EVOLUTION owner's newsletter

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FANCAIR

Information for the Evolution Owner and Builder

Redmond OR; Feb 15, 2013

Weight Control

One of the hallmarks of the Evolution is its' lightweight design and composite construction. Keep in mind that an aircraft's weight affects all areas of performance, starting with acceleration on takeoff, all the way through landing distances. It affects G tolerances at various speeds, range, and efficiency. Not insignificantly, the utility of your Evolution can also be affected by an increase in weight and the resultant reduction in payload. Generally speaking, lighter is better. Hand in hand with weight is balance, and when adding equipment the resultant change in Center of Gravity also affects all the above mentioned parameters.

The final Empty Weight and Payload of your airplane depends on you. You must be aware of the weight and location of any changes that you make to the aircraft, and understand that nearly all options and changes will increase weight. The basic aircraft weight allows for a very nice interior, multiple paint colors and clear coat. There is a very complete avionics suite and all necessary systems. Additional avionics, range extending fuel tanks, even additional colors and clear coats can add significant weight. Most options are great to have, and can add value and utility, but please remember, "It all adds up". So when considering adding options, or making changes, you should always determine and consider the final effect on your Weight and Balance.

Winglets

As I travel the country introducing the Evolution to pilots I am sometimes asked about "Winglets", as in "If this is so advanced, why doesn't it have winglets?" You may be asked the same thing when you are doing the inevitable briefing on your airplane when parked somewhere new.

I could answer that in a couple ways, both a bit from the "smart mouth" angle. I could say, "Because it doesn't need them." Or, I could say, "Well it kind of does, only they aren't "bent upward."

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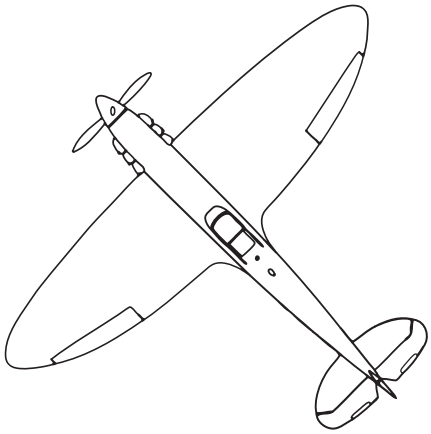
Winglets: cont'd

Both statements are true and here's why. When Richard Whitcomb perfected the winglet in the 70's, his goal was to harness the energy contained in the wingtip vortex and convert that energy into increased lift and reduced drag. This energy is contained in what is known as "circular flow" around the chord line of a wing. This flow, when depicted in a complex computational flow visualization analysis of the pressure above and below a wing shows lower pressure on top and higher below. When you have a "square" wing tip, this flow starts rather abruptly at the tip with the higher pressure from below curling up to the lower pressure area above, starting a circular flow in its' natural tendency to equalize the pressure. Viewed from behind this is clockwise on the left and counterclockwise on the right. Long narrow wings (high aspect ratio) exhibit less vortex flow because they are generally more lightly loaded and have a proportionally narrower chord. When a wing has an elliptical leading edge shape like that on the Evolution or, like a British Spitfire, has a truly elliptical shape on both the leading edge and trailing edge, the pressure difference above and below the wing is gradually brought into equilibrium without the usual abrupt rotational flow being created. When a winglet is fitted to a "square tipped" wing, it adds span (increasing aspect ratio) and also creates a tapered tip, not unlike the tip on the Evolution, to reduce the circular flow. This decreases drag by not wasting energy inducing the circular flow, and creating a slightly decreased wing loading by effectively adding "span". On a swept wing, the winglets also serve to straighten the span-wise flow (like a fence) which also reduces drag and increases efficiency.

So, "we don't need to" is really the answer to the question, the elliptical tip on your Evolution wing accomplishes the same things that the winglet does when installed on a less efficient wing.



Service letter clarification

We would like to clarify Lancair Service Letter SB06-008A dated Jan 30, 2013.

There are two separate issues addressed in this letter. One is the possibility that your aircraft may not have had the fuel tank vent system built to the spec spelled out in the Lancair build manual. The build manual specifies that rigid aluminum tubing be used in the venting system. At least one aircraft has been built with rubber "fuel hose" in the vent system rather than the aluminum tubing. This hose has, in at least one case, kinked, completely closing off the vent function. You must inspect and be certain that your aircraft is properly constructed in this regard, per the manual. If it is not, any continued flight could severely damage the aircraft and cause an unsafe flight condition.

The second is the addition of a modification to the fuel vent NACA duct on the lower wing surface. Lancair recommends modifying the shape of the duct to reduce the air pressure introduced into the wing. Excess pressure, especially when combined with a restricted vent, could increase the likelihood of an unsafe level of pressure within the wing.

