

March - April 2011

# RECREATIONAL FLYER

Recreational Aircraft Association Canada [www.raa.ca](http://www.raa.ca)  
The Voice of Canadian Amateur Aircraft Builders \$6.95



George Elliot's  
**Cyclone**



# From The President's Desk

Gary Wolf

## RAA CALGARY METALWORKING SEMINAR

RAA Calgary is hosting a sheet aluminum workshop on July 10th from 10 am to 4:30 pm at Springbank airport. The \$60 cost includes all materials, coffee, lunch, and a copy of The Aircraft Aluminum Handbook. This is an introductory course that will deal with cutting, drilling, riveting, bending, making parts and performing repairs. Chapter President Don Rennie may be contacted at CGMMV.Skylane@gmail.com or 403-874-0876. Bring your work clothes, gloves, and safety glasses.

## TSB REPORT ON RV7-A INFLIGHT BREAKUP AND FATAL CRASH

In January 2010 an RV-7A crashed under unusual circumstances, killing the pilot who was the sole occupant. The plane had been fitted with a video camera, and the pilot was following another RV-7A through a series of aerobatic maneuvers. A camera plane will normally have to pull extra G's to keep the other plane in the camera's field of view. The TSB report indicates that the maneuvering speed of this plane is 124 knots and Vne is 200 knots. The EFIS and information from the GPS and the camera showed that the subject plane reached a speed of 234 knots, and at times there was a longitudinal shuddering affecting the

plane. Finally the rudder and vertical stab separated from the airframe and the plane crashed.

The TSB noted that the plane had been painted but the W&B had not been amended. They measured the thickness of the paint and calculated the added weight, determining that the plane was well over the aerobatic gross weight allowed by Van's. The TSB also noted that there was no record of the rudder having been rebalanced after paint and possible filler had been added, and they pointed out that that added weight behind the hinge line can reduce the flutter speed by as much as 50 mph.

The entire document is available on the Van's site at <http://www.vansairforce.net/safety/G-GNDY.pdf>. The TSB is to be congratulated for the thoroughness of this report.

## FALCONAR F-11 INFLIGHT BREAKUP AND FATAL CRASH

The coroner for BC called to ask for information on another inflight breakup and fatal crash, this one in a Falconar Avia F-11 that had lost its outer wing section in flight. This plane is related to the Jodel D-11 but changes have been made in the drawings. The builder had constructed the plane under the Basic UL rules which

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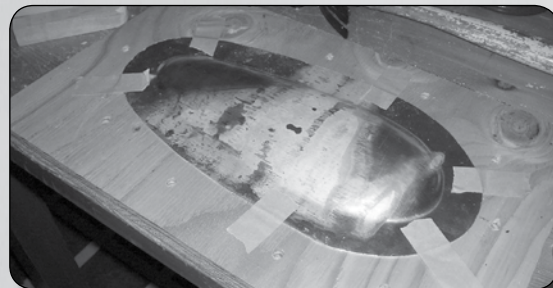
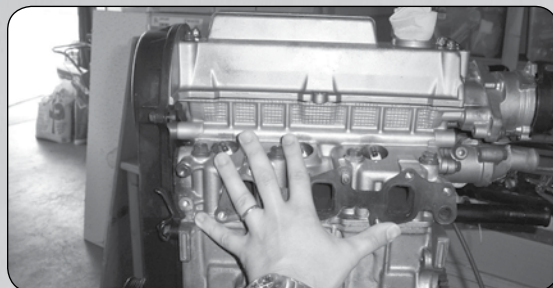
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*Above: A gorgeous RV at the 2011 Chapter 85 fly-in.  
On the cover: George Elliot's Cyclone*

A person is seen paragliding over a valley. The paraglider is a small silhouette against a large, colorful canopy that is orange and red. The background shows a vast landscape with green fields, a river, and distant mountains under a clear blue sky.

# Aviation *Lite*

*Out of the box thinking for out of pocket aviators / by George Gregory*

EVERYTHING'S "LITE" these days (as opposed to light, which is how we like our airplanes). Beer is lite; we have calorie reduced lite cookies, lite, low fat cream cheeze and yogurt. Lite everthing. What they are usually not light in, however is price.

Airplanes are already light. So what's Aviation Lite? If we can't ditch the calories or the fat, where can we do some trimming?

In the pocketbook. Which brings me to the point.

13 years of Cessna ownership have made the associated costs very much a live issue with me; casting about for cheaper ways to scratch my itch, I had considered both paragliding and hang gliding in the past. It was cheap (a brand new wing averages about \$3500) and the lessons are quite reasonable. I'd done a bit in high school, and knew it wasn't as physically demanding as

some thought.

When I turned 50, I announced I wanted to give it a try. I must emphasize I am not an inveterate risk taker, and certainly no adrenaline junkie. It just seemed to me that besides being so affordable, such flying would be ...elemental. Back to the basics, flight distilled to its absolute essential. The sort of flying I had in dreams when I was young, and which drew me toward aviation as a lifetime passion.

Five years passed, and it dawned on me I wasn't getting any younger. Another birthday loomed, and I decided if I was ever going to do it, I should do so while I was able to move under my own steam.

A quick search online found several schools in the Lower Mainland; as I was familiar with the area around Harrison Mills I rattled off an email to Jim Reich of FlyBC which operates a facility called

*We spent a half hour circling with birds and other paraglider pilots, looking for lift and flying by the seat of our pants - in the most literal sense of the word. This is about as pure flight as you can get. Outstanding!*

Eagle Ranch next to Mount Woodside.

There are several options available, but for the utter newbie, a "Tandem Discovery Flight" seemed the sensible option. There are two-place paragliders available for training purposes and it seemed just the ticket to see what it was like.

Jim emailed me back, and we set a date for mid-May.

FlyBC has a lovely acreage west of Mount Woodside which is used as a landing zone for pilots coming off the mountain. I pulled into the farm about 12:30 in the afternoon, and found a group waiting for their ride up the hill. I was the last guy they were waiting for, and in a few minutes we were loaded up and on our way.

Perhaps the most harrowing part of the adventure was the drive up. It's a skinny logging road replete with large rocks, potholes, impressive inclines and the occasional logging truck. At one point Jim pulled over suddenly to give way to one coming down the hill, and I glanced nervously over the "shoulder" of the road to wonder how many times we would roll over if we tipped over the edge.

Eventually, we made our way to the top. There were a number of other paragliders and hang gliders setting up; and I was able to watch a few take off before our turn came to set up and prepare for launch.

My instructor, a youngish fellow (by my middle-aged standards, at any rate) named Jeff, put a helmet in my hands and gave me a brief preflight; basically, it was "if I say run-run-run, then you run, period. Do not deviate from instructions". Same with stop. I can imagine what might ensue if we were committed to running down a 45 degree incline and the newbie chick-



ened out.

When I'm in an airplane, heights are not an issue with me. As long as I feel a degree of control, anxiety vanishes; but put me on a shaky ladder, and I'm a real scaredy-cat. As I looked at the carabiners attaching us to our wing, I asked a few concerned questions about their strength, any failsafes and such. I mean, it's not like I've got structure around me or anything. I was assured of their integrity, and the design of the buckles (I asked about that too) is such that you can't accidentally unbuckle yourself. Good thing. At that point, the thought of just sitting on some nylon webbing 1200 AGL made me want to make sure whatever I was sitting on was dependable.

Paraglider wings are a ram-air wing; made of two layers of fabric, the leading edge is open to the breeze, and the forward motion of the wing in the air inflates it, causing it to assume an airfoil shape. In any kind of breeze, after the pilot(s) is clipped in, he turns around and gives a gentle tug on the lines. This causes the wing to kite up in the air. He then turns around, and starts running. Turning is accomplished by a combination of pulling on one of the risers and weight shift. This surprised me, as I imagined directional control was entirely aerodynamic; but evidently, just using the risers to turn cre-

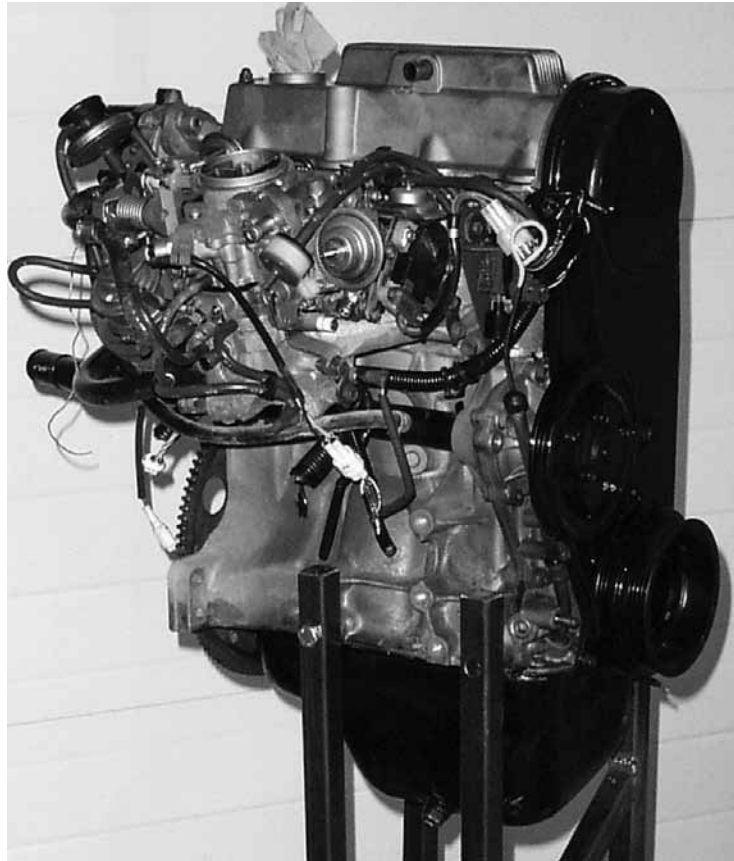
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***I knew it wasn't as physically demanding as some thought.***



# Suzuki G10 for the BD-5

*Power for your Pocket Rocket  
by Mark ter Keurs*



This article will document the full tear-down, rebuild, and installation of a Suzuki G10 engine in a BD-5 application. The actual installation in the airframe may be a bit ambitious for this article as I am still building the airplane. There are a thousand roads that lead to Rome, and this is just one of them. I'm always interested in more directions along the way. So please feel free to send your comments and critiques, good or bad, to the email address at the bottom of this article.

## **Some background**

I'm building a BD-5 for which I need an engine. Yes this airplane has a bad reputation for several reasons, some deserved, and some not. The BD-5 was designed for a 32 hp or 70 hp engine. The 70 hp Xenoah engine had an advertised weight of 125 lbs without muffler or alternator. The original gross weight of the airplane was 500 lbs, and the original empty weight

was 235 lbs. The factory quickly increased these numbers to 385 lbs empty and 690 lbs gross. The single major cause for the bad reputation was the lack of a suitable engine. The most popular engine for early BD-5 airplanes was the Honda EB1 thru EB3 series engines, which frequently weighed between 220 and 240 lbs installed. Obviously the additional 120 lbs of engine weight on a 385





*A lot of engine installations ask a lot more of the structure than it was designed for, with some gross weights approaching 850 pounds. For an airplane designed with 47 square feet of wing area the wing loading was unacceptably high. Here oilcanning of the wing has been known to occur. The structure could take it, but some distortion could occur - undesirable from an aerodynamic point of view - to say nothing of the associated pucker factor. Would you want to see this at 200 miles per hour?*

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airframe is a significant issue. One way or another a lot of the BD-5 airplanes ended up weighing between 500 and 600 lbs empty, and flying at around 850 lbs gross! The amazing thing about Jim Bede's design is that structurally the airplane could take this excess in weight. Aerodynamically, however there were some issues: wing-loading changes a lot when you only have 47 square feet of wing and you add 30% to the gross weight of an aircraft. Also, through the additional weight the wing flexes a little too much causing wrinkles in the airfoil making the wing-loading issue even worse.

So the search for a suitable engine for my BD-5 was on.

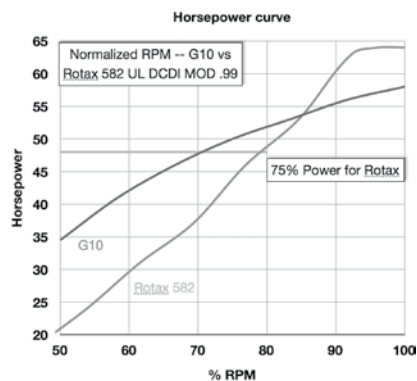
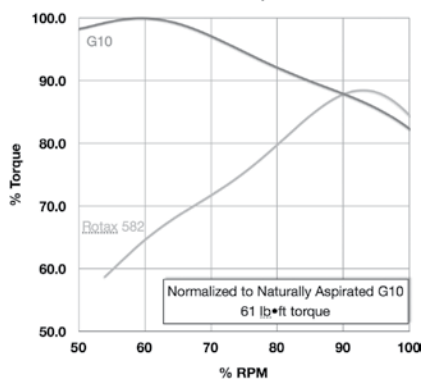
#### **Selection considerations**

I need what we all want. "A featherlight engine that produces lots of horsepower, and if at all possible uses almost no fuel." It doesn't even need a propeller speed reduction drive (PSRU), because a wonderful aspect of the BD-5 is that it has a 1.6:1 PSRU as part of the airframe. Align any engine to the PSRU, install an appropriate length quill-shaft, and you are off to the races. Obviously a good read of Donald Hessenaur's<sup>1</sup> article before hitting the start button is a must.

OK so the perfect engine doesn't exist. Some of the VW conversions are in the horsepower range I'm looking for, and they weigh between 145 and 190 lbs according to Great Plains

Aircraft. However, the engine is 29.5" wide and the fuselage of the BD-5 is only 23" wide. It doesn't sound like much, but the airframe is so clean (about 0.9 ft<sup>2</sup> drag coefficient) that I really don't want anything to disturb its lines. The other thing is that the VW engines seem to prefer to turn about 3200 RPM. Nothing wrong with that, except that the BD-5 propeller is limited to roughly 50 inches in diameter. As a result an engine cruising RPM of between 4800 and 5200 is required.

