LOBO NEWS

Lancair Owners & Builders Organziation

MAY 2012
VOLUME 4, ISSUE 2

## in this issue



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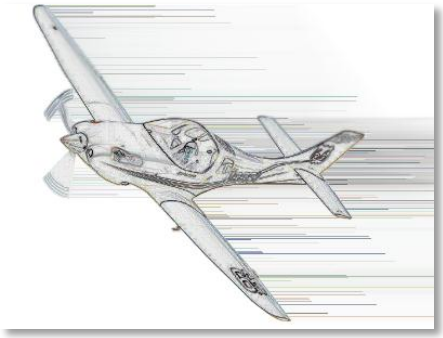
# FROM THE PRESIDENT

*jeff edwards*

Welcome to spring, and a fresh, new flying season! We had an unseasonably warm March and April here in the Saint Louis area, and the warm, blue skies are beckoning.

By the time you read this newsletter your LOBO board will have made significant decisions about our organization's website.

Up to now, LOBO member Don Barnes has volunteered as LOBO's web design and maintenance expert, and member Rob Logan has generously donated server space and the knowhow to keep Don's site design up and available for our membership. We all owe both Don and Rob a tremendous thank you for volunteering their time and resources to keep LOBO's website up and running for the past several years.



To better serve the membership, your board has accepted an offer from LOBO Member Dico Reijers of InternetWorks, a web design firm based on Prince Edward Island off the northern coast of Nova Scotia, Canada. Dico has stepped up and volunteered to head up this new project. He leads the team of mad web designers that make up InternetWorks, and also happens to be a happy (and very sane considering his decision to join LOBO) IVP owner.

Keep your eyes and ears open for the soon-to-come announcement of the new site's grand opening. I hope you all will be as excited as we are when it goes public!

Dico's name goes at the end of the long list of volunteers who have made LOBO possible. I know we've told you this before, but it bears repeating: LOBO is a 100% volunteer organization. Your volunteer Board and committee members sacrifice a lot of their free time to make this organization run so smoothly. I urge you all to join me in expressing sincere appreciation for their valuable time and sage counsel.

### *Annual LOBO/Lancair Event*

Speaking of volunteers—ours have been busy getting a program together for our second annual LOBO/Lancair collaborative event in Sedona, Arizona in September. If you have not already signed up for it, do so now. We have a great slate of sponsors, and a schedule full of activities which promise a get together both fun and informative. For example, at this year's banquet EAA's own Mr. Rod Hightower is our keynote speaker. Additionally, a couple of our more experienced members—Bob Jeffrey and Ernie Sutter—are hosting a Lancair ground school, scheduled on the day before the LOBO/Lancair event officially kicks

off. Attendees will be entertained and informed about ways to fly and enjoy our flivvers both more professionally and more safely.

Take a few moments to check out the many local activities offered around Sedona as well, and you might very well choose to tack on a few extra days in Red Rock country.

### AirVenture 2012

EAA's annual convention in Oshkosh, WI is just around the corner, and Claudette has arranged another energizing (and appetizing!) LOBO banquet at the Hilton Garden Inn. After we all fill our bellies we can all look forward to being regaled with the wit and wisdom of Mr. Brent Regan. As some of you know, Mr. Regan was honored to be selected as one of the "three wise men of Lancair." He will share with us how he got to that exalted position.

One of the issues we plan to address this year was the lack of designated parking last year for Lancair aircraft. The Board plans to work with EAA to reacquire our coveted spot in the homebuilt area next to Lancair's old pavilion. We will keep you informed.

### Training Matters

Since the last newsletter events have caused the Board to rethink our position on mandatory initial training. Put quite simply, the continued high rate of Lancair accidents is causing insurability problems for the Lancair community. For those of us who can even get it, insurance costs on a IV-P are prohibitively steep. Many cannot get it at any cost. The Board sent out an email and survey regarding your thoughts on the matter; Jenn is reporting the survey results later in this issue of LOBO News. The next step is to begin a conversation with FAA HQ personnel regarding LOBO's position on mandatory initial training. Rod Hightower has put EAA at our disposal in assisting us with this difficult situation.

Our research of the Mitsubishi MU-2 community, a group similarly forced to deal with a high rate of serious accidents which threatened fleet viability, reveals an effective flight path to a safer Lancair community. The MU-2 has seen a tremendous reduction in fleet accident rates due to the adoption of SFAR 108, and a commensurate reduction of insurance costs. SFAR 108 mandates initial and recurrent training for all MU-2B pilots and flight instructors. Click here for a reading list of topics regarding SFAR 108 and let us know what you think.

# SAFETY CORNER

*colyn case*

I was on the step ladder fueling my Cessna when I saw my friend taxi out in his Kitfox and take off using the short end of the runway toward a cow pasture north of the airport. He got to maybe 160 feet off the ground when the engine started running rough, and the resulting power loss prompted a turn back toward the airport. Unfortunately, after completing just 90 degrees of the turn, the engine quit entirely. His choices at that point were the side of the farmhouse directly in front of him, or the hope of completing the turn. He chose the turn.

Right about 80 feet above the ground he ran out of energy and the plane pitched straight down. I had witnessed this scenario before; the aircraft crashed with the top of the wing facing me, filling the view just like in the old-time barnstorming movies.

I was sure he was dead…

## The Rest of the Story

I had just landed after a long trip so it wasn't until later that I found out he had been having trouble with his Rotax engine. He had been tinkering with it in front of his hangar while it belched smoke. After a while, he decided the performance of the engine was sufficiently improved that the next logical step was to go out and "give it a try." After all, it had been running "pretty well" at the hangar.

The situation raises a question: How do you know when an airplane is really ready for a test flight after it's been "talking to you" or otherwise been down for maintenance?

My daughter's piano teacher had an answer for this, which was made abundantly clear prior to every recital. To him, being able to play a piece perfectly in your living room was merely "cost of entry." He required perfection in the living room about a month before the event. From that point on it was about playing perfectly in hostile conditions. For example, his students had to play perfectly while roasting in a ski parka, or while people in the room made alarming noises and distracting comments. His students could play without a hitch even while dodging the various domestic projectiles he lobbed at them!