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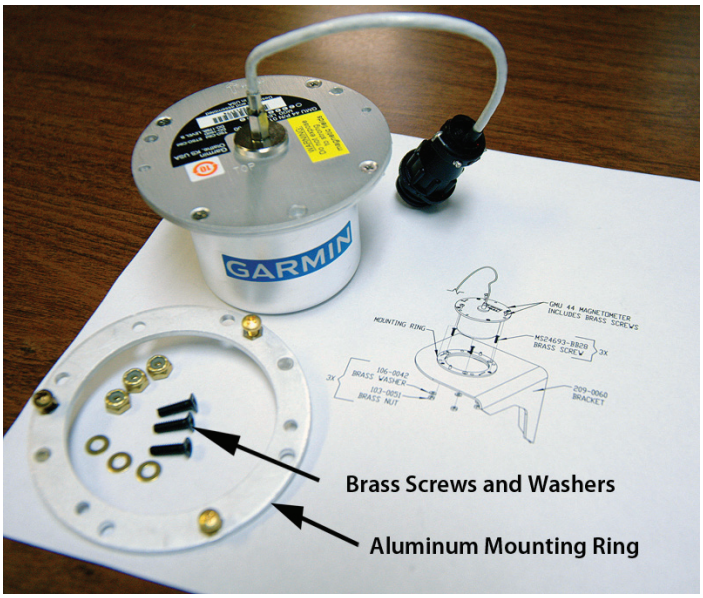
Magnetometer Mount Hardware



In case you didn't know, your magnetometer is very sensitive to magnetic influences. The installation manual specifies that you use non-ferrous hardware to mount the magnetometer and also to keep it as far as possible from any ferrous materials or magnetic sources. Therefore you must use brass hardware to mount the magnetometer unit. Kits from # 49 onward will have brass screws included. If your kit is in process or in need of retrofit, call Alma in Lancair Avionics for the correct non-magnetic hardware if you need it. We have found some calibration problems with kits where steel screws were used. Also, be aware that there is a "right side up" to a magnetometer and the build manual should be followed in this regard.

That High Altitude endorsement

Just as a reminder, the endorsement that you need to legally fly your pressurized Evolution is found within F.A.R. 61.31, Sec. g

Assuming you have the Complex and High Performance endorsements or experience, you will also need the following (Please note section 3, which can "grandfather" you into compliance (italics mine):

61.31

(g) Additional training required for operating pressurized aircraft capable of operating at high altitudes.

(1) Except as provided in paragraph (g)(3) of this section, no person may act as pilot in command of a pressurized aircraft (an aircraft that has a service ceiling or maximum operating altitude, whichever is lower, above 25,000 feet MSL), unless that person has received and logged ground training from an authorized instructor and obtained an endorsement in the person's logbook or training record from an authorized instructor who certifies the person has satisfactorily accomplished the ground training. The ground training must include at least the following subjects:

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That High Altitude endorsement; cont'd

(i) High-altitude aerodynamics and meteorology;
(ii) Respiration;
(iii) Effects, symptoms, and causes of hypoxia and any other high-altitude sickness;
(iv) Duration of consciousness without supplemental oxygen;
(v) Effects of prolonged usage of supplemental oxygen;
(vi) Causes and effects of gas expansion and gas bubble formation;
(vii) Preventive measures for eliminating gas expansion, gas bubble formation, and high-altitude sickness;
(viii) Physical phenomena and incidents of decompression; and
(ix) Any other physiological aspects of high-altitude flight.

(2) Except as provided in paragraph (g)(3) of this section, no person may act as pilot in command of a pressurized aircraft unless that person has received and logged training from an authorized instructor in a pressurized aircraft, or in a flight simulator or flight training device that is representative of a pressurized aircraft, and obtained an endorsement in the person's logbook or training record from an authorized instructor who found the person proficient in the operation of a pressurized aircraft. The flight training must include at least the following subjects:

(i) Normal cruise flight operations while operating above 25,000 feet MSL;
(ii) Proper emergency procedures for simulated rapid decompression without actually depressurizing the aircraft; and
(iii) Emergency descent procedures.

(3) The training and endorsement required by paragraphs (g)(1) and (g)(2) of this section are not required if that person can document satisfactory accomplishment of *any of the following in a pressurized aircraft,* or in a flight simulator or flight training device that is representative of a *pressurized aircraft:*

(i) Serving as pilot in command before April 15, 1991;
(ii) Completing a pilot proficiency check for a pilot certificate or rating before April 15, 1991;
(iii) Completing an official pilot-in-command check conducted by the military services of the United States; or
(iv) Completing a pilot-in-command proficiency check under part 121, 125, or 135 of this chapter conducted by the Administrator or by an approved pilot check airman.

Flight Safety G900x
Integrated Flight Deck Training

That excellent Flight Safety "e learning" Garmin G900x training course that is included with your Garmin manual is wonderful training aid if you are not G-fluent. But, please keep in mind that the course has a specific life once you open it and enroll online. It won't self-destruct like a Mission Impossible tape, but after 60 days it will "expire" and you will be denied access to the course. Don't worry though, you can call Flight Safety at the number listed on the disk package and ask for an extension, and they will be happy to give you another shot at it.

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PICTURE IT

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 dougm@lancair.com. Doing so implies that we may reprint them publicly.

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.

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:
dougm@lancair.com