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RECREATIONAL RELYER

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RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

From The President's Desk

Gary Wolf RAA 7379

ANOTHER WINNIPEG CHAPTER PLANE

Jill Oakes of Winnipeg has really started something. She donated a Cessna 150 to be used by RAA members for flight instruction and $20/hr rentals, sparking a large increase in chapter and national membership. Now they have had a donation of a Piper PA-28 from Bill Vandenberg and Ken and Jerry Pennington. Members may use this 4 seat aircraft for $40/hr dry. To become a member contact jill_oakes@umanitoba.ca.

These are both certified aircraft, as required for flight examinations. First step is to get people licensed, and then they can look at building an airplane with help and encouragement of the RAA Winnipeg members. Congratulations to Jill and members for what they are accomplishing in Winnipeg!

INDUSTRY CHANGES

Lately we reported that Dave Hertner of London has taken over the operations of Fisher Flying Products. He has also now become the Canadian distributor for D-Motor engines, and an article is in this issue.

Sonex aircraft are now represented in Canada by Toronto Aerosport at Baldwin Ontario. They have provided supporting documentation to Transport Canada for inclusion in the Advanced UL category. Gross weight is 499 kg with Jabiru or Aerovee 80 hp, and 521 kg with Jabiru 120 hp.

Bushcaddy was bought by Tony Wilkins several years ago and shortly relocated to Cornwall Ontario. Tony has lately sold Bushcaddy to a Chinese company and now has a contract to set up manufacturing in that country.

The rights to the **Beaver and Chinook** ultralights have been sold to Aeroplane Manufactory in Texas. As yet they do not appear to be in production, but they have some parts available from the inventory that came from ASAP in Vernon BC. At this writing they are not listed as supporting the aircraft for the Advanced UL category, so it appears that there is no one to supply the required Advanced UL documentation.

Turbulence Aviation, longtime Quebec manufacturer of accessories for Challenger ultralights, is selling its operations. The ski business has been sold but the sewing operations are available to someone who would like to continue manufacturing their aircraft covers and interiors.

SAM aircraft, a Quebec manufacturer of light sport and AULA aircraft has completed their development program and is offering the company to someone who would like to continue with marketing their aircraft.

HKS 700E engines are again in production, now distributed worldwide by two companies, Green Sky Adventures in Florida and Quicksilver Aircraft Northeast in New York. Both companies will carry parts and handle service for these engines. This will be a relief to owners of aircraft powered by these light and efficient 4 stroke engines.

GROSS WEIGHT

In the Amateur Built category there is no upper limit to gross weight except that specified by the designer or manufacturer. Owners may apply for an increase if they supply acceptable data to show that the completed aircraft will still be safe to fly.

At the other end of the spectrum,

continued on page 30

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features

columns

George Gregory

A cabin Waco, Arlington 2014.
On the cover: Ivan Kristensen's gorgeous RV-10.

Prop Man

Prop too heavy? Make your own
by Gary Wolf and Mike Shave

MIKE SHAVE IS A RETIRED high school industrial arts teacher who frequently brought his students into contact with aviation, to show them the technologies used in this discipline. Aviation, especially amateur aviation, is unique in that it always very concerned with maximum strength with minimum weight, and this must be accompanied by a high degree of accuracy with an appropriate level of affordable technology. Materials must be employed in a way that exploits their benefits while minimizing their weaknesses. To make a wooden propeller uses every skill that the builder has, and the results can be very satisfying.

For light aircraft where weight is important there is no material better than wood, and many of the "carbon fibre" props are really a wood prop with a carbon fibre exterior. Even the certified prop on a diamond DA40 is made this way, which Mike discovered when one ran off the end of the runway and Mike later found one of the blades in the cornfield. The carbon fibre provides a hard exterior to resist weathering, but the strength of the blade is its wood core. For most of us a wood prop without the carbon will do just fine

Mike has built two aircraft powered by VW engines, first a Druine Turbulent and lately a GY20 Minicab. A VW engine is crankshaft limited in the weight of its propeller and most of the commercially manufactured ground adjustable props are just too heavy to be safe. A conventional wood prop is the only economical way to stay within the limits of the crankshaft, but if the builder is also in a quest for modifications that will produce more power this is going to mean buying a lot of fixed pitch propellers. For Mike the choice was simple – he would make his own propeller duplicator, and prop changes would become inexpensive and easy.

A prop duplicator is essentially a 1:1 pantograph that moves in all three axes. A pair of parallel ways extend the length of the machine to become the X-axis, and a carriage rides on these ways. The carriage provides the transverse Y-axis, and the vertical Z-axis is accomplished with swing arm pivoting from the Y axis. The swing arm holds a follower to trace the pattern, and in parallel a router with a round cutter.

To keep everything in line there must be a firm foundation, and for this Mike made a miniature wing building table from dimensional lumber in a grid pattern, with plywood glued and screwed top and bottom. This produced a machine base with good beam stiffness and great torsional rigidity. Mike's table is approximately 2 ft. by 5 ft., wide enough to accommodate both the pattern and the prop blank, and somewhat longer than half the length of the longest prop anticipated.

Mike made his set of ways from 2 lengths of heavy wall 1-1/4" steel tube. The key to accuracy is to have them mounted parallel in all axes. Mike has a bench top mill-drill so he was able to bore and face lengths of square tubing accurately to become end supports for the tubes. Builders without this equipment could make them from milled hardwood or MDF and shim if necessary to get all to the same height.

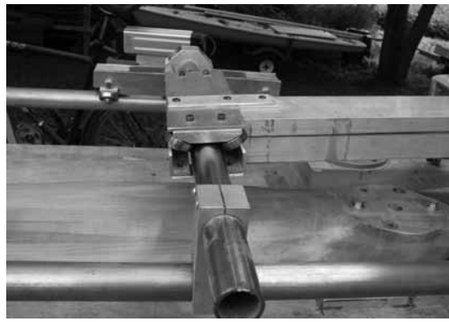
The carriages are assembled from aluminum square tube extrusions bolted together. The rollers are off the shelf 6-series bearings set at 30 degree angles to the ways. The blocks are aluminum but could just as easily have been wood or MDF, cut to the angle on a mitre saw.

The router head was taken from a garage sale Sears Craftsman router and it is clamped firmly into the swing arm. In parallel with the router is a 1/2" diameter aluminum stylus that is adjustable for height, with a skateboard wheel bearing mounted in a slot at the bottom. The 3/4"diameter of the bearing is marginally larger than that of the router bit.

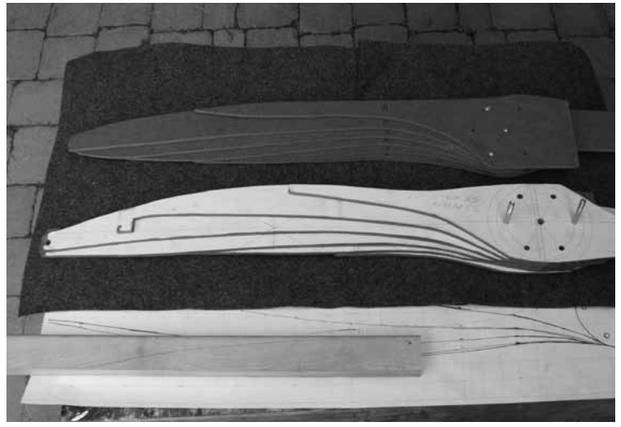
On the table are two machined aluminum plates drilled in the pattern of the prop hub to locate the pattern and the prop blank. The convention is to have two opposite holes positioned along the longitudinal centerline. Placement of the locating plates requires accuracy, especially the lateral positioning. They must be directly under the centres of the cutter and the stylus respectively, otherwise the prop blade will not be laterally centered on the hub. On Mike's machine the lateral spacing is an accurate 7 inches.

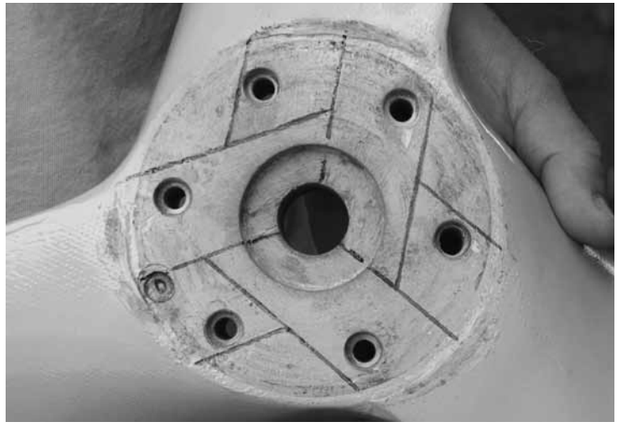
Laminating and drilling will be dealt with in a separate article but once it has been done the blank is drilled for a centre hole and positioned on the table, parallel to the prop being traced. For the roughing cuts Mike begins with the stylus positioned lower than the cutter to leave ~1/4" of extra material on the blank. It would be possible to use the router to rough the entire blank but Mike has a shortcut. He does roughing cuts chordwise every inch and then uses a chisel to pop off the excess material. The extra ¼" of material and the close pitch of the cuts ensure that the material being chiseled off will never get below the finished dimension. Next Mike raises the stylus to the height of the cutter and machines off all but the last 1/16" of the material, leaving a small chunk at the tip for clamping.

The prop blank is then removed and switched end for end and re-indexed, and the process is repeated The prop is indexed on the 6 prop hub holes and a 1/8" hole drilled off the



From top down: A pair of ways, a carriage, and a swing arm combine to make a prop duplicator; Each bearing is set at 30 degrees off vertical to ride the 1-1/4" ways; and the stylus' bearing traces the pattern as the router bit cuts the blank





Left to right: To save wood and cutting time Mike prints cad patterns and aligns the parts before gluing; Even a 3 blade prop can be made using a tracer. Laminations overlap and radiate from the hub in a 3 blader. Note the balance weight sunk into the hub. Right, Legs of the balance stand pivot at the bottom to set the v ways parallel and level prop on plane.

tip of the blank. This hole must be on the center line to ensure that the blank is in the correct position when turned over to cut the back side. A "U" shaped gauge with 3" legs made from 1/8" welding rod, 7" apart, is used to check the position of the blank relative to the template at several places along the span prior to milling. If out of position Mike rotates the tip of the new prop 1/8" either way to align, and then clamps the tip.

After one side has been completely machined Mike inverts both the pattern and the blank and cuts the other side of the prop. Finally the excess at the tips is removed and the prop is smoothed first with a rasp, next with a bastard file, and finally with sandpaper glued to a block. The final sanding is with a 220 grit disk on a random orbital.

Tracking is checked with a pop hub on a bearing, and if there is any disparity light filing on the back surface of the hub can bring the tips into alignment.

Once happy with the initial balance and tracking of the prop the finish is applied. Mike emphasizes that it is important to take the prop to the balancer at each of the following steps to check if it is becoming more out of balance than a light coat of varathane would cure. This is equal to a 1" strip of paper over the tip.

Mike uses West System epoxy and light weight modelers fibreglas cloth. A paper template is made to estimate the shape of the fibreglas, and he then cuts four pieces 1" larger all around to apply to the four surfaces of the prop. Mounting the prop facing up on a 1" rod in a vise Mike does the front face first. With the cloth cut and positioned, resin is poured onto the cloth and spread using a 1" brush, roller or squeegee to wet the cloth out with just enough resin to fill the weave.