It all sounds over-the-top, but by the time recital day rolled around there was no question of readiness. "Ready" meant able to perform perfectly under the most adverse circumstances that could reasonably be simulated.

So why might we pilots be less averse to putting our planes into service when they're not perfectly ready? Maybe it's because an auditorium full of disapproving peers and parents is just scarier than death. Or maybe it's because we don't see the audience (though we know they'll come out in droves after the fact). Or maybe it's because we've rehearsed in our mind so many times this vision of being master of the sky that we aren't prepared to internalize facts that don't agree with our vision. I'm not sure. But I am sure that some very intelligent and successful people have been affected by this malaise whatever it is. Why don't we just call it "WISHFUL THINKING"?

One circumstance where wishful thinking strikes is when we can't reproduce the symptom(s) of a malfunction. Intellectually, we all know mechanical problems don't just go away. But pilots often make war with the facts, and continue as if a malfunction has fixed itself.

We wish away problems because it's a nice day and we want to fly; because maintenance costs too much; because we don't have time to delay; because alternate travel arrangements are expensive or inconvenient. What we do is wish that a flight will conclude uneventfully. What we should be doing is considering what will happen if a mechanical problem reappears right at that moment where the only options available are bad ones.

If you've been on the LML for even 5 months you can name at least one example of how wishful thinking turned out badly for a fellow Lancairian. Indeed, the longer you've been on the LML the longer your list will be.

Some examples you may remember:

- A second takeoff 5 minutes after an unexplained power loss on the previous takeoff
- Planning a leg with no reserve fuel in order to avoid a fuel stop
- Launching and then overflying multiple airports with a rough engine

In hindsight it's very easy to see the risk/reward tradeoff in these instances didn't work out. Not for the pilot, not for his passengers, and not for the Lancair community.

What was the outcome for my friend?

On that particular day, divine forces intervened. Although I could see the plane until it was just feet above the ground, it actually landed upside down on one of those gigantic tubes of hay we have here in Vermont. The force of the impact was sufficient to twist the tail section noticeably, deform the engine beyond recognition, and fold the cockpit cage in on him. He was screaming but very alive. He underwent several days of surgery and then, unbelievably, walked out of the hospital 6 days later. He was back at work in two weeks. Nevertheless, it's clear wishful thinking played heavily in his case.

So how does one avoid this pitfall? By being absolutely sure you've done everything within reason to diagnose, fix and safely test a misbehaving aircraft. It needs to run perfectly on the ground first and then resist adversity convincingly under carefully controlled flight conditions before it's really ready to be trusted.

### Avoiding Wishful Thinking

The first rule is don't perform maintenance in the air that can be performed on the ground. If there's an applicable system test, e.g. cycling the gear, do the test on the ground where you can diagnose the problem without risk to life and limb. If there's a specified setup procedure, get the whole thing done, don't guess. If you find yourself in over your head (e.g. you're not an A&P and your engine is giving you grief) STOP! Seek expert help. Take pictures and make detailed notes to help you communicate the problem(s) you're experiencing.

A note on advice: It never hurts to ask another Lancair owner/builder, but be sure to vet the answers. The experimental aircraft world in particular is a "buyer beware" environment. Just because someone else did it and didn't die (yet) doesn't necessarily mean it's the right way.

Wherever possible, go back to Lancair or the component manufacturer and get an authoritative answer. If that's not possible you can often detect bad advice because of the lack of facts—particularly quantitative facts—backing up the opinion. The bottom line is you should compare the advice you get against common sense, and with what you know. Oh, and by the way, this applies to "expert" advice as well.

After you've completed any required maintenance, the next step is to flight test as carefully as possible. In order to elucidate the concept, I'm going to appropriate liberally from a presentation made to the FAA's FAASTeam by Mike Busch, of Savvy Aircraft Maintenance Management.

### Maintenance Test Flights

To the right is a checklist distilled from Mr. Busch's presentation, with a few additions of my own.

> *Data shows the risk of catastrophic in-flight engine failure is greatly increased after invasive engine maintenance (top overhaul or worse), particularly for the first 10 to 20 hours.*
>
> *~Mike Busch*

To emphasize the importance of item #7, I did the math for my IV-P, which has a measured engine-our sink rate of 1600 feet per minute at 120 knots, dirty (gear & flaps extended). Using Google maps, I plugged the data in for Burlington International RWY 15, which is 8000 feet long. To say the least, I was startled at how limited my options were given the planning parameters.

Following are examples of tragic, poorly planned post-maintenance flights from Mr. Busch's presentation:

**NOTE**: *All content below attributed to Mr. Busch is copyright Savvy Aircraft Maintenance Management and used with permission.*

### MX Test Flights

1. Test flight always after maint.
2. Test flight always:
   - Without passengers
   - In day VFR conditions
   - Close to the airport
   - With a test pilot mindset
3. Use test pilot mindset:
   - Expect problems at all times
   - Be prepared to land ASAP
4. Preflight to save your life:
   - Loose cowl fasteners, fairings, inspection plates
   - Baggage door/canopy latches
   - Flight/engine controls, switches, breakers
5. Do an ultra-thorough run-up:
   - Ignition, propeller, charging system, oil pressure
6. Plan to abort the takeoff:
   - If possible, choose a long runway in flat, open terrain
   - Be sure RPM and fuel flow are right at red line
   - Abort if anything doesn't sound, feel, or smell right
   - Never take a problem into the air
7. Plan for engine out after takeoff:
   - Have plan for each AGL (0', 50', 100', 500', 1000')
   - Know glide/turn data each AGL
   - Google map great planning tool
   - Resolve to NOT turn back if planning proves it impossible

*A pilot of a 1996 A36 Bonanza had his engine and prop repaired after a prop strike. On the initial flight after that maintenance, the pilot took his girlfriend and her two sons for a lunch trip from Everett Washington to Friday Harbor. Here's what happened:*



**In conclusion, take any squawks on your airplane seriously; don't wish them away. Fix them, then carefully test your airplane under controlled conditions. None of us want your airplane to end up like this one.**

*colyn case is your newest LOBO board member.*
*send questions to colyncase@earthlink.net*