This narrows the search parameters to an in-line engine. Some people would suggest one of the Rotax two-stroke engines might be a suitable fit. Good suggestion and it might be the right one for some, but as a result of some personal experience those engines are no longer for me. However, rather than making the decision purely on likes and dislikes I had a closer look at the engines' performance. Here are two graphs comparing a 64hp Rotax 582 against a 58hp G10. The first graph shows the two horsepower curves normalized to RPM. At just under 80% RPM, or roughly 5400 rpm for the Rotax and 4600 rpm for the G10, the engines produce the same horsepower. Rotax publishes 75% power cruise, which works out to just over 5230rpm and 48 hp. At the same % rpm the G10 runs at 4400 rpm and produce about 50 hp. Under these conditions the Rotax will burn, 33.6 lbs per hour (pph) or 5.6 gph, and the G10 will burn 24 pph



Here are two graphs comparing a 64hp Rotax 582 against a 58hp G10. The first graph shows the two horsepower curves normalized to RPM. At just under 80% RPM, or roughly 5400 rpm for the Rotax and 4600 rpm for the G10, the engines produce the same horsepower. Rotax publishes 75% power cruise, which works out to just over 5230 rpm and 48 hp. At the same % rpm the G10 runs at 4400 rpm and produce about 50 hp. Although the horsepower graph clearly shows the power advantage the G10 has anywhere below 78 percent rpm, the following torque normalized graph demonstrates the G10 advantage even more clearly.

or 4 gph. Thus the Rotax airplane will likely out climb the G10, but once in cruise the speeds will be similar and the G10 will slowly correct for its weight disadvantage by burning less fuel.

However, most BD-5 airplanes have fixed pitch propellers and relatively highly pitched at that. Such propellers require a considerable amount of power to turn during the take-off roll and early climb. Although the horsepower graph clearly shows the power advantage the G10 has anywhere below 78% rpm, the following torque normalized graph demonstrates the G10 advantage even more clearly. The relatively huge amount of torque low in its rpm range is what makes the G10, and four stroke engines in general, more versatile than two stroke engines.

The G10 was the result of searching for modest horsepower and high cruise RPM which made me concentrate on the smallest displacement automotive engines. The rationale being that the small displacement will force the manufacture to design for relatively high highway RPM. The smaller package will most likely weigh less. And lastly, the lower rotating mass should reduce internal stresses. Hmm, to put this theory to the test I started looking for a vehicle that would fill all these wishes and have records. As soon as I thought of this, was as soon as I realized that this was ridiculous to expect to find. But I was in luck. The Chevy Sprint/Geo Metro/Suzuki Swift/Pontiac Firefly cars turned out to be enormously popular with delivery companies. After some inquiries I found that they rack up an easy 200,000 miles on only fuel and oil changes, and that they were remarkably reliable from an engine stand-point. When driving at 75 mph the engine purrs along at 3800 RPM, and one delivery company told me they drive up long hills at 4800 RPM and full throttle all the time. This little engine, known as the G10, comes in

several flavors and has been written about various times in Contact! Magazine. Basically, you have a naturally aspirated (NA) and a turbocharged version, ranging in horsepower from 48 to 82.

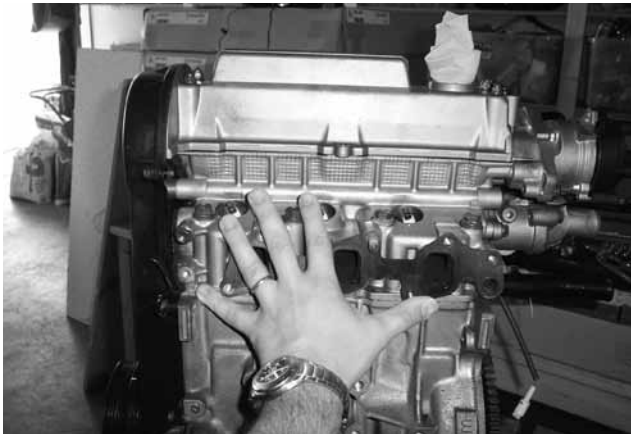
### Engine Research and Purchase

Now that I had a good candidate I had a more detailed look at the engine. The engine is designed and built by Suzuki. The engine block is largely the same on all models, but there have been several different head designs. Most popular are the single cam hemi design, also known as the Mk. I head, and the single cam wedge design, also called the Mk. II. The Mk. II head is 11 lbs lighter than the Mk I head and the stock version produces more power than the Mk. I although the latter has much more power potential in the hands of hot-rodders. Also, the turbo version of the engine uses the MkII head. Suzuki was very obliging in its production run. The bosses for the turbo-oil return and the knock sensor are cast into every single block. If one has a naturally aspirated block all one has to do is drill and tap. The same goes for the heads. Every head has the bosses for the fuel injectors cast in, as well as the bosses where the fuel rail bolts down. Some of the cam covers even have an oil separator box cast into them. Now that I knew which model and year engine I wanted all I needed to do was find one.

What I really wanted was a low mileage engine that did not come out of a crashed car. You never know what the engine was doing when the car crashed. And considering how popular these efficient little engines seemed I had a hard time finding a low milage engine at the recyclers.

Luckily the Japanese emissions standards and testing are extremely tight. So tight in-fact that it is frequently cheaper in Japan to pull and engine with only 30-40,000 miles from the car and replace it with new than keeping it on the road. Those engines





Left: The G-10 really is a small engine. The author's hand give a sense of its diminutive scale. Above, right: #4 Main bearing contamination.

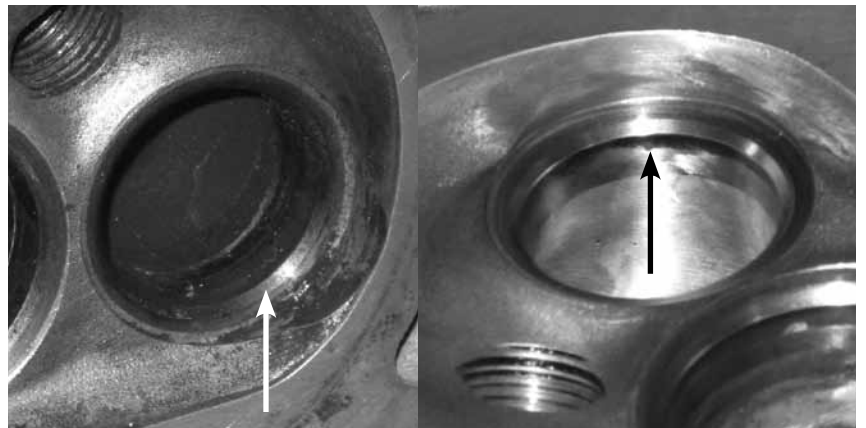
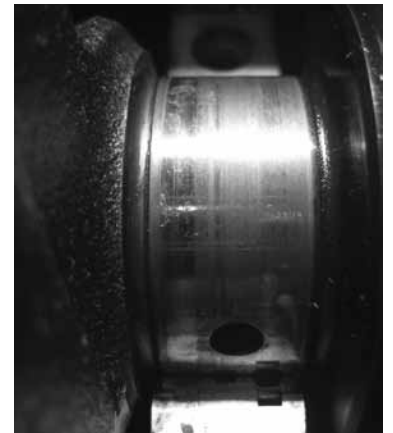
can be imported in North America, and are known as JDM (Japanese Domestic Market) engines. This is what I did. For a total of \$375, I had my G10 engine delivered from Japan. Then came the documentation. After some searching on Ebay® I found the applicable factory service manuals for my engine as well as the turbo supplement. I also purchased one conversion manual. And lastly I purchased Thomas Hinderk's "What am I getting myself into?" parts one and two. Tom takes you by the hand and leads you through the whole process. A terrific manual!

#### Inspection and Tear-down

When I received my engine it was ready to be dropped back into a car. It was fully dressed including alternator, intake, and exhaust manifolds. The first thing I did was completely undress the engine to just the long-block. As you can see the engine is not big! The head measures 14" long without the distributor and 6" wide. At this point the engine weighs 89 pounds - a very good start.

Upon removal of the cam cover and the oil pan it was obvious that this is a low mileage engine. Other than a light film of varnish all engine parts were clean. Following the factory service manual and Tom's manual, the engine was disassembled and every single piece was measured carefully

for all applicable clearances. Tom details this in his manual, but it is basically to be able to make a complete shopping list of items that may need to be addressed during the overhaul. In the case of this engine very little needed to be done. The #4 crank bearing shells showed a worrisome wear pattern, although the crankshaft bearing itself appeared in relatively good condition as did all the other bearings. The block and head measured to within 0.00079" (0.02mm is the thin-

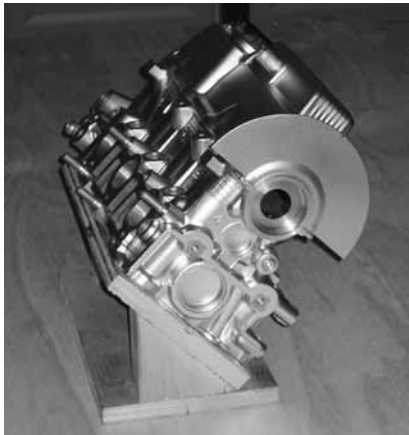
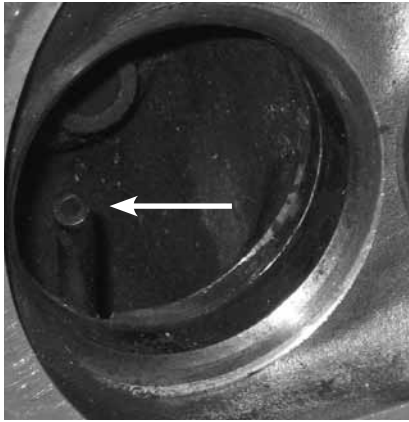


Above right, the #4 Crankshaft bearing. Bottom, note the carbon build up in the machined area and the defined line. This area was polished out to prevent future occurrence.

nest feeler gauge I have) of perfectly true. The oil pump measured to well within factory new limits according to the service manual. Only the valve guides showed any sign of wear and even that was well within replacement

limits. But at \$2 per guide I had them replaced while I had everything apart anyway.

The combustion chambers were nice and clean, but all showed the same carbon build up around pro-



Top: The EGR Nozzle. Centre, the drilling jig used as a paint stand. Third down, NA rod and piston at top. Turbo / Gti rod on bottom, 19mm pin and 75mm Vitaro piston. Bottom, the intake manifold flange. Note that the injector bosses are not yet drilled.

duction machining marks for the valve seats. In an effort to reduce the chances of pre-ignition or knocking these machining marks were cleaned up using a Dremel Tool with a sanding drum.

Hopefully this will clean up the air flow in that area of the exhaust valve and prevent future carbon buildup. The intake and exhaust ports are of good quality, but the surface left by the casting process is fairly rough. So again the Dremel Tool with sanding drum was used to smooth things out. The intent is not to get thing mirror smooth, just smooth to the touch as can be seen in the picture on the previous page.

The G10 had EGR ports build into the head. Exhaust gas is actually injected at the intake valve through small nozzles.

EGR is neither required for us nor used by the engine computer I have so these nozzles were removed to improve the flow to the intake valve. As a result of the space restrictions in the BD-5 engine compartment a custom intake manifold is in the works. The intake gasket was used as pattern to scribe a new flange on 3/8" aluminum stock. A bandsaw was then used to hog out a rough shape. Then a router with standard wood bit was used to finish the flange. Go slow to get great results and your wood bit is still usable afterward. The flange has locating dowels so that it can be installed accurately every time. This also allows the intake port and flange to be nicely matched, once again using the Dremel Tool with sanding drum.

The injector boss castings are clearly visible just above the intake ports. These are cast into every Mk.II head, ready to be drilled and used. The question was how to drill them. Home Depot® had one of their regular racks of odd stock items up for sale. I think they were \$2 each, and it had a drill bit of some odd size in it. The important thing was that the size was too big so I bought it. After an hour

on the lathe turning the bit slowly and... (you guessed it: the Dremel Tool) with a coarse grinding stone, and then a fine grinding stone, I had a usable drill bit.

Now I can drill both the hole for the injector nozzle and the o-ring land in one action. The angle the injector bosses make with the head turned out to be a convenient 45 degrees. So a fixture was made out of 3/4" plywood and two 45 inch 2x4 wedges. The head was then bolted to the fixture using the old head-bolts. Using the drill-press and my custom bit, I had my injector bosses drilled in no time flat.

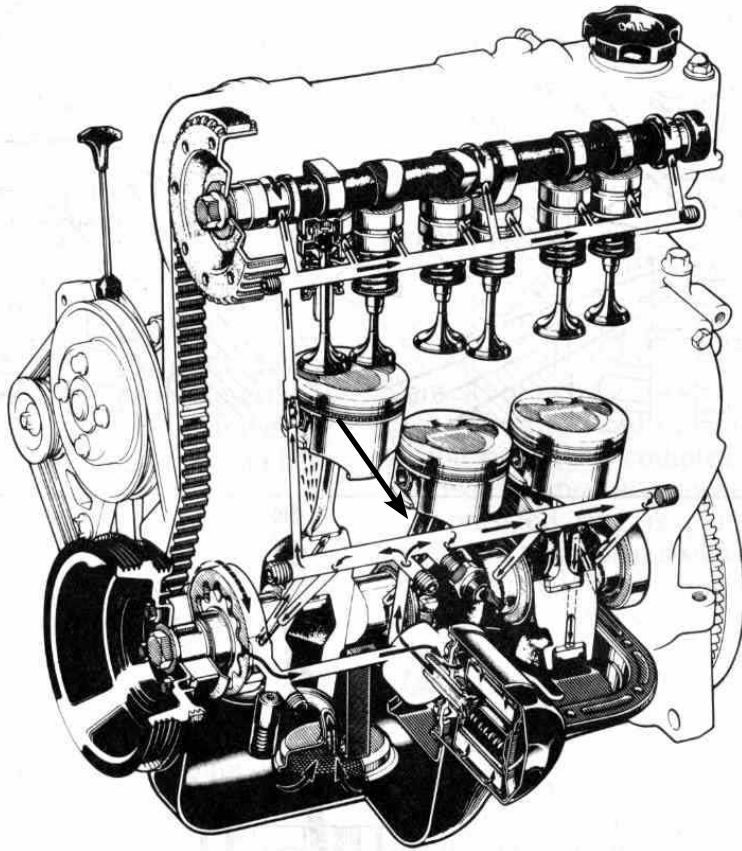
Now that everything was measured, sanded, detailed, and drilled, I took all the parts to a local engine shop. They had no adverse reactions to finding out the engine was going in to an airplane. In fact, the owner of the shop took it to heart and made some recommendations to benefit the reliability of the engine.

### Engine Modifications

My engine started life as a naturally aspirated carbureted G10. As stated earlier the goal was a 70 hp engine. Therefore I had to find out all the differences between the G10 and G10T. The head: no differences. Cam, valve-train, valves, and combustion chamber all the same. Only a change in ignition plugs.

The block: the oil return boss had to be drilled and tapped to receive a hose-adaptor. The knock-sensor boss had to drilled and tapped to receive a sensor. The Simple Digital Systems website was consulted for the sensor. (more on this later) And an oil supply for the turbo had to be found. Once again, Suzuki is kind enough to provide that in all blocks, so that simply required the removal of the plug dedicated to the task with an allen key to get filtered oil from the main galley.

