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RECREATIONAL RFLYER

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RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

From The President's Desk

Gary Wolf RAA 7379

Chapter Status Reports

Yes, it's that time of the year again. Whether or not your chapter exec has had changes, send in an email or snail mail with the chapter's status report. Specifically state the names of the chapter President, Treasurer, Secretary, and two other named chapter members. All five must be National members to validate the status of your chapter.

Besides the five named above also please send in a full chapter list with members' contact information. When this has been accomplished your chapter status will have been renewed for 2014 and your chapter events will be insured under the RAA Chapter Liability Policy.

Email to garywolf@rogers.com . Snail mail to RAA Canada, Box 22 – 4881 Fountain St N, Breslau, ON N0B 1M0

Vans Aircraft Safety Bulletin

Vans Aircraft has issued a safety bulletin in which they require that owners perform an inspection before the next flight, and if necessary perform repairs and upgrades. The issue is cracking in the heavily loaded areas of the elevator spar. The first page of the eight page bulletin is in this issue of the Rec Flyer.

Own an Aircraft Company?

Both Murphy Aircraft and Fisher Flying Products are up for sale because in each case the owners wish to retire. Murphy is selling the company with all tooling and machinery. For the past few years they have been producing to order subject to accumulation, and kits and parts continue to go out the door at their plant in Chilliwack BC. www.murphyair.com

Paul Riedlinger has wound down production of Fisher Flying Products kits but continues to sell plans sets and components for his line of wood and fabric aircraft, from the factory at Brampton Airport in Ontario. Paul is interested in retiring and buyers may go to www.fisherflying.com.

Zenith's 40th Anniversary

Chris Heintz started his company in 1974, a brief forty years ago. In celebration of this anniversary the Midland production facility will host a July 19th open house. Besides aircraft the product line includes their own aluminum floats and the inflatable Full Lotus floats now made in-house at Midland. Builders, owners, and pilots are all welcome to fly in for this weekend celebration. www.zenair.com

HKS STOPS ENGINE PRODUCTION

Without any warning HKS has ceased production of their 700cc boxer engines and parts, for both normally aspirated and turbocharged versions. These light fourstroke engines have been very popular but economic difficulties in Japan have resulted in the decision to stop production. There are many light aircraft that have been designed around the 60hp HKS and their owners and manufacturers will be at loose ends. An owners' group is trying to put together a list of off-the-shelf parts that have been sourced from the auto industry but the major castings, crankshaft, and gearbox parts will become unavailable as the current supply dries up.

The Recreational Aircraft Association Canada
Waterloo Airport, Breslau ON N0B 1M0
Telephone: 519-648-3030
Member's Toll Free line: 1-800-387-1028
Emails can be sent to President Gary Wolf at: **garywolf@rogers.com** *and George Gregory at* **gregdesign@telus.net**

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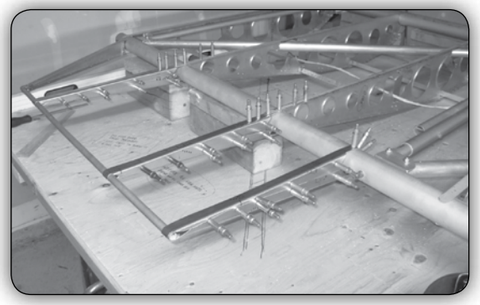
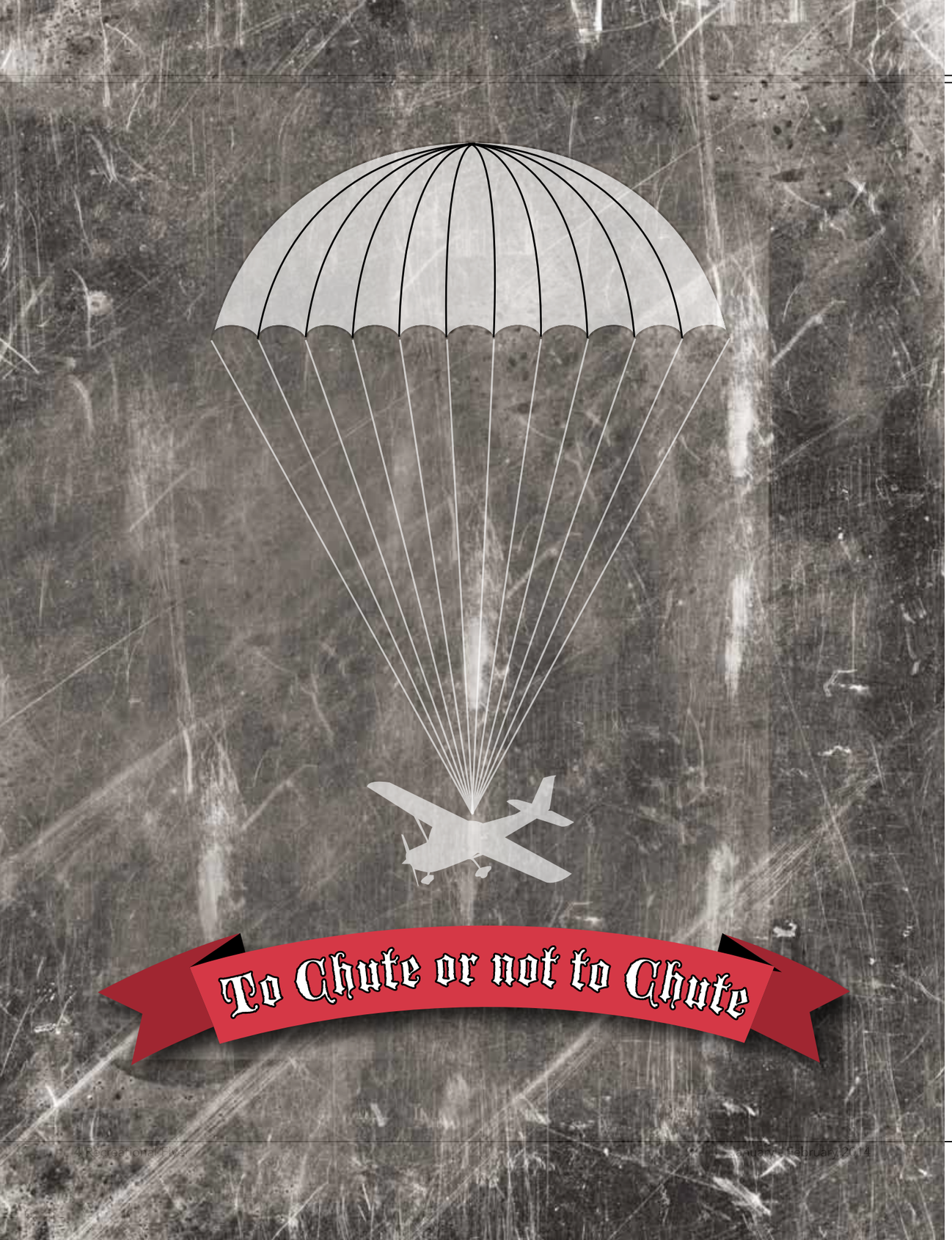
features



columns

Paragliding off Mount Woodside, BC.
On the cover: Pierre Marcotte's One-X .



One of the timeless jokes about aviation concerns how successful our industry is. "We've never left one up there yet," goes the saying. There's no denying, if that is the objective, our success rate is one hundred percent. The way we get them down is where things get a bit cloudy. Landings are either successful or, let's just avoid calling them crashes, and refer to them as "less than successful".

By Barry Meek

Ballistic Recovery Systems, Inc. or BRS entered the aviation world around 1980, following a hang-gliding accident. The company designed and built an emergency parachute to lower the entire aircraft safely to the ground in the event of a catastrophic structural or control failure.

They were initially introduced into the ultralight market, but in 1998 the company collaborated with Cirrus Design to develop the first recovery parachute system to be used on a certified SR 20. Since 2000, there's not been a major flocking to the technology, and it's arguable as to whether all survivors who have used the "chute" actually owe their lives directly to the system, or could they have successfully landed the plane anyway.

In discussions around the hangars, I've noticed two general opinions on "the chute". Some pilots would have no problem deploying it in an emergency, while others would opt for every possible alternative first, and consider it cheating to actually "pull the ripcord". In truth, who can say exactly what they would do in the situation? I for one, couldn't say whether or not I'd activate a "chute" in some emergency. I suppose it would depend on just what went wrong. You do what you think is right at the time.

I flew an ultralight aircraft for a company over the course of three seasons in the 1990's. That aircraft was equipped with the rocket-powered "chute". I can't recall feeling any higher degree of security just because that big, red handle was always there within easy reach. It's not that there was never a concern of an engine failure, but it was perhaps due to conditioning or habit, that I was always aware of the possible landing spots within reach whenever we were airborne. Quite honestly, I don't think there was ever a time when I figured I was any safer because of the "chute" being on board. It just never seriously occurred to me.

However, another pilot in that same aircraft owes his life to the BRS. The left wing spar failed near the strut one day at about 5,000 feet ASL. The outboard section of the wing was torn completely off, damaging the prop and tail as it made its exit. The plane fell like a spinning oak tree seed, completely out of control. The pilot pulled the big red handle. People on the ground looked up at the sound of the tiny rocket motor that launches the system, only to view in horror as the "chute" tangled and failed to open completely. The airplane continued spinning, falling straight down with the cord and fabric helplessly being dragged down with it.

Fortunately there was a cottonwood forest below, most of the trees about 80 feet tall. As the plane fell through the dense branches, its descent was slowed by the mass of fabric and cord that never blossomed into a full parachute. To complete the miracle, the little airplane stopped within inches of the ground when the trees finally caught and held the wreckage and the tangled parachute. The pilot simply released the safety harness, hopped out on the ground, removed his helmet and walked away.

For most pilots, the decision to deploy a "chute" never has, nor never

...in severe turbulence, or even an engine failure, [a ballistic parachute] may not always be the last resort. Keep your options open

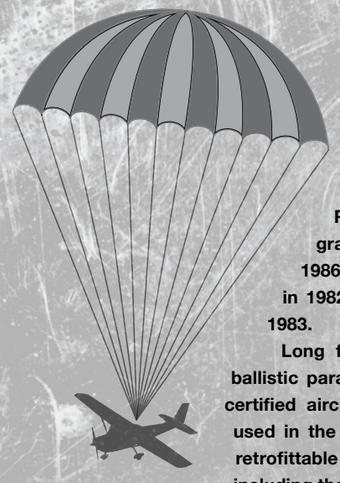
will need to be made. One reason is the reliability of airplanes today, at least the certified airplanes. The other reason is there are actually very few systems installed in aircraft apart from Cirrus, some Cessna 182's and some aftermarket options done with an STC.

Twice in my flying career, I have faced engine failures. And in both cases, there was not a BRS parachute on the airplane. It would have made no difference anyway, as the first problem occurred while on downwind in the circuit (I simply landed on the crosswind runway). The second happened at only two hundred feet above the fields where there was no time to deploy the "chute" anyway. That time, I got away with a bit of a rough but safe emergency landing.

Someday perhaps all aircraft will be equipped with some kind of parachute designed to lower it and everyone aboard safely to the ground. It will remain the pilots' decision whether or not to use it, and there will always be those who won't. The fatalities will continue. I think it's a decision that needs to be carefully thought out, before the flight, while still on the ground. What scenario would it take to actually pull the handle? How far should we go in attempting to safely land a crippled airplane? What type of terrain would we consider to be too hostile?

Definitive answers aren't possible while just sitting and talking about the situations. In the case of a wing coming off, or an engine shaking loose and falling away, there's no question. Pull the red handle. But in severe turbulence, or even an engine failure, it may not always be the last resort. Keep your options open. If you have a parachute system on the plane, it's an option. R

Barry Meek *is a retired paramedic, former broadcaster, mountain bike tour guide and commercial pilot. He lives on Gabriola Island, BC.*



IN 1975 Boris Popove survived a fall in a disabled hang glider, and in subsequently invented a parachute that would lower the entire aircraft to the ground. In 1980 he formed BRS (Ballistic Recovery Systems) and was granted a patent for his invention in 1986. Ballistic parachutes went on sale in 1982 and the first deployment was in 1983.

Long familiar in the ultralight industry, ballistic parachutes are finding their way into certified aircraft. One of the most notable is used in the Cirrus aircraft line, but there are retrofittable versions for other certified aircraft, including the vernerable Cessna 172.

A typical installation includes a solid fuel rocked to pull the parachute out of its housing in seconds.

Ballistic parachutes have been improved and upgraded over the years; BRS' latest version is the BRS-6. Typically the parachute requires repacking every 6 years and the rocket needs to be changed out every 12 years.

Between 1983 and April 2007, it is estimated that over 225 people have been saved by the use of ballistic parachutes.

BRS manufactures parachutes for the entire line of Cirrus aircraft, the Cessna 172, 182 and Skycatcher, the AMD Zodiac, a wide variety of Light Sport Aircraft and ultralights, as well as homebuilt under 1,800 pounds.

Registering a Basic Ultralight

Jumping through the hoops with poise and style / RAA

Scenario

You are just a few months away from completing your new Basic Ultralight so now is the time to get the registration work done. Transport Canada offices, as of late, will take three months to complete this process. You don't want to miss out on the entire flying season over paperwork after spending months if not years while building.

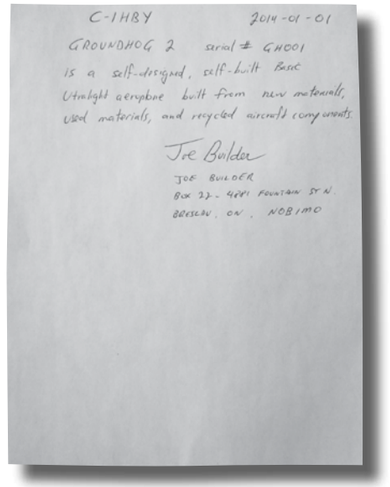
Inform Transport Canada and Pay

First matter is to call your local office to ask for your registration marks. The next available reserved marks used to be free but they will now begin charging $45 for this service. This policy had been held on ice for some time prior but in fact started March 2014. You may request particular marks if they have not already been assigned, and this will cost $140. In either case the registration fee is another $110. You may pay by cheque but most TC offices will put everything on hold until the cheque clears, and there goes the summer. Instead ask to be transferred to their finance department and pay by Visa or Master Card. You will be given a receipt number. This number should appear on all future correspondence with Transport Canada. Once you have paid it is a good idea to call the registration official again to let this be known.

You will be sent a confirmation of marks reservation letter after this process has been completed. The document will show your new marks, an they will expire if you do not complete the registration process within one year, regardless if you have paid everything in full.

Letter

You will need to write a letter describing how your ultralight came to exist. If it was built from a kit or plans, say this in your letter (top right). If you have a bill of sale, make a copy and include it. Joe Builder designed the hypothetical aircraft described here and the letter explains that. When describing the plane and naming the owner be careful to be consistent with the data plate and the registration document. You cannot be Joe Builder on one document or J. Builder on another. Similarly if you use all capitals, continue to do this on all documents including the data plate. Put the registration marks, receipt number and the date at the top of this letter, sign it at the bottom and give your address.