*A Cessna 340 was in for maintenance to repair a VOR head. The pilot determined shortly after entering IMC on the next flight that the airspeed, altimeter and VSI were not working. He declared an emergency and successfully returned back to base.*

*It turned out that the mechanic had disconnected the static line to work on the VOR and had forgotten to reconnect it.*

*This would have been a far less exciting day had the pilot chosen to fly VFR.*

*Another Bonanza pilot departed Santa Monica airport—with his wife—not long after a top overhaul. He lost power shortly after takeoff and successfully ditched. However, without shoulder restraints, both he and his wife were knocked unconscious by the instrument panel and drowned. Forensic examination showed conclusively that one of the #2 rod bolts had not been properly torqued and had no cotter pin installed.*

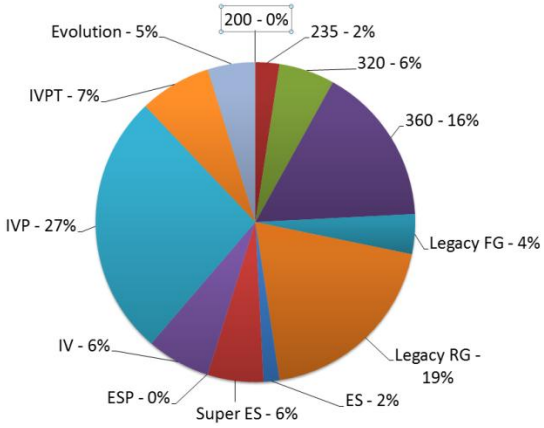

# LOBO MEMBER SURVEY

*jennifer ashley*

As many of you know, LOBO recently conducted a membership survey. We asked you what you thought about mandatory training. A total of 126 complete surveys were returned for analysis. Of the 126 respondents, 97 percent were Lancair aircraft owners and 69 percent were the builder of record for their aircraft. The chart below shows the participant breakdown by aircraft type.

The results showed a strong majority support for mandatory training in regards to the potential for lower accident rates and lower insurance premiums. Eighty-one percent agreed or strongly agreed they would support mandatory training if it could reduce insurance premiums; seventy-seven percent agreed or strongly agreed they would support mandatory training if it could reduce accident rates.

There was significantly less support for the proposal to exempt from mandatory initial type training Lancair pilots who have amassed a minimum number of flight hours (a so-called "grandfathering" clause). The results showed fifty-three percent supported grandfathering experienced Lancair pilots, while 30 percent disagreed or strongly disagreed.



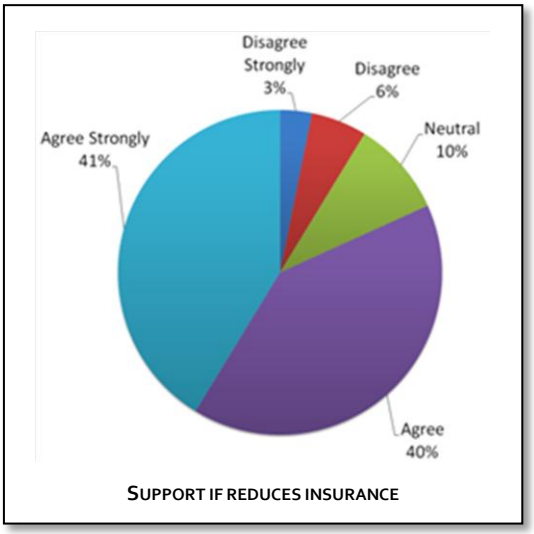

In addition to whether participants supported the idea of grandfathering experienced Lancair pilots, respondents were asked to suggest the number of hours that would qualify a person to be grandfathered. The suggested number ranged from 50 to 2,000 total hours, and 50 to 500 hours in type. Others suggested that pilots must participate in type training, transition training, high performance training, etc instead of communicating a specific amount of hours.

Reasons offered by those who did not support grandfathering experienced Lancair pilots included: "the plane is unique…and no amount of training will offset the uniqueness;" "type ratings do not grandfather…neither should other experience grandfather into a Lancair;" and "initial training should be required for all owners."

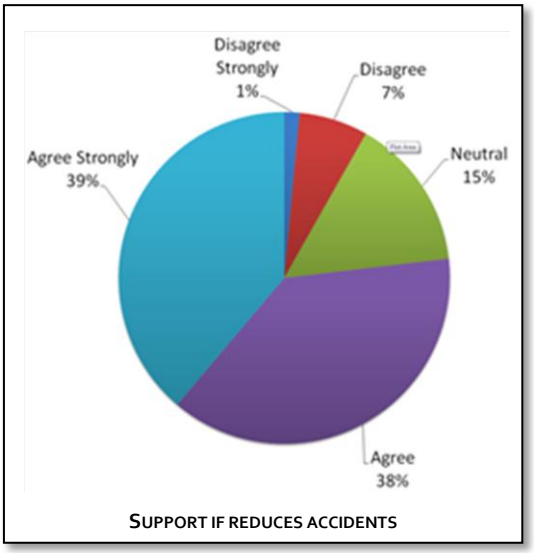
It is evident from the survey results, that participants support the idea of mandatory training, especially if it will help to lower accident rates and insurance premiums.

From the data, this appears to be an issue worth pursuing. Your LOBO board will continue to gather the information necessary to accurately develop training and advisory material with the ultimate goal of furthering fleet safety and controlling operating costs.

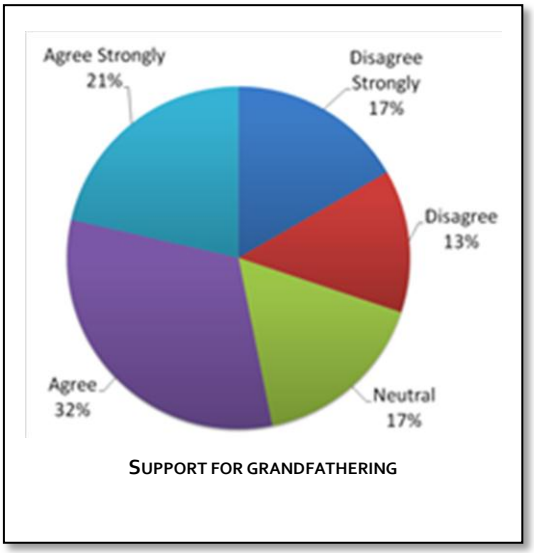
*for questions about this article contact jenn at*
*runninoo@aol.com*




SUPPORT IF REDUCES INSURANCE




SUPPORT IF REDUCES ACCIDENTS

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# MAINTENANCE ISSUES

*bob pastusek*

I recently received two requests for assistance in calibrating the Lancair fuel system. One was from a builder just completing his project; the other from a "second owner" who had doubts about the useable fuel capacity reported to him by the previous owner—who was not the original builder.

