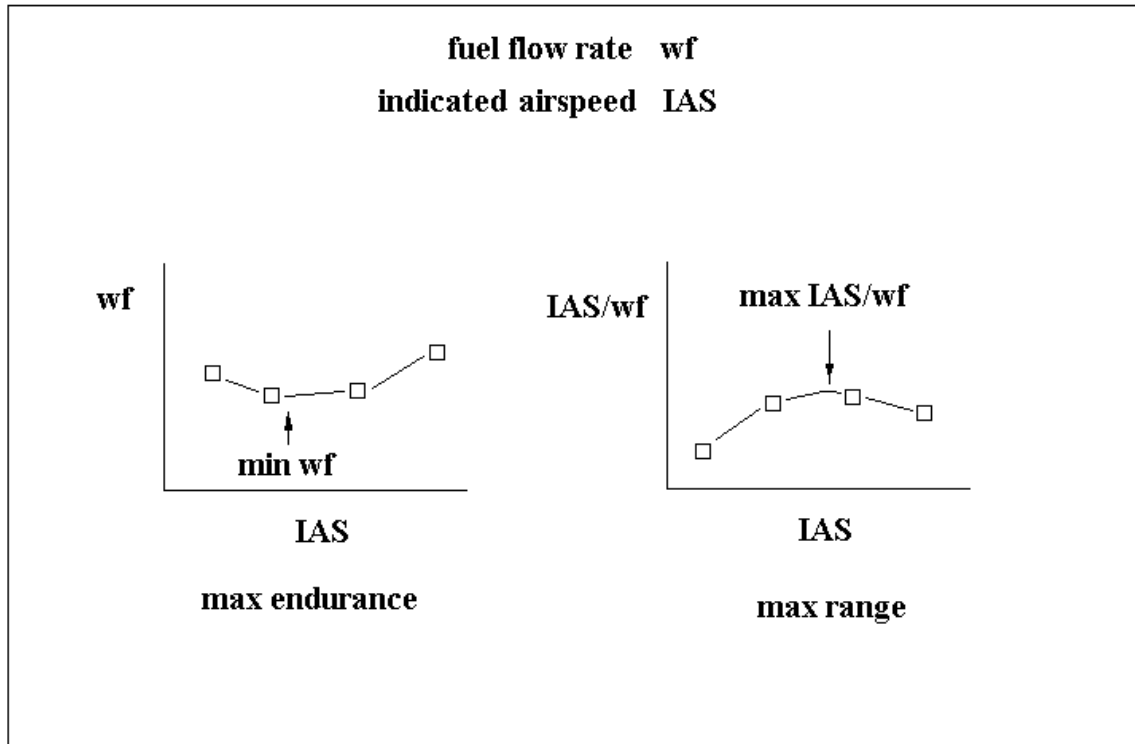


HOW LONG CAN I STAY UP?



A very simple procedure can determine flight speed for best endurance (time aloft) and for best range (not the same flight speed as best endurance). A real flight test enterprise would reduce everything to standard conditions and normalize it, but most light plane pilots need not go to such trouble. You can do this if you have a fuel flow rate meter, which most experimental aircraft have. This will even work in turbine aircraft.

Typically, you have a fairly narrow range of altitudes at which you like to fly cross country. Pick a value in the middle of that range and stick with it. Run all these tests on the same day, three times. Do it first while you are heavy with fuel, a second time about halfway through your flight, and a third time at flight's end, when fuel weight is depleted.

At each of these three gross weight conditions, set and trim-out a constant airspeed with your power at your desired altitude, and read and record the airspeed and fuel flow rate. Do this again at about 3 to 5 more speeds and power settings. Be sure and mark down your altitude and a rough estimate of the gross weight based on your fuel quantity indicator.

When you get back, make two plots at each gross weight. Plot fuel flow rate vs airspeed, fair a curve through your points, and look for the airspeed at which fuel flow is a minimum. This is the speed for max endurance. Also plot airspeed divided by fuel flow rate, vs airspeed, and fair a curve through those points. Look for the maximum, which is the speed for max range.

You will have these results at each of your three gross weights. If they are significantly different as gross weight changes, then at least you know the trend.