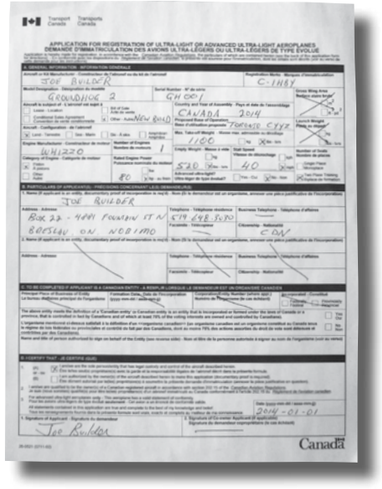

C-IHBY 2014-01-01
GROUNDHOG 2 serial # GH001
is a self-designed, self-built Basic Ultralight aeroplane built from new materials, used materials, and recycled aircraft components.
Joe Builder
JOE BUILDER
Box 22 - 4001 Fountain St N.
BOESEVILLE, ON, N0B1M0

Data Plate

The data plate (centre right) may be made from steel or stainless steel and must contain Serial #, Model, and Manufacturer. In this case Joe Builder is the manufacturer and he has named the plane a GROUNDHOG 2. Note that the upper case has been used to be consistent with the explanatory letter, and the numeral is "2", not "TWO" or "II". You will need a photograph of the finished data plate and this is always difficult. Black shoe polish rubbed into the etched or stamped characters will help make them stand out for the photo. Once again, write the receipt number on the image.

Registration Document

If you search the internet for Transport Canada Ultralight Registration it will usually go to a page that has a link to document 26-0521 (above). Print it out. Alternatively you can ask your local office to mail one to you. (Just



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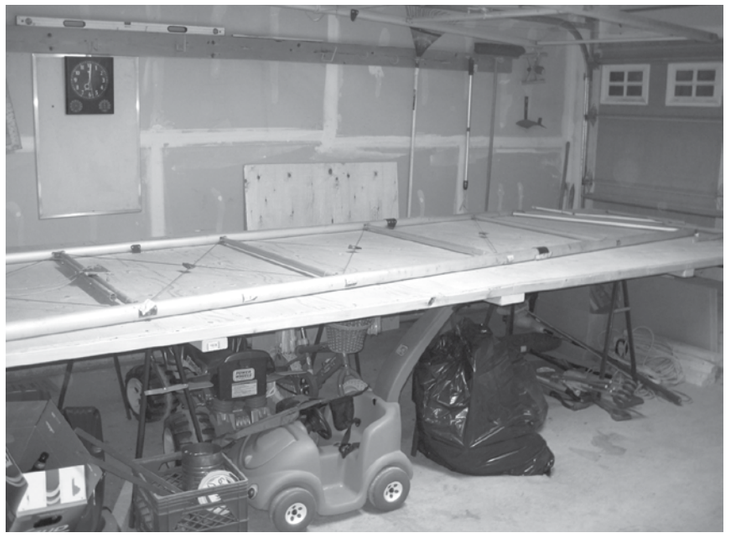
Rebuilding a

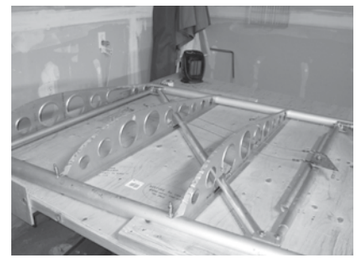
Beaver

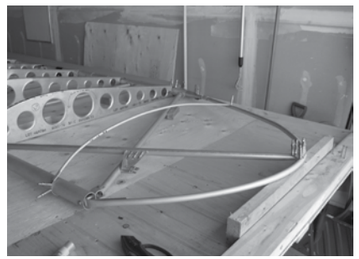
by Allen Mattice

AVIATION HAS ALWAYS been in my blood but I have a young family so the costs have to be kept in check. Several years ago I found a somewhat shopworn Beaver RX 550 2 seat ultralight, still flyable and at a price within my budget. The engine was pretty much finished but I had heard about converting the Geo Metro engine for use in aircraft, using the Russian-made gearbox sold in Canada by Airtrikes in Quebec. I run an automotive body shop and found a low time crashed Metro through an autowrecker. The conversion was a bit heavier than the original Rotax 503 but I intended to fly as a single seater only. A supplementary fuel tank replaced the passenger seat, right under the centre of the CG range, and its extra capacity plus the very low fuel burn of the Geo engine made a travelling airplane out of this ultralight. I could climb at 350 fpm and cruise at 57 mph, using only 8 litres per hour of auto gas.

The next step was to begin refurbishing the airframe. I had earlier repaired and repainted the cockpit fairing but the tail was looking tatty. On 2 stroke pushers the tail always collects a lot of oil residue and this plane was no exception. The flying surfaces of a Beaver are sewn sailcloth envelopes and they absorb the oil, so cleaning the surface was only a half measure. The cure was to strip the sailcloth and recover the tail surfaces with Dacron. My friend Keith Wallace helped me in this, adhering the fabric with Lepage contact cement adhesive, and shrinking it with an iron. I had heard about using latex house paint and decided to give it a try on the tail. The results were encouraging and two summers in my open front hangar have not deteriorated or dulled the finish.







Above: life in the family lane: the "workshop" is in the garage, above all the children's toys. Allen's Beaver originally had wire bracing for drag-antidrag. Upper and lower right, aluminum tubes now handle drag-antidrag and some ribs required slotting to accommodate them.

A year ago it became obvious that the wings were going to need recovering, something I had been putting off because of the cost of replacement sewn envelopes. The problem is that the Beaver does not have real wingribs. The wing is a bolted together aluminum ladder with wire bracing for drag-antidrag but the ribs are just formed aluminum battens that slide into pockets sewn into the surface of the envelope, similar to hang gliders and windsurfer sails. Real wingribs were going to be a necessity, but how to make them?

Fortunately I have a hangar neighbour, Jimmy Kennedy, who has been flying a Beaver for some fifteen years. Jimmy recently finished a Parasol UL for which he had designed his own wing, using the airfoil of the Beaver. Ten years ago he made forming blocks from ¾" MDF and when a friend laser cut his aluminum blanks he had a spare set made for the future. It turned out that I was the future.

Jimmy showed me how to clamp the blanks between the formblocks and to knock the flanges down using a rubber mallet and fluting pliers. A couple months of spare time (I have kids so there is precious little spare time) resulted in a set of accurate and straight ribs for the Beaver.

I was reusing the wing ladders and the original compression struts but there was still the matter of drag-antidrag to be addressed. The original Beaver had a somewhat dodgy continuous loop of wire that zigged and zagged it way down the wing, looping over plastic inserts in the ends of the compression struts. Nicos trapped the cable by tightly flanking the ends of the struts. The problem was that after awhile the cable sawed into the plastic, allowing the cable to loosen and there went the integrity of the drag-antidrag. Many Beavers had this continuous loop replaced by X-wires in each bay but the cost of turnbuckles add up to an expensive number, and they also added a lot of weight. There had to be a better way.

An RAA member suggested to look at the wing structure of the Challenger UL as a guide to how to do it with less weight and complication. Challenger uses 1" tubes and traps the ends in double shear in brackets riveted to the wing spars, so I did the same. I used a bandsaw to make u-brackets by sawing rectangular extruded aluminum tube in half, saving a lot of forming. The wingribs were then positioned and clecoed, and as expected some of the wingribs

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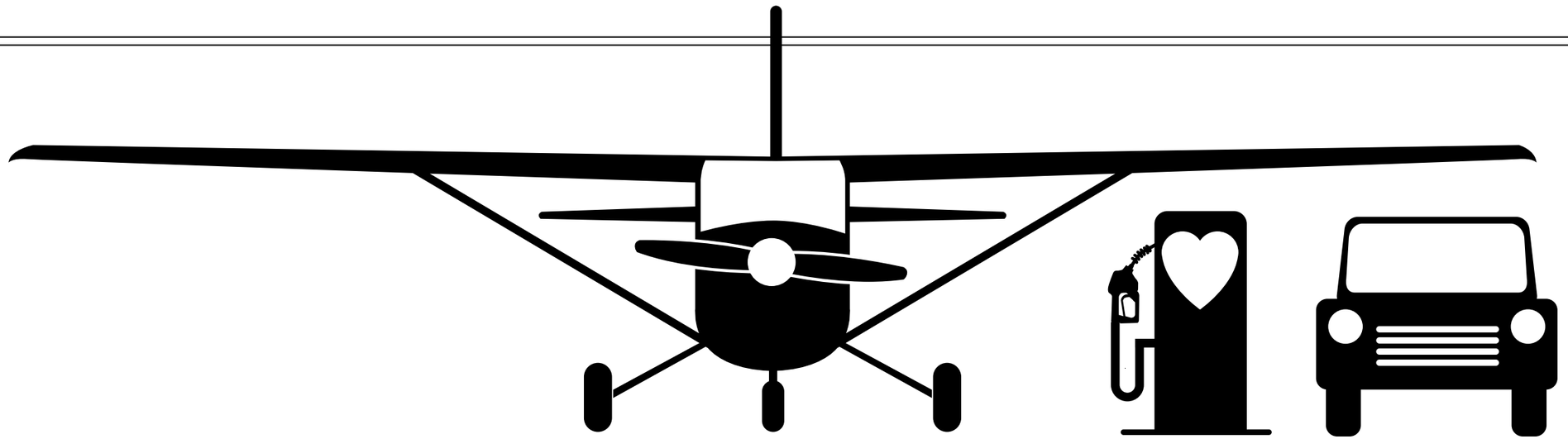


The Good The Bad and the (Really) Ugly

You *can* run mogas in your airplane - within reason

By Kevin Maher

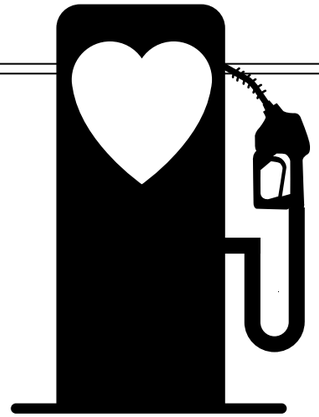
Many years ago I worked for an aerial spraying company that operated its fleet of Ag Cats (P&W Radials) and Pawnees (Lycomings) almost exclusively on auto fuel, amassing tens of thousands of hours of auto fuel operational experience in the process. We never had an engine not reach TBO or have cylinder problems due to the use of auto fuel. In particular, we have not seen any evidence of valve seat recession, but we did break our engines in on Avgas. I currently fly a 450 Stearman, DeHavilland Beaver, and a Harvard on various mixtures of auto fuel and avgas, and thought that I would pass along my observations and experiences. While directed primarily at the operation of the Wasp and Wasp Jnr. radials, I think that the lessons learned are applicable to many engine types.

History: Octane is the measure of a fuels resistance to detonation and is actually the ratio of octane to heptane in detonation tests. 87 octane fuel has the same detonation point as a mixture of 87% octane and 13% heptane. When fuel was first refined, it was 73 octane – that is the best you can get running crude oil through a distillation column. Everything after 73 octane is due to additives and modern chemistry. When the P&W engines were designed in 1925, 73 octane was the only fuel available and that is what they were designed to run on. As both aluminum metallurgy and fuel octane improved, the rated power of the engines increased. The increased octane rating in avgas from 73 to 80 to 87 to 91 allowed increased detonation margins and consequent increase in horsepower. I still have power charts for the operation of the engines on 73 and 80 octane fuel. The increase in octane rating was due primarily due to an increase in tetra ethyl lead. Back in the day before 100LL, the common aviation fuels were 80/87 and 100/130. The first number is the lean octane rating, the second the rich. When sales of 100/130 dwindled, the oil companies decided to phase out 80/87 and only produce one fuel, a compromise called 100LL – low lead compared to the old 100/130, but with over 400% the lead content of 80/87. If you remove the lead from 100LL it becomes 91 octane and this is sold as 91UL in Europe.

Issues with 100LL in P&W Radials: Apart from the cost, the prolonged use of 100LL fuel in the P&W radials seems to cause two main problems – lead fouling plugs and sticking valves. The plugs can be cleaned and the "BY" or fine wire plugs seem to help some. The valve sticking problem is much more serious. When 100LL was introduced it was certified on the basis that the engine manufacturers allowed the use of a higher octane fuel if 80/87 was unavailable. It was never contemplated by P&W that their smaller radials would be run for thousands of hours on a higher octane fuel. Most frighteningly, not one single hour of engine testing was done on the effects of the operation of 100ll fuel on low compression engines. We all became the guinea pigs. It turns out that the rich running low compression engines of old do not run hot enough to scavenge the lead, and the lead precipitates on the valves as it cools while exiting the engine. Then it forms hard, often spherical deposits on the valves that in time builds up to cause intermittent valve sticking. To give you an idea how bad this issue is, I once found a cracked cylinder head on a walkaround by noticing the lead deposits between the cylinder cooling fins, caused when the combustion gasses cooled after escaping through the crack! I have experienced several very rough running engines caused by valve sticking and know of several complete engine failures. Hence my "guinea pig" comment.

So for those of you running 100LL, what can you do? It starts with the engine overhaul. Most engine overhaul companies ream the valve guides to near maximum allowable clearances to allow for some lead buildup. Older overhauls often have tight guides and can be very problematic. The FAA approved oil supplement "AvBlend" has proven very effective at preventing lead buildup when added to the oil and we use it religiously. The downside is that it adds $50 to the cost of an oil change. Marvel Mystery Oil in the fuel is not approved but nearly everybody swears by it. One year at Galesburg I noted that over half the arriving airplanes had MMO in their baggage compartments! We use it, if only to provide lubrication to the fuel valves and pumps but I like to think that the decades of collective wisdom is on our side as well. And the most effective way to solve the problem? Run auto fuel and save money in the process.

If only it were that easy.



The safe storage life of auto fuel now is one to two months, no more. This is why you don't want to buy unbranded fuel. When a big name oil company has fuel that is getting old, they usually sell it to somebody else

Cleanliness: The delivery system for aviation fuels has crazy high quality control standards. When you buy auto fuel you don't know if the tank truck that delivered it had some left over furnace oil in it from its last delivery. Or if the filling stations tanks are rusty, or if it was sourced cheap from some rejected load from God knows where. The solution is to buy branded fuel from suppliers that sell a lot of fuel, and then to have a high quality filtering system that the fuel has to pass through before it gets in the airplane. A "tidy tank" in the back of a pick-up works well with a fine particulate/water filter installed. A jerry can is not so good.

Storage Life: Avgas is designed to have a fairly long storage life. Auto fuel has always been shorter lived but the newer "oxygenated" fuels make this issue worse. The safe storage life of auto fuel now is one to two months, no more. This is why you don't want to buy unbranded fuel. When a big name oil company has fuel that is getting old, they usually sell it to somebody else! Also, you do not want to leave auto fuel in your airplane if you don't regularly fly it. We frequently saw sticky needle valves in the agricultural aircraft after they had been sitting for the winter. Often, this was enough to cause the engines fuel consumption to increase significantly for the first 10 hours or so of operation. A few fillups of 100LL usually fixed this but a word to the wise – fly a tankful of 100LL and then top of the tank if you are going to store the airplane over winter.

Carb Ice: Auto fuel is somewhat more volatile and consequently cools more as it vaporizes. This is very beneficial when trying to start the Beaver in sub-zero temperatures as it is much easier to start. The downside is that when flying in moist conditions, carb icing is more likely and greater vigilance is required.

Vapor Locking: Due to the increased volatility, especially in fuels delivered in winter and used in warmer weather, vapor locking is a distinct possibility. It is unlikely below 6000' density altitude in a gravity fed fuel system but can be problematic in pressurized fuel systems. This is why auto fuel is approved for use in a C-172 but not in a Cherokee with the same engine. We don't use auto fuel at high altitudes and only in a type that has been flight tested (STC'd) to demonstrate the suitability of the fuel system.