Both owners had digital/electronic fuel sensing systems that require calibration to be useful at all. The requests came just after I'd read Mike Busch's excellent article, The Most Unforgivable Sin, in the April 2012 issue of Sport Aviation, about a fatal fuel system-related crash several years ago. The accident pilot, Tony Durizzi, was an ex-airline/Air America/fly anything pilot, and probably the high-time pilot in Lancair aircraft when he ran a IV-P—with known fuel system problems—out of gas on approach to Flagstaff, AZ. If you ever thought that what you don't know can't hurt you, I recommend Mike's article for your consideration—it's an eye-opener.

These closely-spaced events caused me to speculate a bit about how we as a group are managing our fuel systems. I suspect there a lot of Lancair owner/flyers out there, probably some of them even LOBO members, who don't know critical information about their airplane's fuel system. So I'd like to go over some of the more obvious things.

## Lancair Fuel Systems

The construction manuals specify a well-established system design and tank capacity—or do they? Lancair has changed the fuel tank configuration of most models over the years, with the exception of the Evolution—so far. And the "as built" almost certainly varies from airplane to airplane, both in capacity and plumbing. In a production airplane, the location and installation of fuel system components is tightly con-trolled, and the total and useable fuel quantities are carefully determined by testing. You'll find this in the maintenance and operating manuals. Absent documentation of modi-fications to the fuel system—FAR required—you can rely on this information with a high degree of confidence. Not so with our in-dividually, uniquely built airplanes.

For example, the IV-P was originally built with internal tanks that did not extend to the end of each wing. A minor change in the pre-fabricated parts, accompanied by a correspond-ding change in the construction plans in the mid 1990's extended the fuel bays to the wingtips, raising the "standard" fuel some 17 gallons to 95 (or so) total. By 1999, Lancair was offering an "extended range fuel kit" that sealed off more of the internal wing providing approximately 110 gallons of fuel capacity.

Which build series do you have, or more generally, how do you know how much fuel one of these "magic carpets"

can carry, and how much of that is useable? There are some subtle things to look for—none visible from a casual walk around the airplane—that can help you determine the designed fuel capacity. But even with these clues you eventually get to "this airplane should have a capacity of approximately ### gallons..." If built according to plans, that is.

Tony Durizzi's accident airplane did not hold as much useable fuel as it was designed to carry due to an error during construction that blocked the vents to the fuel cell forward of the main spar. So how do you know these things? You can only be sure by testing—yourself. If you are the builder of your aircraft you likely know the design capacity; if you are a second owner, even that information is second hand until you've tested the fuel system. The following is a set of procedures you can use to calibrate and verify proper operation of your fuel system. The complete fuel system calibration is not exactly a "morning at the airport" task, but well worth the time and effort. It's absolutely required if you're building, and highly recommended if you are a second owner.



## System Checks

Let's start with some simple checks you need to complete before undertaking a major fuel system calibration or recalibration. These can be done easily without tools; I recommend you do these checks during your next visit to the airport if you've not done them, and repeat the checks at each condition inspection thereafter.

You can do some of these checks yourself, but two people make it much easier...and more reliable.

### 1) Flapper Valve Check

Each Lancair wing tank should have one-way flapper valves installed in the first wing rib out from the root. This prevents fuel from flowing from the inner-most fuel compartment—that feeds the engine—out to the wingtips during un-coordinated flight. The Lancair is particularly sensitive to outward flow because of the small wing dihedral and relative neutral lateral stability. If the flapper valves don't work properly, fuel flows away from the root and can un-port the fuel pickup during critical phases of flight, causing engine stoppage.

Check each wing by having your assistant lift up and down on the wingtip while you listen near the wing root. You should hear a soft but distinct metallic clicking as the valves open and close in response to the fuel being sloshed around. This check may provide inconclusive results if the tanks are completely full. If there is any doubt, check this again before you refuel. Any uncertainty about the functioning of these very simple one-way valves warrants further investigation. At least two Lancairs have been built without these flappers "to remove a potential point of failure," according to the builders.

### 2) Fuel Vent Check

This is where a bathtub stopper (not your wife's), drilled to hold a short length of tubing, comes in handy. With each tank less than completely full of fuel, remove its filler cap and replace with your home-made tank vent tester. Hold the stopper in place (it doesn't have to fit tightly) and blow into the tube with your mouth.

**NOTE**: *This is not the time to use your fancy air compressor or other compressed air source!*

# HEAVEN'S LANDING

Have your assistant listen at the tank vent. You should be generating a steady, audible air flow out the vent with little blowing resistance. Now have your assistant cover the vent opening with her finger (or use a piece of tape). If you can close the vent tightly, this should generate resistance and no leakage.

Well-known Lancair test pilot Don Goetz tells the story of a ferry flight in the early 1990's where, after level off, he noticed that the left wing skin seemed to be shrinking, making the ribs visible. The right wing was normal. While he was pondering this curious situation, the engine sputtered a bit and quit. Although he did not immediately connect the two events, he switched to the right fuel tank whereupon the engine immediately recovered, and the left wing gradually re-gained its proper shape. Cleaning out a mud-dauber nest partially blocking the vent tube provided a permanent fix.

### 3) Tank Fill Check

For best results, check this in warm weather when the tanks are relatively empty. Also, it's best to do this before you plan to fly—so as to not park the airplane completely full of fuel afterward.

