pressure. To compensate for problems caused by side-slipping the airplane, it is common for a manufacturer to put two or more static ports on opposite sides of the airplane and cross-couple them to create an "average" static pressure.

The most common source of pitot-static system problems is related to the static source rather than the pitot tube. There are two theories of where to mount a static system port. One is to colocate it on the pitot head, and the other is to mount it on the fuselage. In the fuselage-mounted static source, accuracy decreases as airframe longevity increases because any dings, dents, or abnormalities around the static port changes the boundary layer flow, which in turn affects airspeed and altitude calculation. It is most common for fuselage-mounted static ports to produce errors that vary with the configuration of gear, flaps, angle of attack, airspeed, and even the type of aircraft.

Pitot-mounted static sources are located on a finely machined surface on the pitot probe itself, and the airframe condition hardly affects it. This type of system remains accurate significantly longer than fuselage-mounted static systems. For the light general-aviation aircraft however, the cost of a finely machined pitot-static head may outweigh the benefits. Consequently, most general-aviation aircraft have flush-mounted fuselage static system ports.

**Alternate Static Source**

An alternate static source is a must for IFR operations. Many pilots haven't the faintest idea where the alternate source is located or if there is even one in the aircraft. Use of an alternate static source should be a mandatory checkout for all instrument pilots, and it should be tested in flight at least monthly.

Pressurized aircraft have alternate static ports located on the fuselage similar to the primary ports. In an unpressurized aircraft, however, the alternate static source is typically located inside the cabin, under the instrument panel, near the pilot's knee. While being located inside the cabin eliminates any possibility of it icing up, there are some problems. The ambient pressure inside the cabin will be less than that outside the aircraft, so there will be some instrument errors. The operating handbook should detail the difference; if not, the pilot should become familiar with the errors in a controlled training situation.

If your aircraft has no alternate static system and the primary system fails, the attitude indicator becomes a primary instrument and should be used with a power setting known to give appropriate airspeed for the desired phase of flight. All IFR pilots should develop a pitch-power-airspeed chart for each aircraft they fly.

It also is possible to break the glass of the VVI to let static air into the system. While you could break the glass of the airspeed indicator or altimeter and get the same results, they are both more important instruments, and permanent damage may occur when you break the glass. If you are fortunate enough to have copilot instruments, break one of them if they are on the same system. If they are on a different system, you might consider sliding over to the right seat and finishing your flight from there. Incidentally, all pilots should be able to land an airplane from either seat. While it isn't difficult to do, it can be tricky the first few landings, so you're best learning to do it when you aren't under pressure from some other problem. One note of caution about breaking a pitot-static instrument during static system failure. If you are in a pressurized aircraft, you will have to depressurize the cabin or the instruments will read incorrectly because of the high cabin pressure.