Mike watches for excess resin running down the rear face of the prop, and he sometimes uses masking tape and paper to prevent the dripping resin from staining the lower surface. The cloth is not wrapped around the leading edge; instead he allows the weight of the excess resin to bend it over the edge. He then applies a peel ply (polyester fabric) to soak up excess resin and prepare the surface for the next step. Left and right side can be done in one go but he cautions to allow the resin cure before proceeding to the bottom surface. There may or may not be any overlap of the cloth at the hub "sides". Mike cautions not to apply cloth or resin to the seating surfaces of the prop where it attaches to the hub.

As the resin cures and reaches a stiff plastic stage, Mike trims the excess cloth from the leading and trailing edges, and a day later when it has hardened he removes the peel ply and carefully files the edges where the cloth meets the wood. Next he inverts the prop on the 1" rod and repeats the process for the back of the prop, again watching for drips.

During the curing he trims as before and then waits for it to cure fully.

Once it has cured Mike again removes the peel ply and files the leading and trailing edges to remove most of the excess, and finishes by hand with sandpaper.

The next coat of resin can be applied to both surfaces and around the leading and trailing edges, with peel ply to ensure that the resin will stay in position. Mike waits a day for the resin to cure and then uses wet sanding paper to remove any waxy material.

Mike uses varathane as the final coat and when dry he takes it to the balancer for final balancing, adding lacquer to the light end. Mike's balancer is a pair of steel angles set parallel with the sharp edge up, and a round bar through the centre hole. Each leg of Mike's balancing stand can be pivoted to set the angles parallel and horizontal, checking with a spirit level. Final balancing is by spraying clear lacquer on the light tip, which will then descend, and then rise as the vapours escape. It takes a few applications.

Sometimes the prop can also be out of balance in the vertical plane. If so he places a length of 1/4" steel rod into one of the drilled mounting holes of the hub on the light side. Later a 1/4" hole is drilled between the two mounting holes on the light side and the rod is inserted; the hole is then plugged with 1/4" dowel. Mike's scimitar prop was balanced in the vertical plane by using a 6 gram weight made from 1/16" x 5/8 x 3/4" stainless steel. The diameter and pitch information was stamped into the sheet and the sheet was then screwed to the outside of the light side of the prop hub.

Mike's latest prop is a scimitar (seen here on an Emeraude) that has the effect of changing pitch as load and rpm change.

Zigolo Ultralight Introduced to China; Two power options shown at Oshkosh

The first Zigolo in China is now finished and was introduced to the public on 17 July at the Jingmen Airshow. The Zigolo was supplied in kit form by Aeromarine LSA (Lakeland, Florida) and built in only 3 weeks by Chip W. Erwin.

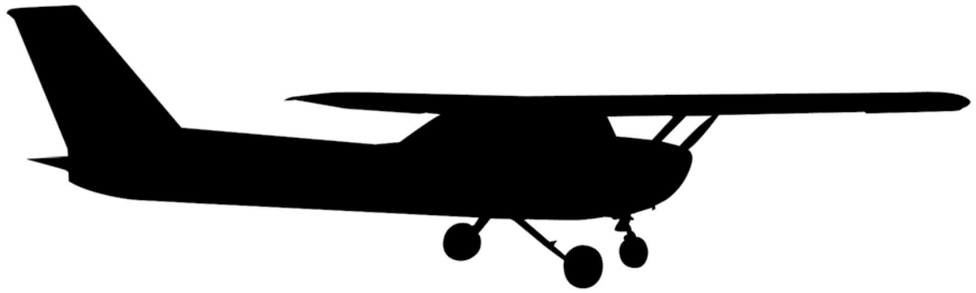
"The Chinese have been shipping thousands of RTF RC model aircraft to the USA. Now they will have the capability to build a man-carrying light aircraft for their own market," said Chip Erwin, Zigolo president. He noted that the technology and design gap between large RC aircraft and this ultralight motor-glider is small; with the coming electric-powered version of the Zigolo, the gap narrows further. He continued, "The Zigolo is similar to what they already build, just on a larger scale."

The Chinese CAAC recognizes the FAA Part 103 rule, which means that Chinese customers can actually fly legally and fly now in China, something that has not been so easy in LSA or other GA aircraft to date.

The Zigolo is already available in kit form; typical build time is about 150 hours. Delivery positions are now available for the RTF version; first deliveries are planned for later this year. Both a gas and electric version are options for this aircraft.
www.aeromarine-lsa.com

Foo-Foo and Me

What memories are made of / by Barry Meek



WHEN I WAS A YOUNG FELLOW, probably 22 years old, I bought my first new car. It was a Volkswagen Beetle. Come to think of it, it's the only car that was brand new I've ever owned! All of my vehicles since then have been from the used car lots, and most were much more than a basic Bug. Owning a brand new car every year or two has just never been important.

I would never deny the next person his desire, his requirement for the car, the truck, motorcycle, or whatever it is that turns his crankshaft. For a time, owning an airplane really made sense to me. And I have to admit to becoming rather attached to one or two, even to the point of giving one a name. This particular plane had the registration letters CF-UFU. The obvious affectionate name became "FOO-FOO".

Foo-Foo and I had some wonderful times together. She was a Cessna 150, and taught me much about flying, more than any instructor ever did. She responded well, forgave me when I asked too much of her, and in spite of all the hours I'd flown in bigger, faster more powerful airplanes, she became my favorite. Her landings, even with some of my awkward inputs, were smooth and graceful. On cross-country trips, she loved to fly on her own, without me having to do anything more than nudge the trim wheel occasionally. She had no bad habits.

We became good friends, the airplane and I. We knew what to expect from each other. I'd put in the gas, sometimes even Mogas, but Foo Foo didn't seem to mind. It all burned the same to her. She didn't use up the fresh oil that I gave her every 25 hours. Other pilots before me had helped to wear out some of the parts, but they were soon replaced over time at the annual inspection dates. It was one aircraft that I came to trust on any flight. I soon relaxed more and more instead of constantly being on the lookout for a place to land if the engine ever quit. Foo Foo's 0-200 was always strong and smooth.

The radios and intercom provided crisp, clear communication with ATC and any passengers that came for the ride. All the instruments gave me the precise, accurate information on their clear round faces. Everything worked together the way the manufacturer promised when she was new, so many years ago!

Instructors can teach a pilot to fly, take off, land and control an airplane. It's the airplane that teaches how to enjoy it all. Foo Foo rewarded me with picture perfect, gentle touchdowns on our days in the circuit. She seemed to communicate the commands of when to nudge the elevator, kick in some rudder, or add a touch of power at just the right moment. Then with a barely audible squawk, the wheels kissed the pavement, and she was rolling. No bounce, no bumps, no shimmy. We could float with a touch of power until just the right moment, the right spot on the runway where brakes were not required to make the final exit and taxi in to her hangar. I often imagined the controllers in the tower pausing from their duties to admire the perfection of it all.

I was privileged to join two other pilots in a successful partnership as owners of Foo Foo. Fortunately for me, there were not many conflicts in booking time to fly her. Extended trips of a week or more were often possible for each of the owners, and we all enjoyed being treated well by an airplane, an inanimate piece of machinery that bored it's way into our minds and hearts to become a good friend. When time came to move on, I sold my share, and said goodbye to the airplane. Other flying was in the works, and there were times that it became more of a job than I would have liked. These days, I often think of the little Cessna 150 as another personal airplane. It's not terribly exciting, not an exotic flyer, not fast. But the connection between man and machine is a reality. Some day, I can see myself attached to another Foo Foo.

Barry Meek *is a retired ambulance paramedic, former broadcaster, mountain bike tour guide and commercial pilot. His articles have appeared in the COPA newsletter, the Aviation News Journal, and (of course) the Recreational Flyer. He resides on Gabriola Island in British Columbia.*

Martin Jetpack Pre-IPO Raising $1.5M Oversubscribed

New Zealand based Martin Aircraft Company Limited ("MACL"), who are developing the world's first practical and commercial flying jetpack, have closed their pre-IPO fundraising round one week ahead of schedule and with $1.5m NZD of oversubscriptions.

Axstra Capital, a Sydney based Corporate Advisory Firm, managed the pre-IPO capital raising and Managing Director Reuben Buchanan is very pleased with the result.

"We are very happy to be able to close the pre-IPO ahead of schedule," he said. "This result gives us a strong indication of the positive investor interest for the Martin Jetpack story here in Australia. We can now focus our attention on the next step which, as previously foreshadowed, includes a possible IPO and listing of the company."

The pre-IPO funds raised are being used to drive the Jetpack towards commercialisation as well as to pay for ongoing costs.

The company is seeing increasing interest and enquiries from around the world in its product due to its unique advanced technological capability when compared to its competitors.Due to the success of the raising, the Company will hold a general meeting of shareholders shortly to approve the issue of capital exceeding the original estimated raising.

Norton Rose Fulbright, Bell Gully and PwC have been engaged to advise Martin Aircraft on next steps as the company looks to raise further funds to commercialise and manufacture the Jetpack to meet with current global demand.

KEY PRE-IPO HIGHLIGHTS:

- **Total of $6.5m NZD raised from a mix of sophisticated and high net worth investors**
- **Over $1m NZD invested from Asia based venture fund**
- **Pre-IPO share price was $0.30 NZD (circa $0.27 AUD)**
- **Investors were predominantly Australian, with several out of the USA, NZ and Asia**
- **Martin Aircraft now has over 125 shareholders**

FURTHER INFORMATION:

Please contact Reuben Buchanan from Axstra Capital on +61 (02) 8234 4409 or email reuben@axstra.com.au

Getting It Straight

Tips on wheel alignment / by Wayne Hadath

A WHILE AGO I replaced the motor mount of my F1 Rocket because of cracking, and reinstalled the gear legs into the new mount's sockets. The legs are titanium rods with a taper at the top to fit into the motor mount sockets. At the top of each leg is a machined square boss that fits into a square hole in the cap of the socket. There is no means of adjusting the toe setting by rotating the gear leg – the square prevents that, so any realignment must be made at the bottom of the gear leg. The original F1 spec was 3 degrees positive camber (positive has the tops of the wheels farther apart than the bottoms) and 3 degrees toe out. This spec was later changed to 0 degrees camber and 0 degree toe due to excessive tire wear at the original specs. These measurements were with the aircraft in a 3 point attitude on the ground with full fuel. When I had the old motor mount on, I purchased shims and set my F1 to the new 0 degree specs. The F1 was now much easier to move by hand on the ground and I experienced excellent landing and ground tracking and good even tire wear.

But after installing the new motor mount I began noticing rapid tire wear, burning off a set of tires in only 20 hours of circuits. Also the plane was hard to push around, requiring quite a bit of effort to make it roll. At first I thought it was the torque on the Matco wheel bearings but loosing them did not help the tire wear. The motor mount was such an exact fit on the airframe that I did not even consider that the camber and toe settings would be different with the new motor mount. Thanks go to a local RAA member who suggested I check my wheel alignment.

Top: Jack the gearleg up and spin the wheel to check trueness. If the bearings are loose, snug them up for the measuring. Left, Using a plumb bob mark centerline points on the floor. Note the tennis ball on the tip of the antenna.