Octane: Auto fuel octane is measured slightly differently than aviation fuel octane and under certain circumstances, regular auto fuel may be slightly less resistant to detonation than the 80/87 octane aviation fuel. This could be a problem when operating at high power settings at high ambient temperatures. From my old charts at greater than about 34" MAP and 30 deg. C OAT. The solution is to use either a higher grade of auto fuel or a blend of auto fuel and 100LL. Be aware that blended fuels will separate out over time. This phenomenon is well known in the Super Cub community, and I have witnessed it occasionally in the Beaver after topping off a tank that is half full of 100LL with auto fuel. When sumping the tanks the next morning, straight auto fuel is often present in the low point fuel drain. On cool days or with unsupercharged engines, this is not an issue. One way we deal with this in aircraft with multiple fuel tanks is to keep one tank full of 100LL for take off and landing, and the rest full of auto fuel for lower power cruising.

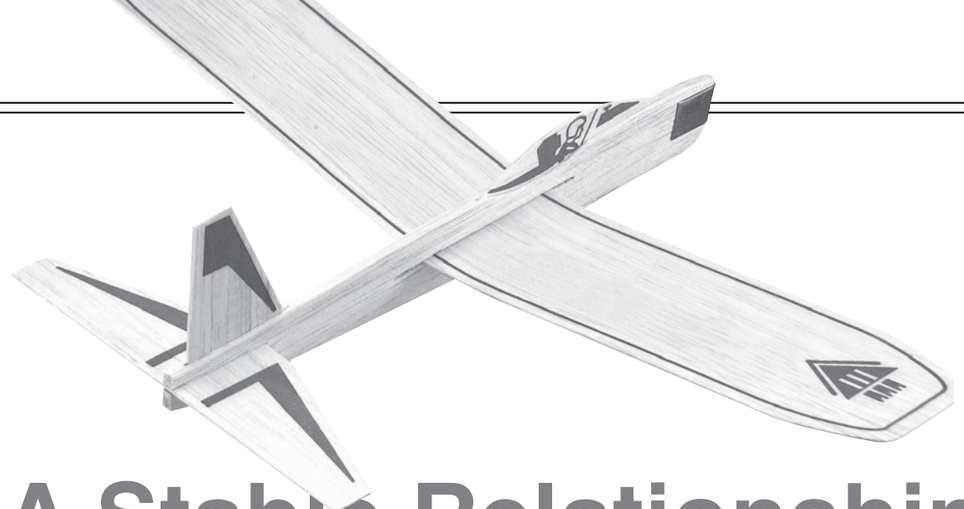
Legalities: A few very old aircraft were certified to operate on "a good grade of motor fuel" but if you operate a type certified airplane, you will most likely require an STC to use auto fuel legally. Pederson Aviation in Nebraska supplies them along with much useful info and the peace of mind that they flight tested the airplane to check for vapor lock and carb ice issues. The price of the STC is such that you recover the cost in about 20 hours of flying.

Alcohol: This is the show stopper. Thanks to an unholy alliance between some mis-guided environmentalists and the farm lobby, many areas now require ethanol or other alcohols to be added to gasoline. Never mind that this contributes to third world hunger, or that it is not cost effective without big subsidies to both the farmers and refiners, this feel good act stupid idea came to be and we now have alcohol contaminated fuel in many areas. If you can't find a supplier of alcohol free Mogas, you can't run Mogas!
Alcohol very quickly eats most of the rubber compounds in aircraft fuel systems and over time can cause corrosion in aluminum fuel tanks. Just how fast? One day I took a load of fuel in the Beaver at a marina in the middle of nowhere in order to get home. I knew that it contained alcohol but reasoned that by the next day it would be gone and it couldn't do any harm in a few hours. Wrong. The next day the primer seal was a gooey mess that required immediate replacement. Luckily, the engine fuel pump and fuel lines seemed to fare better but lesson learned. There are many ways to check for alcohol contamination and it is important that you check every load of new fuel.

Final Thoughts: So what do I do? I run auto fuel in our radials and small horizontally opposed engines but as you can see, using Mogas is not a "fill up and forget" type of fuel. I always ensure that a tank of 100LL is available if flight at either high altitude or temperatures is contemplated. 91UL has been available in Europe for some while and the antique airplane community has been very pleased with it. I have high hopes for 91UL if and when we ever see it in North America. Until then, I run primarily Mogas in our aircraft, dealing with all the consequent issues and hassles that come with it. But it still beats the fear that accompanies a backfiring, rough running engine over inhospitable terrain, due to sticking valves!

And the money I save allows me to fly even more.

Kevin Maher *is an expatriat member of Chapter 85 who lives and works on Vancouver Island. He is currently restoring a 1936 Stearman and is president of the Duncan Flying Club.*



A Stable Relationship

Everybody want one with their airplane. But how does it *really* work?

WHEN IT COMES to aviating safely, stabilty is everything. I'd like to look at three aspects of it: firstly, I'd like to identify a widespread misconception about the design features of conventional aircraft that determine their static longitudinal stability. I'd also like to discuss and support from experiment the correct view of the subject; and finally, direct the reader to an authoritative mathematical proof of the discussion.

Definition

Longitudinal static stability is the stability of an aircraft in the longitudinal, or pitching, plane under steady-flight conditions. (Wikipedia): That is, its ability and willingness to return, hands-off, to its original flight path after it has been disturbed from it (FG).

The misconception

A common misconception about static longitudinal stability of conventional aircraft is that the horizontal stabilizer must fly at a negative angle with respect to the wing, and/or at a negative angle of attack. The reason often given is that "the wing must stall first" to drop the nose. In fact, however, stalling has nothing to do with stability, which is working every moment the aircraft is in the air, nowhere near a stall. Below is an explanation.

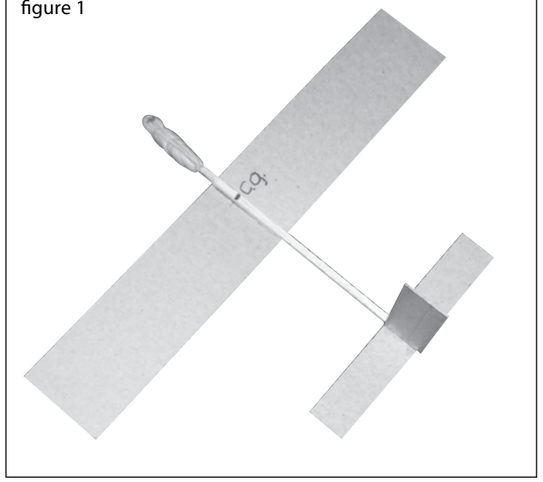
Correction of the misconception

Obviously the feathers of an arrow must be at the back. This suggests that an airplane, different from an arrow as it may appear, must yet obey that same physical law: its "tail feathers" must be well aft of its centre of gravity. Any feathers ahead of the c.g. (such as the propeller with its prop normal force, and the fuselage, nose, etc.) will do the reverse and will be *de*stabilizing. Yes, a canard surface is *de*stabilizing and must not be called a stabilizer; it is a canard surface or a foreplane.

So exactly where is the centre of effort where all these various forces are assumed to be concentrated? The trouble is that the major force, the wing's lift, moves back when the nose drops (decreasing the lift), and forward when it rises (increasing the lift). (NB: with special airfoils like the NACA M6,

A common misconception ... is that the horizontal stabilizer must fly at a negative angle with respect to the wing

figure 1



this movement has been reduced to a minimum. This is another subject.) These reactions are destabilizing. That's why we need a "stabilizer". To demonstrate this vividly, cut a "wing" from a piece of card stock, give it some dihedral, and drop it from your hand. It will flutter down in a series of rapid consecutive loops, not a steady glide; it needs a stabilizer! Glue your little wing 1/3 of the way along a tongue depressor, add a stabilizing surface (20% of the wing area) and a fin at the long end and a little clay at the other end, and you have a stable airplane that will glide just fine, in a gusty breeze which, to scale on the Beaufort, would be about Force 7 (moderate gale)! See Fig. 1 (above), the model described, with wing-tail incidences zero-zero.

So what did you just do? You arranged the plan-view areas so that all of the areas aft of the c.g. multiplied by their blended lever arms was greater than all the areas before the c.g. multiplied by their lever arms, which is a complex way of saying you put the aerodynamic centre of the airplane (not merely of the wing alone) aft of the c.g . If the airplane enters an updraft, it will try to nose up because the angle of attack increases and the centre of lift moves forward; but the area we have identified as the aerodynamic centre (contributed mainly by the stabilizer), having also acquired this same greater angle of attack, will oppose this nose-up tendency, that is, it will "stabilize" the airplane and nose it back down to its original angle of attack. This, in fact, is exactly what is happening every instant of flight in a properly trimmed, stable airplane. It is not necessary for "the wing to stall first" which is so often suggested.

But is this how it actually works?

Old-time builders of rubber powered free-flight Wakefield contest model airplanes usually balanced them near the trailing edge of the wing. This was because the horizontal stabilizer was a huge 33% of the wing area, was cambered, and carried a lot of the weight, flying with a positive angle of attack. A modern illustration of this is the Quickie airplane with its two wings located far fore and aft of the c.g. The aerodynamic centre of the airplane, not of either wing, is between them.

Inherently stable airplanes fly that way, although we don't ask the stabilizer to carry much, if any, load. This includes your faithful C152. You trim-out any nose-up tendency (caused by loading the aft baggage compartment or boarding another passenger) by increasing the incidence of the elevator. This reduces its negative lift or makes it a small lifting wing. Why most conventional aircraft carry a little negative incidence on the stabilizer is another subject for another day: but it has nothing to do with longitudinal stability.

So yes, that is how it works.

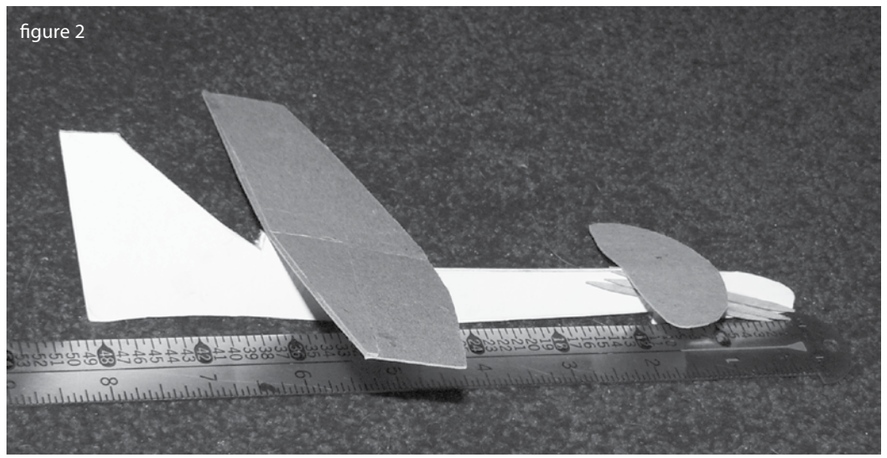


figure 2

A word about canards

A canard obeys exactly the same aerodynamic rules as a conventional airplane, that is, the feathers have to be at the back! It looks different and balances differently, because the weights to be carried, and where, force the designer to put the c.g. much farther ahead than usual. This can be demonstrated with a tiny 79-cm. wingspan swept-wing cardboard canard from a hobby store (Fig. 2); the c.g. is just ahead of the wing leading edge, on the fuselage centreline . This airplane, with its strange c.g. location, flies fine, simply because there is more moment aft of the c.g. than in front of it. The feathers are at the back!

See Figure 2 above: anyone who unwisely dismisses models for aerodynamic investigation should note that the former NACA, now NASA, along with Canada and every other advanced nation, for a century, has used small models to explore almost every phase of flight. We whimsically comment, exaggerating only a tad, that we can do for a buck what costs Boeing a billion! Money aside, commenting to my wife as I return with a handful of debris, "Well, we killed another test pilot today!"

The mathematical support

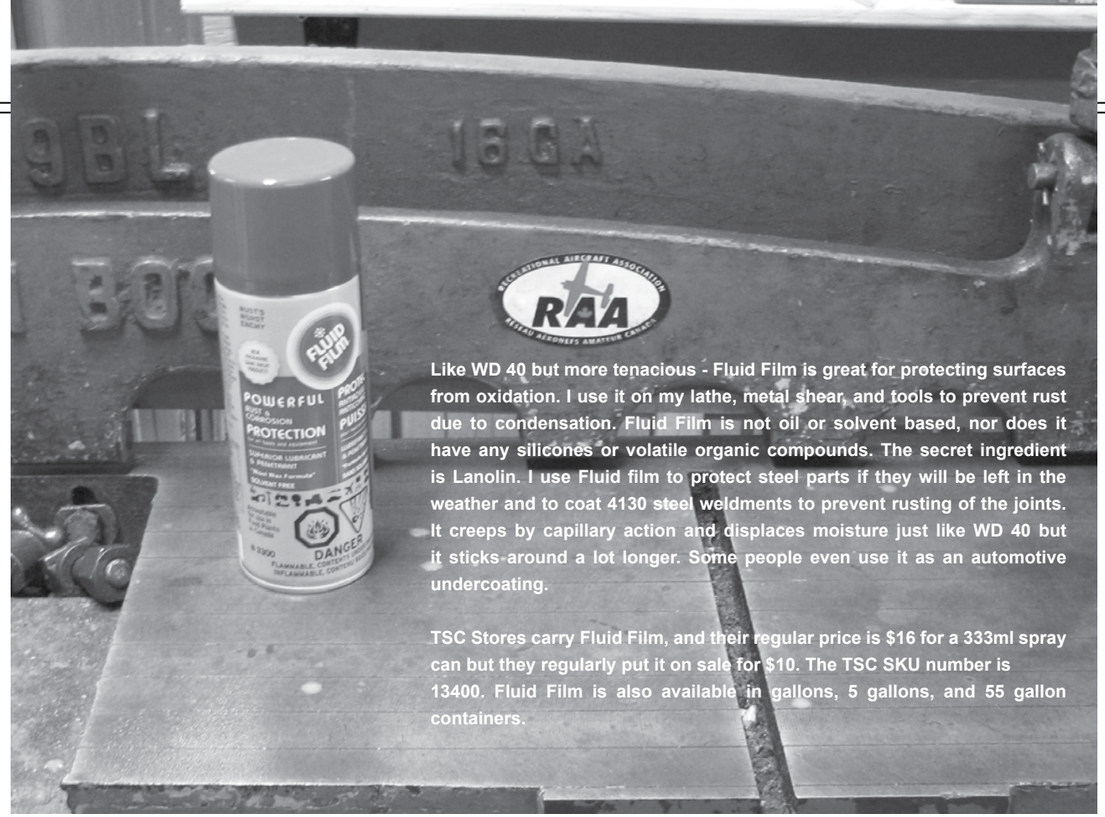
Readers interested and capable in math should consult any good text, such as the old reliable Perkins and Hage, Airplane performance, stability, and control, Wiley, 1949, p. 10-12. There is no trace in the math or in the text of any term that suggests that stabilizer incidence must be less than wing incidence. Indeed, there is the clear statement that, "The slope of the pitching moment curve has come to be the [only] criterion for static longitudinal stability". Yet, despite this half-century-old mathematically and practically provable advice, that superstition continues to flourish, even in textbooks written 47 years later, where we see the erroneous statement, "The tail of a conventional airplane must be at a negative angle of attack."

