

EVOLUTION owner's newsletter

Editor, Doug Meyer

October 2013

Layout and Graphics, Ron Hart

AVICAR

Information for the Evolution Owner and Builder

Redmond OR; October 28, 2013

Correcting Fuel Gauge Mismatch

As you know, the fuel level indications on your MFD come from two different sources. The conventional pictorial gauges are driven by capacitance sensors in the tank and are calibrated prior to the Airworthiness inspection process. Once set, these do not change. The other indication of fuel state is the digital data on the ENGINE – FUEL selection on MFD. These numbers are based on the fuel flow signal sent to the G900 from the flowmeter on the engine. The flowmeter has a small turbine wheel in it that spins as the fuel passes through it and an electronic sensor that counts the rpm. The RPM of this flow sensor is then converted to a gallons per unit of time number through a mathematical algorithm called the “K Factor”.

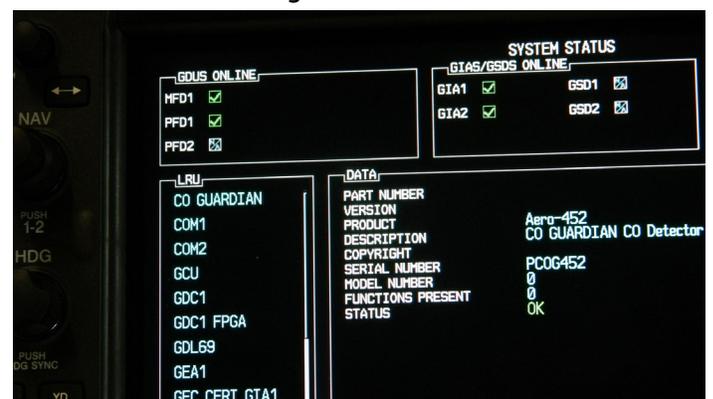
You may have noticed that the gallons used when refilling the tanks do not match the gallons used (and remaining) in the digital data on the MFD. Generally this mismatch overstates the amount used (and therefore understates the amount remaining). That’s not dangerous, but we all would feel better if we knew it was correct. Having this number correct affects the instantaneous Fuel Flow, the Reserve and Maximum Range Rings on the maps and all the digital fuel related information on the MFD.

This mismatch is correctable by changing the “K Factor” in the MFD setup, but first you need to know what your

mismatch is. Start collecting data on your fuel fills and compare the actual amount put into the tanks with the “amount used” shown in your MFD. Longer flights are better, and give a more accurate indication of the error, but use a mix of flights to establish the percentage of error, i.e., your MFD shows you used X gallons but it took X+Y to re-fill. Using this method determine your percentage of error either + or -. If you are overstating the use of fuel you must reduce the K Factor. If you are understating the use of fuel you must increase the K Factor. Once you know this number, adjust the MFD by following this procedure:

1. Before powering up aircraft, pull MFD and PFD breakers.
2. Power up aircraft.
3. Press and hold MFD ENTER key and while holding, reset MFD breaker, continuing to hold (about 10 sec.) until screen shows Initializing System.

Figure 1:

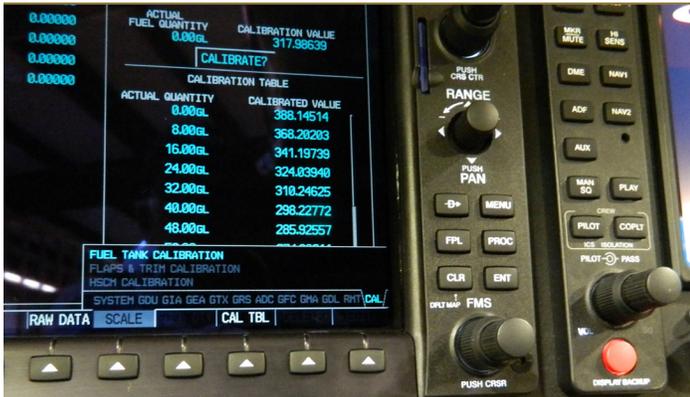


4. Repeat process with PFD (Both screens should now be open in the System Status mode as shown in fig.1., but you will not be doing anything on the MFD).