After installing the new motor mount I began noticing rapid tire wear, burning off a set of tires in only 20 hours of circuits... thanks go to a local RAA member who suggested I check my wheel alignment

The handiest surfaces for measurement are the brake discs or the wheel rims. The first matter was to jack up each gearleg and give each wheel a spin to be certain that both run true. Because my tires were worn I installed new ones and pumped them up to 55 psi to ensure that they were as round as they could get. Both of my wheels and brake discs ran true so I was able to use them for alignment purposes. If yours have runout you will have to allow for this in your measurements. My F-1 has stub axles that mount with four bolts and it uses tapered spacers to make alignment adjustments. Changes are effected by reclocking the spacers or replacing with different ones.

To find the center line of the aircraft I dropped a plumb bob from rivet holes that are on the fuselage bottom centerline. Mine are at each end of the cabin section of the fuselage. This involved a lot of crawling around under the plane so I impaled a tennis ball on the antenna instead of inadvertently using my eye for the purpose.

Using the plumb bob I marked small centerline dots on the hangar floor, taped a string to the rear dot, and pulled the string forward to establish a centerline for toe measurements. I could not use the tip of the prop spinner because there is no guarantee that it is actually on the centerline. Don't fall in love with this first centerline because every time you make an adjustment you will be dropping the plumb bobs again and moving the string.

On my plane the calipers prevented using the discs for alignment purposes so I removed the calipers from each wheel and put a c-clamp on each piston to ensure that these would stay in place. This might not be absolutely necessary but it does give comfort that I would not have to bleed the brake system if one piston oozed out.

It is easy to measure camber with a framing square on the flat floor. To measure toe is a lot harder. I have a five foot level that I used as a straightedge, set it on the floor under a brake disc. By sighting straight down from the top I placed it parallel to the disc. Toe measurements were then taken from each end of the straightedge to the string centerline. The centerline allows me to measure toe for each wheel independently. My wheels were toed out an

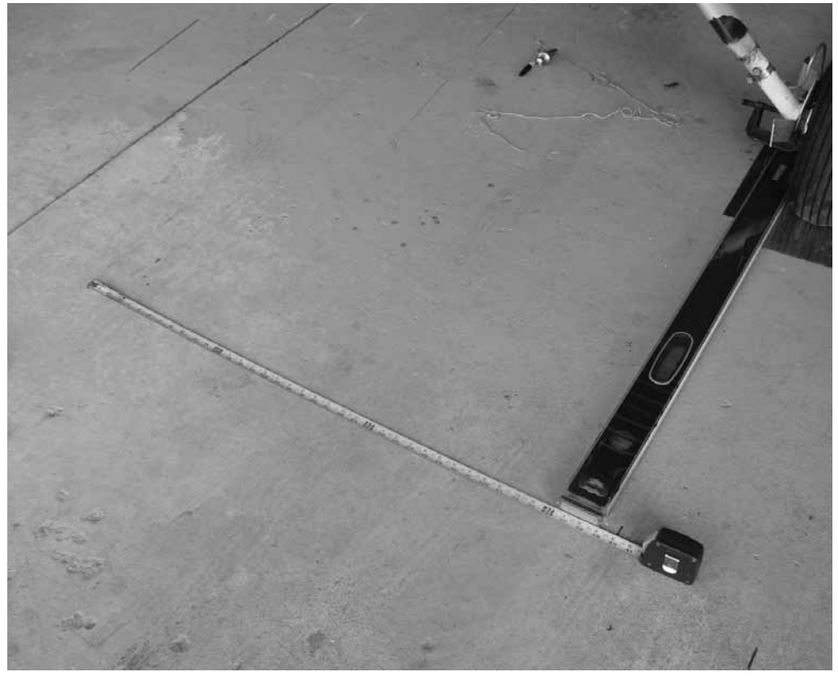
awful lot, hence the difficulty in pushing it around and the rapid tire wear.

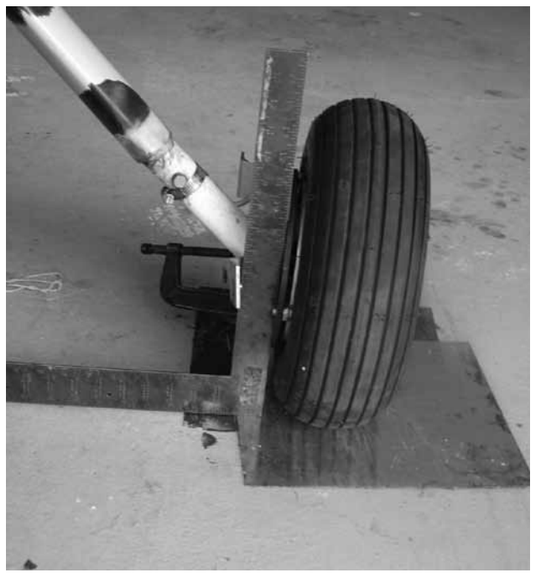
Toe is sometimes given in degrees and sometimes in inches. A high school Tan table shows that one degree is close enough to 1 inch over 5 ft. that this is a usable number. Mine was 5 inches wider at the front of the straightedge than at the rear, so 5 degrees total toe out.

I jacked up the gearleg using a hose clamp as the perch for the floor jack, and unbolted the stub axle from the gearleg. On my plane the mounting holes are in a square pattern so I reclocked the tapered washer and bolted everything up to recheck with this setting.

With spring gear it is necessary to roll the plane back and forth to allow the gear to find its relaxed position. This is a pain and difficult to get it right and to get a repeatable measurement. An alternative is to use grease plates under each tire. I made mine from squares of .032" aluminum, pairing them with grease smeared between. With grease plates under the wheels the legs can displace easily and it is not necessary to

Left: Tape the string to the rearmost point and extend it forward, crossing the forward point. Below, left, sight down the rim or disc and set the straightedge on the floor. Below, measure the distance to the centerline at both ends of the straightedge. One inch difference over 5 ft is 1 degree.





Above left: My Rocket has a tapered aluminum spacer between the gearleg and the bolt on axle. I was lucky that by rotating I could use the same spacer. Otherwise I would have been off to Spruce or to a friend's machine shop for a custom part. Right: Camber can be checked with a framing square. The grease plates have moved quite a lot during the iterations of the test. If they pick up grit they will stop sliding, so keep the floor clean

roll back and forth. It was amazing to see how flexible the titanium gear legs are and how much I could move them on the grease plates by wigging the tire by hand.

It will still be necessary to re-establish the centerline every time the plane is jacked because the jacking will move the plane. Drop the plumb bobs again and move the string. This will be necessary for each adjustment so you will get good at it.

I was lucky and got near enough to 0 camber and 0 toe just by repositioning my original tapered washers. If this had not been enough I would have gone to Spruce for more, or perhaps made some by sawing off sections of aluminum bar stock and having them faced with a mill or a lathe. Planes with welded gear will not find alignment as easy, and an adjustment might involve heating and bending.

The result of getting to 0-0 is that the plane now rolls easily around the hangar. When taxiing it also rolls much more easily, and on my test flight I found myself cruising rather quickly along the taxiway. Next I will be adjusting the injection to idle more slowly. It never ends… R

Wayne Hadath *is a family man and a private pilot who built an F-1 Rocket from parts at a time when a manual was not available. He has successfully competed with that plane in many US races, finishing first several times against American teams.*

When he is not building or flying, Wayne enjoys rock crawling in his highly modified Jeep, taking along his son for remote camping trips, while his wife stays home and enjoys the blissful solitude.

D-Motor Comes to Canada

by Dave Hertner

SINCE PURCHASING the Fisher Flying products company I have now become the Canadian distributor for the D-Motor line of liquid cooled aircraft engines. In development since 2010, production has recently begun on their four cylinder 92 hp model that is suitable for the US Light Sport and Canadian Amateur and Advanced UL categories. A six cylinder version flew for the first time in early August.

The D-Motor was developed with five critical focus areas driving the design.

Compactness: By using the flathead instead of overhead valves the engine could be made physically smaller and lighter, despite the large displacement.

Simplicity: A flathead engine has many fewer moving parts compared to an OHV or OHC engine. At the low rpms of an aircraft engine the side valve layout provides good cylinder filling.

Lightness: The D-Motor does not carry the weight of rocker arms, pushrods, or rocker shaft, and the head casting is simple and light. The liquid cooling means that even the weight of finning is not required. Liquid cooling makes it possible to practise touch and goes without any danger of thermal shock or hotspots. It further improves fuel efficiency and lowers emissions.

Strength: The D-Motor is a large displacement engine that produces its power at low rpms, allowing the simplicity and lightness of direct drive. Nikasil cylinders, as used on many high rpm motorcycle engines, significantly extend the life of the engine.

Safety: With an OHV engine a sticking valve can result in contact with the piston, resulting in an engine failure and subsequent expense. If a valve in a flat-head sticks, the engine can just continue operating at reduced power.

I believe that the D-Motor family of engines are going to significantly add to the safety and utility of smaller aircraft in Canada. These liquid-cooled direct drive engines are ruggedly simple, with no gearbox to worry about. Liquid cooling allows for cabin heat without the possibility of carbon monoxide poisoning.

Pricing for the D-Motor will be very competitive with Rotax and Jabiru. The light weight and narrow width should make this new propulsion package a serious contender for your aircraft.

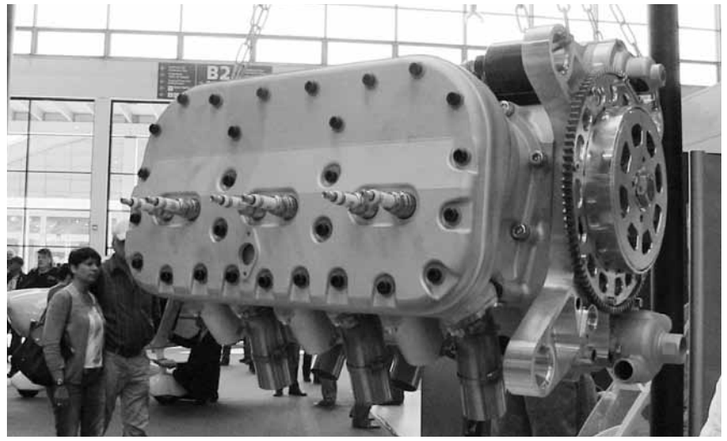
Since Fisher Flying Products has been named the Canadian dealer for D-Motor I have been bombarded with technical questions about these compact, flat-head engines. I think that the best way to get the information out is by repeating the questions as posed with the best information available to date.

The D-Motor LF 26 is a 100% liquid cooled, horizontally opposed engine with side valves and a flat-head design. The engine has a lambda probe and a performance map controlled sequential multi-port fuel injection system with dual ignition, firing 2 spark plugs per cylinder. The entire engine is wired with sensors leading to the ECU which results in a single lever operation of the engine. A second ECU and fuel pump can be added for full FADEC redundancy.

There is a 12 volt, 25 Amp alternator that is integrated into the aft end of the crankshaft behind the flywheel. The oil and coolant pumps are driven directly by the camshaft. The fuel system is held at a constant pressure by a fuel pressure regulator which is connected to the fuel return circuit. The induction system does not need to be preheated to prevent icing.

The ECU collects the following data during normal operation: Throttle valve position, Intake air temperature, Crankshaft position (analogue), Crankshaft Position (digital), Air pressure, Coolant temperature, Electrical system voltage, Engine RPM and Lambda probe voltage.