To Summarize

For an aircraft to have static longitudinal (pitch) stability, the net moment (leverage) of all the top-view areas aft of the c.g. must be greater than the net moment of all the areas ahead of the c.g. How much greater is another question for another day.

Ref.: http://adg.stanford.edu/aa241/stability/staticstability.html
also Perkins and Hage, AIRPLANE PERFORMANCE, STABILITY, AND CONTROL, Wiley, NY 1949, p. 11

Frank Gue *is a Registered Professional Engineer living in Burlington. He is a published author on factory management, education, politics, and economics. He flies a C150, which he uses better to understand the theoretical basics of flight. He uses R/C models to test outrageous designs that would be too expensive for a human to test. One result is a patented hydrofoil landing gear for waterplanes.*



Like WD 40 but more tenacious - Fluid Film is great for protecting surfaces from oxidation. I use it on my lathe, metal shear, and tools to prevent rust due to condensation. Fluid Film is not oil or solvent based, nor does it have any silicones or volatile organic compounds. The secret ingredient is Lanolin. I use Fluid film to protect steel parts if they will be left in the weather and to coat 4130 steel weldments to prevent rusting of the joints. It creeps by capillary action and displaces moisture just like WD 40 but it sticks around a lot longer. Some people even use it as an automotive undercoating.

TSC Stores carry Fluid Film, and their regular price is $16 for a 333ml spray can but they regularly put it on sale for $10. The TSC SKU number is 13400. Fluid Film is also available in gallons, 5 gallons, and 55 gallon containers.

Vans Aircraft Safety Bulletin

Vans Aircraft website (www.vansaircraft.com) has posted a notice about possible cracks in the rear elevator spars, and inspection is to be performed before next flight. The bulletin comprises eight pages including illustrations. Here is the first page:

BULLETIN 14-02-05
Date Released: February 5, 2014
Date Effective: February 5, 2014
Subject: Cracking in elevator spar web near elevator attach points.
Affected Models: All RV-3, 4, 6/6A, 7/7A, 8/8A Flying aircraft
Required Action: Inspect for cracks as described in this document. Stop-Drill cracks (if present) then apply E-00001A and E-00001B Hinge Doubler fix as required to cracked elevator hinge positions. RV-3,4 and 6/6A customers will need to fabricate their own doublers using E-00001A and E-00001B as a guideline.
Time of Compliance: Inspect before further flight.

- If no cracks are detected, re-inspect at every annual condition inspection or until E-00001A or E-00001B Hinge Doubler repair has been installed.
- If cracks are detected, the E-00001A and E-00001B Hinge Doubler repair must be installed at the cracked hinge position before further flight.
Supersedes Notice: SB14-02-03
Synopsis:
Cracks have been found near the rivets attaching the nutplates that hold the elevator rod ends to the E-702 Spar and E-610PP or E-611PP Spar Reinforcement Plates. See Figure 1, Figure 2 and corresponding elevator assembly plans pages.

Method of Compliance:
NOTE: Installation of this service bulletin as preventative maintenance is not recommended. If cracking has occurred at an outboard hinge position, install a doubler only at that position.

Are you current according to Transport Canada? According to TC there are a number of ways a pilot can stay current. TC's "TAKE FIVE"safety flyer TP2228E offers an easy summary of it (see *http://www.tc.gc.ca/eng/civilaviation/publications/tp2228-menu-5418.htm* for more).

Several years ago, when I first became a Director of our local RAA-Toronto chapter, I wondered if some 10 to 15 min quick informal refresher/ brush up sessions might be of interest/ value to the members. I decided to use our monthly general meetings to do this. At first I was not sure how these mostly long time pilots would react to this; after all, they have been flying for years and one would assume that these little refreshers could easily be boring to them.

Not so. It was an instant hit, as long as it was done in small segments. Topics were how to read and properly interpret METARs, TAFs, PIREPS and how to navigate (and read) the many icons on Nav Canada's Forecast and Observation page AWWS.

https://flightplanning.navcanada.ca/cgi-bin/CreePage.pl?Langue=anglais&NoSession=NS_Inconnu&Page=forecast-observation&TypeDoc=html

I converted the Nav Canada Aviation Weather Services Guide into ten individual Powerpoint presentations. Each presentation was designed to interact with the members and encourage a little group discussion on the subject.

I soon realized that many of these long time pilots rarely take any recurrency training or brush up on rules and regulations, especially when it comes to newly published rules and procedures.

In every October issue of TC's Aviation Safety Letter, TC publishes a Flight Crew Recency Test in form of a Self-Paced Study Program, usually around 30+ questions. The answers are given on another page inside the ASL. Completing this test in writing counts as one of the official recurrency requirement options. The ASL used to be automatically mailed to each Canadian Pilot License holder. In recent years they have stopped the mail distribution and made it available only in electronic format. You can subscribe to it with TC (free of charge), and then you get it automatically via e-mail.

The problem, it seems, is that not very many pilots are actually going through the trouble of answering each question and then retain a completed copy as proof that they have actually done it. The questions are based on going through the various sections (beginning to end) of the latest TC AIM (Aeronautical Information Manual), which is also available on line and (always updated) at http://www.tc.gc.ca/eng/civilaviation/publications/tp14371-menu-3092.htm

I saw an opportunity to do this in form of a group session with our members. I converted the entire questionnaire form into a Powerpoint format, and gave every attending member a blank copy of the questionnaire including writing utensils. Then we jointly went through the Power point pages; first the question only, followed by a brief discussion on what the answer may be and why, and then confirming the correct answer on the next slide. The members then wrote the correct answer in their questionnaire.

To give it some extra value and to draw as many members as possible to the annual recurrency session (usually held in January), I checked with TC if I could get formal TC stickers, like you get when attending any of their official recurrency seminars. I was told that, since I was not a TC employee to conduct the seminar, I could not get these TC stickers to hand out. However, if answering of the questions would be done in a group-session format, and the stickers would clearly show reference to CARs 401.05(2)(a), it was OK for me to issue my own stickers with the proper references, which participants then could then use as formal recurrency proof logbook stickers, as long at the pilot retains a copy of the completed questionnaire.

I have been doing this for the last three years and also conduct this once a year group session with the RAA chapters in Flamborough and Waterloo, and members now look forward to this annual event. This questionnaire satisfies the 24-month recurrent training program requirements under CARs 421.05(2)(a).

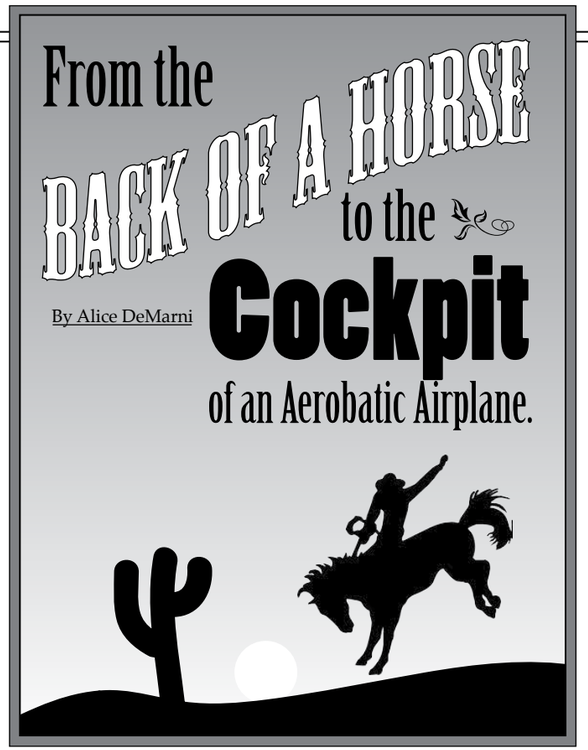
I can only encourage other RAA chapters around the country to do the same. It brings attention to pilot's safety issues and knowledge of the rules and regs, plus it gives value to the club members. Making up the Power point slides takes a little time and effort, but, at the same, it keeps me up to date when preparing the Power point, as I also read up on every answer in the appropriate AIM section, should a member question or challenge the official answer. If then there is still a question or doubt about understanding the answer, I will further look into it and reply back to the member(s) in a day or two.

Safe Flying!

Fred Grootarz *is the president of RAA's Toronto chapter.*

From the BACK OF A HORSE to the Cockpit of an Aerobatic Airplane.

By Alice DeMarni



Octogenarian Tony Bellos has enjoyed a fascinating life with many diverse careers as cowboy, Canadian Air Force Flying Officer, businessman, rancher, horse breeder and cattle buyer. He maintains an active lifestyle even today, flying his aerobatics plane and working out to stay in good physical shape.

EARLY DAYS

In 1916, Tony became one of the first white children to be born at South Fort George, the settlement located next to Fort George, the Hudson's Bay Company trading post. At that time, land was just being cleared for the present day Prince George. Tony's father William, a member of a prominent family in Greece, was sent to the U.S. at the age of 14 for a one-year education. He did not return to his homeland for 65 years. After landing in New York, he worked his way across the U.S., finally arriving in Vancouver, B.C. There, he tried to secure supplies for the Klondike Gold Rush but because of his small stature, he didn't meet the height and weight requirements. He ended up burning stumps on what is now Granville Street in Vancouver. He also worked for the Grand Trunk Railroad before moving to Prince George around 1910.

The railroad had not yet been built so the only industry in the area at the time was the fur trade. He built a hotel, purchased land and met his future wife. Tony's mother Sophie, of Polish/Ukrainian descent, was born on the prairies. Her family came to Canada at the turn of the 19th century and settled in the Vegreville area of Alberta. Sophie's and William's tumultuous marriage ended in divorce after only a few years.

Sophie remained in the community. She nursed people in the 1918 flu epidemic. Afterwards, the local doctor set her up in a maternity house, which she ran for many years, serving as community mid-wife. Following the divorce, William retained custody of his two sons, two-year-old Tony and infant Tom, and farmed them out to various people who helped raise them. "After a local trapper named Porter was killed, Dad gave his widow the job of looking after us," recalls Tony. "When we were about four and six years old, we lived for awhile with a remittance couple by the name of Randall. They taught us our English manners."

Later, the two boys lived occasionally with the Hubble family. They owned various trading posts, located between Prince George and the MacKenzie River, which they had taken over from the Hudson's Bay Company. The Hubbles used Husky sled dogs to transport their furs in the winter. "When I was just eight years old," Tony says, "I drove a dog team home after an employee had taken a load of furs, which were tightly pressed into packages and wrapped in burlap, to the fur house in Prince George. Asking a kid to drive a dog team, then, was like offering a young boy the opportunity to drive a brand new car, today." After the man unloaded the furs, he turned the dogs around and told Tony to take them home. The town of Prince George had been laid out by this time but only a few buildings were scattered here and there. "When I came to one of these buildings and had to go around it, the wind was so strong, the lead dog turned back and the dog fight was on. I knew how to use a club to stop them, finally managed to get the dogs separated and headed out again. When I finally arrived home, the Hubbles heard the harness bells and one of the girls rushed out to help. I couldn't let go of the sleigh handles because my hands were frozen to them. It was 50 degrees below zero."

While growing up, Tony always had horses. "I learned to ride when I was about eight years old," Tony remembers. "Instead of playing games like baseball, men throughout the B.C. interior raced horses against each other. I started jockeying for those races when I was about 12. I raced horses in many small towns from Smithers to Williams Lake."

TONY QUIT HIS RANCH JOB IN 1939 AND ENTERED A THREE-YEAR ENGINEERING COURSE AT NORTHRUP SCHOOL

COWBOY YEARS

In 1931, when Tony who had never got along with his father was just 15 years old, he quit school, packed his few belongings, and left Prince George. He saddled up his horse and rode south to the Chilcotin, a three-day trip, and started cowboying. He worked for various ranchers during the spring, summer and fall, including the Perkypiles, an elderly couple from the states and the Moon Ranch at Riske Creek.

He spent the first two Chilcotin winters chasing wild horses. The first year, he and his partners caught 200 and drove them north, marketing them along the way, selling the last one in Vanderhoof. When they stopped to make camp each night, Tony, the kid of the bunch, had to ride the broncs. "We'd make camp and tie up some of the horses over night and then they had to be rode. Two men herded me and I'd ride maybe 10 head every morning." Tony remembers one particular hair-raising incident. "We stayed at the Cottonwood River north of Quesnel, for a few days, and built a corral. One morning, I was on a bronc in a clearing, located on a flat above the wagon road. The flat was fringed with a stand of small spruce trees and beyond the trees was a cliff overhanging a 200-foot hill. My two herders were pretty casual about their work. All of a sudden the horse headed in the direction of the other horses corralled down below the cliff. Bucking wildly, it suddenly burst into a run, out of control. I just held on. We went through the fringe of trees and over the cliff, flying through the air. I threw myself off the saddle. The horse ended up upside down on his back. Down the steep gravel hill we rolled and hit the road at the bottom. I jumped up and got back into the saddle and gathered up the reins. The horse stood up, still stunned and faced the cliff. My two herders looked over the cliff and asked me how I got down there. I calmly told them I rode down." Tony's wild horse chasing days were soon over.

One winter, the Provincial government shot about 3,000 wild horses on the Riske Creek range. The wild horse herd had grown too large and eating too much of the open range needed by the ever-increasing cattle numbers. For fun and recreation, Tony competed in the saddle bronc event at the Williams Lake Rodeo for about five years. The top prize in those days was $50 and a silver cup. Second place paid $10 and a prize of either a leather belt and silver buckle, spurs or a bridle. He still wears the plain silver buckle that he won for second place. Eventually, Tony went to work for the YB Ranch, owned by the Kinlochs. He soon became cowboss and Mr. Kinloch ran the business end of the operation.

continued on page 34

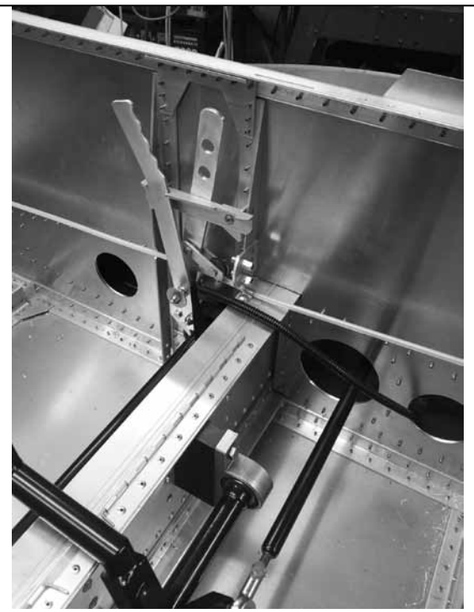
onex

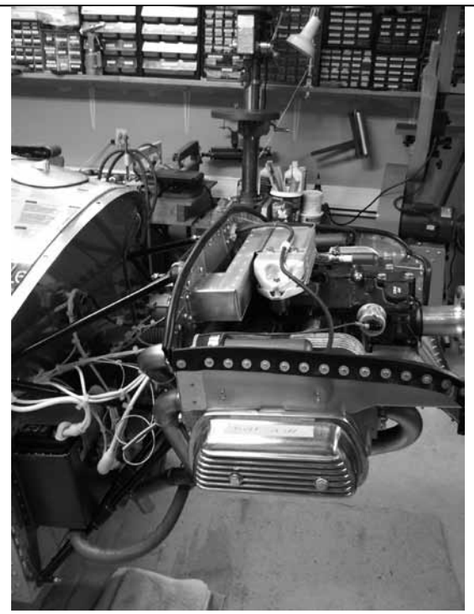
JOHN MONNETT has a long history of designing small and efficient aircraft that give good performance on a direct drive VW engine. He began with his Sonerai with a tube and fabric fuselage and aluminum wings, built to compete in the Formula Vee class that was limited to 1600cc Volkswagen engines. John is not a tall man and his planes were built to fit himself, with as little frontal and wetted area as possible. Shortly he designed the larger 2 seat Sonerai 2 that for most became a single seat plane with a bit of baggage space. After these he turned to stressed skin 6061 aluminum for the entire plane, next building the Moni motorglider and a singe seat speedster called the Monex, setting the shape for all of his later planes – VW power, airfoil shaped fuselage, laminar airfoil, and all aluminum construction. The Monex had only 45 square feet of wing and reached 220 mph on a 2180cc VW engine, but it was too tiny for most pilots.