Correcting Fuel Guage Mismatch, cont'd

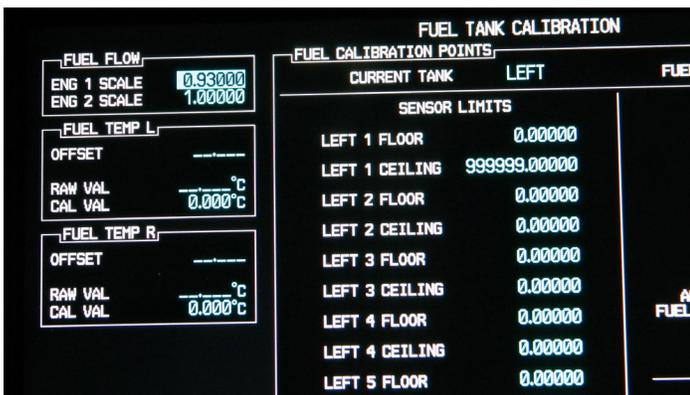
5. On the PFD, rotate the right hand "Large FMS Knob" to select the "CAL" page at the far lower right hand corner of the screen as in fig. 2. (This selection will disappear after a few seconds but the page will remain in the correct mode).

Figure 2:



6. Starting with the far right hand soft key, press once each of the four soft keys moving right to left. (There are twelve keys with "#1" on the left, so this would be keys 12,11,10,9). This unlocks the calibration function and the screen should look like fig. 3.

Figure 3:



7. Look at the upper left hand corner and you will see the fuel "FUEL FLOW" as shown in fig. 3.

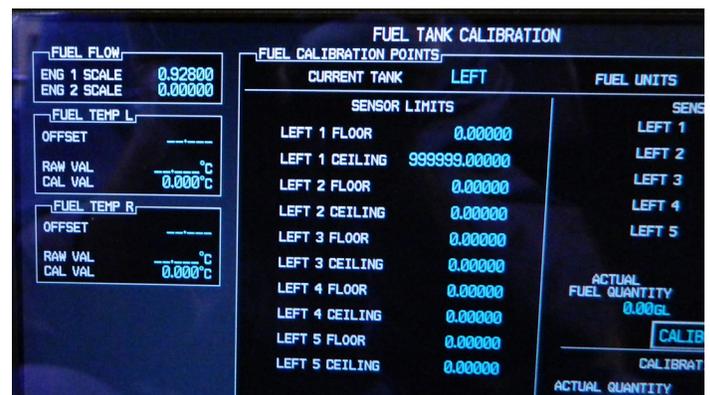
8. Do not be bothered by ENG 1 and ENG 2, we only have "1 ENG"... But the 1.0000 shown in ENG2 provides a clear example of no correction. The .93000 shown in ENG 1 is the default correction number set during the setup of your system and reflects a 7% reduction in the standard no-correction signal to the counter. If this was re-set to .90000, it would show reflect a 4% decrease in the fuel flow from the .93000 in the correction line. This would change the fuel consumed to reflect a value 4% less than the default setting and your digital readout should show 4% more fuel "Remaining" on the MFD. You change that number in the "config" screen in the normal Garmin fashion, i.e., push the Small FMS Knob to turn on the cursor, then rotate the large knob to highlight the ENG 1 field with the cursor, then select the digit with the Big Knob. Rotate the Small Knob to change the value. When re-set, de-select the cursor by a push of the Small Knob. Fig.3a illustrates the actual change in N424SM which required a value of .92800 or a 1% change.