The block's internals: the crank-shaft is the same in all versions of the G10.



Left: the row points to oil supply for the turbo, immediately after the filter and from main galley. Inset: on the left, G10 piston and on its right, the G16 Vitarra piston



There are a variety of connecting rods used in the G10. The G10T and the G10 Gti share the same rods.

The G10T rods have the number 82152 cast on to them. These rods are slightly beefier than the NA rods.

A local engine recycler had a large supply of G10 rods and let me search through the supply to find the best ones. I quickly found almost new looking rods.

G10T pistons are very difficult to come by these days. The stock G10 pistons have a slightly dished top and a compression of around 9.7:1 (depending on which source you check). They also have 17 mm wrist pins. The G10T pistons are dished to lower the compression, but are made of exactly the same material according to the experts I consulted. The Suzuki Vitarra G16 engine uses dished pistons with 19 mm wrist pins, which are a popular retrofit for G10 engines as well as in 1.5L Honda turbo kits.

The Vitarra pistons are 75mm

instead of 74mm for the stock G10 pistons. This was not a problem because I wanted to bore the block one size over stock to assure that the cylinders would be in perfect shape.

These pistons are not forged. Never-the-less numerous hot rodders report running up to 28-30 psi of boost with these rods and pistons<sup>3</sup>. They made 150 hp per piston. I intend on extracting approximately 25 hp per piston. The most common failure point is a lack of ignition control leading to detonation, usually failing the head gasket and occasionally a piston. Normally the pistons and connecting rods are not the failure point.

#### The Engine Overhaul

The head, camshaft, valves, block, crankshaft, pistons, wrist-pins, and rods, along with my factory overhaul manual, went to a local engine shop. The rods and crank were magnafluxed for cracks, and the head and block were checked for cracks as well. Then

the crank was balanced and all the journals were polished. Contrary to my initial fears, all the crank bearings needed was a polish. The journals were measured and showed no significant wear so the bearings were replaced with standard sized new ones. The new rods were balanced both at the small and large ends to within 0.5 grams of each other. The bushings were in perfect condition and the bottom ends were resized to make a perfect fit with standard sized bearings. Then they were peened as well. This was not something I had asked for, but as I said before; the shop owner took an interest and decided that this would make the rods more durable. The wrist pins were measured and polished, and found to be in virtually new condition. The pistons were checked, measured, and skirts were given a quick rub with a purple scotch-brite pad.

Since they came from the 4 cylinder Vitarra, I have a set of 4 pistons. Therefore the three smallest pistons were picked and the cylinders were bored and honed to fit. The idea is that, should I need a spare, the cylinder could be cleaned with a hone a little to fit the last piston. The main bearings were checked to see if they needed to be align-bored, but they were in perfect condition. The oil galleys were brushed, flushed, and brushed again to make sure they were completely clean. Since the deck was



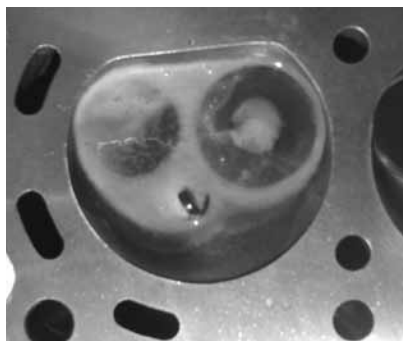
in virtually perfect condition, it was only sanded to clean and true.

The camshaft was checked and the lobes were polished clean.

The valve guides were replaced to bring them to perfectly new condition, although they were well within wear limits. The valve seats were checked, cleaned, and reground. The valves were checked for size, condition, and straightness, and found to be in perfect condition. The stock exhaust valves were in perfect condition, and as JDM it came with stainless steel valves, required for the turbo application.

### Head Assembly

The head was blasted with walnut shells to prepare it for paint, and then painted with a high temperature



Top: Custom timing wheel. Above, WD40 was used to test the seal between the valves and seats. "No leaks!"

primer and engine paint. This was not done to make the engine look prettier; the aluminum surface is relatively porous and holds on to oil and dirt. I wanted to seal that surface with a



Simple Digital Systems G10 kit plus my own camshaft adapter

gloss paint to make it easier to clean so that leaks and/or cracks would be easier to spot.

After blasting and painting the head was washed one more time and the oil galleys brushed one more time as well to make certain no bits of blasting media were still stuck somewhere.

WD40 was used to test the seal between the valves and seats. "No leaks!" The valves were installed and lapped by hand to get a perfect mating surface. Each combustion chamber was tested to verify that the valves sealed perfectly.

The hydraulic lifters were cleaned and carefully inspected. All were in good shape and could go back into the head as removed. However, three of the lifters were polished just to give them a perfect shine..

### Pistons and Rings

The Hasting website<sup>4</sup> publishes that the minimum ring gap, to prevent damage from heat expansion, is 0.0035" per inch diameter. Therefore, my rings need a gap of 0.0103" or 0.26

mm. I strove to get this minimum, because any gap leads to blow-by and all the bad consequences of such.

The rods were weighed and balanced at both top and bottom end. The stock rod and piston combination weighs 679 grams. The 82152 rod and 75 mm piston combination weighs 708 grams.

### Fuel and Ignition Control

Precise fuel and ignition control are essential at any time, but even more so in a turbocharged engine. One has the choice of using the factory engine control unit (ECU) or an aftermarket ECU.

Frequently factory ECUs have protective features programmed in, keep from damaging an engine in the event of the loss of a sensor. Much of Contact! issue #88 was dedicated to this topic. One of the articles presented in the same issue explained the virtue of going with an aftermarket ECU<sup>5</sup>. I chose to go with the Simple Digital Systems (SDS) ECU. This system was specifically developed for the G10

*The BD-5's cooling air exit is located underneath the horizontal stabilizer. Inset: an example of a wing-root air intake: clean and it looks good to boot.*

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series engine. It is my understanding that the 3 cylinder system was an adaptation of the company's 6 cylinder system, and thus has years of operating hours behind it.

I highly encourage you to explore the company's whole website, but particularly <http://sdsefi.com/aircraft.html>. This page links to a wealth of information on many aspects of engine installations in airplanes and is applicable to traditional aircraft engines as well as automotive conversions.

Here are all the parts of my SDS system.

Simple Digital Systems G10 kit plus my own camshaft adapter All the factory parts are beautifully anodized. The red aluminum ring, with the arrow pointing to it, has the timing magnets installed in it and is ready to be bolted on to the camshaft pulley. The hardware is included.

Custom timing wheel: unfortunately, the G10 has at least three different styles of cam pulleys and mine is not the right kind. The aluminum wheel next to the red ring is another timing wheel, but designed to be installed on my style of cam pulley.

### Cooling

More that in most airplanes, cooling can be a major problem in the BD-5. The engine is fully enclosed in a tight engine bay with no direct path for cooling air to enter. Consequently, many installations suffer from overheating. This need not be the problem though. Quite the opposite, the mostly sealed engine bay can be the BD-5's biggest asset in cooling the engine.

NACA published a detailed study in report 818 on exhaust augmented cooling. The report includes sizes and ratios for augmenters versus horsepower.

Convair published results<sup>6</sup> of their real-world application on the Convair 240. They experienced a 13% increase in thrust horsepower and the complete elimination of movable cowl flaps etc.

Most BD-5 airplanes are build with an augments-box out the bottom of the tail. Unfortunately, most BD-5 aircraft are also built to dump their engine exhaust either out the side or bottom of the fuselage, instead of using it in that augments!

Charles Airesman<sup>7</sup> showed that the exhaust can be used



in an augments type cooling system with very successful results. The BD5's design lends itself to this kind of cooling arrangement beautifully.

BD-5 cooling air exits underneath the horizontal stab. Theoretically, air would be ducted to a radiator from where the air enters the engine bay. The cooling air would then be pumped out of the engine bay by the exhaust augments described by Mr. Airesman. Therefore the engine bay needs to be kept sealed so that the only air entering must pass through the radiator.

Once again in the interest of keeping the exterior of the fuselage as clean as possible wing root air-intakes would provide the cooling air. Far less elegant but more frequently used are P-51 style intake scoops.

There have been a number of articles written about sizing radiators for engines. I started my decision-making process by considering the operating environment of my radiator. Car radiators are very thin because they are designed to dump heat with very little airflow. Generally speaking car radiators don't see more than 75 mph wind. Even then they hide behind lots of pretty bumpers, low slung hoods, and other interruptions to airflow. Most of the time these radiators have to cool their engines with only the help of a fan. In a BD-5 on the other hand 75 mph usually means that you need to worry about keeping the pilot cool rather than the engine, since the guy is flirting with stall speeds. When the pilot is nice and cool the airplane is likely to be flying well in excess of 100 mph. At this speed the dynamic pressure is approximately 5 inches of water. The higher the pressure differential the thicker a radiator can be and still pass enough air through. Ross Farnham, from SDS, was kind enough to flow test a number of radiators and publish his findings. You can find this information on the SDS website.<sup>8</sup>

As a result of the wing-root intake ducting of the BD-5, I do not expect to be able to fully recover the dynamic pres-



Simple Digital Systems G10 kit plus my own camshaft adapter

sure of flight, but 85% should be a fair estimate. Based on Ross' numbers this provides a maximum thickness for my radiator of 2.875 inches.

Various people have explored radiator sizes versus horsepower and displacement (CID), for both natu-

rally aspirated-, and turbocharged-, engines.

One company, working on liquid-cooled versions of traditional aircraft engines, reports that a 9 X 12 X 3 inch radiator is sufficient to cool a 180 hp IO-360 engine<sup>9</sup>. That works out to 0.3

square inches per CID, and 0.6 cubic inches per hp.

Tom Wyatt offered the rule of thumb of roughly 1 square inch of radiator face per cubic inch of displacement, and roughly 2.5 cubic inches/hp<sup>10</sup>.

I sourced an air-conditioner evaporator core from a GM pickup. This core, 9.25 X 8 X 2.875, provides 1.23 in<sup>2</sup> per CID and approximately 2.7 in<sup>3</sup>/hp. The small diameter aluminum freon tubes were cut off of the core and 1 in diameter hose adapters were machined and brazed to the core using Dura-Fix® rods<sup>11</sup>. The adapters were brazed rather than welded to minimize the possibility of leaks as a result of the welding heat. **R**

*If you'd like to know more, Mark's email is mterkeurs@gmail.com In the next issue we'll conclude with a look at turbocharging and bearing issues. Stay tuned!*

<sup>1</sup> Donald P. Hessenaur, *Propeller Drive Systems and Torsional Vibration, Alternative Engines Volume 1*, p165-174. Also available at: <http://ibis.experimentals.de/downloads/torsionalvibration.pdf>. <sup>2</sup> Thomas Hinderks, "What am I getting myself into", Part One and Two, available through "Alberta Aviation Museum", 1-780-451-1175, [paul@albertaaviationmuseum.com](mailto:paul@albertaaviationmuseum.com). <sup>3</sup> <http://www.teamswift.net/>, <http://www.suzuki-forums.com/>. <sup>4</sup> [http://www.hastingsinc.com/ServiceTips/ring\\_gaps.htm](http://www.hastingsinc.com/ServiceTips/ring_gaps.htm). <sup>5</sup> Ross Farnham, *Programmable EFI: A second look, Contact! Magazine #88*. <sup>6</sup> H. and C. Mod. *Convair, Thrust, Cooling and Heating from an Exhaust System, Flight November 11th, 1948 p579*. <sup>7</sup> Charles D. Airesman, *Drag Reduction Through Water Cooling and Exhaust Augmentation, Alternative Engines Volume 2*, p139-140. <sup>8</sup> Get SDS radiator web page <http://sdsefi.com/air10.html>. <sup>9</sup> <http://www.liquidcooledairpower.com/lc-radiatortech.shtml>. <sup>10</sup> Tom Wyatt, *Adequate Cooling of Liquid-Cooled Engines, Alternative Engines Volume 2*, p148-159. <sup>11</sup> <http://durafix.com/12> Read SDS turbocharger web page <http://sdsefi.com/techart.htm>



1



2



# Solar Cooker

KW-RAA member Terry Jantzi has a long history of innovating new products, especially if they are environmentally sensitive. Terry's latest

project is a very light solar oven that weighs almost nothing and folds up to the size of a large book. Members who live in areas of the country that



have prohibitions against open flame cannot set a fire going to cook a meal when they are camping under the wing. Terry's solar oven can cook a meal in as little as an hour, reaching well over 160 Celsius in the midday sun.

The oven is a very light plastic board faced with high efficiency mylar foil and it weighs 30 ounces (850 grams). Terry says that a dark enamel or black painted pot must be encased in a cooking bag for maximum efficiency. The pot and its lid may be used as plates from which two hungry pilots may eat their meals. Anything that cooks well in a slow cooker is perfect for the consunrator.

If you would like to buy one of Terry's solar cookers please contact him at [sales@consunrator.com](mailto:sales@consunrator.com) or 519-895-6998.

\$30 for RAA members. \$35 for non-members.

\$12-18 shipping by Canada Post determined by region. A group purchase sent to one address will save on postage.

[www.consunrator.com](http://www.consunrator.com)



# Grease Plates

**Scenario:** You're ready to weigh your pride and joy during the weight and balance part of an inspection. You're having a horrible time getting the scales centred just so under the wheels and what you thought would be a piece of cake turns into a half-day of pure frustration: making fine adjustments once the weight is on the wheels can be a real pain. Here's a simple solution to take out some of the hassle:

**1:** A pair of .025: sheets of

aluminum about 8" x 12" can make alignment or weighing much more accurate. Each pair is greased and placed together, then set under the wheels.

**2:** Once under the wheels, the greased sheets make fine adjustments a snap. Having to jack up the wheel to reposition the scale would be a lot more work!

**3:** Mike Bilinsky's newly built RV-6 was used to test out the grease plates.

# Shared Ownership Of Aircraft

*Barry Meek / bcflyer@hotmail.com*

It is pretty common for pilots to consider aircraft ownership at some point in time. We find it difficult to justify renting at close to \$100 an hour, knowing that when it's over, there is nothing to show but another entry in our log book, and hopefully some good experience.

ON THE OTHER HAND, you've tallied all the costs involved in owning your plane, and that too exceeds the spare change in your pocket.

Another option is shared ownership, investing with a partner (or partners). Personally, I think it's a good compromise having personal experience of three similar situations. Here is how we have been operating our present partnership. Although probably not entirely unique, this seems to be a fair and relatively inexpensive way to fly.