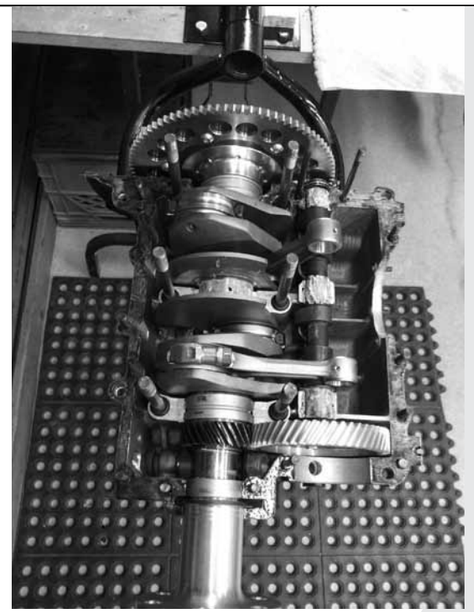
In the late 90's Monnet showed the 2 seat Sonex prototype at Oshkosh and for a decade he has been running with this, all the while adding more value to the kits by offering more premade subassemblies. It is still possible to build entirely from plans (the best construction plans in the industry) but the market wanted a quickbuild so Sonex responded with CNC-formed and drilled parts, fully assembled spars, and many other components. Sonex recommends their own AeroVee 2180 engine but also supports Jabiru 4 and 6 cylinder installations and also the Revmaster conversion.

Five years ago Monnett began showing sketches of a proposed single seat VW powered pocket rocket called the Onex (One – ex) with folding wings. This plane began as an 85% scaled Sonex with a comfortable 27" wide cockpit that accommodates a six foot pilot. The Onex is designed to meet the requirements of the US Light Sport category, and with flaps down it will even meet the landing speed requirements of Canada's Basic Ultralight

By Pierre Marcotte and Gary Wolf







From left to right: tailcone is a rectangular box with a strong spine along the centre of the turtledeck; the flap and brake controls are cut out of flat stock and actuate just behind the spar. The Aerovee package is an engine-in-a-box: the builder assembles it, following the supplied video

category. The Sonex 64-415 airfoil is employed with the chord shortened to 50 inches. Plans are supplied but these are assembly plans, not fully dimensioned construction plans.

Pierre Marcotte of Cornwall Ontario has a long history of building and flying amateur aircraft. He has nearly 1000 hours PIC, with a Private ticket with float and night endorsements, and he has flown many aircraft ranging from a Lazair to a Ron Wilson Acrolite.His building repertoire includes Moni, VariEze, RV-3, RV-6A, Sonex, and Waiex. In January 2012 he began the build of his Onex, his fourth Monnett product and his seventh project overall. Besides being a prolific builder Pierre is an Inspector for MD-RA, so he is very familiar with the Amateur Built process. Although the Onex could have been registered Basic UL he felt that the greater privileges and better resale value of the Amateur category justified the expense of the inspection process.

Pierre had been looking for a quick and economical single seat aircraft that could use an inexpensive engine, and had considered a Hummel and its variants but the speed and handling of the Onex hooked him. He ordered the complete kit, engine and all, and began prepping his 1-1/2 car garage. This workshop has a 12 foot level table, a drill press, a grinder and a disc sander, the usual air and hand tools, a compressor, and a riveting jig for the spar.

The kit arrived shortly after ordering, complete and undamaged, and without any back orders. There was no manual, just additional instructions on the plans sheets when needed. Sonex offers a three day school at their facility in Oshkosh as part of the kit price, but Pierre had already built three Sonex variations so he jumped in. The Onex plans that came with Pierre's kit were not nearly as well done as those for a Sonex. They had errors and omissions, hardware callout mistakes, mislabeled parts and orientation errors. This was an early kit and later ones have been corrected.

The Onex fuselage is essentially a rectangular box with a rounded and reinforced turtledeck. The canopy is similar to the Sonex but much narrower. The Sonex canopy has a reputation for being difficult to fit without cracking, and when Pierre built his Sonex it took three tries to get it right. On the Onex he managed this the first time by using a heat gun to reshape the sides to fit the frame better.

The fuel is carried in a 15 gallon cowl tank made of rotationally moulded polyethylene. Pierre raised an eyebrow at the fuel shutoff valve – it is located well forward, and the pilot cannot reach it while belted into the seat. He installed a long red plastic handle but still does not feel that this is the best setup. Because of the geometry a panel controlled knob is virtually impossible to design. Pierre bought a drain valve with a barbed end fitting and ran a hose from it through a small hole he drilled in the floor. However it is still not possible to hold the valve open and sample the fuel at the same time. 100LL is the only fuel Pierre uses because he chose a high compression ratio for his Aerovee engine.

Landing gear is a change from the Sonex, which uses tapered rods plugged into sockets in the engine mount. The Onex uses a four bend aluminum plank, similar to the one Monnett pioneered on the Sonerai. The engine mount has a socket for a nose gear, should the builder wish that configuration. The aluminum main gear then gets bolted to the bottom of the fuselage in a more rearward position. The centre section of the main gear is unfaired but Pierre made his own to smooth out the airflow on the bottom of the fuselage. The kit brakes are mechanically actuated by a single lever, so no differential braking, but they work well and are able to hold the plane fixed during a runup.

The tail of the Onex follows the Sonex pattern, with the rudder being hinged to one side of the vertical fin. Cables run from rudder pedals that may be bolted down at several different points to accommodate different leg lengths. To improve accessibility Pierre added inspection panels to the sides of the forward fuselage. The tailwheel is actuated by a pushrod from the rudder bellcrank. It required some fiddling to get the airplane to turn more sharply. The horizontal stab is tapered, and its elevator is actuated by a pushrod.

The wing of the Onex is the most distinguishing feature of the plane. The centre section is fixed and the outer sections fold up in the manner of a Hawker Sea Fury or other shipboard plane. The hinge mechanism is simple – a single handle under each wing pulls the pins out of the main spar's bottom cap and out of the rear spar, and the wing can then be tipped up. When the wing is lowered and the pins are pushed back into their holes, an indicator pops up through the top of the wing to let the pilot know that all parts are home. There are no cables to undo or reconnect because the flaps are in the centre section, while the ailerons are actuated by paddles as on a shipboard fighter. With wings folded the plane becomes narrow enough to fit into a standard 8 ft wide trailer. Pierre does not need the wing fold and if there had been an option to eliminate it he would have chosen that to avoid the weight and complexity of the mechanism. The shorter optional 18'9"ft wingspan is easy enough to accommodate in a small hangar.

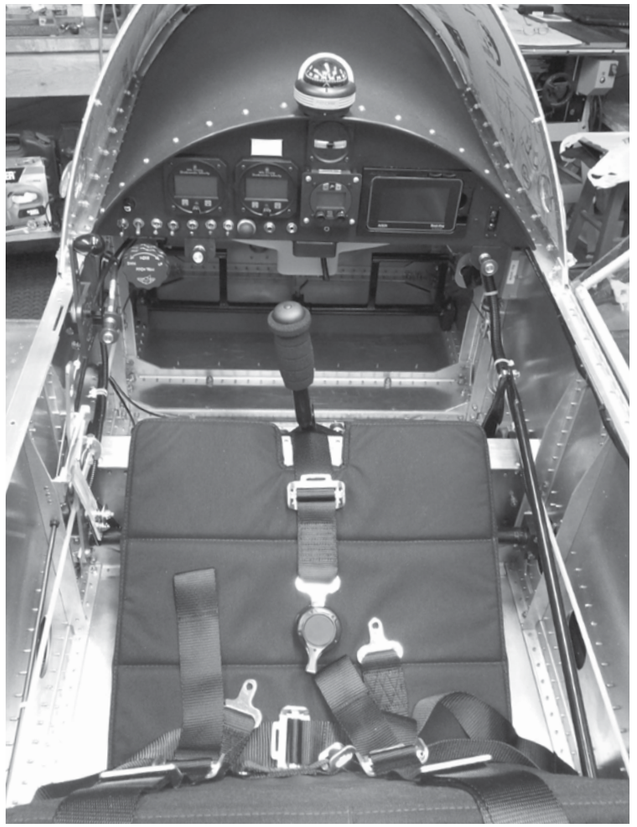
On a Sonex the wing's spar caps are a proprietary T-shaped extrusion but the Onex uses an off the shelf angle extrusion. The centre section and outer sections have no washout and the outer sections have a slight dihedral. Unlike the Sonex that has all rib flange facing the same way, the Onex has left and right ribs. Except for the solid-riveted spars, everything goes together with stainless blind rivets. The wings are essentially self-jigging but because all holes are pilots to be drilled to 1/8 by the builder there is the possibility of ending up with an accumulating error. A straight

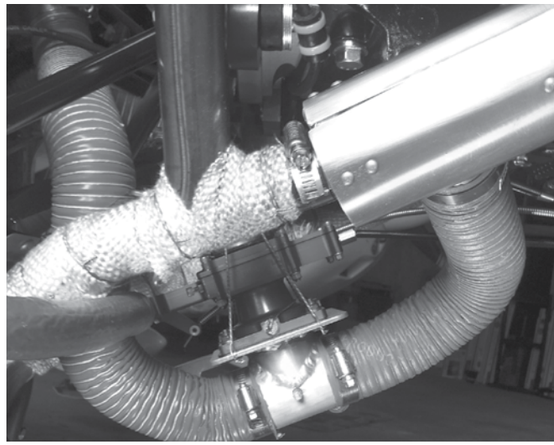
flat table should be used to assure straight flight surfaces.

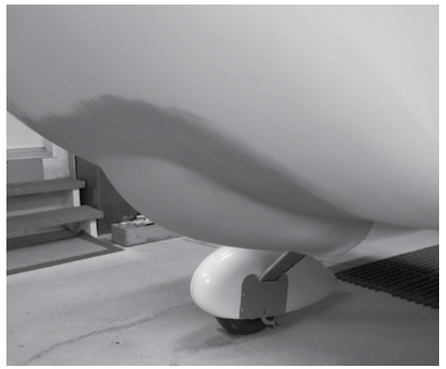
Unlike the Sonex, which has a number of engine possibilities, The Onex is married to a VW engine. Pierre decided to buy the entire Aerovee engine package and assembled it himself using the provided video as a guide. The Aerovee exhaust was designed for the Sonex so he had to refit the tail pipes to clear the gascolator and firewall bottom. He also fabricated a battery box, oil cooler box, and the carb heat installation required by Canada's regulations. The cowling did not fit all that well and required some rework of the forward seams.

Seatbelts and upholstery both came from Sonex, as did the MGL V-6 radio, which had to be mounted with an inch proud of the panel to avoid contact with the fuel tank. Two MGL instruments were fitted, one to handle all engine information and the other for flight instruments. An ACK 406 ELT with remote and a King RV8OR GPS round out the electronics; a standard whisky compass and a slip indicator are the only mechanical gauges. Pierre made the panel easily removable because it is just about impossible to get underneath the panel to do any checks or rework. The radio works without any static but feedback was being picked up by the ELT antenna that was also installed on the turtledeck, but at least three feet from the com antenna, causing the remote panel reading for the ELT to act up whenever the mike was keyed. The cure was to move the com antenna to the belly of the plane.

The cabin has both heat via a muff and ventilation via two side mounted scoops in the canopy. There is no sunshade but Pierre wears a(n) Onex cap. The 27 inch







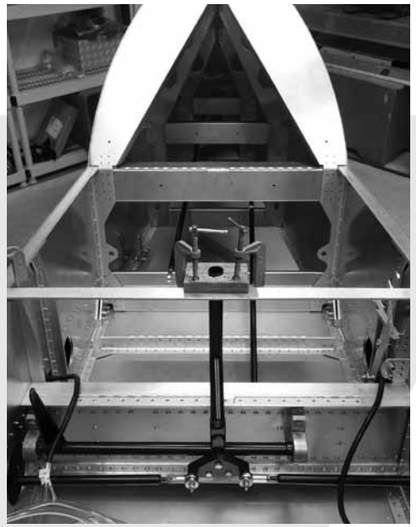
Above: Full metal jacket cockpit makes it tempting to play fighter pilot. Top right, the intake system provides either hot or cold air to the Aeroinjector; above left, US spec does not require carb heat so Pierre added his own fairing for his intake system

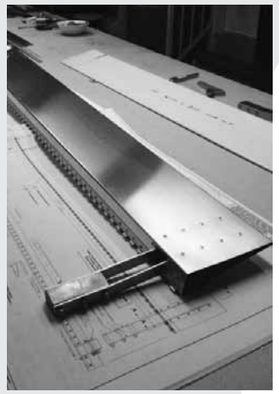
wide cabin is roomy and comfortable and as easy to get in and out of as any low wing plane. There is lots of head and legroom. The control quadrant is on the left side and falls to hand except that the mixture knob is too close to the flap handle. Pierre plans next to shorten that handle.

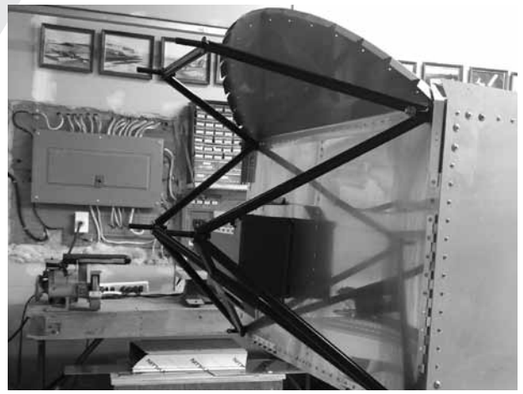
Rather than add the weight of paint, Pierre decided to polish the aluminum and paint only the fiberglass components. He used a waterborne paint but did not like it, and if he were doing it again he would use Imron. The empty weight claimed by Onex is 600 pounds, and even with the items required by Canada's regs Pierre's plane came in at only 624 pounds including an extra foam cushion. Next time he would paint the whole plane and save a lot of time polishing. The factory claims +6/-3 G's at 950 pounds so there is plenty of payload in this plane. The CG ended up at 30-32% chord and it appears impossible to get outside the CG range.

Pierre did his own first fight in October 2013 and is still flying off the 25 hours. He is impressed by the performance, meeting or exceeding the factory numbers. His little pocket rocket cruises nicely at over 150 mph when the Sensenich 54-44 wood prop is turning 3400 rpms. A low and over produced 180 mph while remaining well within the 4000 rpm limit of the engine. Takeoff roll is 4-500 feet on pavement and 3000 rpm produce an 8-900 fpm climb. In the circuit Pierre flies the downwind at 100 mph, 90 mph on base, and 70 mph for final, usually touching down below 50 mph. On pavement the plane likes to roll so he likes a 2000 ft strip. The aluminum landing gear is very effective, wide and stable, and it absorbs the bumps well.