If one of the sensors fails, the ECU will move automatically from the standard mode to the emergency mode. In the emergency mode, the prime task of the ECU is to keep the engine running. This may be at a reduced maximum power setting and higher fuel consumption. The ECU will illuminate an engine warning light either through a stand-alone LED or by sending a signal to an EFIS.



the D-Motor family of engines are going to significantly add to the safety and utility of smaller aircraft in Canada

The optional redundant FADEC system with dual ECUs, fuel pumps, etc. will keep the engine functioning with either a fuel pump or ECU failure. Full function is assured if one circuit fails completely.

The design of the engine itself eliminates a failure mode that is particular to overhead valve engines. When a valve or its retaining hardware fail in an overhead valve engine, there is a likelihood that the valve will come in contact with the piston. This can lead to a catastrophic engine failure. In the side valve engine, the failure of a valve will simply result in a loss of power from that cylinder. There is a greatly reduced risk of valve train components getting into the piston cylinder.

There can be loss of up to 2 cylinders without the loss of the engine function. It will continue to operate with reduced power available which will allow the aircraft the opportunity to reach the nearest safe landing site.

With any new engine offering, there are always questions around the infrastructure that supports it. We have been asked about how many engines we would have in stock. Early production of the D-Motor is occurring in batches to fill customer orders. This allows the customer the option of having the starter located at the rear of the engine or on top of the engine.

What about the supply of spare parts? How fast can I get them? Most of the engine parts will be kept in inventory either in Belgium or at a parts depot in North America, and they can be shipped overnight from either location. The only parts that are not kept on the shelf are the crankshafts and cylinders, with a delivery time of 8-12 weeks.

Service manuals, engine installation

manuals and parts catalogues are very important to both the owner and the service organization supporting D-Motor engines. Are they available yet? D-Motor has manuals for both installation and operation. The parts catalogue will be available shortly. D-Motor has partnered with a firm in the U.K. to produce an updated installation manual and corresponding videos.

Is all the service activity going to be concentrated in one location in Canada? If so, what will buyers in the West do if they need service? Are service schools in your plans? D-Motor has already had initial technical training for its dealers, and the US distributor will be setting up training sessions for mechanics representing other North American service nodes.

The LF 26 is a very simple engine that does not require a great deal of training to service. D-Motor is willing to record service and technical videos for its dealers should an issue arise that cannot be explained otherwise.

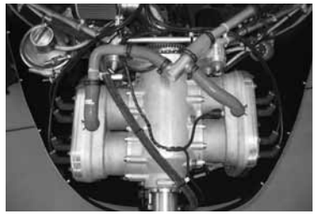
D-Motor has put together a straightforward warranty package that is fair to the purchaser and has very few notable exceptions. The purchaser is covered completely for parts and labour except for normal wear for 2 years from the invoice date or 300 hours read from the ECU, whichever comes first.

What does not constitute normal wear? If you fly without coolant and the engine overheats, D-Motor will be able to see this when it reviews the ECU data. Flying inverted will void the warranty. As with most aircraft engines, the D-Motor must always be kept in positive G's.

The maximum propeller weight that this engine can handle is 18.7 lbs

D Motor Specs

Manufacturer	D-Motor Belgium
Construction	4 Cylinder, Horizontally Opposed, 4 Stroke, Flat Head
Reduction Gear	None
Cooling	Fully Liquid Cooled – Heads and Cylinders
Engine Control	Single or Dual ECU – 12v (8A for ECU and Fuel Pump
Required)	
Fuel Supply	Multi-Point Sequential Fuel Injection
Ignition	Dual CDI Controlled by ECU
Alternator	300 Watt / 25A Regulated – Integrated
Cylinder Bore	103.6 mm
Stroke	80 mm
Displacement	2697 cc
Compression	8.0:1
Starter	12v – 1.1 kW
Fuel Pressure	36.3 – 43.5 psi (2.5 – 3.0 bar)
Fuel Regulator	36.3 psi (2.5 bar) Opening Pressure, In the back flow
Fuel	MOGAS – Super Unleaded 95 ROZ, 100LL Avgas
Fuel Filter	Bosch No. 6462 Ultra-fine filter, Pressure side operated
Power	92.5 hp (69 kW) @ 3000 RPM
Torque	162 ft lb (220nm) @ 2600 RPM
RPM Range	800 to 3000 RPM - 2100 to 2800 RPM in Cruise
Lubrication	Dry Sump
Oil Pump	Gerotor Pump Driven by Camshaft
Oil Pressure	21.7 – 72.5 psi (1.5 – 5.0 bar)
Oil Specification	Synthetic 5W50 – 5W40 – 0W50 – 0W40
Oil Quantity	2.7 Qt (2.5 Litre)
Oil Filter	Mahle OC 475 (11 W 27)
Oil Temperature	Min 122°F to 248°F (50°C to 120°C) – Best Range 122°F to 248°F (50°C to 120°C)
Coolant	Demineralized Water with Anti-Corrosive Antifreeze for Aluminum Engines
Coolant Temp	50°C to 110°C (Opening Pressure at 1.2 bar) 50°C to 120°C (Opening Pressure at 1.4 bar) 75°C to 95°C Best Range
Coolant Pump	Centrifugal Pump Driven by Camshaft
Propeller Flange	Bolt Hole Circle Diameter – 101.6mm – 6 x 13mm
Spark Plug	Beru "Ultra X Titan UTX 1"
Ignition Coil	Bosch RB 110322-2
Plug Lead	Bosch 90° Angle – Rubberized
Lambda Probe	Bosch



The design of the engine itself eliminates a failure mode that is particular to overhead valve engines.

(8.5 kg), and the crankshaft rotation is clockwise from the pilot's seat.

What are the number and type of main bearings? There are 3 main crankshaft bearings in the LF 26. There is one roller bearing at the aft end of the crankshaft and one duplex ball bearing at the front of the crankshaft. These ball bearings enable both tractor and pusher configurations. The plain bearings on the crankshaft are 54mm in diameter and the duplex ball bearing is 54mm ID and 80mm OD.

There is a camshaft driven gerotor oil pump with an operating pressure, depending on RPM between 22 and 73 psi. Fully synthetic SAE 5W50 engine oil is used in a dry sump system. Oil quantity, depending on the length and position of the oil cooler will be 2.5 – 3.0 litres.

The crankshaft is currently machined from a solid billet. In the future the crankshaft will be produced from a forged piece.

The pistons are forged aluminium flat top racing pistons with 3 rings. The first ring is the compression ring which is a normal flat ring. Next, are the double oil rings for scavenging oil from the cylinder wall.

The connecting rods in the D-Motor engines are forged conventional rods. They utilize plain bearings in both ends.

There are 2 valves per cylinder seating on Stellite valve seats. The valve followers are of the plain type and are in contact with the camshaft which sits directly below the crankshaft.

The crankcase material is cast aluminum. The liquid cooled heads are made as pairs while cylinders are individually removable.

The integral water pump is driven off the camshaft at 2x engine RPM. No thermostat is supplied with the package but the customer has the option of installing one. Since radiators are usually a custom fit these are not supplied with the engine. Coolant is a mix of demineralized water and any coolant that is compatible with aluminum engines. The operating coolant temperature range is 50°C to 110°C with a best range of 75°C to 95°C.

An oil cooler is supplied with the engine and is recommended for summer operations. It is not required for winter operations. Operating oil temperature range is min 50° C to 120° C with a best operating range of 80°C to 100°C.

The fuel injection system used on the engine is a sequential multi-port system utilizing a common fuel rail that operates at a pressure range of 36.3-43.5 psi. The unused fuel in the fuel rail is depressurized at the fuel regulator and is returned at low pressure to the supply tank or header tank.

The ignition system utilizes dual ECU triggered coils that supply energy to dual spark plugs per cylinder through spark plug wires. There is an option for dual ECUs to add to system safety. The charging system is powered by a 300 W / 25A integrated alternator. Full output is 25A @ 3000rpm. At 1000rpm the engine is self-supporting electrically.

The starter can be located in two separate positions on the engine depending on the installation. It weighs 2.42 lbs (1.1kg). There is a slight weight shift between the two starter locations so it can be used to assist in setting the weight and balance.

The D-Motor engines were designed to have the same propeller flange to engine mount dimensions as the Jabiru engines. The D-Motor also uses the same mount geometry as the Jabiru

engines. This means that any mount designed to fit a Jabiru to a specific airframe will accept the D-Motor without any alterations. There are hundreds of aircraft that have Jabiru mounts already designed for them. This reduces cost and increases the ease of installation for the D-Motor. The D-Motor utilizes the same rubber isolation mounts as well. The propeller flange is the same as both the Rotax 912 and the Jabiru engines.

The dry weight of the 4 cylinder LF 26 is 56kg (123.2 lbs). A completely installed weight of 60kg (132 lbs) is possible. This can rise slightly with longer exhaust pipes, type and size of radiator, radiator location and hose lengths.

Fisher Flying Products has been named the exclusive dealer for D-Motor products and accessories in Canada. We will also be working closely with D-Motor to support their product line by becoming the Canadian authorized warranty, maintenance and repair facility. Fisher Flying Products has partnered with Purple Hill Air to take care of warranty, maintenance and repair of D-Motor engines. This will initially be for all Canadian customers. Purple Hill Air is a full service aircraft maintenance and training facility at the St. Thomas Municipal Airport (CYQS). John Goris, owner of Purple Hill Air welcomed the opportunity to work with a new engine platform. In the future, as demand increases a second organization in Western Canada will be named to take care of Western Canadian customers.

I recently purchased Fisher Flying Products from Paul Riedlinger and have moved the production facility from the Brampton airport to an industrial park just outside of Dorchester Ontario. When asked what my plans are for the company, I replied that I want the business to become a one stop shop for the needs of my customers. Fisher is currently a supplier of Hirth engines which support the smaller and lighter models of the aircraft we sell, but customers of the heavier models such as the Dakota Hawk, Celebrity and R-80 Tiger Moth have had to go elsewhere for higher horsepower engines. By becoming the Canadian D-Motor dealer, we can now supply engines for these models as well.

For more information:
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D-Motor Canada
www.d-motorcanada.com

Do you need to remove some powder coat paint to inspect the metal below? You can't sand it off but a torch will burn it off nicely, albeit at some risk to the plane. Dan Oldfield found that Permatex Gasket Remover will soften most powder coatings within fifteen minutes, and a cloth will wipe the softened paint right off.

Winnipeg to Oshkosh

by Jill Oakes

RAA WINNIPEG always has a contingent that heads down to Oshkosh each year. Jill Oakes and her recently repainted Piet (pictured above) were featured at the Canada area. Left, a volunteer directing C-GGLU to parking at base of the KOSH tower in front of the EAA Canada Pavillion, a few feet from center stage to join C-FLUG on display. Below, a veritable crew of volunteers in the homebuilt section walked Jill's Pietenpol C-GGLU right out to the runway for departure at KOSH!

Pietenpol C-GGLU and the RAA's Cessna C-FLUG have introduced about two dozen EAA Eagles to aviation and these Eagles are now going on to get their private pilots' licences. One of these women is Becky who flew C-FLUG to OSH this year a few months after getting her PPL. Thankyou to Jack Dueck, Paul Dyck and Cory Puuri for making the parking arrangements.

About 10,000 planes visited KOSH, and the homebuilt section was a terrific success with all types of homebuilts on display.