9. Shut off the PFD and MFD's by pulling the breakers.

10. Re-start the PFD and MFD normally by pushing in the breakers.

11. Run further flight tests to validate.

Figure 3a



MMEL

There has been a lot of conversation over the last few months about the Master Minimum Equipment List (MMEL) and you've probably noticed that latest update to the Evolution POH (July 2014) contains a recommended MMEL for the Evo. The purpose of an MMEL is to list equipment that is required to be present and operational during various phases of flight (Day, Night, IFR, VFR). The presence of this list is required by the FAR's in a part 23 certified turboprop aircraft and it becomes part of the aircraft's required documentation by way of an STC (Supplemental Type Certificate) added to the Type Certification of the airplane. The area of controversy on this topic centered around the apparent disconnect in the FAR's between the statement that "All Turbine and Turboprop powered aircraft are required to carry an MMEL" (FAR part 91.213), and the resultant opposing supposition that Experimental Category aircraft are exempt from this requirement because they are not "Certified" aircraft. The EAA, LOBO, Lancair, and some other interested parties asked the FAA for clarification on this issue, i.e. is the MMEL required or not required in an Experimental Category Turboprop? The first reaction was that yes, it was, because the "Turboprop" trumped the "Certified". However, upon further examination and discussion this has been set aside by the fact that the MMEL is an STC to a particular Certified aircraft. Since the Evolution is not Certified, there is no STC process by which to attach the MMEL to the Experimental Category Evolution. Therefore, according to the FAA and as of this writing, a MMEL is NOT required to be on board your airplane. What is important, though, is that a personal MMEL is a good thing to have and we recommend that you read it and use it as a guideline for the safe dispatch and completion of your flights. We will continue to keep our recommended MMEL current, updated, and part of the POH.

RECOMMENDED MINIMUM EQUIPMENT LIST

Recommended Aircraft Equipment Requirements
By Types of Flight Operations

Flight Operation Definitions:

All – Required for all flight operations
Night – Required for night flight operations
Optional – Not required for flight operations

Bullets in the Flight Operations Requirements columns indicate the requirement for that item.

Instrumentation Item	All	Night	IFR	Optional
Garmin GDU 1045 PFD	•			
Garmin GDU 1045 MFD	•			
Garmin GCU 476 Keypad				•
Garmin GRS 77 AHRS	•			
Garmin GDC 74A air data computer	•			
Garmin GMU 44 Magnetometer				
GMA1347 Audio panel				
Standby Attitude Indication			•	
Standby Altitude Indication			•	
Standby Airspeed Indicator			•	
Outside Temperature Indication	•			
Magnetic Compass	•			
Clock			•	
Trim Position Indicator	•			
Landing Gear Position Warning	•			
Hydraulic Pump Operation	•			
Stall Warning	•			
Engine Torque	•			
Engine ITT	•			
Gas Gen RPM (Ng)	•			
Prop RPM (Np)	•			
Engine Oil Pressure	•			
Engine Oil Temp	•			

May 2013 (Rev. 6)

VIII-7

Lockheed Martin Flight Service

I have become a real fan of the Lockheed Martin Flight Service automated briefing and flight plan filing system. Filing online is a breeze and the automated briefing is incredibly complete and easy to use. It is very simple to create a profile which relieves you of entering standard information and if you do need to call the FSS, they immediately know who you are and what you are flying. In my opinion their system has evolved into a superior platform, far better than flightplan.com, certainly better than- DUAT and dovetails well with Fore Flight (Rumor is that they may be "connected" soon). As with any program, it takes



Lockheed Flight Service, cont'd

some time to really get to see how powerful it is. One of the coolest new features is that, as you file and you click the tab on the flight plan form for “area brief” for your departure area or destination area, or a “route brief”, the TAFs and METARs are automatically time shifted for your actual arrival at that station based on your filed departure and speed. When selecting “route brief” you get METARs and TAFs graphically presented in a corridor along your route at the time you are expected to pass that fix and also showing how the conditions are trending over the duration of your flight. No more mental gymnastics with the time.

You get a text message when your plan is filed and what is really cool is that if there are changes in adverse conditions or TFR's since your initial (online or phone) brief, you get a text message advising you of the type of change and a link to call the FSS for more info. When I was departing for the AOPA at FTW last week, I got a text message advising me of a change in the area for an AIRMET for icing as I was walking out to the plane. A quick call and I had the latest info. Very nice. With this feature I have no worries about filing the night before or as early as I wish before departure without fear of forgetting or missing

a pop-up TFR or Adverse condition. You can set filters to remove B.S. NOTAMSs (for airports you intend to overfly, unlighted 200 foot towers, etc.). All the weather area and route summaries are translated into plain English with extensive details, and if you want to see it, shown in raw data. I attended their seminar at AOPA and they have some really cool improvements in the pipeline. They have a very complete online user guide as well. Check it out. It's actually fun to use. Find the home page here: <https://lmfswb.afss.com/Website/home> . You'll need to fill out a profile, but it is just basic information on you and your plane.

