5 Steps to Fly the Knife-Edge Spin

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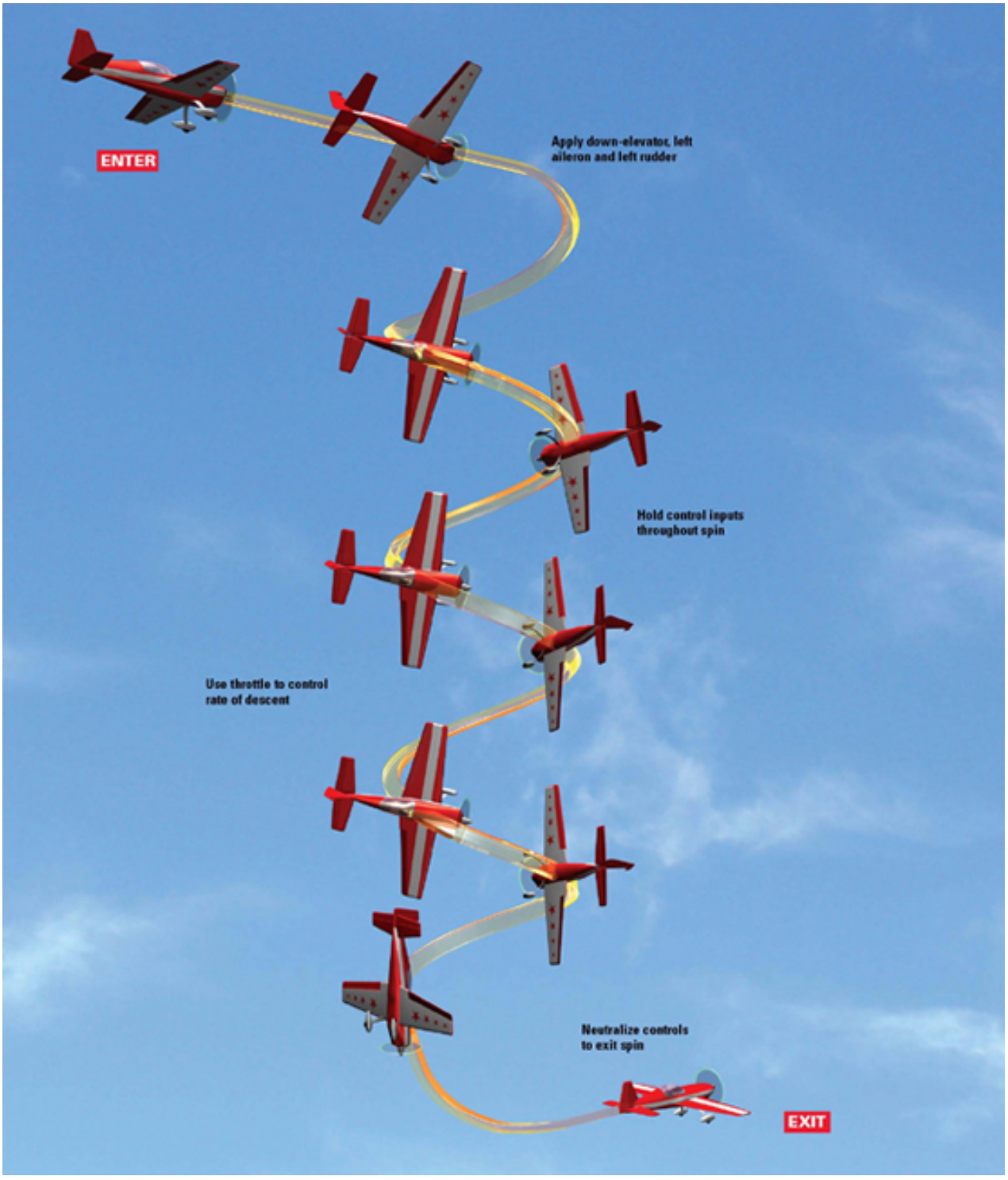
In my opinion, the knife-edge spin is one of the most impressive extreme aerobatic maneuvers. It's very demanding for the pilot and the airframe. First, I'll describe the maneuver.

In traditional knife-edge, the aircraft is rolled approximately 90 degrees from upright level flight. Then altitude is sustained by using "top" rudder. When the maneuver is complete, the pilot will roll the model 90 degrees to return to upright level flight. Compared with a traditional knife-edge, in a knife-edge spin, the model's attitude remains parallel with the horizon. To do the knife-edge spin, you have to gain a lot of altitude. Then, when you are ready to begin, bring your throttle back to about 50-percent power and apply full down-elevator and right or left aileron and rudder. When the model begins to tumble, it will change its attitude and begin a tumbling descent. This is the knife-edge spin. When you are ready to exit the maneuver, simply neutralize all stick inputs, and the model will quickly come out of the spin. Then pull up-elevator ever so gently to an upright and level flight exit.

During a knife-edge spin, your model will quickly lose a lot of altitude. This is because during this maneuver, lift comes from your fuselage side area, which doesn't even compare with the lift produced by your wing area. Make sure you gain a lot of altitude before you begin this maneuver.

FIRST THINGS FIRST



When you start to do a maneuver that stresses the airframe, e.g., the knife-edge spin, you must make sure that you have a rigid airframe with the best possible linkage setup. Also make sure that your model has more than enough servo power.

Now let's talk about you, the pilot. Most pilots roll more comfortably in one direction than the other. If you prefer to roll right, it's better for you to spin to the right during a knife-edge spin and vice versa. Once you're familiar with the maneuver, you'll be able to spin in either direction.

Begin at a high altitude and with your model parallel to the runway. In the language of aerobatics, we say our position relative to the runway is our ìcenter.î When the model approaches the ìcenterî of the aerobatic box, you will begin the maneuver.

In this example, we fly the maneuver from left to right. When you have gained enough altitude (spin-entry height) and the model is in the center of the aerobatic box, start the maneuver. Fly into the wind, pull the throttle back to about 50-percent power and apply down-elevator and left aileron and rudder. The model will tumble but will soon enter a knife-edge spin, or a ìtumblingî spin.

You need to hold the same inputs throughout the maneuver, but some models may react differently. If you have too much down-elevator deflection, your model may enter an upright flat spin. If you find that this is the case, you must decrease the endpoint values of your control surfaces. Start by decreasing elevator deflection, and if the model still does not want to do a knife-edge spin, slightly decrease aileron deflection, too.

To control your model's rate of descent during this maneuver, increase the throttle. On 3D-capable models, you can add power to increase their angle of attack. At a lower throttle setting, the model will sit at a lower angle relative to the horizon; increasing the throttle will lift the fuselage because of rudder authority.

To complete the maneuver, simply neutralize your sticks. As soon as you do this, your model will come out of the knife-edge spin. Timing is everything, and you need to time it so that your model exits the maneuver in an attitude that's perpendicular to the runway.

When the model is perpendicular to the runway, pull back on the elevator for a gentle 90-degree turn to exit in upright level flight and parallel to the runway.

You've finished the maneuver! Sit back, relax and enjoy the rest of your flight!

Give yourself time to learn this maneuver. If you have difficulties, do not blame yourself; instead, check your airframe and tweak your endpoint adjustments as described in Step 2 so that your model will fly the knife-edge spin. Next time, I'll continue my discussion of various aerobatic maneuvers, but until then, practice, practice, practice and have fun!

BY JOHN GLEZELLIS