Right, Becky, Darryl and their children with C-FLUG at KOSH; Above and upper right, Becky and Beth flew C-FLUG from Winnipeg to the Great Event. It took C-FLUG about 9 hours of flying time to get there. Also shown is Becky's SPOT track to and from KOSH

Top right, Donna, Continental president Rhett Ross and Jill - we had a breakfast date with President Ross to lobby Continental to start production of A-65 and A-75 cylinders for the thousands of Champs, Cubs, Chiefs, and home builts desperately looking for Standard cylinders... If you or anyone you know is interested in buying new cylinders for your A-65 or A-75 Continental, please submit your name, email address to Jill Oakes (Jill_oakes@umanitoba.ca) by September 15 and what you are willing to pay. If we can collect emails from one thousand interested A-65/A-75 Continental engine owners, President Ross is interested in meeting the demand and has confirmed Continental still has the tooling for the A65/A-75 cylinders(!) Please pass this invitation on to everyone you know who might be in the market for these cylinders or dealers who might be aware of the large number of aircraft owners looking for new Standard cylinders (eg homebuilts plus Champs, Chiefs, Cubs, etc... including many people with more than one plane who are storing their larger plane and flying their planes with smaller engines (which equals less fuel and more fun).

***Jill Oakes** is very active in the Lyncrest chapter of the RAA. She works at the University of Manitoba at the Centre for Earth Observation Sciences, and holds a commercial rating. She flies a plans-built AcroSport II, a Land Africa kit-built STOL aircraft and a Pietenpol.*

Aero-Glass: Synthetic Vision and "Augmented Reality" for Pilots

Over the past decade, GA pilots' ability to visualize terrain, navigation, traffic (ADS-B), weather, and airspace has become easier, along with improvements in convenience and safety items like emergency, preflight, inflight, and landing checklists. But handy as this information is, accessing it requires pilots to take their eyes off the sky, and often access multiple screens and devices.

As even a HUD (head-up display) is in a fixed location, Aero Glass has integrated all these functions, and made them available to pilots, wherever their head is turned, with 3D, 360-degree perspective, and is premiering its augmented vision glasses, wearable information for pilots. Using Epson Moverio™, Google Glass™ and other head-mounted displays, Aero Glass is the first to bring Augmented Reality to pilots, providing an unparalleled 3D, 360° experience in the cockpit, regardless of the visibility.

Ananda Leon, General Manager at Levil Technology Corp., which is a major technology partner with Aero Glass, says, "We at Levil Technology are excited to be part of the Augmented Reality concept that Aero Glass provides. The iLevil series revolutionized the role of tablets in the cockpit, placing essential flight information at the pilots' fingertips. The fact that this information is now available in the pilots' line of sight is simply breathtaking. AeroGlass unlocks unexplored opportunities in HEADS-UP technology for GA and takes your flying experience to the next level."

This technology, previously available only in specialized military helmets, is now available to GA pilots, and at accessible prices.

Cameron Clarke, VP, Business Development at Aero Glass, says, "Our community of Pioneer Program Beta testers will work together through an online forum to create the final product which will provide feedback and special features of interest as part of this program, leading to safer skies for all aviators, as they navigate the skies easily in any visibility."

Aero Glass displays flight plan, airways, ADS-B traffic, nav aids and geographic points of interest through head mounted displays.

FIRST CLASS SEATING

Ivan Kristensen's exquisite RV-10

WHEN I RETIRED from my flying career in April of 2004 I walked away saying to myself that my flying days were over. It had been a wonderful 14 years of flying big piston and turbine twins and I was planning that in retirement I would concentrate on my first love in aviation, that being building, flying and competing with R/C (radio controlled) model airplanes.

Early in the year of 2008 while vacationing in Florida, my wife and I were visiting my friend near Vero Beach. This fellow was at one time an avid R/C-er, and that is how we first met in 1968, but he later switched to full scale aviation, including building several amateur aircraft.

During my visit he suggested that I too should build an amateur airplane. At the time he had built and was flying a Van's RV-7. I flew with him in it several times and liked but felt that it was a bit too cramped for me to be interested in building my own. He mentioned that a mutual friend in Ohio was in the process of building an RV-10. My first question was "what is an RV-10?" After some research it became obvious that if I was going to build an airplane the RV-10 would be the perfect fit.

On our return to Canada in early February I called my old friend in Ohio (also a former R/C-er) to ask if we could come by for a visit so I could have a look at his RV-10 building project. Going there, if I really had not wanted to build an airplane, would have been a mistake. As they say "the rest is history". Soon after my return home I ordered the tail kit from Van's, a tool kit from Avery, and began building on April 19, 2008.

Six months and approximately 2600 hours of building time later on June 28, 2010 I test flew my new and recently completed RV-10. This was an exciting project and I loved every minute of it. Initially the airplane was not painted so it was pretty ugly at first, with its pink fibreglass cowl and cabin top. During the winter of 2011 it spent 6 weeks in the paint shop at Purple Hill Aviation near London Ontario, and from an ugly duckling came a beautiful Swan. Today over four years later I have accumulated a total 550 hours, flying trips as far away as Vancouver Island, The Bahamas, St Croix (US Virgin Islands) and Grenada, all on separate trips. This is a wonderful airplane with great speed and good range and payload. A typical trip would be a nonstop return trip from St Croix to Exuma in the Bahamas, a leg of 720nm in 4.6 hours flying at

Van's Aircraft has a successful forty year history of manufacturing sport aircraft kits, beginning with the single seat RV-3, which was a development of VanGrunsven's first plane, a Stits Playboy with draggy compression struts. Van made a new cantilever spar wing, and this became the basis of the RV-3. Shortly there came a demand for a 2 seat version of the RV-3 and this became the RV-4, and later the demand for a side by side cockpit resulted in the RV-6.

Early Van's designs were well kitted and complete, but before match hole technology it was necessary to make jigs in order to build a plane. Van's was one of the first kit manufacturers to make the leap to computer aided design and manufacturing, and all kits after the RV-6 have used match hole technology, which has drastically shortened the build time while increasing the accuracy and consistency of build quality. The next step was to push the limits of the 51% rule to provide quick build subassemblies that shortened build times even further. Lately Van's technology has again improved – previously holes were punched undersized to be upsized by the builder to correct for minor variances in location. Now all holes are so accurately placed that they are to the finished size, and all the builder has to do is deburr and dimple for flush rivets.

Unlike many manufacturers, Van's is very forthcoming with safety information. Their www.vansaircraft.com website has a support section that is model specific, listing service bulletins, service letters, and drawing changes and revisions. Van's provides better information service than one would expect from a manufacturer of certified planes.

The quick build option is very popular these days, to the extent that there is usually a waiting list of several months. The current price for the standard kit is $45K US, and people are lined up to pay another $13K for the quick build option. A quick build comes with the cockpit's aluminum "boat" already constructed. The builder must finish and fit the reinforced fiberglass cabin top and bond in all the windows. The gullwing doors come disassembled and the builder fits and assembles the inside and outside castings, with the windows and the rack and pinion latch mechanism trapped between. Early kits had some problems with doors opening in flight so Van's has since added a centre latch mechanism to supplement the fore and aft pins that poke into the door jambs. Ivan substituted an aftermarket centre latch on his plane. He also used an aftermarket flush door handle and lock for lower drag and a smooth custom appearance. The Van's door seals are rudimentary, and Ivan used aftermarket seals that eliminate all wind noise.

The RV-10 wing is a Hershey bar constant chord with no washout. The main spar is a formed aluminum C-channel with machined aluminum caps top and bottom. The caps are machined in steps to become reduced in thickness as the spar proceeds toward the wingtip. Stepping instead of tapering means that the rivets lengths can be batched, instead of every rivet being a different length. The RV-10 has a CG range of 15-30% chord, giving a generous 8.4" of CG range, allowing the plane to remain within the envelope for all expected loadings. The RV-10 wing has a very benign stall, giving a buffet and then a soft break without a wing drop, using only one or two hundred feet to recover.

On a slow build the spars come assembled and riveted, but with a quick build the wings arrive largely finished. The 30 gallon wing tanks are fully assembled and sealed and they are already screwed into the leading edge, which means that the onerous job of installing the nutplates has also been completed. The D-cell comes riveted and closed, as are the slotted Fowler flaps and the ailerons, so the MD-RA will be inspecting only the remainder of the wing. The lower wing skins come prepunched but not installed, to allow installation of the aileron and flap pushrods and bellcranks, and also to facilitate the precover inspection. In the walkway area Van's installs a second sheet of aluminum under the wing skin and also doubles up on the number of ribs.

Going there, if I really had not wanted to build an airplane, would have been a mistake. As they say, "the rest is history".

14000' and landed with 15 gal of fuel left in the tanks (total capacity 60gal.) That equates to an average groundspeed of 156 knots at a fuel burn of 9.78 gallons per hour. Not bad considering we were 3 guys at an average weight of 200 pounds each, plus baggage.

This airplane has been IFR certified by TC. This process was fairly simple and TC officials were very accommodating with information and instructions on how and what to do. It is mainly a paperwork process. Of course, to make use of IFR the pilot must have an instrument rating. After leaving my professional flying career in 2004 I didn't fly an airplane again until 2009. During that time my IFR flying privileges not only expired, they lapsed altogether, which meant that I had to start studying to write the exam again. Much studying and training took place and the IFR rating was once again mine.

In the few years I was away from flying (five) I found a huge change in the cockpit. The advance in technology in instrumentation is amazing, especially as it applies to non-certified aircraft. The so-called

Left: Both trim tabs go down for "Nose Up" trim; less "Nose Down" trim is required so only the right hand tab goes up. Opposite, lower gear leg fairing was split and bonded into the wheelpant.

"Glass Cockpit" that I opted to install is all electric and controlled by an EFMS (Electronic Flight Management System) The Display Unit for this system is the screen below the throttle quadrant. There are very few standard mechanical circuit breakers in the airplane - all the devices are controlled by the EFMS which uses solid state circuit breakers.

Another big change in the cockpit is the so called "Paperless Cockpit" All airport, frequencies, runway info and approach guidance are contained within the EFIS screens and the Garmin GNS-430. However, one still must have either paper charts, a CFS and a CAP for IFR approaches available or get a tablet EFB (Electronic Flight Bag) and download this information for use in the Cockpit.

I chose to use an iPad Mini 32GB with WiFi and GPS

One nice aerodynamic touch is that none of the wing skins are overlapped. The nose skins and the rear skins are a tight butt fit against each other, meeting on the spar to minimize turbulence that would cause drag. Some of the early kits had skins a bit oversized so they interfered with each other and had to be trimmed to fit, but this has since been corrected.

If the builder wishes to install aileron trim the inboard inspection panel is used. Ivan Kristensen did this, using a servo that pulls the aileron pushrod with a spring to provide roll trim. The flaps are actuated by a servo that is mounted in the tunnel console that fits between the seats.

Building the tailcone is somewhat more of a test for the builder. Neither the turtledeck skin nor the longerons are predrilled, so the builder must lay out, drill and countersink all of these holes. The rationale for this is to satisfy the 51% requirement. Considering that on the RV-6 and earlier kits there were many thousands of these to do, this is not such an onerous task.

In the left side of the tailcone is a locking baggage door for access to the generous storage compartment. The limit for baggage at this station is 100 pounds, enough for most purposes. The rear seats are on pins and can be quickly removed if more capacity is required. Some early baggage door were mispunched, causing an alignment problem but this was quickly rectified.