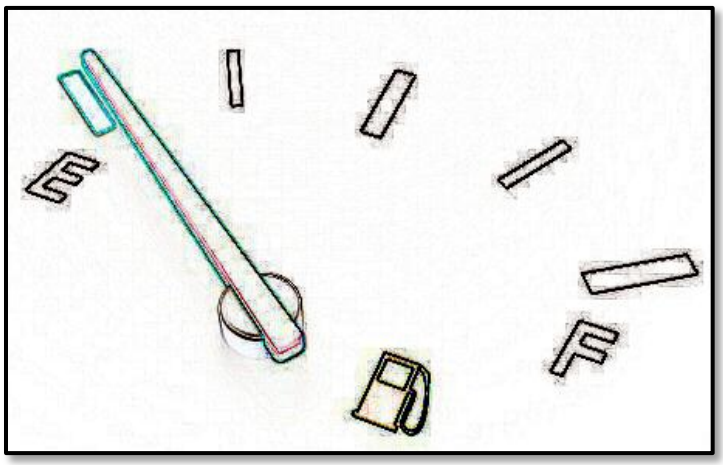
Fill each tank full to the top—even if you normally leave some expansion room. Install the cap and wait 5 minutes. Depending on the ambient temperature, both tanks should dump a small amount of fuel out the vent as the fuel warms to outside temperature. Either tank venting a stream of fuel could be an indication of air trapped in some tank compartment that is expanding and pushing fuel out the vent—most likely a blocked upper internal tank vent within the wing.

**NOTE**: *This is the very situation experienced by Tony Durizzi in the accident cited at the start of this article.*

Now remove each cap in turn and verify that both tanks are completely full.

**NOTE**: *Expect some overflow/spilling when you remove the cap—this is normal, and the reason I leave some air space in the tank during filling.*

If a tank is no longer completely full




when you make this check, it indicates a potentially blocked lower fuel transfer gallery within the wing.

Either a blocked upper internal tank vent or a blocked lower fuel transfer gallery reduces the useable fuel you can carry.

### 4) Fuel Shutoff Valve Check

Start the engine normally, then close the fuel shutoff valve. Verify that the engine stops after a short time. If it's still running after five minutes or so, you likely don't have the ability to shut off fuel flow to the engine in an emergency.

**NOTE**: *Leave the shutoff valve closed/off for the next test.*

### 5) Gascolator Check

With the fuel shutoff valve closed, remove the gascolator bowl and carefully check the contents by pouring the fuel it contains over/through a paper towel. Blue shop towels are excellent for this as they will show both black carbon and white/clear glass fibers easily.

A small amount of construction fiber (and even some bits of metal) is normal, but any significant collection of debris or water, or any amount of gooey/semi-solid material warrants further investigation.

I encourage you to complete these basic fuel system checks if you've never done so for the airplane you are now flying, and to add them to your condition inspection checklist. They go a long way in insuring you catch any developing fuel system problems early.

With these checks completed, you can proceed with a fuel system calibration.

## Fuel System Calibration

**WARNING!** *Gasoline contains more explosive energy, by volume or weight, than dynamite. You will be transferring dangerous quantities of gasoline (or kerosene) between your airplane and multiple open containers. Spills are inevitable. You MUST do this work outside; definitely not inside a hangar; and "I didn't even know you" if you consider doing any of the following checks in your garage or basement workshop!*

## What You'll Need

As a start, you'll need about 20 feet of ½" (or larger) ID hose with an AN fitting on one end that's compatible with the exit port of your fuel gascolator. An additional fitting that will connect the hose to your engine fuel line down-stream from your fuel flow transducer will permit another important fuel system check. You'll need enough hose to reach from the engine compartment/gascolator to each of your fuel filler caps, with a bit extra for maneuvering around the airplane. You can make this up from a piece of new garden hose, or use (expensive) aircraft hose, but this is hopefully needed only for a one-time use, so the only real requirements are that it be fuel-proof and clean.

You'll also need an old-fashioned funnel large enough to line with a chamois and a large exit hole that will fit into your fuel tank filler port without scratching the bottom of the tank. Spread the chamois loosely across the large opening of the funnel, push it gently into the bowl, and use safety wire around the outside to form a strainer for your fuel. The last "special equipment" you'll need is four or five five-gallon fuel containers. Get containers that are easy to transfer fuel to/from without spilling. Be sure to "calibrate" your containers. Most have markings that are accurate, but you'll want to confirm they are accurate. There is little point in calibrating your system in five-gallon increments using a 4.5 gallon quantity of fuel! You'll also want to calibrate one container in 1-gallon increments. The red semi-transparent containers available at auto parts stores are good for this purpose.

For those already flying, you'll also need to determine pitch attitude in level, cruise flight. You can do this in flight by taking a measurement using a digital level. Place the level in a spot you can also measure on the ground. Record the value and use jacks or blocks under the wheels to replicate the same attitude on the ground.

## Getting Started

The procedure described here is based on calibration of Electronic International's MVP-50 engine management system, but the concepts and procedures are compatible, with minor modification, for calibrating most electronic fuel measurement/monitoring systems. (I have no affiliation with EI, but can highly recommend the company and this unit from my four years of use in N437RP).

**NOTE**: *The MVP-50 and similar units measure both fuel quantity (by use of capacitance probes in the tanks), and consumption (using a transducer to measure fuel flow over time). These two independent methods provide a good cross-check of your fuel system that can be exercised each time you fill up or add fuel to a reference fill point.*

To calibrate your electronic fuel measurement system, you'll want to start with tanks just over half full. Specifically, you'll need to be able to fill each tank completely, in turn, and to completely empty the other tank by pumping any excess fuel into your containers. We'll also use the transfer process to filter all fuel a couple of times while emptying the tanks. This will remove most sediment and particles from your fuel system.

Confirming maximum fuel transfer rate and calibration of the flow rate transducer is probably the simplest task, so we'll start there. Begin by moving your aircraft outside and

posting a couple of high-capacity fire extinguishers. Get rid of any open flames, and I'd strongly recommend moving any electrical cords and appliances well clear of your work area. You will be creating fuel vapors and need a well-ventilated space with no ignition sources.