There are three of us who own a Cessna 150. The initial investment was split three ways, as was an engine overhaul. We share equally the hangar rental and insurance. Here's something very important we learned about insuring a shared aircraft. We

found that we could buy full coverage, including hull insurance (Gold Wings policy) from Marsh Insurance through COPA for less than each of the three of us purchasing the Silver Wings policy. More coverage for less money when it's split three ways. The people at Marsh were helpful in pointing this out to us.

The maintenance and annuals are paid from a fund we build by charging ourselves an hourly rate. In this instance, that rate is \$10 an hour. Since the 150 seems pretty consistent at burning \$22 an hour for fuel, that puts the hourly cost at \$32.

Naturally that is not the full cost of ownership. The hangar and insurance must be factored into that rate. In our case, if each pilot flies 60 hours a year, the hourly rate is about \$52, or about half what we would pay on the rental market.

There is always the chance the annual maintenance costs could exceed \$1800 that builds up in the fund when all partners fly 60 hours in the year. If it does, we will contribute equally to the overrun, and consider raising the rate we charge ourselves.

As for sharing the time on the airplane, any arrangement that works for your group is fine. We divide each month into three, designating a period of 10 days for each partner.

***It's a "user pay" system, but can easily beat the cost of renting, and give the owners more flexibility in when and where they fly.***

We're flexible on that too, offering our unused time to the other fellows. We can request certain times of the month, and work around each other's schedules. Knowing we have our time written on a calendar though, we can at least plan an extended trip once a month.

This type of partnership can work, not just with airplanes, but with other toys like boats, motorhomes, even lawn and garden equipment. Basically, it's ownership where each individual takes responsibility for his particular share or time he uses the item. It's fair for the partner who may not make use of whatever the item is. I have seen this system work successfully with a group owning a wilderness cabin. They split the capital cost equally, then charge themselves a daily rate

for the time they use it. For instance, a member who takes 3 friends to the cabin would pay his rate of \$10 per person, per day. That would total \$40 per day, \$280 per week, which goes into the fund for maintenance and taxes. If a member has no time in a given year to get out there, he has no obligation to pay into that fund.

I have discussed partnerships with pilots who simply divide their annual costs equally between the partners. However it doesn't seem fair that the person who flies only 20 hours annually pays the same as the one who has 60 or 100 hours in the log book at the end of the year.

It's a "user pay" system, but can easily beat the cost of renting, and give the owners more flexibility in when and where they fly. **R**







**RAA Ottawa-Rideau Fly-in / Drive-in / Camp-in / BBQ July 16/17, 2011**



July 17, Kars Rideau Valley Airpark (CPL3); RAA Chapter 4928 11th Annual Kars 'n' Planes Summer Fly-In BBQ. Comm 123.4 RWY 26/08 Glider activity in area. Homebuilt, Classic and Antique Aircraft, Rideau Valley Soaring Club, Model Aircraft displays, Vintage Cars, Swords and Plowshares Military Museum. BBQ served from 11 AM till 2 PM. Large Brats on a Bun, World Famous steamed Hotdogs and assorted beverages. Overnight camping on Saturday....campfire, "beverages" and food available to campers. Limited bunkhouse space available in new Clubhouse. Reserve ahead. **PUBLIC WELCOME.** Dilworth Road just East of Highway 416. For more information please email Dave Stroud [dstroud@xplornet.com](mailto:dstroud@xplornet.com)






**RAA**  
NORTHERN REGION  
**FLY IN**  
JULY 9, 10, 2011  
Collingwood Regional Airport  
(FREQUENCY 122.85)



*Free Admission  
Demonstrations  
Vendors  
Good Food (Breakfast and Lunch)  
RV and Underwing Camping (hydro available)  
Steak Dinner 6pm, Tickets \$15.00  
Saturday Social Around the Campfire  
Transport Canada Recurrency Seminar 10 am Saturday  
Technical Seminars Saturday starting at 1pm  
Classic, Homebuilt, Ultralight and other unique aircraft  
Fly In Pilots qualify for Raffle and Peoples Choice Awards*

**Remember your tie downs...**

For more information contact  
Keith at 705-444-1422  
[ckweston2@sympatico.ca](mailto:ckweston2@sympatico.ca)

# Zenith Aircraft Consolidates Operations

*Zenair shows new direction with Spring Open House in Midland, Ontario*

Canada's oldest and largest kit-plane and aircraft float manufacturer, Zenair Ltd., recently announced consolidation of manufacturing and sales efforts at its Huronia Airport (CYEE) facilities. Out of the public eye for a long time, the company just hosted its first Open House in many years on June 11, 2011.

On display were aircraft assemblies and kit components for the company's two popular LSA and Experimental models: The Zodiac CH 650 and STOL CH 750. Company

president Mathieu Heintz was on hand to answer questions and offer tours of the manufacturing floor: "For ten years, this shop has been making parts for sale through distributors and regional representatives, both in Canada and abroad. Sales for the Canadian market are now again handled factory direct, leaving representatives more time to focus on builder-assistance and aircraft completions (now allowed by the regulations)," said Heintz.

In line with the shift in direction, Zenair Ltd. now also offers technical support from Midland: "By phone or e-mail, customers have better access to our technicians; future plans include demonstration aircraft for introductory flights and check-rides" adds Heintz.

The early summer Open House is slated to become an annual event for the company, with a "Zenair Fly-in" slated for the fall.

For more information on Zenair or its aircraft, now some of the most tested and vetted aircraft in their class, contact the Midland, Ontario company directly at 705-526-2871 or go to [www.zenair.com](http://www.zenair.com)



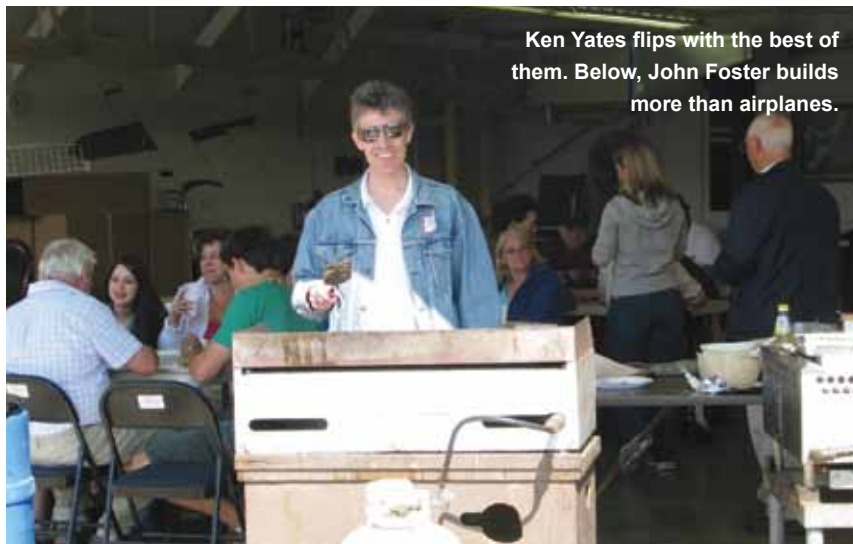
# Across Canada

*RAA Chapters in Action*

## RAA Toronto

On Father's Day the chapter hosted a pancake breakfast for deserving fathers who slave day after day over rivet guns and hot Lycomings (some-one's got to do it, right?). Right, Ken Yates flipped pancakes for all who attended the RAA-TR Fathers' Day breakfast.

Lower right, RAA-TR member Joe Foster (centre) has built more than his Osprey amphibian. Joe is explaining to visitor John Szemerey and RAA-TR



Ken Yates flips with the best of them. Below, John Foster builds more than airplanes.

## Join the RAA Forum

RAA's new forum is online! We hope to add many features over the next while to enhance the value of your membership. The URL is the same at [raa.ca](http://raa.ca) - once you're on the home page, simply click on the "forum" tab to get there. You'll find it a useful place to exchange ideas and ask questions - but it's only as good as the people who contribute to it. Help make this a useful resource for builders and pilots.

Members are encouraged to send in news and chapter happenings for postings on the site. Get the word out, and check frequently for news on upcoming events. You can post them directly on the forum, and we'll make sure they make it onto the main site as well.

Any suggestions and ideas for improvements are welcome and can be sent to George Gregory at [gregdesign@telus.net](mailto:gregdesign@telus.net). Stay tuned for further developments!



president Brian Heinmiller the construction of his plansbuilt car, a Lotus Seven replica. Ken Yates flipped pancakes for all who attended the RAA-TR Fathers' Day breakfast.

## Midland-Huron

The Midland RAA Chapter had its Family Day and Fly In on June 11 and 12 at the Midland Huronia Municipal

Airport. Saturday, June 11, the Zenair Factory had an open house, Martina Wassmer, a Transport Canada Civil Aviation Safety Inspector from the Buttonville office gave a Safety Seminar from 10:00 to 12:00, the Midland District Railroad Club, who use the old terminal building as their clubhouse, opened their doors to show their model railroad setups, and



*Scenes from the Midland-Huronina Fly-In:*

*Midland ramp, with member Ray McNally's Mustang II in the foreground.*

*Sight seeing flights available (centre) and the indefatigable Mike Manappso, our greeter, in our "follow me" vehicle.*



Bruce Platt Flight Training offered sight seeing flights in a Cessna 172. The Barrie-Huronina CVMG had a display of antique motorcycles present. Representatives from Aircraft Spruce were present to hand out catalogues, and John Packer, from the Stanhope Airport, had a display of aviation lighting products for sale.

Tom Watson, a local aircraft owner on the field, represented William C. Aitken Insurance Ltd. Tom had a table set up to distribute insurance literature, and answer any aviation insurance questions. Tom was also a major contributor of the door prizes that were awarded on both days.

On arrival each pilot was given a registration ticket to be filled out and deposited in the draw box. At 13:00, door prizes were awarded on both Saturday and Sunday. Sunday

was a poor flying day, and there were only two aircraft present. Mike from Collingwood chose 6 quarts of aviation oil, donated by Tom Watson, and Joe Dyer from Elmvale, chose an LED trouble light, donated by our RAA Chapter, from our table of prizes.

Breakfast and lunch were served both days. Breakfast consisted of scrambled eggs and sausage, with a drink, and lunch consisted of either a hamburger, sausage, or hot dog, with chips and a drink. Ice cream bars were also available, but with the cool weather, were not a big hit.

Our event was scheduled from 08:00 to 16:00 both Saturday, June 11, and Sunday, June 12, with dry camping over night. We had two motorhomes, and 3 motorcyclists overnight on Saturday, June 11. RAA Vice President Garry Kingma stayed in the Terminal overnight so that the doors could be left unlocked and the washrooms made available to the campers.

The weather on Saturday, June 11 started with a high overcast, deteriorating during the day to a light rain that started at 15:00. There were approximately 15 airplanes present and 100 people drove in. Sunday, June 12, had low ceilings with winds increasing during the day. 2 airplanes present, and approximately 20 public.

The cook tent blew over in a gust with RAA member and cook Piet Gooding inside. Piet was surprised but not injured. Our 2 BBQ's were knocked over and all the supplies on the tables, with some of the cooked food, ended up on the ground. There was no one left to take advantage of the discounted food so we called it a day at 14:00.

We'd like to thank all of you that



*Calgary Fibreglass Course. Top: Students at the seminar check out technique; above: some of the participants, clockwise from left. Al Runnells, Colin Cleland, Glenn Miller, Gerry Theroux, Shane Daly - instructor, Paul Swift, Matt Swain, Tim Houle, and Carl Forman.*

attended, and I would especially like to thank all the RAA volunteers that worked so hard to make this the success that it was with the conditions we were dealt. Midland Huronia RAA Chapter President Ian Reed.

#### **RAA Calgary**

The Fiberglass course was a phenomenal success. The 11 people that attended said that they learned substantially more than they thought they would.

We learned the differences in resins, what Epoxy is, 3 different styles of lay ups and vacuum bagging. This was all hands on work!





Chapter 85's Award Banquet. Left: Rob Prior receives the Most Valuable Member Award. In the picture, left to right are chapter president Tim Nicolas, Eric Munzer, Rob, and Vice President John Macready, who was also Master of Ceremonies. Centre, Carol Foley receives the Woman of the Year Award, and at right, Ray Colley is presented with the Ira Jamison Award by Bruce Prior.

### RAA Chapter 85 (Vancouver)

In late March, Chapter 85 had its annual Awards Banquet. Chapter Vice-President John Macready was the Master of Ceremonies. At the exquisitely catered event, a number of awards were presented to deserving members: Most Valuable Member went to Rob Prior, Woman of the Year to Carol Foley, and the Ira Jamison Award to Ray Colley.

By the time this issue gets in members' hands, Chapter 85 will have had their July 2 Fly-in. Stay tuned for a report on that event!

### London/ St. Thomas

Thank you to Gus Cameron for his past efforts as our Chapter membership secretary! We all have appreciated Gus' support of the Chapter and are sorry to see him step-down from this position.

A plaque for completion of the first flight of a completed amateur built aircraft project was presented

to Gary Wilcox, by Angus McKenzie, for the first flight on Jan 23, 2009 of Gary's RV-7. Currently Gary has 160 hours flying time on the aircraft, and noted a top speed of 222 MPH.

Angus noted that the fighter aircraft from the Canadian forces were to land in St. Thomas for the upcoming Great Lakes Air Show, but the runway length is inadequate. Therefore the forces are setting up an 18,000 pound arrester cable mechanism across the runway to catch the jets similar to a carrier landing on an aircraft carrier. That should be a really interesting display in itself.

Also the largest collection of USA based Military aircraft outside the US border will be on display. The Canadian forces are planning a simulated combat display and will be blowing stuff up !!! (How cool is that?)

Project Report: Dave Hertner noted that his RV-10 is now located at St.Thomas Airport. The wings and tail are installed, and the rigging is

proceeding well.

Charlie Murray announced that the COPA St.Thomas Chapter will be having their "Flight for Kids" day on Saturday. Kids from 7 to 17 years old who show up at the airport will get a free airplane ride provided by COPA member in their own planes, and a free hot dog (but not until *after* the flight...).

Charlie drew attention to an automotive headlight electrical connector which melted and nearly caused a fire on his motorbike. A connector similar to the landing lights on many homebuilt planes, and was told by the mechanic to change the connector every time the Halogen bulb is changed!

