Tips on Flying A Sailplane on Instruments

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THERMAL EDITOR'S NOTE: *A year or so ago Stan Hall permitted us the pleasure of publishing a few excerpts in the Thermal from a book he was preparing concerning instrument flight in sailplanes. Other pressing duties have forced him to temporarily suspend work on the book. We have asked Stan to prepare a brief, concise article on the technique of flying on instruments especially for the Thermal. Here it is:*

ALMOST any sailplane can be flown safely on instruments. Some are easy, some are hard. The relative ease of controlling flight depends greatly upon the hands-off stability of the glider. A glider that is nose heavy, for example, will drop its nose once the pilot loses visual contact with the natural horizon. This is because the pilot only becomes acutely conscious of control *pressures* when he has lost contact with outside the cockpit. He will, unless possessed of a great deal of experience on instruments, unconsciously relax any control pressure he may have held prior to going on instruments and the glider will automatically assume its hands-off characteristics. A glider requiring noticeable control pressures to maintain steady cruising flight is very tiring to fly on instruments and in some cases can be downright dangerous.

Pilots intending to fly their ships on instruments should adjust their gliders beforehand to fly perfectly straight, at exactly the desired airspeed, with all controls free. If manually operated trim tabs are used, trim position for instrument flight should be clearly marked for ready reference.

The Turn and Bank indicators on most sailplanes are improperly adjusted and pilots as a rule do not associate in their minds a certain needle deflection with a certain rate of turn. A sailplane cannot be safely controlled if this association does not exist.

From observation it appears that the average sailplane requires just a shade over 30 seconds to complete a 360 degree turn. The turn needle should be adjusted to move either one or two needle widths from the center indice at this rate of turn. As a matter of fact it may be better to adjust for 36 seconds in order to yield a turn of 10 degrees per second. This will be helpful when trying to hold a compass course in rough air when the very nature of turbulence makes the compass practically unreadable. Two adjustment screws are provided on vacuum operated instruments, just aft of the face of the instrument, for adjusting needle sensitivity and dampening. Only small adjustments to sensitivity are possible here. Large adjustments must be made at the source of instrument vacuum.

As for actual instrument flying technique it will be found that confidence and clear, cool thinking are prerequisites. Long practice under contact conditions and experience "under the hood", wherever possible, will go a long way toward making these qualities available when needed.

Before going into a cloud survey the possibilities of someone else being in there. If you're not one hundred percent sure don't go in. Look the countryside over and decide ahead of time the compass heading you will take up to get out. Don't fail in this. Make allowance for wind drift if the clouds are moving toward mountains. Don't go into a cloud unless you're positive that by the time it reaches the mountains you will be safely above them. Keep in mind that if you get into trouble you may not be able to spin out into clear air because there may not be any between the cloud and the mountain.

Flying straight and level is done with the Turn and Bank indicator and airspeed, aided by the compass whenever it settles down. Control the turn needle with the rudder only and the ball with the aileron only. Control airspeed with elevator only. All control use should be based on *pressure* alone as control movement has no significance in instrument flight. This is especially true in the case of the elevators, where very small control movements, recognizable only through pressure on the stick, have big effects on airspeed.

A glider is light and will bob around considerably even in air that is only mildly rough. The turn needle will swing back and forth like an automobile windshield wiper, only faster. Don't bother to correct short period oscillations of the turn needle or you'll tire yourself out for nothing. Deflections lasting two or three seconds or longer should be corrected by ruddering the needle to the opposite side by the same amount and for the same period of time.

In spiralling, watch the airspeed closer than when flying straight as it will be more sensitive to stick pressures. Keep the ball exactly in the center. If it rolls to the low side the airspeed will pick up quickly. If it rolls to the high side you can expect a rapid decrease in airspeed. Control airspeed in steep spirals mostly with the ailerons. That is, if the airspeed starts dropping off apply a little forward pressure first, then follow by taking off a little bank. This will decrease the angle of attack and cause the airspeed to pick up again. If the speed picks up too rapidly in a turn take off a little bank first, then, if necessary, apply a small amount of back pressure. If you apply back pressure first you'll only succeed in tightening the turn and cause the speed to drop off too quickly. Here is the perfect set-up for a spin. It may not be necessary to apply back pressure at all since widening the turn will, at constant airspeed, cause the nose to raise. Watch the *trend* of the airspeed needle and apply control pressure accordingly.

Don't "chase the airspeed", that is, don't succumb to the tendency of holding stick pressure until the speed you want has been attained. This will cause the airspeed needle to overshoot the desired value and you will find yourself overcontrolling constantly to no avail. The right way to use stick pressure is to apply pressure slowly until the needle *starts to move,* then hold steady.

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