

**Solo Flight: Scanning the Instruments****Fly This Lesson Now****Step 3 of the Three-Step Instrument Scan**  
**Trim using the VSI, and Monitor-Scan the Big-6 Instruments**

By now, you know that instrument pilots are not folks who sit in airplanes and play piccolos or guitars. The closest they come to making music occurs as they follow a step-by-step instrument-scan procedure when making a major attitude change. So far, we've covered two of the three steps. Let's complete our instrument-scan procedure by studying the last step in the three-step scan.

In Step 1, you made a major attitude change followed by Step 2, in which you fine-tuned the airplane's pitch, bank, and power. In Step 3, you'll offer a final twist of the trim so the airplane stays put, then you'll relax a bit and monitor-scan the six main flight instruments on your panel (also known as the Big-6 instruments). Monitor-scanning is a more relaxed way of observing the flight instruments compared to the radial-scan of Step 2. Let's take a closer look at Step 3 of the scan.

**Step 3 of the Scan**

Your main objective in Step 3 is to make a final trim adjustment by referencing the vertical speed indicator (VSI). The VSI is sensitive to small pitch changes and will quickly indicate any deviation away from the desired attitude. Additionally, the length of the VSI's needle makes it easier to detect vertical movement.

The secret of the final trim is to look for a constant VSI indication. When leveling off, trim so that the VSI needle indicates a zero rate of climb. Don't whip the trim wheel (or button) around like you're spinning a merry-go-round and trying to make your little brother sick. Give the trim wheel a slight twist, and then ease up on any control pressures you might be applying. Watch the VSI's needle. If it moves up or down, apply nose-down or nose-up trim, respectively, to stop the needle's movement.

There's never any reason to completely let go of the controls to see which way an out-of-trim airplane moves. This causes pilots more heartaches than it's worth. And whatever you do, don't let go of the controls while saying, "Accept this sacrifice, oh great Lord of Darkness." Yikes! By letting go of the controls instead of easing off a little on control pressures, an untrimmed airplane could rapidly deviate from the planned flight attitude, depending on just how out of trim it was. Now, you must return the airplane to its previous flight condition before you retrim. It's much easier to relax the control pressure, observe the beginning of any VSI needle movement, and make a corresponding change in the trim. Small adjustments in trim can now be made without having to recapture a runaway airplane.

Trimming for a climb or descent is done in a similar manner to trimming for level flight. Relax control pressure, and watch for a constant VSI needle indication. Suppose the needle indicates a specific climb rate. If you relax control pressure and the needle moves, then the airplane needs trimming. Apply nose-up or nose-down trim as appropriate to stabilize the airplane at the previous climb rate (or descent rate). It may take two or three adjustments of trim to find a setting that works, but that's okay. You've got the time. It's not as if you're going anywhere, are you?

Also, keep in mind that it's difficult to trim an airplane perfectly. Even if you're a high priest (or priestess) of trim, an airplane can still wander up or down a few hundred feet. There's not much you can do about this outside of making small, manual pitch corrections. Airplanes are not all created equal. A little dent here, a little extra weight there—all of these have a subtle effect on aerodynamic performance, which prevents an airplane from being perfectly trimmed.

**Monitor Scanning**

After the final trim adjustments are made, the six main panel instruments (Figure 1) are monitor-scanned. This is often done in a clockwise fashion, going from the top row to the bottom row of instruments. Actually, you can select any particular pattern of eye movement that is comfortable to you. The objective is to monitor deviations from the established attitude. If you notice a deviation, make a small adjustment on the attitude indicator to maintain the desired flight conditions.

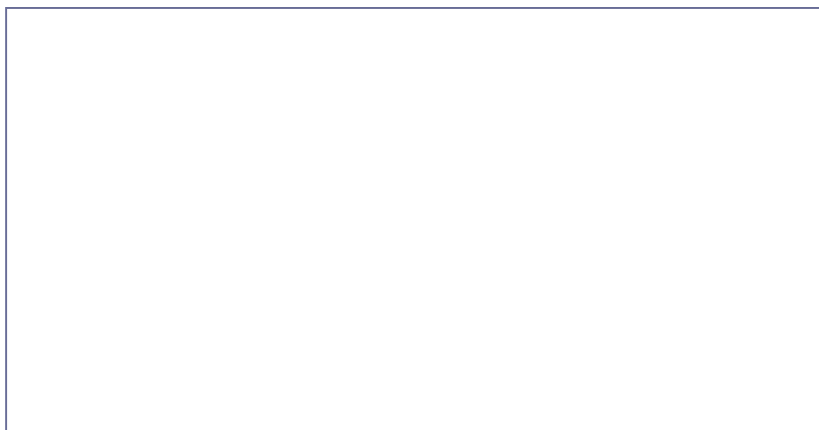




Figure 1

Monitor scanning is the condition in which you'll spend most of your time while on instruments. Step 3, therefore, is performed continuously until a new flight attitude is desired (thus requiring a major change in attitude). All three steps of the scan procedure are repeated again when making this major attitude change.

The first two steps of the three-step scan typically take 5 to 15 seconds to complete. There will be instances in which you might have completed Step 2 of the scan and might not be able to move on to Step 3. For example, in turbulence or when you're on an instrument approach, you may find yourself obliged to rapidly radial-scan the primary instruments to maintain precise control of the airplane. Remember, radial scanning is a lot of work: physically, intellectually and emotionally. It is possible to radial-scan all the instruments on the panel, but this is usually unnecessary and can become tiresome. Radial-scan only those (primary) instruments necessary to control the airplane.

## A Tip from the Professionals

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Over the years, some professionals have reported a rather unusual method of detecting instrument deviation once the airplane's attitude has been established and the aircraft trimmed. These pilots focus their vision in the center of the panel just underneath the attitude indicator. Relying upon only their peripheral vision, they watch for any instrument movement. In much the same way a speed reader is taught to take in three or four words at a glance, instrument pilots can absorb information from clusters of instruments at a single glance. Developing peripheral vision takes practice, but it does seem to represent the higher art of instrument flying. Until then, when Step 3 of the scan is completed, keep your eyes moving around the panel while looking for attitude deviations.

## Subtle Secrets

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The VSI, once mastered, provides additional useful information for the precise control of an aircraft. Most pilots also find the VSI useful for helping maintain level flight within the 10- to 20-foot range. Sometimes, it's easier to use the VSI to identify trends away from level flight because of the large swing arc and greater sensitivity of its needle. Taking time to learn to fly the VSI with precision pays off handsomely.

There are many boring things to do in life, but instrument flying isn't one of them. The art of flying instruments is a challenging test of your mettle. Instrument flying offers you the opportunity to master the airplane and yourself. Perhaps this is why most instrument pilots are so happy. They realize the scope of their accomplishment. I should warn you, however, that looking really happy at the airport is often inconvenient. Someone might become suspicious and require you to take a drug test. Be cautious!

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