At 7:55PM Dave Hertner introduced the speaker, Josh Pegg, a third year apprentice working at Brant Aero in Brantford. Josh has about forty hours in Dave's garage wiring in and interfacing the very complex sensors, computer based avionics displays,

*continued on page 36*



## Terry Wilshire Passes

**RAA Member Terry Wilshire passed away in late June as a result of ALS. Terry was a true citizen of the aviation community, and his accomplishments many and varied. Already deeply involved in**

**chapter activities, in the 1990's he was instrumental in working out a deal with provincial and municipal levels of government when the much beloved Delta Airpark was threatened with closure: the result was a win-win for local**

**pilots, the chapter, and greater Vancouver parks boards. Along with Bob Cutting he designed and built an exquisite Spitfire replica, served as Aircraft Chairman and Director for RAA Chapter 85, as Regional Director for RAAC, Chairman of DAPCOM (Delta Air Park Committee), President of Tally-Ho Enterprises (the company selling plans for the Spitfire), President of Industrial Laser Cutting (ILC), and recently as BC/Yukon director for COPA. His strength and enthusiasm kept him serving even as the disease progressed. He was one of the greats and will be truly missed.**



# Cyclone

*Cessna knock-off improves the breed / by George Elliot*





**THE MOST IMPORTANT PART** of the project was the beginning when I did nothing but think about it. Too many people build the wrong airplane and despite the fact that I felt that this was the right plane, I still convinced myself to go through an 18-month thinking period. That was the dream stage and the most productive part of the whole process. After 18 months I still felt the same; therefore, it was now time to spend money, cut metal and get on with it.

The concept for the Cyclone came from a Quebec company called Avionnerie Lac St-Jean Inc. in Dolbeau Quebec. They are located in the geographical middle of Quebec where English is unknown. These folks took a Cessna 180 totally apart and made very good drawings of all the parts. At the same time, many changes were made to the design, all of which I totally agree with. To illustrate the nature of the changes, I will give two examples. The wing was made one foot longer at the root, which results in flaps, which are one foot longer than Cessna flaps. This also opened up the C of G limits for the better. The Cyclone designers also claim a stronger spar, which allows a greater gross weight. The stall

***For many people, the building of an aircraft is a dream and for those with patience, a dream come true. I've been most fortunate in having family support, which has resulted in three projects, which have all flown. The ultimate dream started in 1992 when I saw a magazine ad for the Cyclone. Can you imagine an airplane that is bigger than a Cessna 185 on amphibious floats – how can it get any better than that?***





*Above: The picture of the uncovered wooden gas tank shows most of the hardware involved. From the top; fuel filler, fuel drain, one of several check valves, fuel out to engine – this is the rear one, mechanical fuel gauge, and ground wire. Other stuff not shown here include pressure relief tubes between the sections and overfill drains.*

*Right: The picture of the firewall shows the number of AN3 bolts used to secure the 40 thousandths stainless steel plate on the other side of the firewall. On the side of the fuselage, I riveted a 40 thou. aluminum sheet on the outside.*



speed has been dramatically reduced. Although I've read reports about 45 mph stall, I can't get mine any lower than 50.

I ordered and received all the raw material for everything except the fuselage. This was to conserve space and dollars and it made sense at the time. It took several months to sort out the raw material against the parts drawings and by then the instruction manual arrived. This became my second problem (the first was French). The manual was thin and you could read it in no time at all. Let me give you a sense of this by giving a couple of examples.

Instrument panel: don't forget you will need one and you should consult with Transport Canada to determine minimum instrumentation.

Don't forget to design and install gas tanks. Most of the manual was made up of photocopies of a Cessna parts manual and you know what that's like. For some strange reason this did not upset me at all, quite the

opposite; I took the view that there are always solutions to problems and I would find them and I did.

The French was resolved when I found a secretary at Avionnerie that had taken English in High School and I admit that her English was a little bit better than my French. We were both determined to make it work and it did. She had to take all the questions to the French speaking technical folks and translate back to me or at least some of it since I didn't know the French words for a lot of airplane parts.

The lack of a manual was fixed when a good friend with a 180 on floats gave me access to his aircraft to use as a prototype. It is amazing how much information you can get with a note pad, camera, ruler and a screwdriver. My friend Doug had a single condition that is that I put the aircraft back together after each note taking session. Doug and many other people like him made this project possible and all I can do is say Thanks – on the other hand, that is what this hobby is





# *Flying the Cyclone is* **fun**

all about. Doug is gone now and is missed; all I can do is to continue to say thanks by helping others.

I tried to get a decent manual from the supplier, but unfortunately they had gone bankrupt in the meantime. This is of course problem number three.

The solution was simple in the minds of Transport Canada. I got a thorough briefing about the 51% rule and was advised that they now considered me to be the Designer of Record. Any questions that I might have had to be addressed to myself, now I was concerned. Again the solution was simple and practical. Lots of friends, lots of reading and lots of questions. It really worked well, then I realized that I was now a real homebuilder because I could do whatever I want as long as it was safe and made technical sense in the eyes of the MD-RA inspector.

The first major design problem was the fuel tank system. In looking at many homebuilts, it was clear

that aluminum tanks were popular. After much reading, I took a welding course at the local community college and concluded that aluminum welding was beyond an art, it was black magic and its secrets would never be made available to me. I refused to pay someone else to do the welding because I was going to solve the problem without the use of a cheque-book. The next solution was rubber bladders. This was good enough for Cessna and Boeing therefore it was worth looking into. The final result was NO due to a number of accident reports that blamed collapsing bladders, high initial cost, and rigid maintenance requirements. Next on the list was a wet wing. This was most attractive until a friend asked what would I do if the wing leaked. At this point I was really running out of ideas. The final solution hit me out of the blue while at the lumberyard. Why not build the tanks out of wood? I selected some oak plywood and started to experiment.

In designing these tanks, I could write a long article but I'll keep it brief for now. The tanks are wing tanks and I didn't want to fill them from the top of the wing. When you have a floatplane, that is a good way to learn how to swim. Unfortunately,

you hit the floats first when you fall off the wing. The design includes a small filler tank in the fuselage from which fuel is pumped up to either or both wing tanks. The fuel filler is on the side of the fuselage. The fuel level indicator is a mechanical type side mounted on each wing tank. Just think of no electronics to fail. Each tank has three separate sealed sections connected with pipes and check valves to encourage fuel to always be at maximum in the section closest to the fuselage. The wood is protected against exposure to fuel by lots of epoxy resin. There are two outlets on each tank (front and back) to avoid fuel starvation in steep climbs or descends. The screens are copper plumbing pipe drilled with many many holes corresponding to the correct mesh requirements. I've often wondered if the original designer (Avionnerie) would have approved of this design. The good news is that they work well, Transport Canada and MD-RA are happy with them and I now have a lot of bragging rights.

Now we have completed the wings, fin assembly and stabilizer assembly; all is inspected, signed off, sealed and stored. Time for the fuselage. I was now stuck since there



## *The decision to build the Cyclone was a good one and I'm having the time of my life with the aircraft*

was no supplier of material (they had gone bankrupt), I hadn't bought that material yet and there were no instructions. The final solution was to buy a wrecked 182 fuselage. This aircraft had an accident and had spent the last two years at the bottom of a lake. There was nothing forward of the firewall, no instrument panel, no windows, pretty well nothing. Another surprise was that Cessna never designed or approved the 182

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*Above: The aircraft on the ramp is 13.5 feet to the tip of the tail. You soon get a sense of how big this aircraft actually is.*

for float operation. To solve this one, I strengthened the firewall and fuselage. The reinforcing sheets and doublers were 40 thou and I used many AN3 bolts on the firewall. Too many floatplanes had lose rivets and my solution was to use nuts and bolts. The 51% rule does not give you credit for work on a previously certified part. In the final count, I got credit for the engine installation and the instrumentation in total. The modification for floats was also a major credit. When MD-RA added up the score, my 51% came out at 87%. I was delighted and maybe ecstatic.

The basic attitude was to keep it simple. All instruments are steam gauges, the flaps are operated by a long handle and the hydraulic gear has a manual pump. The only modern electronics would be the radio, transponder and that type of stuff. The use of vacuum tubes

would have taken this attitude too far.

Flying the Cyclone is fun. It is also different and busy. When you want to increase altitude you bring in some fine pitch to the propeller but don't touch the throttle. Never let the throttle setting exceed the manifold pressure. The biggest fear is that the gear will be in the wrong position for a landing; to reduce this risk I've installed several labels which read "ON FINAL - CHECK THE GEAR AGAIN". There are four indicator lights for gear position - four greens for landing on grass or asphalt and four blues for water. There are many levers and dials to play with. A check list is mandatory.

At this point I'm going to give a lot of credit and thanks to Transport Canada. They let a Chartered Accountant become the design authority of a complex airplane, they removed the flight restrictions when I gave them the documentation in the time it takes to drink a cup of coffee and they approved the float conversion within four hours of receiving the technical report by courier. In truth, I have no complaints but was fortunate to deal with Jeff Langford in the Buttonville office.

This project has been fun and a fantastic learning experience. I appreciate the freedom to be creative in solving the many problems that I faced. Every problem had a good solution which were all in my favour. The decision to build the Cyclone was a good one and I'm having the time of my life with the aircraft.

I also recognize that at 71 years old, there are only a few years to fly this toy before I should convert to a 150 or J3 for a couple of years. Time is not on our side and my only hope is that I recognize my age limits before someone else points them out.



### Cyclone Specs

Engine	230 hp	300 hp
Stall	37 mph	38 mph
Takeoff	40 mph	40 mph
Takeoff roll	250 feet	225 feet
Cruise Speed	155 mph	163 mph
Range	870 miles	912 miles
ROC	1300 fpm	1600 feet
Max gross weight	3000 pounds	3500 pounds
Empty weight	1700 pounds	1750 pounds
Useful load	1300 pounds	1650 pounds

For more information: 1310 Gay-Lussac, Boucherville (Québec) Canada J4B 7G4

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## Forming Aluminum Blisters

*Graham Luckhurst*



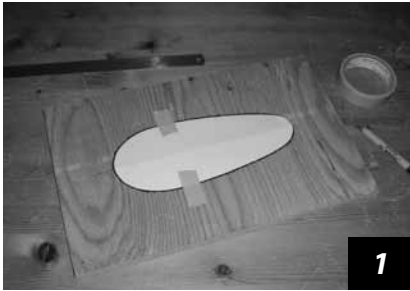
MAKING CHANGES to the design of your aircraft brings many unanticipated challenges but also an occasional unexpected benefit. Due to some ergonomic issues, I decided to move my instrument panel further forward for better entry and egress. However, to avoid issues reaching instruments that require adjustment such as GPS, EMS & radio, plus added panel space, I added a center panel that reduces reach to those critical components and a center column to the floor. This arrangement locates all electrical instruments, circuit breakers and switches to the central panel and column. Well into this, I realized it would be really nice if I could route the wiring from this central panel location to the rear of cabin without going right around the cabin walls. However, I have this pesky but rather essential spar carrythrough getting in the way of such a desirable cable route. A short excursion of electrical wiring outside the plane under the spar would work well. But wire exposed to the outside elements and the appearance would just not fly (ugh!). Well, this looks like the need for a little cover up job and a small aerodynamic blister located under the plane bridging the spar carry through would do the trick. I may polish the plane and therefore wanted this blister to be aluminum. RAA friends to the

rescue. There is usually someone with the right idea on how to approach the problem and I'm always eager to learn something new. Aren't we all? So here is how I went about forming an aluminum blister.

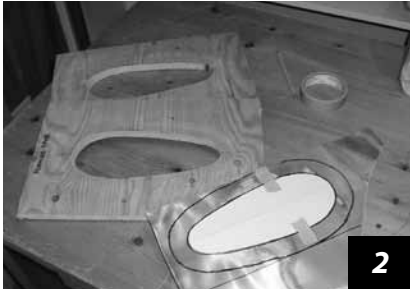
First I needed to determine the footprint of the blister so I measured the gap to bridge and drew one half on stiff paper, folded it over, traced the other side to ensure it was symmetrical and cut it out. I was warned not to make the rear of the blister too sharp as this would be difficult to form. I traced this shape onto two pieces of  $\frac{3}{4}$ " plywood, cut out the profile with a jig saw and filed the holes' edges smooth. Making sure the two blister profiles were aligned, I drilled 10 holes for  $\frac{1}{4}$ " bolts around the periphery, making sure they were about  $1\frac{1}{2}$ " from the cutout's edge. These holes should not go through the aluminum to be formed as some movement of the aluminum might be required when forming.

What to choose for the aluminum material to be formed? It has to be malleable and thick enough so it does not get too thin when it's stretched. Utility grade O condition aluminum 0.040" thick is perfect for the job. The blister is for cosmetic purposes only and certainly not a structural component, so utility grade is OK. It is soft but work hardens from being formed.





1



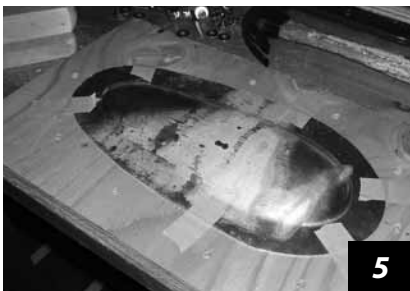
2



3



4



5

I cut out the aluminum 1" larger all around the blister footprint to make sure it would not slip out when clamped between the two pieces of plywood.



1: The pattern for the blister is cut out and taped to the plywood. 2: Establishing the size and shape of the aluminum blank. 3: The blank is bolted into the pattern. 4: The setup and tools used to form the blister. Above, the hammer marks are worked out with a small English Wheel. Opposite: the finished blister is now ready for trimming and fitting.