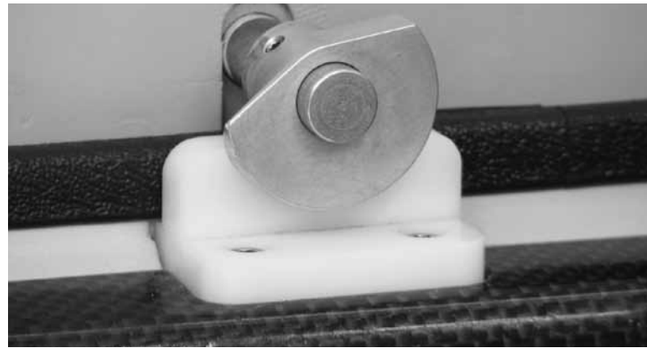
The steps can be a concern on the RV-10 because overstressing can cause looseness, they are mounted in an enclosed structure and cannot be serviced without drilling them out. The solution is to make a service panel, and when building to beef up the attach points.

Tail surfaces are all prepunched so these parts go together quickly. The vertical fin and the stab each have two spars, while the control surfaces each have one. The holes are so accurately located that everything aligns without any jigs. Even the elevator mounts are

In the few years I was away from flying I found a huge change in the cockpit. The advance in technology in instrumentation is amazing

but I have no data plan for it. A standard size iPad is too big in my opinion, but Android tablets and phones can be used as well. "FltPlan Go" is a free web base service, and the best one for several reasons. First of all because it is free, but perhaps more importantly because it has all the Canadian approach plates as well as VFR and IFR (Lo & HI) charts and recently added the CFS as well. You can also file cross-border flight plans as well as flight plans within Canada using this service. To my knowledge this is the only US-based flight planning company. providing this service, and oh yes did I mention that it is all completely FREE.?

I sometimes ask myself if I would build another airplane. If I did it would be another Van's for sure and likely an RV-8. The reality is that what I have right now is the perfect airplane



Opposite, both gullwing doors open simultaneously, and seats fold forward for easy entrance and exit. Front seats have NACA ducts for fresh air while rears have a their own hinged air doors. The locking baggage door gives good access to the finished compartment, and the plastic box stores the oxygen equipment. Top, aftermarket centre door latch mounts to the carbon fibre doorframe cover. Above, flush push-button fasteners and a below flush hinge keep the oil door tightly fastened.

so accurately made that they can be flipped over, and when riveted to the spar the pivot holes will all be in line. Van's CNC accuracy is impressive. All pivots have bearings and all pushrods have rod ends so there is very little friction in the controls. The kit includes a Ray Allen servo for elevator trim. Each elevator has a trim tab, with both going down to provide "up" trim, but only one goes up to provide "down trim."

The RV-10 is built only as a nosedragger, so unlike many other models there is no taildragger option. The main gear-legs are tapered steel rods that plug into the sockets of 4130 sheet weldments that are attached to the main spar. The nose gear is a bent piece of 4130 tube that is hinged to the motor mount at the bottom of the firewall, with a caster that carries the nosewheel. Suspension is by an elastomeric shock absorber between the nosegear leg and a box structure halfway up the motor mount. Lately there have been some cracks found in this structure in high time / rough field RV-10's, so Van's has issued a service bulletin to inspect this area. The castering nosewheel is a service point that requires occasional attention to minimize the possibility of a wobble. There are Belleville washers at the pivot point, and the nut that retains everything must be tightened to provide a specified preload. This is measured with a spring scale pulling laterally on the axle and the nut must be tightened until the breakout figure is 26 pounds. Too little and there will be a shimmy that can become strong enough to break the nosewheel pant. Too much, and if the plane takes off in a crosswind the nosewheel will not self centre in flight. The kit includes a set of Cleveland 600-6 main wheels and brakes, and a 500-5 nosewheel. Because of the castering nosewheel the brakes get used more often than on many aircraft. Still, 200 hours on a set of brakes can be expected for most pilots. On Ivan's plane the wheelpants came in for some custom work. The kit gear to pant fairing is a separate piece but Ivan split his and bonded it into the pants

Ivan's balsa and ply overhead console holds lights, switches and headphones. Opposite, power is courtesy Aerosport Lycoming IO-540 producing 260 hp.

for me so building another one is not going to happen anytime soon.

Airplane facts:

GMDV's empty weight is 1682lbs with a maximum takeoff weight of 2700 pounds. Power is courtesy of a Lycoming IO-540 D4A5 rated at 260 horsepower at 2700rpm. The engine is normally aspirated

Cruise rpm is 2400 rpm at maximum manifold pressure. Typical fuel burn at 9000 feet is 11gallons per hour giving a true air speed of 168kts running lean of peak. If I run 100 degrees rich of peak I gain about 7kts giving me a TAS of 175 knots, but the fuel burn would increase to 13.5-14 gallons per hour.

The ignition system features a single mag on the bottom plugs with a Light Speed electronic ignition on the top plugs.

The Hartzell constant speed propeller features a blended airfoil.

The glass cockpit consists of two GRT (Grand Rapids Technologies) EFIS (Electronic Flight Information System) screens on the left side in front of the pilot plus a third screen on the right - a Dynon D-100 EFIS all with independent AHRS (Attitude Heading Reference System) and magnetometers. After engine start it usually takes between one and two minutes for everything to stabilize and become aligned, during which time to airplane must remain still. This is not a temperature affected process.

The Autopilot is a TruTrak Digiflight II, a must-have piece of equipment when flying long distances. It features automatic climbs and descents, altitude pre select, GPS steering and instrument approach coupling including the glide slope.

for a more finished appearance and easier access to the wheels.

The recommended engine for the RV-10 is the 260 hp Lycoming IO 540. Many builders have tried other engines but Ivan was not looking for a hobby – he wanted something that would provide the performance in the factory specs, so he chose the engine that Van's recommended. To complement the engine he installed a Hartzell constant speed prop with a blended airfoil. For lightness he chose to make a pressure cowling instead of a plenum. The oil inspection door on a pressure cowl RV-10 experiences ram pressure so Ivan used a pair of flush mount push fasteners to keep the door firmly in place, and he also used a below-flush hinge. On Ivan's plane the fiberglass cowl is attached with flush mount fasteners instead of the stock hinge and wire method, to make removal and installation quicker and easier, a nice custom touch.

The interior is what really sets Ivan's plane apart. Knowing that he and his wife would be using this for long trips, Ivan had Fliteline make a custom "Lexus" interior using hides that he supplied. All seats are comfortable, and the fronts can be adjusted fore and aft, with the seatbacks also reclinable. Elbow rests are trimmed with lightweight carbon fibre covers, and all panels are textured formed plastic that fit perfectly. This is a first class cabin with lots of legroom, even in the rear. Rear seat side panels are fully trimmed and include grilles for the rear seat air vents. There is 48" of shoulder room in front and 46" in the rear, so long trips are comfortable.

Entrance is easy with both gullwing doors able to open simultaneously, and he front seatbacks lean forward to allow full access to the rear seats. On the cabin roof centreline there is an overhead console that carries the night lights, switches, and headphone hooks. This looks like a moulded part but Ivan used his model building skills to make it from balsa and thin ply. An Aerox oxygen system bottle is mounted on the floor console between the seats, with the gauge visible to all, and when not in use Ivan stores the hookup kits in separate fitted bags in the luggage compartment.

What is it like to fly in the RV-10? It is a lot like driving the Autobahn in a high oerformance luxury car, but much better and much faster. The IO-540 starts up quickly and six cylinders provide smooth running. The exhaust is quieted by two mufflers and even in flight the cabin is quiet enough to talk without headphones. The RV-10 can operate from grass or pavement, it gets off the ground quickly, and climbs very fast to whatever flight level the pilot or his autopilot have chosen. The plane is stable enough to be used for IFR while still responding quickly enough to have sporting pretensions. The RV-10 will true out at just over 200 mph, making it possible to do Toronto-Florida in five or six hours, and Toronto-Calgary in nine. With an early start a family can do Toronto- Vancouver the same day, and with oxygen and the horsepower of the Lycoming there is no problem clearing the Rockies.

What does it cost to build an RV-10? A quick build kit and a new IO-540 will get you to $120K. Interior and paint will use up another $20K and the panel and bits and bites will take you to $175K. If you want to write cheques instead of banging rivets there are builders who will assemble one for $50K, but probably not as nicely as Ivan's labour of love. You would then have a plane that is every inch the equal of a Cirrus but at one third the price, and without the dread of having annuals performed on an expensive certified plane. Only occasionally does an RV-10 come up for sale and they get snapped up very quickly, usually very near the asking price. The reason is simple – there is no other aircraft that compares to the RV-10 for price, versatility, and performance.

Wayne Hadath and Gary Wolf

Of all the airplanes I have flown this is the best one to date, exhibiting very smooth turns and intercepts.

I always cruise Lean of Peak (LOP). The engine is equipped with EGT and CHT probes on all six cylinders. This is a must to be able to manage LOP operations properly. I typically run 25-50 degrees LOP which lowers the CHT by as much as 40 degrees; these temperatures are typically in the low 300 degree range which is perfect.

My preferred cruising altitudes are 8-9-10 and 11000' These are the best performing altitudes below oxygen levels and above slower traffic and most mountains on the eastern half of the continent. TAS between 166-170 knots fuel burn between 10.5 and 11.2gph. I have had the airplane up as high as 17000' and up there the TAS was 155kts with a fuel burn of 8.8gph.

An interesting fact about the RV-10 wing is that the TE (trailing edge) has a 3 degree reflex. This means that the complete TE including the flap and ailerons are curved up 3degrees which gives greater cruising speeds. Many RV-10 pilots lower the flaps by 3 degrees to "in trail" for takeoff but I lower them an additional 7 degree for a total of 10 degrees for takeoff.

After a 400 ft roll the rotate speed is 60 knots, lift off 65 knots - accelerate to 100 knots initially at 1500 fpm, enroute climb 120 knots at 1100-1200 fpm.

Downwind at 100, 10 degrees flap, base at 90 and final at 80 knots. Over the numbers 70 knots. touchdown at 60. Max flap speed is 87 knots.

Cruise speeds at 2400rpm is 166-170 knots TAS depending on load and temperature.

IVAN KRISTENSEN *is a retired commercial aviator and an avid RC modeler. The RV-10 was his first project.*

President's Message / cont'd from page 2

it is also possible to reduce the gross weight of an A-B aircraft at the time of initial registration. Why would someone wish to do this? It makes sense if the builder wishes to fly on a PP-UL, a permit that limits his PIC privileges to aircraft that meet the UL definition which has a maximum gross weight of 1199 pounds. A builder could initially register at this weight, and subsequently perform his climb test to validate that weight. If he later earned a Rec Permit or higher license he could then apply to have the gross weight increased to the designer's number, and then perform a new climb test at that weight.
One thing to be careful of though – the plane must still meet the Minimum Useful Load requirement at the 1199 pound figure. For a two seat plane with 100 hp this means a MUL of 400 pounds, so the empty weight must be no higher than 799 pounds.

Guardian Avionics Unveils Connected Cockpit System

The FMS 650 is a state-of-the-art connected cockpit system. The unit is installed in your panel and communicates via the RS232 data bus. Bluetooth technology provides multiple data feeds from the FMS 650 to as many as six iPads or iPhones. Pilot(s) and passenger(s) can view real time GPS, Engine, and Instrument data on their handheld device(s). Additionally, the FMS 650 is engineered with two Smart USB chargers, which provide fast and efficient charging to all your portable electronics. These features are in addition to standard CO Detector safety features.