### 1) Calculate Fuel Flow Rate

Disconnect the main fuel feed line between the engine and the fuel transducer and attach the transfer hose you've fabricated for this purpose to the feed line. Power up your fuel measurement system and have your assistant run the pump while you measure the time it takes to pump exactly 5 gallons through the funnel/filter into a container. Record the system flow rate and compare it to your measured rate (quantity/time).

Depending on your fuel system set up, you may be able to check this at high and low boost pump rates, and also at takeoff power and cruise fuel flow settings by using the mixture control to modulate the flow rate (fuel injected engines only). Confirm the indicated flow rate at max and cruise power settings if possible.

### 2) Determine Unusable Fuel

Reconnect your engine fuel line and connect your fabricated fuel transfer line directly to the gascolator output fitting. Set the aircraft pitch, using blocks under the nose wheel, at the approximate take-off attitude plus 2 degrees.

I recommend 10-12 degrees more than level flight pitch for Lancairs, but I don't know of an "official" value for this. If you are building and have not yet flown, leveling the aircraft with the basic leveling points should provide good results.

Now, pump fuel from one tank through your funnel/filter into the other tank and then into your containers until the pump cavitates (can't draw any more fuel). Lower the nose to cruise pitch attitude and resume pumping until the pump again cavitates, but pump into your calibrated containers this time. This measured fuel is your "unusable fuel during a pitch up/go around." You may want to put padded saw horses or similar under the wings after you lower the aircraft to cruise pitch because the weight imbalance will tilt the airplane and may invalidate your calibration. The amount of fuel remaining in the tank/lines at this point is your "unusable fuel" for that tank.

**NOTE**: *You can open the tank drains to catch and measure unusable fuel if desired. You should know the quantity for exact weight and balance determination, but the number is not required for the following fuel system calibration. The remainder of this procedure assumes unusable fuel remains in the tanks/lines.*

### 3) Fuel Capacity & Gage Calibration

Turn on the fuel measurement system and allow it to stabilize. Set the quantity calibration point for the tank at 0 (useable fuel remaining). Now add fuel at one gallon at a time, watching for the first indication of change in the measurement system. This is the minimum quantity your system will indicate, but will likely not be accurate at this low value. Still, it's a good reference point you'd like to never see in flight...

**NOTE**: *Each fuel measurement system has unique calibration instructions. Refer to those instructions for procedures specific to your system.*

Continue to add measured quantities of fuel while updating the indicator in accordance with instructions for your system. Some call for calibration points at ¼, ½ and ¾ full; the MVP-50 can calibrate in 5 gallon increments, and I recommend that for the MVP-50.

**TIP**: *Calibrating your fuel quantity indicator in smaller increments than recommended does not make it more accurate and likely will cause a calibration error...for which you get to start over.*

As the tank fills, the indication system will stop increasing somewhat short of completely full. I therefore recommend you plan for and record the indicated fuel in your tank—below its maximum capacity. For the Lancair IV/IV-P, this value could be 40 or 45 gallons (96 gallons max fuel for my airplane, as built).

Continue adding known quantities until the tank is completely full, then record the total quantity added. The quantity added between level-flight, unusable fuel and tank full is your useable in-flight fuel for that tank. Repeat this process for the other wing. As previously mentioned, some fuel management systems incorporate a "totalizer" function which continually calculates fuel remaining based on fuel burned. To be accurate, these systems must have a known starting quantity. If your system provides totalizer functionality, enter the measured useable in-flight fuel quantity as the

"standard fill up/reset quantity" (or equivalent term for your system).

### 4) Return System to Normal Configuration

The process of pumping fuel through your tanks and lines will flush them of most debris. As noted above, it's normal to see a small amount in the funnel/filter at the end of the calibration process. If you get a significant amount (1/4 teaspoon?), you should continue to flush the system by pumping fuel back and forth through the filter until the quantity is negligible.

Once satisfied your system is as free of debris as possible, remove and clean the gascolator filter, then **CAREFULLY** re-attach and check the fuel lines, including the one near the fuel flow transducer.

**WARNING**: *At least one Lancair has been lost due to a loose main fuel line in the engine compartment*

**NOTE**: *If you were unable to establish a level-flight pitch reference before starting this calibration test, you should do so during initial flight testing. If the pitch attitude differs by more than 2 degrees from that used for calibration, recalculate "unusable fuel" with the aircraft in the correct pitch attitude.*

### 5) Fuel System Verification

During normal operation, make it a habit of cross-checking your calculated fuel burn (or the totalizer if you have one) with what you put in the tanks and what the quantity gauges show.

A fuel totalizer is a handy tool. If properly calibrated it provides a "count down" to tank empty as you burn fuel. You can reset the fuel flow rate on most electronic fuel management systems at each fill-up. I encourage you to check this each time as it provides an early indication of a fuel leak, but I recommend you recalibrate it only when your tanks are filled from near empty and your previous flight represents normal in-flight use.

Remember that totalizers are independent measurement systems, but should correspond closely with the quantity indication system (within the range of your quantity indication system; between 5-45 gallons for my IV-P). You need to fill the tanks, or fill to a known reference level for the totalizer to be accurate, but it's an important indication (pun intended) of the overall operation of your fuel system. I've verified my fuel management system many times, and found both the tank measurement and the flow rate system to be extremely accurate, usually within one gallon or 2% of actual.

Optionally, as a final verification, you can run your tanks empty (one at a time) to confirm the quantity indication system. On my aircraft I found the system accurate within a gallon. To do this, I established the aircraft in cruise configuration at a safe altitude permitting a dead stick landing directly above the airport (in case the engine could not be restarted). For each tank, I recorded the time and fuel burn rate at 10 gallons remaining, at 5 gallons remaining, and finally when the engine quit. The 10-to-5 gallon and 5-to-engine quit times were within a minute, and within two minutes of expected fuel exhaustion time after reaching 10 gallons, based on burn rate. (This was much better than I expected, but was under stable and controlled test conditions; you can't pitch up and accelerate for a go around and keep the engine running with this little fuel aboard!)

And that's it! A comprehensive fuel calibration such as that described here

can tell you everything you need to know about your fuel system. It can help you identify problems before they cause a mishap, and you will know as accurately as possible exactly how much fuel is available at all times.