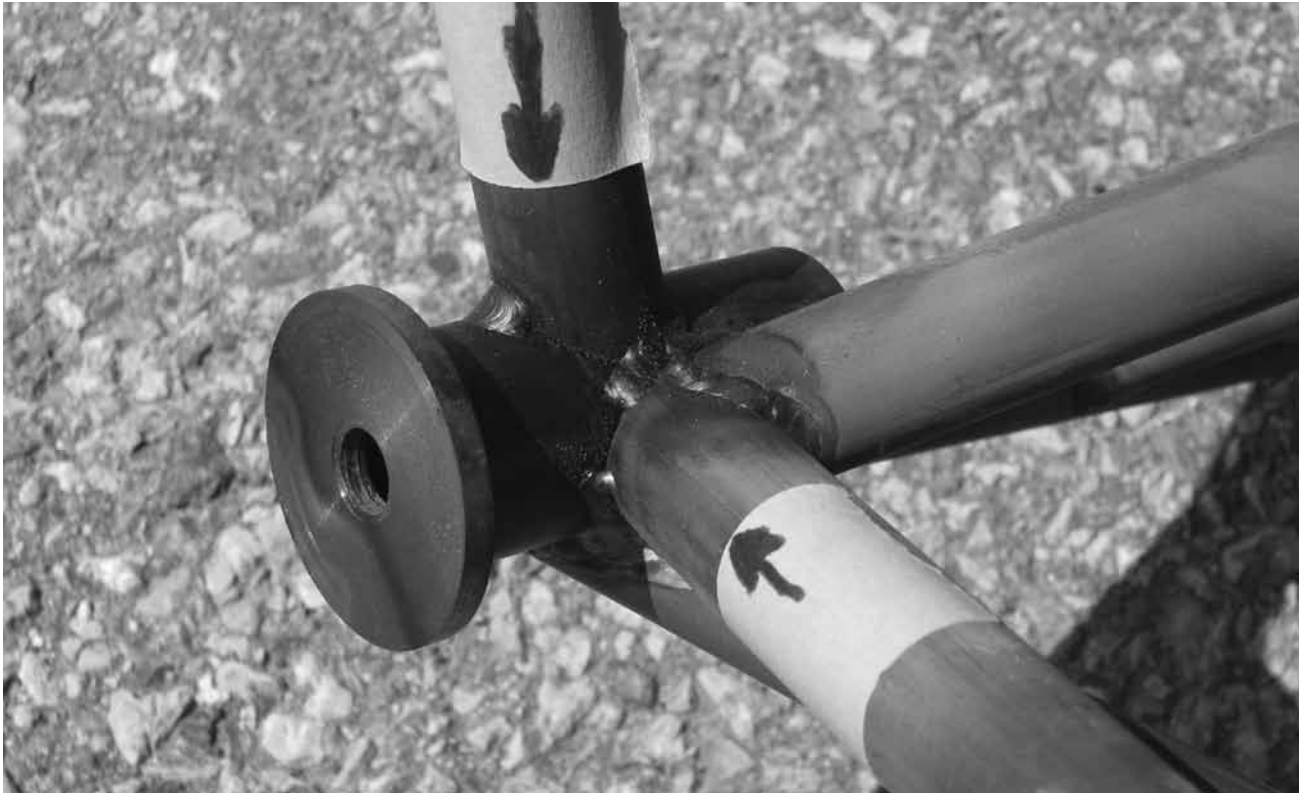
To form the material, I rounded the end of a 6" long 1 1/2" square piece of pine to a radius a little tighter than what I wanted in the part. Gentle tapping with a 2lb hammer starting in the center and circling outwards started off the forming process. Just a little bit at a time seemed to keep the forming process under control, repeating the circular process and carefully knocking down the high spots as I went. After a while, I noticed the center was getting suitably shaped but the edges next to the plywood were staying flat as I could not get the pine forming block into the corners. I made a second 1/2" square forming block and rounded it with a bias to one side. This allowed me to get right up to the plywood pattern and start forming those areas to

the shape I wanted. I was rather timid with the forming process and spent 2 hours to get to a satisfactory profile. One whack too hard and it would be all over; it won't go back. I'm sure you could be much quicker with practice. However being this careful resulted in a fairly smooth surface. A little bur-nishing using a small English wheel set to a low level of compression produced an acceptable finish.

Now if I had only made it a little bigger the routing of the wires would be much easier. Ahh! But I'm an expert now, I'll just make another. I just need to beg for a bigger piece of aluminum to play with.

R

Graham Luckhurst is a member of KW-RAA, and is currently building a Sonex.



## Powder Coating Metal Parts

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*Gary Wolf*

POWDER COAT PAINT has been around for a long time and the companies that provide powder coating services extol its abilities to hide imperfections and to provide a thick plastic coating on metal parts. The range of colours available is wide, and when the plastic powder is fused in an oven it provides a lustrous coating that makes welded parts look much better than they are.

My first encounter with powder coating was some twenty years ago when a customer brought me a beautiful set of race car suspension arms that had been powder coated in black, and he wanted them stripped so that I could add tabs for sway bar links. Sanding and filing the coating proved fruitless so I set them off to the local powder coater to have the finish burnt off, the most common and effective way of removing it.

When the arms came back we had a look at them and found

that the fabricator had forgotten to complete the welds at two of the mitered joints, leaving fully one-third of each joint unwelded. Because of the generous fillet provided by the powder coating there was no way of knowing that these arms would have been doomed to quick failure.

Recently an RAA member who was doing his annual showed me his motor mount that had been supplied with his kit powder coated in white. Because there was some minor wrinkling of the coating and a few unexplainable black spots he wondered if there might be a crack in the tubing under the coating. He had given up trying to abrade the coating and asked if I could torch the area to get the paint off. He removed the engine and left it hanging on the hydraulic lift, then removed the mount for inspection, definitely not an easy job.

Even with the mount removed it was still impossible to determine

if the wrinkling of the plastic meant that there was a crack in the tubing so out came the oxyacetylene torch and we used the preheater tip to burn the plastic off. What we saw made our jaws drop – the steel receiver for the Wittman gearleg had a crack running  $\frac{3}{4}$ " each way from the tip of the welded gusset that was meant to stabilize the area. That was 1.5" of crack in a tube with a circumference of about five inches.

We had a look at the lower mounting lugs and again burnt off the plastic coating. What we found was that both lugs had cracks that went around the weld, and then ran halfway around the lower support tubes of the engine mount, despite that there had been only minor wrinkling but no cracking of the coating. Elsewhere we found more wrinkles and burnt the paint off but found no cracks under these. We were getting both false negative and false positive indications, not what one wants when doing an annual.

We doubted that all the cracks occurred simultaneously. The landing gear receiver certainly had the most developed crack but the two lower lugs were not far behind it. The previous visual inspection had been only 15 hours earlier so either the cracks had been propagating for awhile under the paint or they were propagating very quickly. Either way if the lower lugs had separated from the engine support tubes the results would not have been good.

A new engine mount was ordered and this time the owner informed the manufacturer of the cracking and specified that he wanted the new mount supplied in bare metal. He planned to use a thin white enamel paint from a spray can so that cracks would show up easily and if necessary the paint could be removed with sandpaper or solvent.

The new mount arrived by courier and an inspection showed that the welds on three of the clusters had not

***Because of the generous fillet provided by the powder coating there was no way of knowing that these arms would have been doomed to quick failure.***



been completed. One was down in the valley of a three tube cluster, a very difficult place to weld and easy to ignore. If the mount had been powder coated the masking properties of the plastic coating would have covered this area very nicely.

Powder coating is the best ally that a careless welder can find. It fills in pinholes, bridges unwelded areas, and makes it impossible to inspect for cracks. The custom motorcycle and car crowd love this stuff but they make their parts out of mild steel that is three times as thick as necessary. Aircraft are made out of thin wall 4130 that requires excellent welding techniques to ensure that there is no undercutting of the tubing next to the welded area.

An engine mount is the most highly stressed part of most airframes, especially when it is asked also to carry the landing gear loads into the fuselage longerons. If you are order-

ing a kit it would be wise to specify that you want your mount supplied in bare metal so that you may inspect it carefully. You should also consider painting it with thin white organic enamel paint from a spray can.

One other concern with powder coating is that it is usually a polyester and if there is an engine fire it will burn very nicely and give off a poisonous gas. Builders spend a lot of money to use the white aircraft-spec wiring instead of the much cheaper automotive wiring. What sense does this make when powder coating does an end run around this care? **R**



# 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](mailto: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 Ibergville, 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](mailto:NRIOUX@lapresse.ca)

**OUATOUAIS/GATINEAU:** Every Saturday 9:00 am to noon at the restaurant 19 Aileron in the airport terminal. Contact Ms N.C. Kroft, Gatineau Airport, 819-669-0164.

**ASSOC DES CONSTRUCTEURS 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](mailto:lesfaucheurs@hotmail.com)

## ONTARIO

**BARRIE/ORILLIA CHAPTER** Fourth Monday 7:30 PM Lake Simcoe Regional Airport Contact Secretary Dave Evans 705 728 8742

E-mail [david.evans2@sympatico.ca](mailto:david.evans2@sympatico.ca)  
**COB-DEN:** Third Thursday 8:30 pm at Club House, Cobden Airport. Contact Pres. Clare Strutt, 819-647-5651.

**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](mailto: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](mailto: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](mailto:lazykfarm@sympatico.ca)

**KENT FLYING MACHINES:** First Tuesday 7:30 pm at various locations. Contact President, Jim Easter 519-676-4019 [jim.easter@teksavvy.com](mailto:jim.easter@teksavvy.com).

**KITCHENER-WATERLOO:** Meets the third Monday of each month in the upstairs meeting room of the cadet building at CYKF, except during the summer months when we have fly-ins instead. Please contact Clare Snyder [clare@snyder.on.ca](mailto: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 Angus McKenzie at 519-652-2734 or [angus.mckenzie@sympatico.ca](mailto:angus.mckenzie@sympatico.ca)

## MIDLAND/HURONIA

Meeting: First Tuesday, 7:30 pm at Midland/

Huronian airport (CYEE) terminal building. Contacts: President Ian Reed – 705-549-0572, Secretary Ray McNally – 705-533-4998, E-mail – [raa.midland@gmail.com](mailto: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](mailto:murphage@cogeco.ca), [www.raa-niagara.ca](http://www.raa-niagara.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](mailto:jamesmorrison190@msn.com)

**OWEN SOUND** Contact President Roger Foster 519-923-5183 [rpfooster@bmts.com](mailto:rpfooster@bmts.com)  
**OTTAWA/RIDEAU:** Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-831-8762 [bill@ncf.ca](mailto:bill@ncf.ca)

**SAUGEEN:** 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](mailto:barry.tschirhart@bell.net)

**YQG AMATEUR AVIATION GROUP (WINDSOR):** Forth Monday, 7:30 pm Windsor Flying Club, Airport Road, Contact: Kris Browne [kris\\_browne@hotmail.com](mailto: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](mailto:bstobie@pathcom.com)

**TORONTO:** First Monday 8:00 pm at Hangar 41 on north end of Brampton Airport. Contact: President Brian Heinmiller 905-877-7947 [b.j.heinmiller@sympatico.ca](mailto:b.j.heinmiller@sympatico.ca)

**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](mailto: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 Canadian Flight/Roof Top Cafe at Warton-Keppel Airport. As there are some-time changes, contact Brian Reis at 519-534-4090 or [earlycanflight@symptico.ca](mailto: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](mailto:raa@mts.net). No meetings June, July & Aug. RAA Winnipeg info also available at Springfield Flying Center website at <http://www.lyncrest.org/sfcrac.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](http://www.raa4901.com). Brian Caithcart is the chapter president. Contact email: [president@raa4901.com](mailto: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 Don Rennie [cgmmv.skylane@gmail.com](mailto:cgmmv.skylane@gmail.com) 403-

874-0876

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

**GRANDE PRAIRIE:** Third Tuesday, Chantelle Aviation Hangar, contact Jordie Carlson at 780-538-3800 work. or 780-538-3979 evenings. Email: [jcarlson@telusplanet.net](mailto:jcarlson@telusplanet.net)

#### BRITISH COLUMBIA

**ABBOTSFORD:** Third Wednesday 7:30 pm Abbotsford Flying Club, Abbotsford Airport. Contact President, John Vlake 604-820-9088 email [javlakeca@yahoo.ca](mailto: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 Kelowna Yacht Club. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 [mon-eypit@junction.net](mailto:mon-eypit@junction.net)

**QUESNEL:** First Monday/Month 7:00 p.m. at Old Terminal Building, CYQZ Airport.

Contact President Jerry Van Halderen 250-249-5151 email: [jjwanhalderen@shaw.ca](mailto:jjwanhalderen@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: Tim Nicholas [vibraanalysis@shaw.ca](mailto:vibraanalysis@shaw.ca)

biz.ca. Website <http://raa85.b4.ca>.

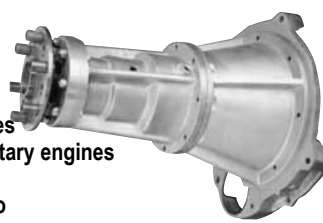
**VANCOUVER ISLAND AVIATION SOCIETY (VICTORIA):** Third Monday 7:30 pm Victoria Flying Club Lounge. Contact Pres. Roger Damico, 250-744-7472.

**THOMPSON VALLEY SPORT AIRCRAFT CLUB:** Second Thursday of the month 7:30 pm Knutsford Club, contact President - Dick Suttie Phone 250-374-6136 e-mail - [richard\\_suttie@telus.net](mailto:richard_suttie@telus.net)

**ALASKA 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 Richard at 782-2421 or Heath at 785-4758.

Chapter executives, please advise of changes as they occur. For further information regarding chapter activities contact RAA Canada, 13691 McLaughlin Rd, R R 1, Caledon, ON L7C 2B2 Telephone: 905-838-1357 Fax: 905-838-1359 or call toll free: 1-800-387-1028 email: [raa@zing-net.ca](mailto:raa@zing-net.ca) [www.raa.ca](http://www.raa.ca)

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# RAA Executive Director NOMINATION FORMS 2011

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To Nominate National Executive Director, fill in name

Nomination for \_\_\_\_\_ National Director

I, \_\_\_\_\_  
Nominee's Signature Printed RAA #

Being an RAA member in good standing, accept nomination  
Note - Nominee's signature constitutes acceptance of nomination

I, \_\_\_\_\_  
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*Note - Five Nominators are required; it is good practice to obtain several additional nominators in case of an inadvertent lapsed membership by a nominator.*

*Three seats on the Board of RAA Canada are expiring this year, and we need your help in running this national organization. Please photocopy this form and have five National members sign. Send it to RAA Headquarters by August 30, 2011. The nominations will be posted in the September-October issue, plus on the Announce e-mail list, and the [www.raa.ca](http://www.raa.ca) website.*

Complete the above, and forward before August 30, 2011 to:  
Recreational Aircraft Association Canada, Waterloo Airport, Breslau ON N0B 1M0  
Telephone: 519-648-3030 Member's Toll Free line: 1-800-387-1028  
email: [raa@raa.ca](mailto:raa@raa.ca) web: [www.raa.ca](http://www.raa.ca)

## Paragliding / continued from page 5

ates added drag and is considered bad form. I was told to cross my legs and point them in the direction of the turn, while Jeff manipulated the wing.

Being the man in front, I was instructed to face downhill and lean forward while Jeff attended to kiting up the wing; as it inflated I was amazed at the force as the wing pulled me back a half dozen steps - nearly off my feet. I imagine this is pretty common because I sensed no consternation in Jeff's voice - just "run-run-run" - and we were off.

Wow. My first impression was how

smooth it was; my second thought was how natural and solid it felt. Any apprehensions of having nothing between me and the ground evaporated in a second as I discovered the degree of control we actually had; further, the leisurely pace of flight was quite striking. We probably didn't fly much over 20 mph for most of the flight. When encountering turbulence (read: lift) the wing flexes, so even when you feel the bump, it's attenuated as the wing flexes.

We immediately turned to the right, looking for some lift to prolong the flight, and within seconds found a wonderful little bubble that carried

us above the landing zone. Watching the hawks and other paragliders was a good way to find out what was happening, and we were able to stay up for nearly a half and hour, just finding thermals and ridge lift to prolong our bliss. It was pretty cool seeing birds sharing the updrafts with us. Although it's a totally different form of flight, I found some of my aviating instincts helpful - mainly that of being comfortable at altitude. I wasn't looking *down*; I was too busy taking in the beauty of the experience and relishing the sensation of pure flight.