The FMS 650 combined with our Pilot FMS App will automatically record engine and flight data onto your iPad or iPhone. After your flight, the flight data can be automatically uploaded to a secure cloud through a Wi-Fi connection. The secure cloud stores all your engine data, take-off(s), landing(s), and flight time. The data can be viewed and analyzed later on an iPad or computer in the comfort of your home or shared with your aviation technician.
www.GuardianAvionics.com

MVP Aircraft Debuts at Oshkosh

A new 2-place amphibious pusher with folding wings aircraft was unveiled at OSH 2014. MVP stands for Most Versatile Plane, and they've taken utility to the next level with a nose-to-tail platform for moving around the aircraft on the water, and the wings can fold while afloat. The control panel folds up and back to allow a utility or a bass-boat fishing platform in various settings; a specially-designed tent wraps around the front of the aircraft when docked to create a sleeping area. For more information visit their site at http://www.mvp.aero

Hoverbike meets Kickstarter Objectives

Hoverbike is a London (UK)-based company working on the development of a viable VTOL motorcycle type of aircraft. They started a crowdfunding campaign on Kickstarter and in recently announced they had met their goal, in fact collecting £64,000, more than double their objective of £30,000.
Their website states: " The Hoverbike is the result of years worth of R&D. We combined the simplicity of a motorbike and the freedom of a helicopter to create the world's first flying motorcycle.
"When compared with a helicopter, the Hoverbike is cheaper, more rugged and easier to use - and represents a whole new way to fly. The Hoverbike flies like a quadcopter, and can be flown unmanned or manned, while being a safe - low level aerial workhorse with low on-going maintenance".

Pietenpol Cables

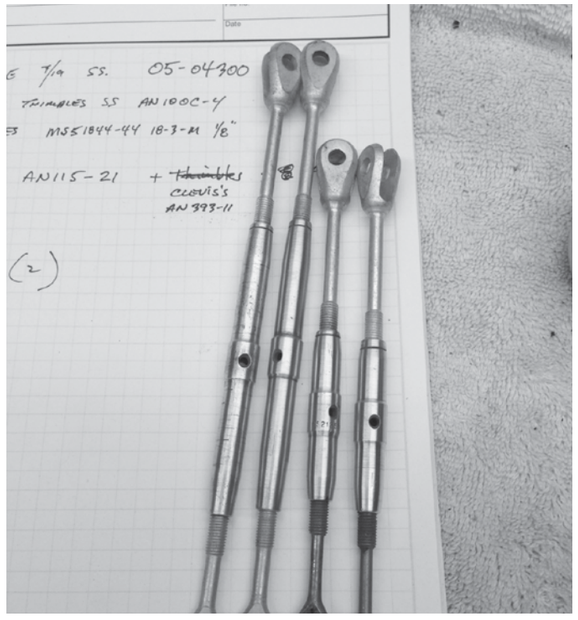
Scott Knowlton

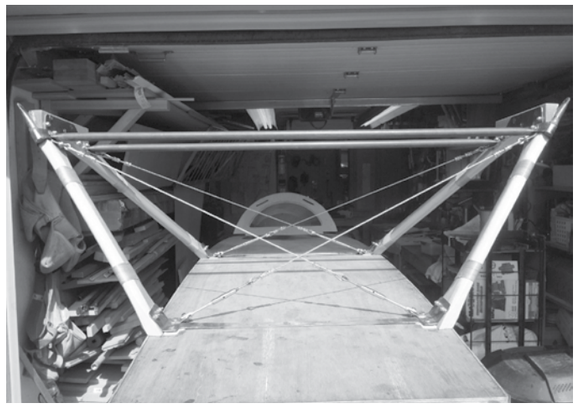
BUILDING AN AIRCRAFT from plans should be just as much an educational experience as it is a manufacturing process. Being a first time homebuilder I have found myself faced with a multitude of daunting tasks which I really didn't feel technically equipped to tackle. EAA manuals, old RAA magazine articles or an internet search would often reveal to me a process or technique that I never would have come up with, and as a result my part would get built, jig would be fabricated, or awkward weld would get completed. At other times, having the experience of another builder was what I needed as I lacked the expertise or simply the self confidence to acquire the new skill.

I had been struggling on my landing gear for my Pietenpol - a straight axle and wood "Jenny style" set up that was an option in my plans. I loved the appearance and apparent simplicity of construction of the gear but soon learned that I would have to teach myself to cut compound angles, carve, align and cross cable using turn buckles and a niccopress.

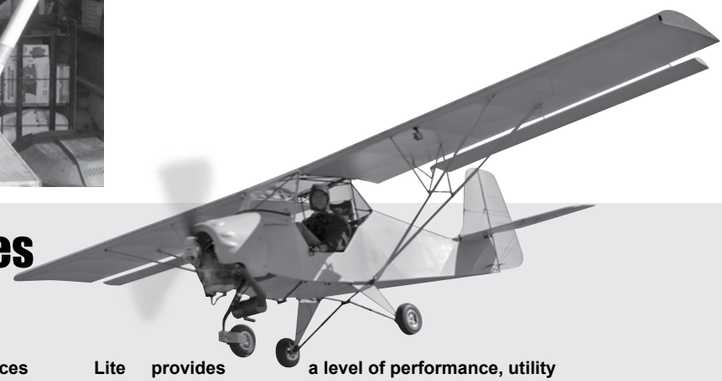
Through patience and the fortitude to make a lot of firewood from expensive Sitka Spruce shavings I finally found myself with a straight, nicely carved set of gear legs with metal fittings all assembled on my upside down fuselage.

While my friend Brian Kenney - local Pietenpol owner, technical counsellor and all-round neat guy to hang out with - made the necessary modifications to my motorcycle wheels, I set about to tension my gear legs with 1/8" cable. I had some very old turnbuckles that I had saved and cleaned for the job and a bag of new cable eyes, sleeves and clevises from Aircraft Spruce. Another good friend, John VanHattem - another guy with vast building experience and know how - came to my shop with





nico-press squeezed in hand to assist me with a process that I had never attempted before. We measured, cut fabricated and installed four cross cables in the length of time it would probably take me to sweep my shop floor. John left me with lots of tips, tricks and know how along with a new found skill. My biggest takeaways from the experience was that making cables is a task best performed by two people. The right tools are also necessary - a good long squeezer for leverage and a means to cut cable without it fraying are desirable. For me, a confident person along my side was the most important ingredient to success. When I purchased my plans from Bernard Pietenpol's son, Don left me with some advice. He told me to keep going back to my shop to make parts as often as possible and one day I would have no more parts to make and all I'd be left with was an airplane. The piece missing in his advice was that I wouldn't only end up with an airplane, I would also be blessed with the many friends and skills I picked up along the way.



Belite Aircraft Announces Canadian Distrubutor

Wichita, KS – August 11, 2014 – Belite Aircraft announces that Melody Aircraft, of Alberta, Canada, will exclusively distribute Belite's aircraft and kits throughout Canada.
"In order to meet the needs of the Canadian market, we're upgrading our ProCub Lite model with a gross weight increase to 285KG (625 pounds), a larger 10 gallon fuel tank and a four stroke engine," said James Wiebe, CEO of Belite. "This upgraded ProCub Lite will provide a large dose of fuel efficient flying, and we're pleased to partner with Melody Aircraft on this venture."
Gary Steadman, CEO of Melody, continued: "The ProCub Lite provides a level of performance, utility and economy which has otherwise been unavailable to Canadian pilots. We're looking forward to receipt of our first demonstrator aircraft late this year.
Belite Enterprises was founded in 2009 by James and Kathy Wiebe. It designs and manufactures FAR Part 103 ultralights and a line of lightweight avionics. It has recently introduced the ProCub Lite with a unique carbon fiber/foam/aluminum construction. Aircraft are sold as ready to fly or as kits.
FMI: Belite Enterprises LLC 316-253-6746
info@beliteaircraft.com www.beliteaircraft.com

Rotax Exhaust Ball Joints

Gary Walsh

IF YOU STARTED out flying behind Lycomings and Continentals, and now find yourself behind a 4 stroke Rotax power plant, every time the prop comes to a stop you know you are dealing with a different beast. It does not spin slowly to a stop - it simply stops. This is the nature of a geared small displacement engine. The same is true when starting. If it is cold, it will often kick back with enough force to shake the entire airframe. The exhaust system hangs below the engine like a pendulum, and it often ends up cracking.

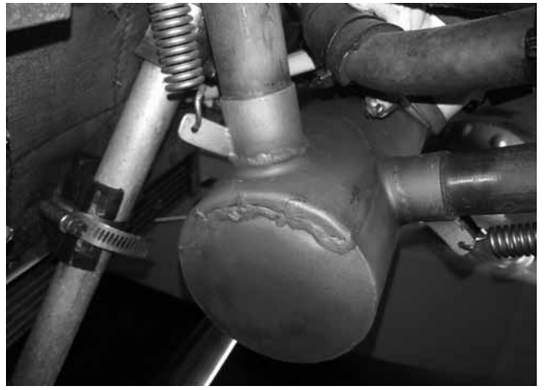
I have owned a Kitfox IV with a Rotax 912s for more than a decade now. The exhaust canister has cracked so many times we had welds on top of welds. The system would crack two to three times a season. Dave Park, AME supreme, told me I had to do something. Buying a new canister was not the answer. Neither was me buying a TIG welder and learning how to use it.

I always knew what the solution was. Ball Joints. On my exhaust system the header pipes slipped into tubes coming out of the exhaust canister, and were held in place with a single spring. Ball joints would allow the system to move, so the forces generated by the kick back when you start the engine on a cold day and the sudden stops whenever you shut it off would be dissipated. Also the single spring should be replaceD with springs that pull each side of the pipe equally, rather than loading up one side.

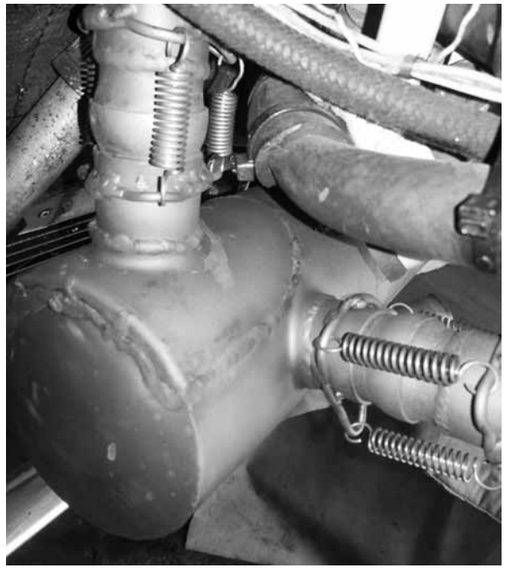
The problem for me was the cost of the Rotax parts. Typically $35 for each male and female part of the connection. Times four that amounts to $ 280. If you then look to the Rotax Ball Joint upgrade kit from Aircraft Spruce, which is just the springs, at $ 78 a pair...you are looking at a total cost of around $ 600...before tax.

Fortunately I was able to source the ball joints through Acorn Welding in Edmonton. They were half the cost of the equivalent Rotax part. Dave Park from the Brantford Flying club welded the system up for me, using three springs equally spaced around the tubes for each connection. The loops for the springs were created using stainless steel wire. The lower ball joint connection is still a slip connection into the canister, so to replace the canister no welding is required.

For more info contact parts@acornwelding.com.