Fuel burn appears to be 3 gph, giving a range of 500 miles for economical cross country flights at over 40 mpg.







Clockwise from top left: steel pushrods with rod ends actuate the elevator and the aileron paddles; the canopy work requires a padded workbench and a careful touch. The motor mount is x-braced to handle torsional vibrations; ailerons on this high speed ship are of course mass balanced. The top of the firewall slants forward to allow a shallower angle for the forward windscreen. Below, aluminum paddles are automatically engaged when the wing is folded down

Handling is very responsive but not twitchy, and the elevator and aileron control forces are well harmonized, and there is enough rudder authority to do an effective slideslip. The Onex trims fairly well for map reading but it is not what anyone would call a good IFR platform. This plane is made for fun. Fuel burn appears to be 3 gph, giving a range of 500 miles for economical cross country flights at over 40 mpg.

Pierre feels that by all accounts the Onex has hit the nail on the head. They have produced a mini fighter plane that goes together quickly, has good creature comforts, and is an economical and fun way to travel around the country. He recommends the Onex to anyone, even first time builders and low time pilots. No other company offers anything like this little gem!

Pierre is now contemplating his next plane, and it might be the single seat Panther.

Ultralight / continued from page 7

remember, this takes even more time both in their office and then in the postal system). Make copies before filling anything out in case you make mistakes. This document is a bit of a bother because it can be used for an Advanced Ultralight, a Basic Ultralight under the original Launch weight Regs, and a Basic Ultralight under the current 544kg/1199 pound regs. We want to use the current 544kg/1199 pound regs so the first matter is to go to the right hand side and X out the boxes asking for wing area and launch weight. Also in the bottom row of the general information section it asks if the plane is an Advanced Ultralight, so the correct answer is NO. Everything else in this section must be filled out.

Beginning at the top left corner, print the ***name of the manufacturer***, again being consistent in upper and lower case. You will already have been issued the registration marks so put them in capitals, with the hyphen between the C and the I.

Model Designation must be consistent with the letter and the data plate, as must the serial number.

Go down a row and they ask whether the plane is subject to a lease, sales agreement, bill of sale, or other. This sounds confusing but the same document also gets used for re- registration of an ultralight. In this case it is a NEW BUILD.

Country and year of assembly for this plane: CANADA 2014.

Proposed base of operations will normally be the strip from which you will be flying. In this case Joe Builder is a bit optimistic in planning to use Toronto CYYZ as his home strip. A Volksplane landed at CYYZ a few years ago and it might have been Joe's previous plane.

Aircraft Configuration concerns itself with landing gear only. Check all boxes that will apply to your plane. If you have skis, or straight or amphib floats indicate this here.

The engine manufacturer is self-explanatory. If you later change engine manufacturers you should let Transport know to have your document amended. They won't actually care much but if you have an accident your insurer will.

> You don't want to miss out on the entire flying season over paperwork after spending months if not years while building.

Basic Ultralights are not limited in the number of engines. There is even a four engine Lazair in Ontario.

Category of engine is in all likelihood Piston but if you have a Wankel, a jet, or a large rubber band, put an X in "other" and indicate what it is.

Rated Engine Power for this engine is 80 and the hp box has been checked. Do not exaggerate here or you might have problems meeting the Minimum Useful Load. More on this later…

Moving over to the right is where some applicants have padded the numbers. Transport is not going to send someone out with scales to see if you are telling the truth, even after an accident. Your insurer might have a look though. It is always in your best interests to be as accurate as possible. Remember, not only is it your own rear end in that pilot's seat but perhaps later on that of the next owner of the Groundhog 2.

Maximum Take-Off weight for this category is in this instance1199 pounds, although not every plane will get off the ground and climb at that weight. Your kit manufacturer might have given a weight but sometimes not. You can certainly register a Lazair at 1199 pounds but if you sell the plane the next owner's widow might want to have her lawyer contact you. Be reasonable here.

Empty Weight is whatever your plane weighed. They do not say whether you must have residual fuel, oil, safety equipment, ELT, or fire extinguisher included. The important matter is that when you subtract empty weight from gross weight you have a number that will satisfy the Minimum Useful Load. (Note that a weight and Balance is not a requirement but you would be foolish not to do one before flying.)

Stall Speed is usually given by the kit manufacturer or plans designer. The limit for the category is 45 mph in the landing configuration. The document does not specify whether this is at gross but one could reasonably expect that it should be. Landing configuration can mean full flaps, leading edge slats deployed, 1500 rpms on the prop, whatever the manufacturer deems as the landing configuration.

Although ***Minimum Useful Load*** does not have a box on this form, the TC inspector will check the numbers to be sure your plane qualifies for registration in this category. You should do the calculation yourself on a separate sheet. Make sure the numbers used are the same when filling out the form. Transport requires a reasonable payload so that pilots are not tempted to fly over gross. An 1100 gross weight with an empty weight of 900 leaves only 200 pounds, so those numbers will not result in a registration.

This GROUNDHOG 2 has an empty weight of 520 pounds and a gross of 1100 pounds, for a payload of

continued

Ultralight / continued

580 pounds, and amazing plane that will lift more than its own weight. The box in the bottom RH corner asks how many seats and Joe has indicated that it is a 2 seat aircraft.

Transport wants a ***weight allowance*** of 175 pounds per seat, so for a 2 seat plane that means 350 pounds. There must also be an allowance for a reasonable amount of fuel. A spec fuel of 0.5 pounds per horsepower is common, and Transport appears to want one hour of fuel at minimum. Take the hp number and divide it by 2. The result is the minimum fuel allowance. The Whizzo engine produces 80 hp so that means an allowance of 40 pounds. Add this 40 pounds to the 350 crew allowance and Joe has 390 pounds as the Minimum Useful Load requirement for his 2 seat 80 hp aircraft.

With 580 pounds of payload Joe has built a plane that has a payload 190 pounds in excess of this Minimum. That means that Joe or his licensed copilot can afford to gain some weight and they can also carry enough fuel for more than an hour's flight before the tank runs dry. None of this is on the form but if your plane does not have enough payload it will not get a registration.

Now on to the ***Particulars of Applicants*** section. Again the name of the owner must be as on the other documents. There is space for one co-owner and if there are more just use a separate sheet of paper for the purpose.

It is possible for a corporation to own an ultralight aircraft, and if this is the case with your plane someone with signing authority must sign that part of the document.

The last section of 26-0521 is where you make your sworn statement and sign it.

Naturally, you have one last look to make sure that pesky receipt number is displayed prominently at the top of the application.

Transport Canada offices have a fair amount of autonomy in how they handle registration of ultralights, and sometimes even the same office will have different procedures on different days. Generally you can drop everything off, you can mail it in, you can fax it, or you can even scan or photograph and email it all to caso-saco@tc.gc.ca. Call your local office to see which method they prefer. Get the name of your TC official and do whatever he/she says. Sometimes it can all be done in one day and sometimes it takes a good three months. (Or forbid the reality of even longer) It does not hurt to call your inspector a bit later to see if you have made any mistakes that would cause a delay. Meanwhile keep getting the plane ready for the day the registration arrives. R

Zenith Aircraft Turns 40

Midland, ON – Canada's leading manufacturer of recreational aircraft kits is turning 40 this year. Zenair Limited was founded by Chris Heintz in his 2-car garage in 1974; the company moved to its current 15,000 sq./ft. facilities on the Huronia Airport (CYEE) over 30 years ago. Now directed by the founder's sons, the family-owned business makes complete airframe kits for a number of popular 2 and 4-seat all-metal designs as well as light aircraft floats.

Over the years, Zenair designs have set a number of world records – including longest distance flown non-stop by CH 300 for any aircraft in its category (Trans-Canada flight - 1978). While the majority of Heintz' varied designs are used around the world for personal recreation, they are also used for glider towing, agricultural spraying and flight training. Thanks to their excellent off-airport capabilities, some are even used for missionary work and anti-poaching missions in remote African locations.

As part of its 40th anniversary celebrations, Zenair Ltd. is planning a fly-in/Open House event at its facilities on Saturday July 19th. A week later, one of its aircraft kits (a STOL CH 750) will be fully assembled and tested during the seven-day AirVenture Oshkosh fly-in Wisconsin. This "One Week Wonder" project will mirror similar feats accomplished by Zenair in the nineties.

"We hope that many join us for these exciting events" says Michael Heintz, company spokesman. "Thousands of our kits have been assembled by builders over the past forty years and the July 19th fly-in will give many past and current builders, owners and enthusiasts an opportunity to meet again and to visit the birthplace of their homebuilt aircraft."

For more information on Zenair, its aircraft kits and planned events for the company's 40th Anniversary celebrations, visit http://www.zenair.com/

Across Canada

RAA Chapters In Action

Chapter 85 Vancouver

Chapter 85 has a new executive this year. Heidi Bekker replaced Bruce Prior as Secretary and Gerard Van Dijk and Cyril Henderson moved over to Directors positions. Peter Whittaker has thankfully agreed to continue on as Vice President and Tom will look after the finances again. We do not have a program chairman this year. The rest of the executive stays the same.

We have had a binding offer on the Turbi. A vote was held at the January meeting and after some debate the membership agreed to allow the sale to go through. It was somewhat bittersweet as the Turbi has been our signature aircraft for many years and it will be sad to see her go.

Bruce Prior was awarded the Most Valuable Member award by Chapter 85 President John Macready. Bruce has done just about everything that can be done at the chapter level and serves as a wonderful example of community service to his fellow aviators.

The Aircraft Chairman has been searching for another aircraft to replace the Turbi. A survey was completed by the members at the March meeting and the results will be known in a week or so. In the meantime Dave Rose and John de Visser have been looking at aircraft for sale in the Valley with the idea that we might be able to find one close to home.

After a lengthy investigative process which involved helping Dave Marsden with the preliminary aspect of construction of his Skylark, the chapter decided that this was not going to be a suitable project for us. Dave Marsden decided that he would finish his aircraft on his own as a private project. At the present he has completed wings, the tail sections and most of the fuselage. Dave will be ready for his first inspection in a couple of weeks. At the end of April, Dave plans to move the project to Pitt Meadows where he will rent hangar space to complete the project. The workshop should be available for rental to other members at that time. The chapter wishes to express their sincere gratitude to Dave for offering his aircraft as a project and wishes him well in the future in its completion.

At the January meeting Behrouz Azadeh, an air traffic controller from Boundary Bay Control Tower, came to the chapter meeting to talk about ATC procedure in the Boundary Bay area. He summarized the services that ATC will provide to pilots in this area. The talk was very informative and the speaker very knowledgeable. In February, Mark Garner reviewed some of the aircraft tracking websites of interest to pilots. Paul Harris from the Pacific Flying club came to speak in March about safety procedures for VFR pilots. Ray Maxwell from the Vancouver Soaring Association is coming to speak in April.

At the February Meeting the Executive of Chapter 85 confirmed that it was in agreement that the chapter will host the 2014 Annual Fly in to be held on June 28 and the April Pancake Breakfast.

The Annual Awards Banquet was held at the Delta Town and Country Hotel. Mitch Sokalski spoke about Parks Planning. Ron and Lynn Zeleschuk presented a slide show about their flying exploits to Central America. The food and venue was excellent as usual. Thanks to the Delta Town and Country Staff who make us welcome annually.

Ottawa Rideau

On Saturday 01 Mar 14 the (Ottawa/-Rideau) RAA Chapter 4928 held its annual winter fly-in at the Kars/Rideau Valley AirPark. Weather was overcast and despite the low ceiling later in the afternoon one aircraft was able to make an appearance making it officially a fly-in. The chapter members put on an excellent feast for all attending including chili, Swedish meatballs and Shepherd's pie, on site made onion rings, soup, hot dogs and beans with a large variety of deserts.

Many local pilots attended despite

Now you can be the first on your block to own a 4 engine homebuilt - you're bound to turn some heads with this one.

the poor weather. Some flew into Carlton Place and then drove the short distance to the Kars air park to join in in the festivities. This year some of the visitors expressed interest in joining the club which is a good boost to membership numbers. The winter ski fly-in has always been focused on good friendships, sharing stories and inviting new pilots and families into our flying family. I wish to thank everyone who came out and prepared the club house, donated food dishes, helped serve or helped in any way to the success in this event. Thank you. Again: a great start to this year.

RAA London - St Thomas

Mel Blundell has answered the question posed in the March Slipstream concerning the mini Herc at Stratford. A picture of this amateur built aircraft taken last June is attached. It had flown twice at that time, but there were elevator problems which I hear have been corrected.

As noted it is for sale. The workman ship is very good. It has four 1600cc VW's rated @90 HP each. This aircraft is the first piston 4-engine amateur-built aircraft in the world!

Phil Hicks showed the completed rudder of his Sonex but with clecoes so that it may be opened for inspection. Bill Weir showed the wooden mockup of an engine which was a project taking off on its own and showed the trim wheel inspired by the one in Me109s and a couple projected pictures of the process of creating it. Howard Faulkner showed a variety of neat tools that he has gathered. Another tool was a camera on the end of a probe to examine inside workings without disassembly like a do-it-yourself colonoscopy.

Dan Oldridge showed a DC to DC converter which could be used to create the 28 volts required by components when used in a 12 volt equipped aircraft. Ed Hollestelle showed sockets that accept current automotive fuses and a thermometer probe with a digital display. Jack Schenck showed a "snake" that can be laid on one's drafting board or aircraft [for painting] and bent into a desired configuration. Ian Haryett brought the panel cutter that cuts two sizes of holes [not at once] left from his a/c building days. Ian went on to show a cable from the trim control of his C-150 that was much frayed. It was in an area that misses inspection and his showing it was a warning to 150 fliers. Ian tried vortex generators on his C-150 with negative results and removed them and donated them to anyone present.

Tom Hawkins showed the parachute stick from his RCAF instructing times. He told how one could insert the stick into the parachute pack and check that the corners were well into the corner of the pack and that the ripcord assembly was free. Tom mentioned the "Caterpillar club"of those who had escaped disaster buy using his parachute. Gary Bishop showed that part of the leading edge of his project plane that contains the landing light. He went on to describe a tool from Canadian tire that consists of a reciprocating saw extending up through a table and has proven excellent for cutting aluminum sheet. Jerry Trimble noted that we were having presentations from very creative people that made for a wonderful meeting. Gus Cameron made an impassioned presentation pointing out that our RAA Chapter is important and that we are must continue to expend effort to ensure its existence and prosperity.

RAA Scarborough

Bob Stobie has secured a 3-disc DVD series of The Ultimate Dambuster Collection produced by Stephen Fry (the British actor, Jeeves in the memorable "Jeeves and Wooster" series by P.G. Wodehouse) - definitely a 5 star epic. It is not the movie The Dambusters which I imagine all of us have already seen, probably more than once. Instead, this series is really a study of the Lancaster bomber. The story is told of the raid by 617 Squadron on the Ruhr dams by considering the design, planning, training, deployment, etc. of that famous mission. As a documentary, it has interviews with planners, RAF personnel as well as German civilians on the receiving end in the Ruhr valley. Archival footage is included. On another disc, the viewer goes along on an actual night bombing raid to Berlin in 1945 (in colour, no less) aboard a Lancaster. There is material here for more than one good evening. The reviews of this series are very favourable.