Eventually, we ran out of lift. ►

Being a glider, one has to turn towards the landing zone while one still has enough altitude even while looking for lift enroute to it; a tree landing could be unpleasant enough. We found a few little bumps but soon realized that we were going to land sooner rather than later.

We turned towards the LZ at Eagle Ranch, approaching from the north. At possibly the most inopportune time, the wind picked up, reducing our glide ratio relative to the ground to something like 1:1. It became apparent we were not quite going to make the landing zone. Rats.

We came down about a hundred yards short, on the wrong size of a line of blackberries. The field was soft, and our touchdown though a bit of a pratfall, was gentle enough for all that. Jim called us on the radio to suggest we pack up and meet him on the highway, but a break in the blackberries and a dried out ditch were all that were separ-

ating us from the Ranch, and we were able to get over without too much trouble once we were packed up. The idea of an airplane you can fit in a rucksack is kind of cool.

The paragliding culture is somewhat different than that of conventional aviation. There are some middle-aged sorts in the sport, (the owner, Jim, I'd guess is a 40-something with a Minimax in his barn) whom, I gathered, discovered the sport looking for a cheaper way to fly. The paraglider drivers tend to be younger, 20 and 30 year olds; older guys lean more to the hang gliders. The most notable characteristic to me, however, is that it truly is a solo sport. You won't be taking visiting relatives for a flight, because apart from instructing, and familiarization flights, there is no two-person paragliding. You'd probably have trouble convincing your mother-in-law to strap in anyways.

FlyBC offers several options for the curious. the Tandem Discovery Flight I

went on is \$150 (\$125 Monday-Thursday); a Two-day introductory course is \$395, with an intermediate, 5 day course for \$995. The whole enchilada runs \$1950 with full certification with HPAC (Hang Gliding and Paragliding Association of Canada) certification. Previous course expenses are deducted from this total, so if I took the two-day course, my tandem flight expense would be deducted from the \$395, and so on.

My particular interest is in paramotoring, the powered version of the sport; it frees you from the hour-long drive to the mountains, and I live on an acreage. But that's a story for another time.

If you're interested in a pure flight experience and are reasonably fit, this is a great sport. You owe it to yourself to give it a shot! For more information: [www.flybc.org/](http://www.flybc.org/)

**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

<p style="text-align: center;"><b>Keep in Touch With Your Board of Directors!</b></p> <p>Gary Wolf ..... President .....519-648-3030 garywolf@rogers.com Wayne Hadath ..... Treasurer ..... whadath@rogers.com Dave King ..... kingdws@shaw.ca Ed Perl..... ed.perl@sympatico.ca</p> <p style="text-align: center;"><b>RAA Regional Directors</b></p> <p><b>Mainland BC:</b> BC Coast .....Pending</p> <p><b>Interior BC/Technical Director:</b> .....David King contact best between noon-10pm 7days work ph. 250-868-9108 home ph. 250-868-9118..... .....emailKingDWS@Gmail.Com</p> <p><b>Alberta North:</b> Tom Hinderks.....780-453-1078 or leave a message at 780-451-1175 ..... e-mail eahs.execdir@interbaun.com</p>	<p><b>Alberta South:</b> Gerry Theroux .....403-271-2410 grtheroux@shaw.ca</p> <p><b>Saskatchewan:</b> Laura Drinkwater..... 306. 955-1361 lauraprd@shaw.ca</p> <p><b>Manitoba:</b> Jill Oakes.....204-261-1007 jill_oakes@umanitoba.ca</p> <p><b>Ontario SW:</b> Jim Tyler..... tyler@orc.ca</p> <p><b>Quebec:</b>.....Pending</p> <p><b>Appointed Positions:</b> Translation:.....Pending Magazine Mailing: .....Dave Evans Ultralights:..... Wanted Web Page ..... George Gregory Insurance Committee ..... Gary Wolf AirWear.....Dave King</p>
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# Coming Events

## **Delta Pancake Breakfast**

Second Sunday of each month - Delta Heritage Air Park, Vancouver Monthly fly-in pancake breakfast by RAA Chapter 85 and DAPCOM. Air Park location is in the CFS. Full breakfast for \$4. Breakfast served from 9am until the food is gone or 11am, whichever comes first.

## **15th Annual RAA**

### **Northern Region Fly-In**

July 9-10 2011 at Collingwood Regional Airport. Comm frequency 122.85. Free Admission, demonstrations, vendors. Classic, Homebuilt, Ultralight and other unique aircraft!. Good food (breakfast and lunch), with RV and underwing camping with hydro available. There will be a steak dinner at 6 pm (\$15).TC Recurrency Seminar will be featured at 10am Saturday, with technical seminars starting at 1 pm. There will be a Saturday social around the campfire, and fly-in pilots qualify for a raffle and Peoples' Choice awards. Don't forget your tiedowns if you're flying in! for more information, contact Keith at 705-444-1422 or email him at ckweston2@sympatico.ca

## **Calgary Sheet Metal Seminar**

The Sheet Aluminum workshop is on Sunday July 10, 2011. From 10:00 to 16:30 or until we are finished, and is happening at the Springbank airport in Scott Church's hanger. The cost is \$60 for members and \$65 for non members and includes all your material, coffee's, lunch and an awesome book, The Aircraft Aluminum Handbook. You can pay at our next meeting on June 27, 2011, at the work shop (just let me know your coming) or contact Don Rennie CGMMV.Skylane@gmail.com This is an introduction to working with aircraft aluminum, making a parts, cutting, drilling, riveting, bending, and doing a repair. We will also answer any questions and show advanced techniques for those that request it. Bring your weekend work clothes, including glove's and safety glasses!

## **Saskatchewan Aircraft Adventure**

Last year more than 200 adventurers flying 100 airplanes made an outstanding trip to the Yukon in what was the largest group flight in Canadian history. The Century

Flight Club will conduct the third annual 100 aircraft flight on July 16 - 23, 2011. This time into Canada's northern wilderness.

Registration is \$695.00 (\$595.00 for registrations booked before Dec.1.2010) Call or go online now to register! Limited to 100 aircraft. 1-778-297-7377  
WWW.CROSSCANADAFLIGHT.COM

## **RAA Chapter 4928 11th Annual Kars 'n' Planes Summer Fly-In BBQ**

July 17, Kars Rideau Valley Airport (CPL3): Comm 123.4 RWY 26/08 Glider activity in area. Homebuilt, Classic and Antique Aircraft, Rideau Valley Soaring Club, Model Aircraft displays, Vintage Cars, Swords and Plowshares Military Museum. BBQ served from 11 AM till 2 PM. Large Brats on a Bun, World Famous steamed Hotdogs and assorted beverages. Overnight camping on Saturday....campfire, "beverages" and food available to campers. Limited bunkhouse space available in new Clubhouse. Reserve ahead. PUBLIC WELCOME. Dilworth Road just East of Highway 416. For more information please email Dave Stroud dstroud@xplornet.com.

## Chapters / continued from page 21

and radio equipment in Dave's RV-4. Josh is a VFR pilot, and the grandson of Fred Pegg.

Thanks to Dave Hertner for arranging Josh's visit and presentation.

### **Scarborough/Markham**

Ed Weeks provided the entertaining videos which were shown at our April meeting. Ed obtained these in England; not surprisingly, they present a British point of view with respect to the aircraft involved. The videos shown pertained to the Spitfire, the P-51 Mustang and the Lancaster

bomber. There was a consensus that these videos were well done.

Claren Turner of the RAA Brandon Chapter has given our Chapter (and others) a copy of a book "The Man Who Discovered Flight" by Richard Dee, a biography of Sir George Cayley and the First Airplane (McClelland & Stewart, 2007).

We wish to thank Caitlin McWilliams who addressed our May meeting with many fine pictures of nose art on WWII aircraft. Caitlin is a Research Assistant at the Library and Archives, Laurier Centre for Military Strategic and Disarmament Studies,

Wilfred Laurier University. Everyone is familiar with the shark mouth on Curtiss P-40 Flying Tigers and the pretty girl on the B-17 Memphis Belle. Initially, these pictures served for aircraft identification, crew bonding and camaraderie, and morale boosting for bomber crews. They became more exuberant (and risqué!) as the war progressed. Bombs, beer steins, little dogs or merely X's served to record numbers of combat victories or missions completed. The most popular icon was women (e.g. "Lucky Lady", "Lady Orchid", "Madam X") from matchbook ►



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## Canadian Owners and Pilots Association

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covers and calendars featuring Petty Girls, Vargas Girls, etc. – the popular pin-ups of the day. The second most popular images were those of Disney characters; in particular, the wolf.

Walt Disney himself encouraged some of the nose artists. The artists included ground crews, officers, non-coms – all types got involved. “The name and nose art made us feel she

was ‘our’ aircraft, and would always bring us home” (Jack McIntosh of 419 ‘Moose’ Squadron). There is a fine nose art collection at the Canadian War Museum in Halifax. We are grateful to Caitlin McWilliams for a very interesting presentation.

*Controller: “FAR1234 confirm your type of aircraft. Are you an Airbus 330 or 340?”*

*Pilot: “A340 of course!”*

*Controller: “Then would you mind switching on the two other engines and give me a 1000 feet per minute, please?”*

## Name That Plane

*This aircraft is powered by a 3.8 Ford and the plane has been flying since 1995. It is a plansbuilt Jurca Sirocco built by Alfred Knudsen (RAA 1417) of Edmonton. It is unusual because of its auto-based powerplant and retractable undercarriage.*

### President's Message *continued from page 2*

do not require inspection of any sort, and he had outfitted it with a G meter. The pilot held a license higher than Private and he had previously reported having done many aerobatics, reaching over 5 G's at times. The failure was at a point near the end of the box spar where the cranked outer section of the wing separated, causing the fatal crash.

A post crash inspection revealed that the woodwork had been done well but that it was likely that its empty weight was over the limit of the Basic UL category. We discussed that it is illegal to conduct aerobatic maneuvers in a Basic UL, or in any non certified aircraft that does not include these in its operating limitations. The coroner said that the plans claimed a rating of more than 8 G's, a number we have not been able to verify, and he was concerned that there is no oversight on design whether the plane had been built as a Basic UL or as an Amateur aircraft.

I explained that he was correct in his observation and that most pilots will choose not to overstress their aircraft. I further explained that in the Basic UL category there is no requirement for a W&B, nor is there any requirement to keep a logbook, so the builder of a basic UL can claim any empty weight he wishes at the time of registration and there is no oversight or verification by Transport Canada. Since there is no logbook requirement there is no way of knowing whether subsequent modifications or additions to the weight had been made or if inspections or repairs had ever been performed to maintain continuing airworthiness.

The category of aircraft appears to have had little bearing on this fatality. The plane withstood more G's than many certified aircraft can handle, and had the pilot used a certified plane the results would have been the same. It is unfortunate that non certified aviation gets a black eye from crashes like the RV-7A and this Falconar, the first being operated outside its envelope and both

being flown in maneuvers that are outside their operating limitations.

### CESSNA SEAT RAIL AD

The FAA has mandated an AD for all Cessna single and twin engined aircraft, to inspect and possible repair their seat rail mechanisms. This AD has been prompted by reports of crew seats slipping when the primary latch pin was not properly engaged in the seat rail (or track) and reports of seat roller housings departing from the rail. Slippage or departure from the rail could prevent the pilot from controlling the aircraft. The inspection must be performed within 100 hours or 12 months, whichever comes first.

If you own one of these aircraft you should contact your AME for details. Many Amateur-Built aircraft use Cessna seats, and while owners of these planes are not legally required to comply, it would be prudent to contact an AME for details. R

# Classified Ads

To submit or delete a classified ad, please send to [classified@raa.ca](mailto:classified@raa.ca) and place "RAA ad" in the subject line.

The Recreational Flyer is pleased to offer you colour advertising within the magazine. Previously limited to the back cover, we have added 4 new colour pages which will be available with limited space for your advertising needs. Our rates for both black and white and colour ads remain very competitive and you reach a captive and qualified audience. Ads can be emailed to : [raa@raa.ca](mailto:raa@raa.ca)

**Deadline for submissions** is the first of the month preceding date of issue.

**Artwork:** Rates apply to camera ready artwork. Digital files are preferred and should be sent as email and in .txt format, PDF, JPEG, MS WORD, Photoshop or other common file types. Advertising is payable prior to printing of magazine unless other arrangements have been made. Payment is in Canadian funds. 10% Discount applies to one year (6 issues) insertion paid in advance. Commercial Classified ad rates 1/8 page minimum.

**Advertising Policy:** The Recreational Flyer Publisher reserves the right to refuse any or all advertising for any reason stated or unstated.

The Recreational Aircraft Association Canada does not assume responsibility for advertisements, but does exercise care to restrict advertising to responsible, reliable individuals.

Please note: Ads running more than 3 issues must be renewed to guarantee continued display in the magazine.

Recreational Aircraft Association Canada  
President: Gary Wolf / Treasurer: Wayne Hadath

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The Recreational Flyer is devoted to the aerospace sciences. The intention of the magazine is to promote education and safety through its members to the general public. Material in the Flyer is contributed by aerospace engineers, designers, builders and restorers of aviation devices and vehicles, used in an amateur capacity, as well as by other interested persons, publications and organizations. Contributions to the Recreational Flyer are voluntary and without remuneration. Opinions expressed in articles and letters do not necessarily reflect those of the Recreational Aircraft Association Canada. Accuracy of the material presented is solely the responsibility of the author or contributor. The Recreational Aircraft Association Canada does not guarantee or endorse any product offered through articles or advertising. The Flyer and its publisher welcomes constructive criticism and reports of inferior merchandise or services offered through advertising in the publication.

