will be experienced during inverted flat spins, and because these forces may be experienced over a substantial period of time, final recovery should be inverted so as to avoid abrupt g-load reversal and the possibility of blackout near the ground.