Centre: There it is, in this case a knurled wheel in the fitting Above, Yes, all that watery slime was waiting to go through your air tools and paint gun, or into your engine when you check leakdown at annual time.

Caring for your Air Compressor

Rob Schieck

Air compressors have horrible lives. We neglect them and expect top drawer performance. If it has an oil sump we grudgingly check the level once every year or so, but there is a requirement to drain the water that condenses inside the pressure tank. A tire shop will do this every day while we tend to ignore for years and all the while water is collecting in the bottom of the tank, rusting and thinning it. Water that becomes entrained in the air ends up in our air tools and wears them out. Spray painting will be ruined by rusty water and an air drier cannot provide 100% protection. There are lots of reasons to drain the water but it is still a job that gets ignored.

I usually rock the tank and when I hear sloshing it is time for me to drain out the rusty water. I like to run the compressor to put about 20 psi into the tank. Then I take it outside and crack open the drain cock, and there is always an impressive spray of rusty water. It is actually a slurry that can plug the drain cock so I make certain to open it all the way.

On one of my compressors I ignored this for too long and the drain cock seized, so now I use a ratcheting spanner to remove the entire plug, which immediately shoots a long way because of the pressure being released.

Heavy upright compressors pose a different problem - how to catch all the water instead of having it spray onto the shop floor. On the way to the hangar drop into Dollarama and find an oven tray or a plastic "Tupperware" container that will fit under your upright.

While you are at it you might as well check the compressor's oil level, the drive belt tension, and the air filter.

Tony Bellos / continued from page 21

In 1937, not seeing much of a future for himself at the YB, Tony decided he'd like to fly airplanes. He took a two-year aeronautical engineering course by correspondence from Brisbane's in Vancouver. "It was tough technical stuff but I managed to struggle through it." Tony quit his ranch job in 1939 and entered a three-year engineering course at Northrup School in the Los Angeles area, receiving a one-year credit for the correspondence course he had completed.

Canada was getting into World War II at the time so Tony switched from engineering to airplane construction. He also learned to fly. After completing the course, Tony was offered jobs all over the world, including Australia, since Northrup was the largest airplane school and repair depot in the world. "But I wanted to stay Canadian," he explains. "So, I took a job in Montreal with the Nordyn Aircraft Company and spent the next two years working for them. I continued to fly, with the intention of becoming a bush pilot since I couldn't stand working under a roof all the time. I was being groomed as assistant superintendent when I decided to join the Canadian Air Force."

AIR FORCE CAREER

Tony joined up in the winter of 1941/42 and was trained as a fighter pilot. He went overseas in 1943 and was assigned to a bomber crew as co-pilot and bomb-aimer. Bomber crews were expected to make 30 trips to every tour. On their 29th trip, Tony and his crew were shot down. "We were flying a brand-new Lancaster on that fateful mission. We had it into good running shape, but another crew had used it, so the electronics were haywire. We flew off course and missed the target. Instead of aborting, I decided to fly back and bomb anyway. That's when the enemy fighters shot at us. Instead of hundreds of planes, they had just us in their sights, so they pounded the hell out of us." The crew managed to hold the plane at 1,200 feet and fly in a general direction for England. "The first pilot and I took half-hour turns at the controls, due to the effort required to fly the shot up plane. It was the darkest night. We couldn't see anything. Finally, I went to the navigation area and using the defective radar, found we had crossed southern England and were heading out towards the North Sea. I made a course to Yorkshire where we hit rough air and the plane broke up. I was blown out of the plane and injured. The kid in the rear turret successfully ejected but our other five crewmen were killed," Tony explains."The Air Force usually sent you home if you finished a tour and lived through. But if they needed you, they gave you a rest period, usually as an instructor, before sending you out on the second tour. That's what happened to me while I was convalescing, walking with two canes."

During his convalescence, Tony went to see Trixie Bassett, a WREN in the British Navy. Trixie had been dating Tony's navigator, who had been killed. Tony wanted to tell her about his last mission. He began seeing her and they were married in July, 1945. Shortly after their honeymoon, Tony was ordered back to Canada to help organize the Tiger Force, training to fight the Japanese. "We got halfway across the ocean when the Japanese surrendered and the war was over." The Air Force wanted Tony to stay on, but Tony, who felt he was in bad shape mentally, declined. His father had offered him a partnership so he thought he would try once again to get along with him. Trixie joined him in Prince George nine months later after she was discharged from service. When the arrangement with his father didn't work out, Tony opened a business on his own. He repaired cats, logged and built roads. Their children Carole and Peter were born in Prince George. Tony soon wanted to get back into ranching. So he and Trixie sold their business in 1951 and purchased Willow Ranch, the historic ranch formerly owned by Alex Bulman, headquartered along Highway 5, 16 miles south of Kamloops.

RANCHER AND CATTLE ORDER BUYER

Life on Willow Ranch was always a struggle, Tony recalls. "I was underfinanced and I was no farmer, having grown up on horseback. The buildings and fences were old and the equipment was worn out." Tony's greatest accomplishment during the nine years he owned Willow Ranch was building a quality herd of commercial Hereford cattle. "We always did well with our cattle and usually set the price for quality Hereford cattle at the sales." Another accomplishment was developing a herd of 75 outstanding quarterhorses. "We supplied horses for rodeo competitors and trained some for cutting. Jimmy McDonald worked for us as a trainer before he went to Douglas Lake Ranch after Chunkie Woodward bought it." For breeding purposes, Tony purchased a champion chestnut quarterhorse stallion from Colorado named Diamond Fire. He also owned Cariboo Chief, an Appaloosa stallion nicknamed Appie, #7 in the Canadian Appaloosa Registry. The Bellos' sold Willow Ranch in 1960 to the McKenna Brothers and purchased a section and a half closer to Kamloops at Knutsford. There they ran the horses until they were sold and for years, pastured yearling steers. In 1962, Tony became a cattle buyer, the western agent for Ontario Co-op. "I was able to control most of the sales of quality cattle because I had the financial backing," he says. "The only problem I had was getting enough railway cars to ship the cattle I bought to Ontario. All cattle went by rail in those days."

COWBOY ARTIST

Tony eventually gave up cattle buying for health reasons. "I spent months in hospital as a result of old war injuries." During one of his lengthy hospital stays, Trixie encouraged him to try painting and bought him some oil paints and canvas. She first learned about Tony's artistic talents when their daughter Carole was little and needed help drawing a picture of a horse for a school assignment. All Trixie could draw was a stick horse. She asked Tony to help and was amazed at the quality of his hastily-drawn pencil sketch. Over the years Tony has created a dozen canvasses of amazing cowboy art. Three portray famous rodeo riders and horsemen: bronc riders Kenny MacLean from Okanagan Falls and Louis Bates from the Sugar Cane Reserve; and cutter Jimmy McDonald on Rocky Sam. While Tony hasn't picked up a brush in 12 years, family members continue to hope for more works of art.

"YOU HAD TO BE THERE TO UNDERSTAND IT. BECAUSE WE WERE AIR CREW, WE NEVER EXPECTED TO LIVE"

AEROBATICS PILOT

After he got out of the service, Tony didn't want to look at an airplane. "I'd had enough flying in the war." Then he was asked to join the fledgling Prince George flying club. "It was a case of the returning war hero and they wanted me on the executive of their new club. I consented to testing planes for members who were planning to purchase. I would go to Vancouver and fly these planes two or three times and then fly them again in Prince George. But that's all the flying I did for years." After he retired, Tony, who had always loved aerobatics, became involved with organizing the Kamloops Air Show. He hosted the Ray-Ban Golds Canadian Aerobatics team at one show and was invited to fly with them when they practiced. "I really enjoyed it. That lit the spark in me to go back flying." He now flies what he calls an old man's aerobatic plane, a Murphy Renegade Spirit biplane that he had built from a kit in 1989. He keeps his plane in a hanger right on his property and flies almost every day with a group of flying enthusiasts. "I recently celebrated my 86th birthday, so I'm the old geezer of the bunch. Most of my flying buddies are in their forties and fifties and I'm the only one who's retired. If we decide to go to Quilchena for coffee, we just fly there. We also attend most of the interior fly-ins." Besides flying his plane, Tony keeps busy working out in his basement, reminiscing with friends and family, and poring over his wonderfully detailed albums of cowboying and war time memories. "Of all the careers I've had, the four years I spent in the Air Force during the war hold the most meaning to me. It was a different life all together. You had to be there to understand it. Because we were air crew, we never expected to live. As officers, we were well paid and we spent it all during our time off. We lived life to the fullest and we became very close to one another." Tony and Trixie Bellos continue to enjoy their retirement, living in the large dream home they built on their Knutsford property in 1994, and spending quality time with their two children, seven grandchildren and three great grandchildren. RF

RAA Chapters and Meetings Across Canada

The following is a list of active RAA Chapters. New members and other interested people are encouraged to contact chapter presidents to confirm meetings as places and times may vary.

ATLANTIC REGION

HAVELOCK NB: Weekly Sunday morning get together year round, all aviation enthusiasts welcome. Havelock Flying Club - 25 mi west of Moncton. Contact Sterling Goddard 506-856-2211 sterling_goddard@hotmail.com

QUEBEC REGION

COTE NORD (BAIE COMEAU): Meeting times to be advised. Contact Pres.Gabriel Chouinard, 418-296-6180.

LES AILES FERMONTOISES (FERMONT): First Sunday 7:30 pm at 24 Iberville, Fermont. Contact Pres. Serge Mihelic, 418-287-3340.

MONTREAL (LONGUEUIL): Chapter 415, Meeting in French second Wednesday at 8 pm, at CEGEP Edouard Montpetit 5555 Place de la Savane, St. Hubert, PQ. Contact president Normand Rioux at NRIOUX@lapresse.ca

OUATOUAIS/GATINEAU: Every Saturday 9:00 am to noon at the restaurant l9Aileron in the airport terminal. Contact Ms N.C. Kroft, Gatineau Airport, 819-669-0164.

ASSOC DES CONSTRUCTUERS D'AVIONS EXPERIMENTAUX DE QUEBEC (QUEBEC): Third Monday 7:30 pm at Les Ailes Quebecoises, Quebec City Airport.

ASSOC AEROSPORTIVE DE RIMOUSKI: First Saturday at 9:00 am, La Cage aux Sports, Rimouski. Contact Pres. Bruno Albert, 418-735-5324.

ASSOC DES PILOTES ET CONSTRUCTEURS DU SAGUENAY-LAC ST JEAN: Third Wednesday 7:00 pm at Exact Air, St Honore Airport, CYRC. Contact Marc Tremblay, 418-548-3660

SHERBROOKE LES FAUCHEURS de MARGUERITES. Contact Real Paquette 819-878-3998 lesfaucheurs@hotmail.com

ONTARIO

BARRIE/ORILLIA CHAPTER 4th Monday of the month at 6:00 PM at the Lake Simcoe Regional Airport for the months of June, July & August (BBQ nights) For other months contact Dave Evans at david.evans2@sympatico.ca or 705 728 8742

COBDEN: Third Thursday of the month at the Cobden airfield clubhouse 20:00 hrs. President - Grantley Este 613 432 0797 este@compmore.net

COLLINGWOOD AND DISTRICT; The Collingwood and District RAA, Chapter 4904, meets every first Thursday of every. month, at 7:30 PM except July and August, at the Collingwood Airport or at off-site locations as projects dictate. The January meeting is a club banquet held at a local establishment. For more information contact Pres. George Elliott gaelliott@sympatico.ca 705-445-7054

EXETER: Second Monday 7:30 pm at Summers-Sexsmith Airfield, Winters-Exeter Legion. Contact Pres. Ron Helm, ron.helm@sympatico.ca 519 235-2644

FLAMBOROUGH: Second Thursday 8:00 pm at Flamborough Airpark. Contact Pres. Karl Wettlaufer 905 876-2551 or lazykfarm@sympatico.ca

KENT FLYING MACHINES: First Tuesday 7:00 pm at various locations. Contact President Paul Perry 519-351-6251 pkperry@teksavvy.com

KITCHENER-WATERLOO: Kitchener-Waterloo: New Meeting Time. We now meet the Second Monday of each month at 7:30pm in the upstairs meeting room of the Air Cadet building at CYKF, except during the summer months when we have fly-ins instead.Please contact Clare Snyder clare@snyder.on.ca

LONDON/ST. THOMAS: First Tuesday 7:30 p.m. At the Air Force Association building at the London Airport. Contact President Phil Hicks p.hicks@tvdsb.on.ca 519-452-0986

MIDLAND/HURONIA

Meeting: First Tuesday, 7:30 pm at Midland/Huronia airport (CYEE) terminal building. Contacts: President Ian Reed – 705-549-0572, Secretary Ray McNally – 705-533-4998, E-mail – raa.midland@gmail.com .

NIAGARA REGION: Second Monday 7:30 pm at Niagara District Airport, CARES Building. Contact Pres. Elizabeth Murphy at murphage@cogeco.ca, http://www.raaniagara.ca/

OSHAWA DISTRICT: Last Monday at 7:30 PM at the Oshawa Airport, South side, 420 Wing RCAF Assoc. Contact President: Jim Morrison ,905 434 5638 jamesmorrison190@msn.com

OWEN SOUND Contact President Roger Foster 519-923-5183 rpfoster@bmts.com

OTTAWA/RIDEAU: Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-858-7333 bill@ncf.ca

SAUGEEN: Third Saturday for breakfast at Hanover Airport. President: Barry Tschirhart P.O. Box 1238 27 Ridout Street Walkerton, Ontario. Home: 519-881-0305 Cell: 519-881-6020. Meetings are held every second Tuesday evening, at 7:30pm. Location(s) Saugeen Municipal Airport, Kincardine or Port Elgin. All interested pilots are welcome. Email: barry.tschirhart@bell.net

YQG AMATEUR AVIATION GROUP (WINDSOR): Forth Monday, 7:30 pm Windsor Flying Club, Airport Road, Contact: Kris Browne e_kris_browne@hotmail.com

SCARBOROUGH/MARKHAM: Third Thursday 7:30 pm Buttonville Airport, Buttonville Flying Clubhouse. Contact Bob Stobie 416-497-2808 bstobie@pathcom.com

TORONTO: First Monday 7:30 pm at Hangar 41 on north end of Brampton Airport. Contact: President Fred Grootarz - Tel: (905) 212-9333, Cell: (647) 290-9170; e-mail: fred@acronav.com

TORONTO ROTORCRAFT CLUB: Meets 3rd. Friday except July, August, December and holiday weekends at 7:30 pm Etobicoke Civic Centre, 399 The West Mall (at Burnhamthorpe), Toronto. Contact Jerry Forest, Pres. 416 244-4122 or gyro_jerry@hotmail.com.

WIARTON: Bruce Peninsula Chapter #51 breakfast meetings start at 8:30am on the second Saturday of each month in the Gallery of Early CanadianFlight/Roof Top Cafe at Wiarton-Keppel Airport. As there are sometime changes, contact Brian Reis at 519-534-4090 or earlycanflight@symptico.ca

MANITOBA

BRANDON: Brandon Chapter RAA meets on the second Monday of each month at the Commonwealth Air Training Plan Museum at 7:30 PM except in the months of July and August. Contact Pres. John Robinson 204-728-1240.

WINNIPEG: Winnipeg Area Chapter: Third Thursday, 7:30 pm RAA Hangar, Lyncrest Airport or other location as arranged. Contact President Ben Toenders at 204-895-8779 or email raa@mts.net. No meetings June, July & Aug. RAA Winnipeg info also available at Springfield Flying Center website at http://www.lyncrest.org/sfcraac.html.