*for questions about this article, contact bob at rpastusek@htii.com*

## Social Occasions

*claudette colwell*

Hello, and welcome to our spring 2012 newsletter! I have lots of exciting news about LOBO events for the rest of this year's flying season, so let's get started.

### Annual LOBO/Lancair Event

LOBO & Lancair are again joining forces this year to hold another dynamic social event for Lancair owners, pilots, spouses/significant others and wannabes. Please join me in thanking members Larry Eversmeyer, Doug Owen, Charles Bracken and Jim Scales, our volunteer site committee. They thoroughly investigated a number of promising sites and finally decided on beautiful Sedona, Arizona for the 2012 LOBO/Lancair Fly-In (click here for registration information).

Sedona was their number one choice based on many factors including hotel accommodations, FBO/airport authority cooperation, weather, and a facility within walking distance of the ramp for all daytime pilot activities. Like last year, we'll have forums, lunches and sponsor displays, all within the airport environment at the Masonic Lodge approximately ¼ mile from the FBO. There are many factors that go into an appealing and appropriate site, and our four-member committee did an outstanding job with the additional challenge of trying to duplicate the success of Branson.

Denise Knotts is very busy planning a number of events aimed at our Lancair ladies. The Chico's style show was a big hit last year, and the ladies who attended are looking forward to renewing the friendships forged at Branson, and making new ones at Sedona.

Sandy Gainza is busy obtaining another set of fantastic door prizes for those who come to Saturday night's banquet. Please share your thanks with these able volunteers for the time and effort they put in to make this year's annual LOBO/Lancair gathering another stellar event.

Speaking of thanks, the first response commitment from both old and new sponsors has been great! Without the help of our sponsors, events like the annual LOBO/Lancair gathering would not be possible. Be sure to thank them and acknowledge their support when you do business with them.

### Don't Miss Sedona!

LOBO and Lancair International are extremely pleased and honored to announce Rod Hightower, President of the Experimental Aviation Association (EAA), as the guest speaker for our dinner banquet at this year's annual LOBO/Lancair Fly-in scheduled for 28-30 September at Sedona, AZ!

Mr. Hightower was named EAA's third president on July 26, 2010. Before that, he spent more than 25 years in management and senior leadership positions for various Fortune 500 companies, including operations with as many as 3,200 employees and annual revenues of $470 million, both here in the US and abroad.

Aside from his success in business, Mr. Hightower is a passionate aviation enthusiast. Hailing from Dallas, Texas, he has been an EAA member for more than 20 years, an active pilot for 31 years, and restored his own Stearman biplane that he flies out of Creve Coeur Airport near St. Louis. Mr. Hightower is also active as a director of the National Stearman Foundation, a volunteer role focused on fundraising and organizing the annual week-long National Stearman Fly-In. His Stearman involvement expanded in 2009 as Rod is

a founding member of Stearman Flight, a F.A.S.T. signatory organization dedicated to Standardized formation training in the Stearman aircraft.

Please don't miss an opportunity to share an evening this September with fellow aviator and true American success story, Rod Hightower!

## Sedona Recon

Steve and I just spent 2 days at the Poco Diablo Resort, our housing headquarters for the LOBO/Lancair 2012 Fly-In. This is a premier facility for which our team was able to negotiate a rate of $141 (plus tax) nightly—down from the resort's normal nightly rate for late September of $249.

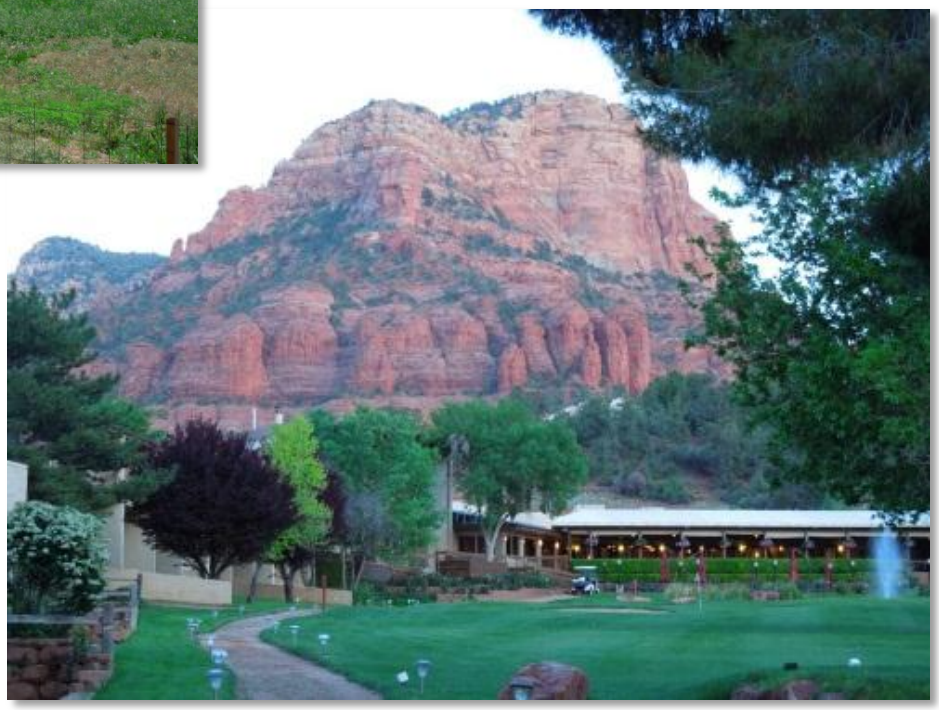
This is a truly lovely resort with a 9-hole golf course, beautifully manicured grounds, and comfortable, attractive rooms.

The FBO is waiving tie down fees entirely for us and the staff are looking forward to the arrival of lots of Lancairs in September. Management has also promised a fuel discount based on the number of aircraft. There is a great new restaurant on the airport with a view of the runway.

Sedona's red rocks are absolutely beautiful, boasting a plethora of activities, shops and art venues.

The Masonic Lodge we're using as HQ this year has separate rooms for the forums and sponsors' exhibits.

