After buying my airplane several years ago I did a series of maneuvers at different power settings and, by using GPS groundspeeds, I made a fairly accurate calibrated airspeed chart. For the next few years I used the CAS chart often and found that, at normal power settings, I consistently cruised at 143KTAS.

Fast forward to this year (2013) when I installed a complete DYNON Skyview EFIS system which automatically calculates TAS. But, at normal cruise power settings, the Skyview consistently showed me cruising at 156KTAS. The Skyview also showed that no matter which direction I was flying, I always had a headwind. Knowing that the Skyview did not change the aerodynamics of the airplane and the system had just passed an IFR check, something was not right.

On subsequent flights I calculated my TAS using my old CAS chart and came back to 143KTAS not the 156KTAS the Skyview was displaying. The plots on my CAS chart shows that as my airspeed increases, IAS and CAS spread apart with IAS being almost 20KT faster at full power. Since the Skyview does not have a method of factoring in a CAS, it uses IAS for the calculations. With the significantly higher IAS used by the Skyview it would display a higher TAS than actual, matching what I was seeing.

Talking with the engineers at DYNON, they told me that in a “well designed” system the difference between IAS and CAS should not be more than a few knots. If my IAS and CAS was that far apart there is a problem with either the pitot or static source position. Having IAS significantly higher than CAS meant that either the pitot tube is in an area of “higher” pressure or the static source is in an area of “lower” pressure. If the pitot is in an area of “higher” pressure the error would only be in airspeed. But if the static source is in an area of “lower” pressure, altitude indications will show me flying at a higher altitude than I really am. This is a potentially deadly situation when flying real IMC, which I do.

To isolate if the error was in the pitot or static, I flew to different airports with ILS approaches over the next few months. I found that when at the FAF on the glideslope of each airport, the Skyview displayed a consistent 100-110’ higher than what the approach plate showed. In order to confirm what I found, I did several high speed passes, over different airports, trying to stay about 10’ above the runway. At each airport the Skyview displayed a consistent 100-110’ higher than what the runway really was. This matched what I found with the FAF experiment. Since my CAS chart showed the IAS and CAS getting further apart the faster I flew, the data obtained from the test flights was consistent with the static source being in an area where pressure drops as airspeed increases. So I needed to correct the static source placement.

The dual static sources I have were installed by Rich Trickel back in 2008 and I really didn’t want to change where they were located. So in order to correct for a possible changing static pressure situation I experimented by placing a piece of Gorilla tape just behind each static port hole and doing the flight checks again. With one piece of tape, the FAF and high speed runway checks altitude error dropped to about 40’. My displayed TAS error, based on my CAS chart, had also dropped to about 10kts.

I figured I was on the right track so I added a second piece of tape effectively doubling the thickness behind the static port hole. The next series of flights showed my FAF and high speed runway checks had dropped to within a few feet. My TAS error had also dropped to within 2Kts at normal cruise. A third piece of tape caused the FAF and high speed runway checks to show the altitude difference was about 40’ but in the opposite direction. Now the TAS error was back to about 10Kts, also in the opposite direction than before. Armed with this information, I went back to using two pieces of Gorilla tape just behind the static source hole.

During the next flights the FAF and high speed runway checks showed the altitude error was within 10 feet of what I was expecting. Additionally I did a series of maneuvers at different power settings and, by using GPS groundspeeds, calculated that my TAS was within a few knots of what the Skyview was displaying. During my final test flight (October 21, 2013) I found that normal approach speed (90Kts) and normal cruise (143Kts) speeds were within 2Kts of calculated. I also found that as I approached to land, the wind aloft display matched very closely to what the tower was reporting. Now I know what I have to do to correct my static source position error. I can complete the work by making a piece of aluminum the thickness of two pieces of Gorilla tape and permanently attach it just behind to the static source hole.

So if your EFIS shows an airspeed higher than what the “book” shows your airplane should be doing, check it out. You may have a pitot/static source error that can be corrected. Overall I think I corrected a possibly serious situation and now completely trust my Skyview is displaying correct information.