SASKATCHEWAN

Chapter 4901 North Saskatchewan. Meetings: Second Tuesday of the month 7:30pm Prairie Partners Aero Club Martensville, Sk. info at www.raa4901.com. Brian Caithcart is the chapter president. Contact email: president@raa4901.com.

ALBERTA

CALGARY chapter meets every 4th Monday each month with exception of holiday Mondays and July & August. Meetings from 19:00-22:00 are held at the Southern Alberta Institute of Technologies (SAIT) Training Hangar at the Calgary Airport. Join us for builder discussions, site visits, tech. tips, fly out weekends and more. Contact President Bob White 403-472-1035 pittsflyer111b@gmail.com

EDMONTON HOMEBUILT AIRCRAFT ASSOC: First Tuesday 7:30 pm EAHS boardroom. Contact President Bill Boyes 780-485-7088

GRANDE PRAIRIE: Third Tuesday, (September to April), 7:30, 2nd floor boardroom of the Grande Prairie Terminal Building. Summer events on an informal schedule. For more information contact Lee Merlo at 780-518-4254 or e-mail arniesusanmeyer@gmail.com

BRITISH COLUMBIA

ABBOTSFORD: Third Wednesday 7:30 pm Abbotsford Flying Club, Abbotsford Airport. Contact President, John Vlake 604-820-9088 email javlakeca@yahoo.ca

DUNCAN: Second Tuesday 7 pm members homes (rotating basis). Contact Pres. Howard Rolston, 250-246-3756.

OKANAGAN VALLEY: First Thursday of every month except July and August (no meetings) at the Mekong Restaurant.1030 Harvey Ave. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 moneypit@uniserve.net

QUESNEL: First Monday/Month 7:00 p.m. at Old Terminal Building, CYQZ Airport. Contact President Jerry Van Halderen 250-249-5151 email: jjwvanhalderen@shaw.ca

SUNCOAST RAA CHAPTER 580: Second Sunday 13:30 pm Sechelt Airport Clubhouse, sometimes members homes. Contact Pres. Gene Hogan, 604-886-7645

CHAPTER 85 RAA (DELTA): First Tuesday 7:30pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President President: John Macready jmacready@shaw.ca. Website www.raa85.ca.

VANCOUVER ISLAND AVIATION SOCIETY (VICTORIA): Third Monday 7:30 pm Victoria Flying Club Lounge. Contact Pres. Roger Damico, 250-744-7472.

THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President - zzALASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Gerry at 250-782-4707 or Heath at 250-785-4758.

Chapter executives, please advise of changes as they occur. For further information regarding chapter activities contact RAA Canada, Waterloo Airport, Breslau ON N0B 1M0 Telephone: 519-648-3030 *Member's Toll Free line: 1-800-387-1028*

Emails can be sent to President Gary Wolf at: **garywolf@rogers.com** *and George Gregory at* **gregdesign@telus.net.**

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To submit or delete a classified ad, please send to raa@raa.ca and place "RAA ad" in the subject line.

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The Recreational Aircraft Association Canada does not assume responsibility for advertisements, but does exercise care to restrict advertising to responsible, reliable individuals.
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Recreational Aircraft Association Canada
President: Gary Wolf / Treasurer: Wayne Hadath

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1960 BELLANCA CRUISEMASTER 2555 TT 260 HP IO-470F A fast aircraft with good short field performance and triple tail style.Full size nosewheel suitable for grass fields.1000 mile range. Gami injectors, engine analyser,white polyurethane paint . Otherwise stock. Have paperwork to turn it into an amateur built.
$65,000.00 Richard 705-652-6307

ACEY DEUCY 2 seat open cockpit project. Fabric covering completed and painted. Engine Continental 0200A rebuilt with logs. New Warp Drive 3 blade ground adjustable prop. B and C Light weight starter and alternator. Full instruments and guages in rear cockpit basic flight instruments in front cockpit. Full electrics. Aluminum fuel tank. Radio included. ELT included. Gross weight 1230lbs. Estimated 50hours to final inspection. Asking $18000. Will sell only as a package. Many extras. 905-786-2482.

STINSON 108-3, a classic aircraft for sale. Airframe 2365TT. Franklin 165 hp engine 998 TT, 82 hours since top overhaul. Fabric in 2005, float kit, wheel pants, spare engine parts, 2 metal props - seaplane and cruise. 30K OBO. 250-991-7958 Quesnel BC.

CAVALIER 102.5, "Aero Sport Power" O-320-B2B; 182 TTSN. Sensenich metal prop. Airframe was totally rebuilt in 1997; 1750# GW, 622 lb useful load; VFR instruments + Garman GTX 327 TXP Mode C & Val Radio; Trutrak Turn & Bank; Kept in heated hangar; 8/10 inside and out. $29,000 OBO. cavalier102@uniserve.com or 250-558-5551. Ask for Cameron.

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"NEW" 2011 CHALLENGER LIGHT SPORT XS50, only 21 hrs. For Sale $45,000
TTSN 21, TET 6 Built professionally by the late Rob Lake of Lake Aviation Wing tanks Brakes, Heater Upgrades include: Rotax 582 engine installed professionally September 2012 Flip-up nose cone hinge (Aeroloite Flight) for easy access to battery, panel wiring Custom fabric interior with pockets Hinged third door for easy entry and exit to cockpit Oil injection Strobe lights, wing tip lights from Kuntzleman Electronics upgraded Throttle assembly from light Engine Services. Avionics: BECKER CCX 175 COM/XPDR COMPAC FALCON VSI2FM-3 VERTICAL SPEED BANKINDICBALLTYPE20-20M2010-00700 Falcon Gauge Voltmeter, 6-16V, 2-1/4. Model number is VM16-2Q. AmeriKing AK-350 encoder. Avcomm AC-2EX intercom TED antenna for the transponder 11-17995 Miracle Air Whip Antenna 11-03018 for the radio additional ram mounts. Contact Bev 613 478-2923 or bevie01@ho mail.com

1974 WITTMAN TAILWIND W8, for sale because Transport does not want old pilots flying. C-FSNY has a C-90-14F Continental with compressions 80-70-74-76. Prop is a 3 blade IVO (great prop - easy to change pitch) This plane will fly at 150 mph at 5000 ft at 75% power (measured with a GPS 4 leg measure) Uses 4 imperial gallons per hour (18.24 litres) Capacity 20 imperial gallons.Fuselage was recovered in 2012. with Ceconite. Com transceiver and 1 transponder (not working at the moment). You must have tailwheel time. I will check you out but will NOT teach you to fly. $12,000. Jack Steele, Brockville ON 613-865-8107 jsteele@cogeco.ca

TAILWIND W-10 $49,000 One of the best metal wing Tailwinds around. Time since new – 150 hours. Lycoming 0320 Engine, 160 HP, SMOH 650 hrs. Warnke prop. IFR, 2 King 170B, 2VOR, GS, King
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2012 RV6 35TT with slider canopy. Aerosport Power O-360 with hollow crank ready for constant speed. New Sensenich fixed pitch currently installed. TruTrak Dual EFIS and engine monitoring, connected to Garmin 696 and 2 axis autopilot with "panic button". LED lights/strobes, HID landing light, Garmin Mode C, electronic breakers, hooker four point belts. $82,000. Call Mike 905-520-8500 or mwiebe@bell.net

HANGAR FOR RENT at YKF (Kitchener-Waterloo) Available immediately 40 x 40 feet, concrete floor, Bi-fold door, unheated, with hydro for engine pre-heating and extra lighting. Good access to taxiway, close to RWY 32 The hangar is large enough to accommodate two small aircraft. Rent is $400.- per month plus HST For more info contact Rudy Hane at 519 648-3006 519 648-3006 FREE

Hangar For Sale at Sundridge Ontario, beside CPE6 airpark.Hangar is a wood framed building with steel siding, roof, and doors, with a gravel floor. 40x40x10 on 7.5 acres. Taxes this year were $352. Asking $50,000. Phone 705-386-9080.

KR 2 TRIGEAR, 2180 cc Great Planes VW, 3.5 gph @ 130mph cruise, TTAE/TTAF 54 int/ext 10/10 $15000 call Ray Larson {905}892-6389 (SEE PIC)
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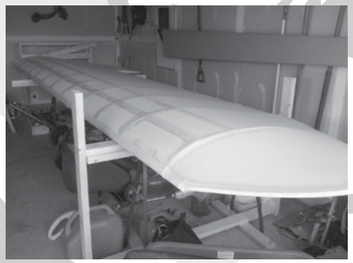
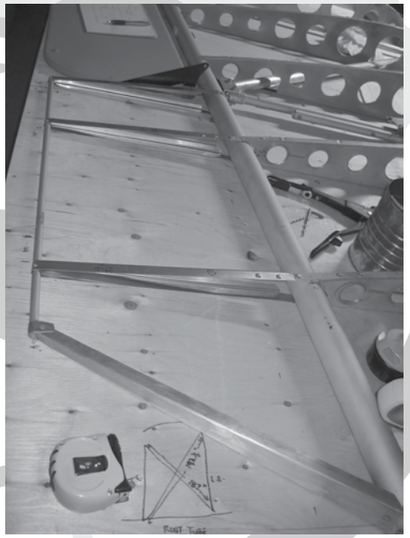
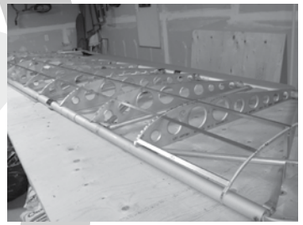






TopBottom left: fabric was adhered and shrunk to fit. This is a much smoother wing than the original. Above, aluminum angle stringers were let into the nose ribs to support an aluminum cuff

Beaver / continued from page 9

were going to need slots to allow the drag struts to pass through. The slots had their edges sanded smoothed and then reinforced with riveted doublers.

I wanted a smoother wing than the original and decided to use a leading edge cuff on the upper surface. This was formed on rollers from .016" aluminum sheet in 4 ft sections. To attach it I also formed light aluminum angles in sections and used them as two full length stringers on the forward part of the noseribs. These kept the ribs from flopping over during construction and provided a surface for riveting the cuffs. The first wing was a lot of work with over 120 different parts designed, fitted, and built for each wing. But of course the second was a lot easier with all parts already made and the experience of just getting done the first one. First wing took 8 months to build, the second took 1 month.

Dacron was again used as the covering, glued in place with Lepage contact cement, and shrunk with an iron. The latex paint had worked well on the tail so I bought 2 gallons of Sherwin-Williams Duration paint, had it tinted blue, and applied it with a 4" roller, over the Zincer 123 primer already installed that fully encapsulated the fabric.

Jimmy and Keith helped me reinstall the wings, a straightforward job since I had been careful to maintain the original sweep. All new hardware was bought at Spruce to make this plane fresh for the season. Jimmy did the test flights and pronounced it as excellent.

The new wing with its consistent airfoil has transformed the Beaver. Climb has improved to over 500 fpm, stall speed decreased by 7 mph, and my previous cruise speed of 57 mph is now 63 mph while maintaining the same 4700 rpm. Roll rate has also improved as the entire plane just feels more "alive" rather than feeling like it was half asleep being forced in the air by the engine.

My Beaver now looks better than when it was a new plane and the Geo engine and Dacron fabric are a great improvement on the original. They both take work but it was worth it.

I would like to thank Jimmy Kennedy, Keith Wallace, and the other RAA members who helped me through this project.

Innovations

Carter Aviation Expands Cartercopter Envelope

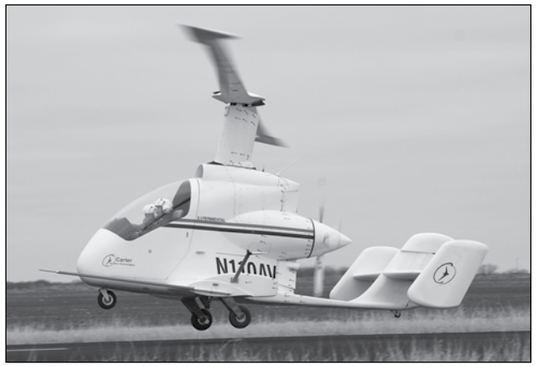
Carter Aviation Technologies has been back to expanding the aircraft envelope since its public demonstration at Kickapoo Airport in Wichita Falls, Texas in November of last year. On January 21st, 22nd, 23rd & 24rd, with test pilot Larry Neal at the controls, Carter's Personal Air Vehicle (PAV) prototype broke five of its own records. "We set an altitude record just shy of 18,000 ft, a Mu [advance ratio] record of Mu 1.13, slowed the rotor to a new minimum of 105 rpm, achieved a level 202 mph true speed on 325 hp at an aircraft test weight over 4000 lbs, and flew for well over an hour representing our longest flight to date," exclaimed an excited Jay Carter. "We are expanding the envelope in baby steps and still have a ways to go. This aircraft should be able to fly up to 8 hours on its given fuel capacity, cruise at 220+ mph and up to 28,000 ft."

Carter was the first to achieve Mu 1 (Mu is the ratio of aircraft speed divided by the rotor tip speed, and Mu 1 is when both are equal) back in 2005, and have accomplished the feat again numerous times with the latest aircraft shown above. To put this into perspective, from the Wright brothers' first flight in 1903, it took 44 years to break the speed of sound, 66 years to put a man on the moon, and 102 years to achieve Mu 1.

With the aircraft flying so well and most of the critical flight test milestones *continued on page 42*

Aeromarine-LSA announces first flight of Zigolo Motorglider

SEBRING, FL: Aeromarine-LSA announces the first USA flight of the new Zigolo SSDR concept motor-glider. The Zigolo is a FAR Part 103-compliant Single Seat De-Regulated (SSDR) aircraft which means it does not require any license, medical, registration, or certification to fly it. The Zigolo is powered by a 25-hp gasoline engine; an electric-powered option is close to completion. The electric power will provide self-launching capability for gliding or quiet and smooth dawn patrols and evening flights and still met the SSDR criteria. The Zigolo is available in a classic kit for only $14,500. This price includes the engine, propeller, and a complete aircraft rescue parachute system. Build time is only 100 hours. An even better option is the Almost-Ready-To-Fly aircraft: a finished Zigolo that is then disassembled and packed in one easy-to-ship crate. "Some Assembly required" means a pictogram assembly manual and an afternoon to put it together! Includes everything you need to fly, plus a complete aircraft parachute rescue system, all for only $16,000.



Carter / continued from page 41

achieved, Carter plans to fly the aircraft to the "Sun 'n Fun Fly-In" the first of April in Lakeland, Florida. This will be part of many cross country flights for the Carter PAV to other airshows, cities, and military bases during 2014.

"We cannot keep our current aircraft in flight test forever," explained Jay Carter. "In the next month or so, we will approach the FAA requesting a change to our certification from research and development to demonstration." This is a significant milestone for Carter Aviation. The demonstration ticket from the FAA will grant Carter the access to multiple venues across the country with its prototype aircraft. "It is time to get our aircraft and technology in front of the public so we can gain support to move toward production," triumphed Jay Carter. "Pictures and videos are just fine, but there's nothing better than experiencing our aircraft and technology first hand. It is time we prove to people we are for real and gain the support we need to get the technology into the marketplace."

Classifieds On The Internet:
http://www.ocis.net/tvsac/buyandsell.html - more ads from our Kamloops chapter
http://www.lyncrest.org/sfcclassifieds.html - more ads from our Winnipeg chapter

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