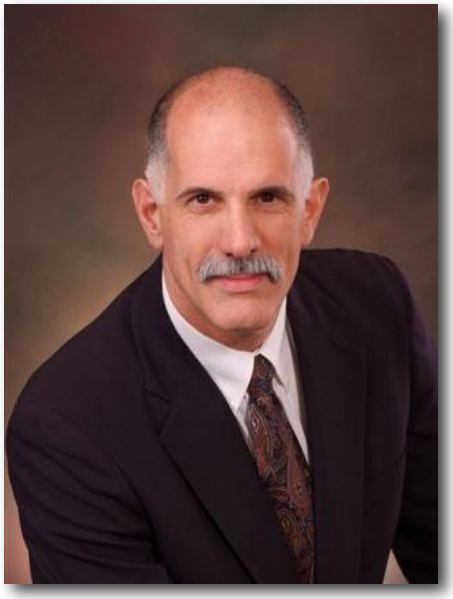
We want to thank Jim Hergert who squired us around the airport, introduced us to key people and shared his love of Sedona. He and his lovely wife, Mosel, made our trip entirely pleasurable. We'll see you in Sedona in September!



## Don't Forget AirVenture

We've teamed with the Hilton Garden Inn at 1355 West 20th in Oshkosh, WI to bring you another LOBO Banquet at Air-Venture. Scheduled for Thursday July 26, cocktail hour (no host bar) begins at 5:15 p. Dinner will be at 6:15p and we'll adjourn at 9:00p.

This will be another great evening with delectable food, outstanding entertainment and the company of aviation's most fun crowd.



Spellbinding you with tales of magic glass and the wonders and treachery of technology, our own Brent Regan will give you a reason to stay awake after what is sure to be a magnificent meal.

Lancair is this year's major banquet sponsor, with AirCrafters chipping in to help as well. Lancair's generosity with LOBO's banquet means there won't be a Lancair Bar-B-Que this year, so the LOBO banquet is THE Lancair social event at AirVenture 2012. Consequently, we expect a sold out crowd—in a space-limited venue. That means if you wanna be there you need to register ASAP!

LOBO Member ticket cost: $33.00

Non-member ticket cost: $40.00

Register and pay online at:

www.lancairowners.com

Or mail a check payable to:

LOBO | 18437 Edison Avenue | Chesterfield, MO | 63005

*Reservations made after July 18 cost $5.00 more per ticket. Your dues must be current to get the LOBO price.

## New Board Member

If you've read this far, then you're already aware LOBO has a new board member, and his name is Colyn Case.

Readers who frequent the Lancair Mail List will probably be familiar with Colyn's name. He contributes frequently to the many discussions that make the LML the marvelous resource it is. Now you can put a face (at right) with the name.

Legend has it Colyn started flying at the Sugarbush, VT airport during his college days. Like many of us, he had to be creative in the search for resources to support a flying habit; for Colyn it was trading hangar maintenance work for flying lessons.

Some years later, he took a decade-long hiatus from aviation—Colyn says that's when his family happened—which ended (the hiatus, not the family) when he resumed flying in 2000. Again like many of us, Colyn found a way to meld avocation with vocation, and commuted by air from Grass Valley, CA (home of Gen. Chuck Yeager) to his job in Santa Clara.

For some reason he decided to return to the Northeast, and he now lives near the Stowe/Morrisville Airport (KMVL) in Vermont, where he expects his IV-P will rejoin him this fall.

Since earning his IFR ticket and acquiring a Lancair IV-P, Colyn has become keenly interested in improving GA safety, which is why he is currently pursuing a CFI certificate.

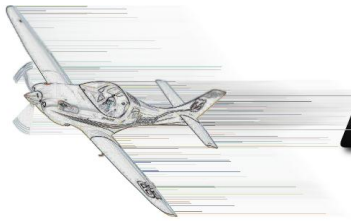
Please join me in welcoming Colyn, who has volunteered to serve as the newest member of your LOBO board!

*While you and I might find the look a bit, um, interesting, LOBO board member Colyn "not-a-slave-to-fashion" Case insists this is perfectly acceptable attire for operating a snow blower.*

*Personally, I think the hat needs a propeller…*

*--ed*

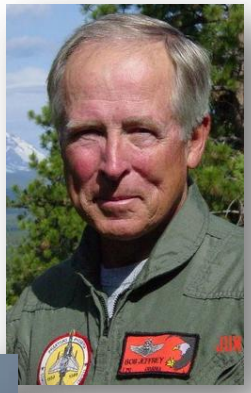
# A VALUABLE TRAINING OPPORTUNITY AT SEDONA, AZ



# Lancair Ground School

Join recognized expert Lancair instructors Bob Jeffrey and Ernie Sutter for a specialized Lancair Ground School, for your convenience scheduled on Thursday, Sep 27, from 9:00a to approximately 5:00p at Sedona, AZ. That date is one day before the LOBO/Lancair Fly-in, and will be at the same on-airport facility (the Masonic Lodge).

**Bob Jeffrey**



FAA statistics reveal the overwhelming majority of Lancair accidents result from pilot error and/or poor decision making. Messrs. Jeffrey & Sutter represent decades of experience and training in avoiding these and other common pratfalls of high-performance aircraft operations. They've organized a daylong program (to include guest appearances from a select few other Lancair masters) to share their perceptions, insights and invaluable knowledge. Don't miss this rare opportunity to become a more confident, proficient and safe Lancair pilot!

**Ernie Sutter**

This unique training experience is open for both pilots and their significant others. The nominal event cost of $100 ($10 for significant others) includes a light lunch. (Attendees can get the Lancair rate at the hotel for the three days before and after the LOBO/Lancair Fly-in.)

Registration requires **a $50 non-refundable depost paid by July 31**, with the **balance due NLT Aug 31**. Putting together materials and presentations for this event is a major undertaking. To make scheduling and preparation possible, we need your cooperation in registering as early as possible.

**Click here to register online, or send a check payable to LOBO, 18437 Edison Avenue; Chesterfield, MO 63005**

FOR MORE INFO CONTACT:


**Ernie Sutter**
281 364-7514

**Bob Jeffrey**
541-350-2336