Opposite: the female joint slips into the original muffler receiver, and the male is welded to the headpipe, all pulled tightly together with springs. Below, The weld line shows a previous repair. Ball joints should stop this.



RAA Chapters and Meetings Across Canada

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

ATLANTIC REGION

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

QUEBEC REGION

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

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

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

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

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

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

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

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

ONTARIO

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

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

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

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

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

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

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

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

MIDLAND/HURONIA

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

NIAGARA REGION: Second Mondat at 5:30 pm in the orange hangar at Niagara Central Airport June to September. Contact Pres. Elizabeth Murphy at murphage@cogeco.ca , www.raaniagara.ca

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

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

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

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

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

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

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

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

MANITOBA

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

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

SASKATCHEWAN

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

ALBERTA

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

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

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

BRITISH COLUMBIA

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

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

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

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

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

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

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

THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President Wally Walcer 250-578-7343

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 Gerry at 250-782-4707 or Heath at 250-785-4758.

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

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

Classified Ads

To submit or delete a classified ad, please send to raa@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. Emails can be sent to President Gary Wolf at: **garywolf@rogers.com** *and George Gregory at* **gregdesign@telus.net**

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

Recreational Flyer Magazine

Registration Mail Publication No. 09869

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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

CAVALIER 102.5, "Aero Sport Power" O-320-B2B; 182 TTSN. Sensenich metal prop. Airframe was totally rebuilt in 1997; 1750# GW, 622 lb useful load; VFR instruments + Garman GTX 327 TXP Mode C & Val Radio; Trutrak Turn & Bank; Kept in heated hangar; 8/10 inside and out. $25,950 OBO. cavalier102@uniserve.com or 250-558-5551. Ask for Cameron.

WANTED: CONTINENTAL A65 PARTS: Pistons, cylinders, carb, magnetos, rocker covers, spyder, cams, etc. Also interested in complete engines up to C90. Email Chris at cphorsten@yahoo.ca or call 416-918-6569.

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

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

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CNC3 BRAMPTON, HANGAR SPACE FOR RENT. Suitable for high wing. Heating, electricity and bi-fold door. $335 monthly. 905-861-9535 Paul Horsten.

FOR SALE MINI MAX. TTSN220 TSEO40. In wing tank. New ICOM radio. Always hangared. Aluminum skis. 447 Rotax.
Very good condition. $8900.00 OBO. Contact by phone only at 780-460-6841 (Alberta)

Sump for O-360, complete and in good shape, includes heater and rear mounted carb. This was removed from a Sundowner. Asking $500 OBO. Located at my hangar in Hanover Ontario, will ship, postage or UPS extra. Please call 519-881-6019 between 9 am and 8 pm EST or email to fleetair@wightman.com

4 Pietenpol lift struts for sale.They are brand new and are made from 4130 streamline tubing bought from Aircraft Spruce Part # 03-00192. Wall thickness 0.065. major axis 2.697", minor axis 1.143"
These have been epoxy primed and painted black -price: $1500. pjb@ornithopter-pilot.com Ontario

1946 Luscombe 8E, 2755TT 90 Cont. 1108 S.M.O.H., Alternator, Val Radio, Skis, Paint and interior good, $24000. firm.
Also a Benson Gyro with McCutcheon Blades. Also a partially Pietenpol project. Best offer.

306-645-4320. Rocanville, Sask.

0-290-D Lycoming Engine with newly overhauled carb, 6 Bolt prop extension

Newly reconditioned 80 amp light weight alternator. Starter. 80 amp gel-cell battery. Cooling plenum. Log book and maintenance manual Asking $8,000 OBO ontact Norm at graham110@rogers.com

VW engine parts – several cranks $25 each. A pair of single port heads with valves, springs, retainers, includes rockers shafts and arms - $75 each, $125 the pair. Camshaft $25, rods $20/set.. Full set of1600 cylinders with pistons but no rings -$100. Updraft intake system for single port $50. garywolf@rogers.com

Czech aluminum 1150 floats with mounts for Savannah / 701.$6500. al.hayduk@shaw.ca

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

Engine sump for Lycoming 150/160 hp with intake tubes and oil pickup tube. Removed from Grumman Traveller. $250 OBO. 519-925-3712 flybobbriggs@bell.net

Ads run for a maximum three issues depending on space available and then must be renewed for continued display. Please direct all classified inquiries and ad cancellations to: garywolf@rogers.com and place "RAA ad" in the subject line.

Right: Some chapter 85 airplanes bask in the sun at the recent chapter BBQ and Corn Roast. Photos courtesy Robin McNamara

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

Across Canada *RAA Chapters in Action*

RAA London St Thomas

The Acting President's Message in the July Slipstream outlined some of the concerns facing the future of our Chapter. These concerns were brought forward during a brainstorming session facilitated by Roland Kriening at the June meeting. One of the recommendations put forward was that a meeting of Executives and Directors should be held to prepare suggestions of actions that might be taken in order to guarantee a prosperous continuation of our Chapter in the future. This meeting was held on August 21st at the home of Phil Hicks with eight members in attendance.

The meeting was very productive. A significant number of suggestions came forth, some advocating changes in how we structure our organization and others offering suggestions on how we conduct future meetings.

Bill Weir reports:

I was pleased to host the 2014 annual RAA London – St. Thomas Chapter picnic. It gave an incentive to tidy and also to showcase my property. And Brook and Alden had a great time parking cars. They were set to park an endless number of aircraft and it was good that Rod Bell didn't let them down. The weather for the day was cause for anxiety and the wet morning may have caused some to give up on the picnic idea for the day. I phoned flight service and after I gave registration and location I confessed that it was a flyers' picnic I was calling about. The young lady said the weather to the west was moving at 45 knots and it would clear at 2000 Zulu. She was right to the minute.

Weather is always on a flyer's mind. We live in a scientific age and we understand weather systems and watch radar images on our computers and we understand that what we see is what we get. We can make a joke about the relationship between one's behaviour and the weather for one's picnic. But has the one who has sunshine for his picnic being rewarded while the farmer down the road who wants rain for his corn and not receiving it being punished? I'm glad we are past that sort of thinking.

One should learn something. The Chapter has traditionally had a fly-in [out?] in June and a picnic in July. It may be that the announcements for the Chapter picnic should make it more clear that it is a family event rather than a meeting with supper. [It was pointed out by daughter Nancy that coloured tablecloths might have been nice and helped to smother the smell of testosterone].

And money! The costs mount up. Even a litre of half-and-half for the coffee cost $3.95. The Chapter has enjoyed various ways to arrange for repast at its picnic. But it would be my opinion that when Karl Pfister hosts the picnic at his heritage Airpark he is putting out for a thousand dollars.

Lastly, I would be pleased to provide a venue for the 2015 Chapter picnic if there would be volunteers to organize it and arrange for food etc.

First Flights – Up-dating the Don McKenzie Trophy

The last first flight recorded on the Don McKenzie Trophy was that of Stan McClure's Corby Starlet on August 11th, 2011. Since that time there have been four first flights in the Chapter, They are:

- Dave Hertner's RV-10, C-GVMH, July 12th, 2012.
- J. Davis' Zenith CH-750, C-FJNJ, November 8th, 2013. See the December 2013 Slipstream.
- Dan Oldridge's Highlander, C-FDEP, May 23rd, 2014. See the March-April & May-June Rec Flyers.
- Roland Kriening's Murphy Rebel, C-FDMM, July 10th, 2014.

This brings the first flights in our Chapter since 1990 to 46. A very impressive number indeed!

RAA Oshawa recently hosted a rib building session for 181 RCAC Squadron (Chadburn). Here are some photos that were taken at the wing rib building session that was held with our first year cadets and 6 members of the local chapter of the RAA. A very successful evening that was well received by the cadets.

Reaching out to young people is key to the survival and growth of our sport. Good on the Oshawa chapter for reaching out!

Top: Chapter 85 member Dave Marsden shows off his Skylark to prospective aviators at the Abbotsford Airshow. Above, the airshow was graced with the presence of a recently restored Dehavilland Mosquito.

Chapter 85 Vancouver

The summer was mostly quiet as some people are away on holidays. The weather has been wonderful on the coast and suitable for some great flying.

The Chapter Executive attended the Abbotsford Air Show on invitation. Several Members Including Peter Whittaker, David Marsden, John Macready and guests Al McDougal and Terry Johnston took the exhibit. See the photograph attached. The picture display boards were previously donated to us from RAAC Canada. We now have a tent and a picture display which is reasonably functional. Next exhibit will take place in September at Cammidge House in Delta. We will represent Chapter 85 at that event.

The August meeting time was scheduled as our summer barbeque. We had about 30 members in attendance and several spouses. Robin McNamara prepared the food. The Vice President, Peter Whittaker, did an excellent job with the barbequing. We requested that members bring their airplanes to give demonstration flights. Those people included Trevor Skillen (Stearman), Dave Marsden (Skylark) Bob LaLonde (Jodel) and John Stewart (Cessna 150). The demonstration rides turned out to be a popular idea. Other airplanes on display included a Cessna 140, an Aeronca Champ, and a Kitfox.

We are still in search of a chapter aircraft. The latest aircraft under consideration is a Piper Tri Pacer located on the field. We intend to purchase this as an interim aircraft for the use of members until we can acquire an amateur built aircraft of our choice. The Tri Pacer appears to be a functional and solid aircraft which has been well maintained by a local owner. Tom Boulanger is undertaking an online voting procedure to find out how many members would like the chapter to buy an airplane and the results should be available for the September executive meeting. Despite this members have been reminded that our principle objective is the

acquisition of an amateur built aircraft and once we find a suitable one the intention is to sell the "Flying Aircraft "and purchase the amateur built. The chapter may look for a quick build kit as an alternative. A team and a leader are required to expedite this idea.

The workshop has been rented out consistently for members to work on their airplane projects. Dave Marsden has been in the workshop for 20 months with the condition that he can vacate the premises when someone else wants to use it. At the moment, a member is painting the wings for his homebuilt aircraft and two more members are considering doing the same. The workshop has been converted to a useful work station by our Hangar and Buildings Chairman, John de Visser. He has other work initiatives on the go. He has done a great job in keeping our facilities in good repair.

At the July Executive meeting, the executive did confirm that the Building Chair is the person to communicate with for all matters having to do with management of the workshop and rental of the hangars. Contact John de Visser if you have questions in this regard.

Over the Next 6 Months the Chapter will lead and participate in the negotiation of the Licence Agreement for Delta Heritage Air Park with Metro Vancouver Regional Parks. Chapter 85 has submitted its request for renewal and has received a response from Metro. The negotiation will take place during the next 6 months. If all goes well, we should receive a renewal on July 31, 2015.

A KR-2 and Champ were amongst the aircraft present at the recent chapter 85 BBQ. Photos courtesy Robin McNamara

Annual elections will be held on the first Tuesday of October. All members have been reminded that they should consider serving on the executive.

-John Macready, President RAA 85

Pilot Thoughts

If your other car is a Porsche, why are you driving that one?
Growing old is not for the faint of heart. It's for the old.
Luck is a matter of preparation meeting opportunity. Opportunity is a matter of preparation meeting luck.
Winning isn't everything. It's just preferable to losing, especially in war.
A check ride ought to be like a skirt. Short enough to be interesting, but long enough to cover everything.
It takes only two things to fly: Airspeed and money.
Speed is life. Altitude is life insurance.

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