## For Sale



**NEW PRICE!** Zenair Zodiac 601HDS Tricycle gear, registered 1993, Rotax 912 UL, ARPLAST flight adjustable prop. 756 hrs TT. ICOM A-4, 2 headsets, GARMIN 95 GPS, Vacuum AH. Stainless exhaust, new upper paint 3 years ago. Canopy cover. Cruise 120 mph. Any reasonable offer considered. At Oshawa. Dave, 416-282-5252 Oct10

MINI-MAX tsn 217 seoh 29.8. Rotax 447 new GSC prop. skis. radio. always hangared. excellent condition \$11,900.00 obo

For sale KR-2 fuselage in boat stage and metal kit for retractable landing gear castings \$300.00 call Ian 604-856-1159 or email [tripyramid@telus.net](mailto:tripyramid@telus.net)

For Sale: CH-701, Basic Ultralight, Rotax-912, jeep gear, gull wing doors, \$24,500. Tom 1-519-822-6693, 1-519-638-5075, [millfly@sympatico.ca](mailto:millfly@sympatico.ca) June/10

C-IGVE Cara-two (Karato) 2 seat basic UL with overhauled Continental 75 hp engine and Zenith wood prop. Steel tube and fabric taildragger fuselage with all metal wing. Day vfr panel, no electrics, 600-6 wheels with disc brakes. \$12000 OBO Bill Rice 519-461-1849 June/10

C-ICPZ Silverbird single seat Basic UL with aluminum fuselage, all metal wings, HAPI VW 1600 direct drive engine with dual ignition and Ellison carb/injector, day VFR panel. First \$5000 takes it all Bill Rice 519-461-1849 June/10

C-IFWE Cloud Chaser single seat Basic UL that began life as a Schweitzer 126B sailplane. 40 ft span all metal wing, steel tube and fabric fuselage and tailfeathers, tricycle gear with telescoping nose strut and fibreglass main gear. Powered by electric start Kawasaki 440 with belt redrive and IVO prop. Day VFR

panel. plexiglass canopy. \$7000 OBO Bill Rice 519-461-1849 June/10

Beryl project - tail feathers, all 26 wing ribs, plans - unused. Some Sitka & a/c grade plywood. The Beryl is a Claude Piel design - like a more robust Emeraude but with tandem seating. Good x-country and strong enough for mild aerobatics. Some instruments too. \$1,000 takes it all. Call Nigel (705) 429-3449 or landnlaw@sympatico.ca Oct10

Citabria instruments for sale. Airspeed, vacuum turn and bank, whiskey compass, oil pressure, oil temperature, 2 ammeters, battery powered red cabin light. John Foubert 289 752 1650 Brampton. Oct10

For Sale; CH-601 Canopy cover, professionally made, like new, Value \$400.00+ Will sell at \$300.00 Phone Mike @ 905-476-3438 Dec10

For Sale; New 66" dia. 3 blade Warp Drive propeller with 4" dia. bolt pattern and bolts for Rotax 912S. Never used as it was purchased as a backup. \$1500.00 Call Mike @ 905-476-3438 Dec10

STRETCHED PACER PROJECT - ESTATE SALE 0320 160 HP Lycoming engine in crate - extended fuselage 18" - ready for covering - new windshield - side-by-side sticks and toe brakes - large luggage compartment - 2 doors - welded float fittings - seats included - main gear with new Cleveland wheels and double puck brakes - tail wheel and spring - wheel pants - super cub wings with cuff leading edge ready for covering - extended flaps and ailerons - fiberglass wingtips - 15 Imp. Gal. Tanks / wing - most instruments included \$29,500.00 complete (905) 985-3195 Rose Dec10

Brand new dynafocal ring for Rotax 912/914, never used. Regularly \$800 plus tax, I have one for \$375 CDN plus shipping. gpeees@hotmail.com Dec10

For sale: Engine Mount for LOM 337B Engine installation into a Zenith CH 801. Asking \$1,200.00. Nose Gear for the same, \$1,000.00. Walter Lom Engine: New factory overhauled M337B (6 cylinder, inverted, inline, supercharged, certified 235 HP aircraft engine):

1400 hours TBO with possible 200 hour extension, including spare parts, tool kit, log book, and manual. In its original shipping crate. The distributor, governor, and oil lines for a LOM V541 propeller are factory installed on the engine.

Walter Lom Propeller: V541 (2 blade) constant speed propeller with tool kit, log book, and manual. The propeller is brand new and is in the original shipping crate.

One set of aluminum anodized engine mount pad blocks, vibration isolators, and bolting kit. For further information and images contact: Dan Marshall 519-794-3270 dgmecc@bellnet.ca Feb11

68 Cherokee PA-28 with 160 hp cylinders. Low time airframe with engine on condition. Plane is based at Brampton. Exterior 6/10, interior 7-8/10. VG's, speed mods, glideslope, Mode C, annual to July 2011. Best Offer. 905-785-9032.

Need to pick up or deliver a plane on a trailer and don't have one? At YKF is one available for members for a reasonable rental fee. Trailer has a flat platform and is 16' x 8', dual axle one of them with brand new electric brakes wired to work. A class III hitch is required with a 2 5/16" ball. A hitch can be provided complete with load distribution bars. The trailer is NOT suited to haul a backhoe or a pickup truck. For more info email Rudy at rudyhane@gmail.com

Wheel Pants Galore! I have several sets in various conditions. Some need work and/or painting. They came off Cessnas and Pipers and likely could be adapted to your homebuilt aircraft. Prices negotiable from \$75 per pair to \$200 per pair. Contact Rudy at rudyhane@gmail.com

A whole airplane for parts. Sale subject to court decision in US. 1972 Grumman AA5, 2955 TT, 940 SMHO with Millennium cylinders, overhauled 200 hrs ago when high compression pistons were installed. Sensenich prop with 60 hrs TT. Newer radios and instruments. Landing gear with new brakes installed. Parts will not be available till April. And if you need information on how NOT to import an aircraft, I can help you! Contact Rudy at " rudyhane@gmail.com

Propellers, wood, new, never mounted, tractor cwise (view from cockpit), priced OBO plus shipping: One 42x23, weight 2 lb., Lepper, conventional outline, 4 bolts on 70 mm b.c., \$195. One 43x34, 4 lb., squared tips, 6 bolts on 75 mm b.c., \$295 Call Frank, 905 634 9538

FREE ENGINE Titan T51 Mustang, partially built, includes 160 hp belt drive Suzuki engine. Buyer responsible for pick and delivery costs. For more info on kit go to titan aircraft.com Price \$54,900 can. email piper22@telusplanet.net or ph. 1 780 623 3151

1 Set of Zenith 601 HD Wings complete with Attachment plates. They have 450 Hrs. of flying time on them with no Damage. They have built-in wing lockers. They come with custom supports on casters for safe storage. Asking \$1500.00 obo. 1 complete set of new Zenith 601 Drawings with VHF tape. \$200.00 obo. Please contact Erwin @ 905 457 3716 or erwinhornemann@bell.net



Bede-4 for sale! 380+ hours TTSN, Lycoming 0-320 E2D McCauley FP prop 75x53 2000 lb GW, 1285 empty. Murphy ext. metal wings, 30 ft with droop tips. Vortex generators, Extended flaps and ailerons. Wing fold mech. built in! Complete set of fairings - all design improvements complied with. Cessna gear legs with solid link in gearbox. Murphy type nose wheel (5x4) Towbar (2 pc) New brake discs and linings! Endura paint - 2002. Complete upholstery, adjustable seats, headliner, door panels, carpets. Instruments: A/S, A/H, Alt., VSI, Turn Co-ord., Slaved mag compass. Tach, Vac. Gauge, Cyl. Temp (2) Fuel (2) oil press., amp. meter, clock/air temp and heated pitot. King KX145 NavCom with KI205 Ind., ValCom 760, Flybuddy Loran, RT359 Transponder with Narco AR850 Encoder (mode C) Magellan GPS with expansion card/software, Sharc ELT, 2 place Flightcom intercom, 2 headsets. Maintenance records, builder manual, some spares, etc., halon fire ext. first aid kit. Any serious offers near \$27,000 considered. No tire kickers please. Located CYNJ. Contact



1997 Pegastol with moving slat wings (Zenair CH-701 Variant) The original Pegastol aircraft built by the owners of Dedalius Aviation in 1997. Registered as an amateur built aircraft @ 1200lbs gross weight and can be flown with a ULP. Rotax 912S x 100 HP, with slipper clutch gear box and 68" Warp Drive Propeller. Engine just back from Rotax (Tri-City) for starter sprag clutch replacement. Gear box overhauled. New tires and tubes that have yet to leave terra firma. New engine Barry Mounts upon engine reinstall. New Custom aluminum main fuel tank spring 2010. New windshield and upholstery in 2009. Floats have Lake n Air pump out cups (that are rarely needed as floats are tight). 1/2" sound deadening foam throughout cabin. Wheel gear and forks also included. TTAF 600 hours, 912S Engine TT360 hrs, Prop TT 512 hrs, TT on Amphibs 422 hrs. New \$700 Heavy Duty starter. Offers on \$49,000 Cdn For more details view at [www.irishfield.on.ca](http://www.irishfield.on.ca) or send us an email [oifa@irishfield.on.ca](mailto:oifa@irishfield.on.ca)

**Nostalgaire N3 Pup \$7500.00**

Registered as Basic Ultralight and in flying condition. This Pup has a Global 2 cylinder engine and is a gentle flyer. I had no previous tail dragger time and with minimal work was able to feel confident with this little gem. Panel has Altimeter, EGT, CHT, Compass, RPM, Oil Temp, Oil Pressure, Digital Tiny Tach/Clock, and connections for ACK ELI. This Pup is hangered in Winnipeg and I can send photos etc to interested parties. It is easily taken apart for transport on a trailer. [piney@mts.net](mailto:piney@mts.net) 204-885-2443

For Sale. Lycoming O-360-A4A. 279 SMOH c/w mags and carb. Recent prop strike inspection by Pro Aero Engines in Kamloops. Yellow tagged. New bearings, rings, gaskets, inhibited and crated, ready to ship. \$15,000. Barry Holland 250-785-6431. [w-b-holland@uniserve.com](http://w-b-holland@uniserve.com)



CP 301-A Emerald, first flew June 2003. TTAF 47 hours O290G Lycoming 393 hours since Major. Sensenich metal prop inspected and refurbished by Hope Aero June 15/09. Dual controls (pedals, sticks, throttle), custom interior, Annual due may 2011. Hangared at Stratford Ont. \$25,000. Jim Demerling 519-348-9655

O-200 engine 2000 hours in running condition with accessories. \$4000 Ron Fleet fleetair@wightman.ca 519-364-5975

VANS RV7A, by owner and 6 times Van's builder. TT A/F and E 183.3 hrs. Lycoming 0320/160, AP, EFIS, KLX 135 with GPS and Moving Map, GRT Engine Monitor, 3 blade Catto comp prop., etc, etc, list of eqpt and more pic avble on request, Prof paint., new FlightLine int, superb workmanship throughout. Manitoba, \$110,000 204 371 5209, [burtloewen@mts.net](mailto:burtloewen@mts.net)

AVID AMPHIBIAN KIT FOR SALE \$5,000 Complete kit; tube fuselage and tail, all wing parts, wheels, tires, hardware. Left wing started. No engine, no mount, no instruments, no fabric. Contact Don, located near Owen Sound, ON Telephone: 519 372-1383 . email: [we3kingers@yahoo.ca](mailto:we3kingers@yahoo.ca)

FOR SALE; MURPHY REBEL KIT, Serial #515. Wings and Empennage complete, also Fuselage from Cabin back. All closure inspections completed. Spring type Landing gear. Reason for sale, lost Medical. Available in Edmonton AB. \$12,000. OBO. Ted Taylor, 780 455-2524 [ted.taylor@shaw.ca](mailto:ted.taylor@shaw.ca)

Zenith CH300-1983-LYC. O-320 (case split under Leavens Supervision). TT273. ICOM 200/Intercom. Mooney seats. Nosewheel Mod. Toe Brakes. Strobes. Sensenich Prop. Based Oshawa. Lost Medical. \$19,990. 905-686-7546. [albanus@rogers.com](mailto:albanus@rogers.com).

Murphy Moose; firewall back kit, 40% built.

Many extras including long range tanks, drooped wingtips, float and ski fittings and bubbled side window, partially crated and ready for shipment. Asking \$38,000.00 OBO 40% of new price. Contact Lyle Skaien 1-403-875-2770 or Cal Gazdag 1-403-875-2770



Stitts Skycoupe with O-290 125 hp, 240 hrs TT. Garmon 195, Escort 110, ICOM A5, intercom, wing tanks. Located at Burlington Ont CZBA. Must sell due to financial constraints. \$16,900 OBO. 905-332-7331

Amphibious homebuilt Floats approx 1400'S in need of modification water tight bukheads not watertight. with rigging for installation 2 rudder config Floats too small for my aircraft \$6000.00 Larry Taylor 250-492-0488 days [ltaylor@pacificcoast.net](mailto:ltaylor@pacificcoast.net)

0320 E2C currently mounted on my Osprey which could be included in sale. Osprey has 175 hrs since new engine has 1850 but was disassembled for a propstrike inspection 200 hrs ago Compression 125 lbs cyl on all four jugs oil pressure good complete with accessories. \$6000 for engine \$9000 for all aircraft needs refinishing and recover Larry Taylor 250-492-0488 days [ltaylor@pacificcoast.net](mailto:ltaylor@pacificcoast.net)



FOR SALE C-GTYZ ZENITH CH-300 on floats (land gear available) Engine O-320-C2A zero timed in 1999 now with 170 hours. Prop McAuly 1A175/GM8241 new in 1993 Floats, Zenair 1850. Location Lake Muskoka. \$20,000 George 705 445 7054 Collingwood

Super Cub project with fuselage and wings ready to cover. Includes Ceconite cover



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## Thomas Kawasaki's Zenith CH601XLB

**Powered by the 6 cylinder Jabiru 3300 engine, Thomas' Zenith features a Dynon D180 panel with Micro-Air radio & Mode C transponder.**

**Thomas built this beauty at Can-Zac in Kitchener under the builder assist program with Mark Townsend.**

**The first flight was at Waterloo-Regional Airport (CYKF). Thomas now has 7 hours of his 25 hour flight restriction flown off.**

**Submitted by Bob McDonald**

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kit, glass, Lycoming 135 hp O-290 D2 and Macauley metal prop. Most parts to finish included. \$27,500, serious inquiries only. Located Alliston Ontario 705-435-9460

For Sale: 1997 Pazmany PL1. C-90 Cont. Total Time: 220 hrs. (Airframe and Engine). Side by side seating. Low wing, tip tanks (24 gals US total). Full inst. panel with mode C. Always hangared. Pictures available. \$24,000.00 or Best Offer. Call: Ed at 204-642-9485 or email: [edira@mts.net](mailto:edira@mts.net)

PA-18 Super Cub Project. Wings complete less leading edge skins. Fuselage 30 in. wide complete with rudder pedals and tow brakes. Flaps (90 in. ), ailerons, Rudder, Elevators

and Horizontal Stabilizer complete. Gear wheels, brakes complete. Seats installed. Project Pre-Cover inspected. \$37,000.00 OBO. Lycoming O-320 (150 hp) with E-Mags, requires carb. Ed at 204-642-9485 or email: [edira@mts.net](mailto:edira@mts.net)

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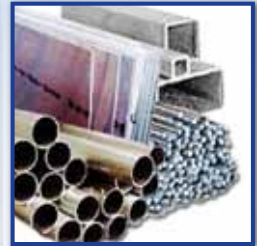
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