Weather Briefing - Mozilla Firefox
 Lockheed Martin Corporation (US) | <https://lmfswb.afss.com/Website/weather/text?seed=1382552358013#>
 Route brief for IFR N698W EVOT/G KOSH 231830 250 KLUK 0145 50nm

Adverse Cond Synopsis Current Wx **Forecasts** NOTAMS Flow Control Misc All

Area Forecast: **Terminal Forecast** Winds Aloft

Automation Summarization - TAFs Standard View

Your projected flight time and filed speed have been used to identify the most relevant TAF forecast information for your flight. These times do not include adjusted wind speed.

Passing Time	Forecast
18:30z	VFR TAF KATW 231730Z 2318/2418 29011G17KT P6SM BKN040 BKN070 VFR FM240000 29007KT P6SM SCT035 BKN060 VFR FM241600 31010G16KT P6SM BKN035 =
18:40z	VFR TAF AMD KUES 231759Z 2318/2418 29011G15KT P6SM BKN050 VFR FM232000 31010G15KT P6SM VCSH BKN050 VFR FM240000 29008KT P6SM BKN040 VFR FM240300 29006KT P6SM SCT040 VFR FM241600 30011G17KT P6SM BKN040 =
18:45z	VFR TAF KMKE 231730Z 2318/2424 30010G16KT P6SM BKN050 VFR FM232000 31011G17KT P6SM VCSH BKN050 VFR FM240000 29010KT P6SM BKN040 VFR FM240300 29008KT P6SM SCT040 VFR FM241600 30012G18KT P6SM BKN040 =
18:50z	VFR TAF KENW 231730Z 2318/2418 30011G16KT P6SM BKN040 VFR FM232000 31011G17KT P6SM VCSH BKN050 VFR FM240000 29009KT P6SM BKN040 VFR FM240300 29006KT P6SM SCT040 VFR FM241600 30011G17KT P6SM BKN040 =
19:05z	VFR TAF KSBN 231720Z 2318/2418 31008KT P6SM SCT020 BKN040 MVFR TEMPO 2318/2321 BKN020 VFR FM240100 28010KT 6SM -SHRASN OVC035 =
19:20z	VFR TAF AMD KGUS 2317/2417 33012G18KT 9999 SCT030 BKN050 520509 QNH2983INS VFR BECMG 2400/2401 27009KT 9999 SCT050 BKN070 620709 QNH2993INS VFR BECMG 2407/2408 26006KT 9000 BR FEW025 SCT030 QNH3001INS VFR BECMG 2413/2414 28012G18KT 9999 NSW SKC QNH3004INS VFR T08/2321Z T01/2412Z AMD 231718 =

Summarized graphic created at 18:20Z

All TAFs TAF + METAR/SPECT Summarized TAFs

A little inside baseball

Recently a customer made mention of an issue that he had discussed with another staff member. When I admitted that I was not aware of this issue, he responded “don’t you guys ever talk?” While we clearly had not in his case, I’d like to share with you a look at our internal communication here at Lancair that we hope helps to facilitate just such communication.

Each and every day at 8am all the department heads plus a few others, up to 13 in all convene for “The Morning Meeting”. Monday, Wednesday, and Friday this is in COO Tom Bowen’s office, on Tuesdays it is in the Build Shop, and on Thursday’s it is in the Composite Shop. This is a “stand up” meeting, no lounging or droning allowed. The staff stands around a conference table or in a circle and in turn, going around the circle, each takes up to several minutes to speak about issues that concern them, issues or news that should be communicated to the group, customer concerns or complaints, what they intend to accomplish “today”, progress on specific projects, and kudos when appropriate. Other than the P.I.A. of having to be ON TIME every day, this is a tremendous way for us to do the best we can to “talk to each other” and get any issues in front of the appropriate person for resolution as quickly as possible.

Fleet hours

We requested this in the last newsletter and had limited response, so I will ask again. It would help us a lot in our continuing analysis of any issues that may arise if we could get a fix on total fleet hours. Please send a simple email of your serial or N number and total hours to date.

Personalized Evolution Art:



Your photo digitally enhanced in large poster sizes or printed on canvas for fine art framing. For information contact Llsa / Lancair Marketing Dept.

Send us your photos



If you have any particularly good photos of your Evolution (especially in flight) we would like to add them to our web Gallery. Please email them to dougml@lancair.com. Doing so implies that we may reprint them publicly.

Back Issues of these newsletters

If this is your first Evolution Newsletter or if you would just like to review the past issues, you can download them at: [Click here](#)

Comments and responses please email:
dougml@lancair.com