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RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

From The President's Desk

Gary Wolf RAA 7379

A common complaint from chapters is that their membership is getting older because new members are not joining. There is a common thread in this – chapters that have become a once a month refuge for a coffee and bitch session about Transport / the price of aviation / bad weather / are not doing anything to attract another generation of builders. Have a look around your own chapter and ask yourself if it provides any value that would encourage new members to join.

Some chapters are doing very well – they have made the investment in work and money to create a social hub for pilots and builders. Winnipeg is the shining example, where the members have financed and built their own clubhouse and hangar, and they have filled it with tools and equipment that are available to members. They also own two club planes, and national RAA membership is their requirement to fly these. They have a lot of activity and interest, their membership is growing, and they are providing new national RAA memberships.

The other side of the coin is an unnamed chapter that elected their newest, greenest member and made him their president. The poor fellow called to join as a national RAA member and to get some understanding of what he should be doing with his group. There was money in the chapter's bank account so I suggested that they outfit a tool crib to encourage new memberships, and that he should contact the nearby aircraft service facilities and the Nav Canada tower to get speakers for the meetings. Still, it is going to difficult for one newby to rejuvenate what has been left to deteriorate.

A chapter project is another way to build memberships. Chapter 85 in Delta BC has embarked on a project to build a Zenith Cruzer as a chapter aircraft, to replace their old Turbi that for years introduced members to flight and kept them current while building.

When you are attracting new members remember that it is in your own interest to require that at the same time they become national RAA members. Membership dues pay the cost of the insurance that covers your chapter events, and as older members retire there must be new memberships to keep this in balance.

DRONE OCCURRENCES INCREASE

Transport Canada has had people responsible for drone activities for nearly a decade and when drones cost the price of a decent car there was little to do except issue Special Flight Operation Certificates (SFOC) for commercial operations. A few years ago drones became relatively inexpensive, and the occurrences began increasing. In 2013 there were half a dozen, 2014 saw some fifty, and in the first eight months of 2015 there have been seventy. What appears common is that they are operated privately and the owners like to fly near airports, mixing it up with the real airplanes. This is not surprising because what fun is there in looking at trees? Flying in the area of departures or arrivals provides a lot more entertainment. So far there have been no crashes but there have been many near misses. Drones are now interrupting operations at Toronto and Vancouver, plus at many other airports and water aerodromes. Recently a firefighting operation had to be shut down because a private drone operator was interfering with the aircraft.

Transport Canada's response has been to limit the operations of private drones to further than 5 nm from an airport, at altitudes no higher than 300 ft. The problem remains that the word is not getting out to the owners of drones, and the hobby shops certainly do not want to tell the customers anything that might limit sales. This is similar to the ultralight situation is the early eighties, when Transport sat back and let the matter get out of hand, and then it took many years to get the cat-

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features

columns

George Gregory

Spitfire Mk V commemorates the 75th anniversary of the Battle of Britain at Abbotsford 2015
On the cover: First flight as a Canadian Pietenpol. Eric Dumigan photo.

An Issue of Responsibility

By Barry Meek

When things go off the rails, who pays?

IS IT THE RESPONSIBILITY of the pilot or the aircraft owner when things go wrong? Many years ago the Canadian Law system (I don't think of it as a justice system) attached liability and negligence to someone other than the person who caused an alcohol related accident. What that means is a restaurant or bar could be held responsible for damages caused by a patron who drank too much, then drove away and was involved in a mishap. This became known as "Commercial Host Liability", and it is similar to "social host liability", which pins the blame on a private citizen who hosts a party, for the damages/injuries caused by someone attending that party.

Another way the courts attach liability is with what is called "Negligent Entrustment". The term has been around a long time in the United States, but is relatively new in Canadian negligence cases. The basic concept is that the supplier of an item (legally known as a chattel), often a vehicle like a car or a snowmobile, even an aircraft, has a duty not to supply it to someone he/she knows is incompetent to safely use it. Negligence can be found against a supplier who ought to have known he was supplying the item to a person who would cause an unreasonable risk of harm.

It is all legal ideology, but in simple terms is nothing more than placing responsibility where it probably should not be placed … the passing of the buck, so to speak, from the one committing the act to someone else.

It seems to me that there is always something new coming out of the courts. Huge sums are awarded a plaintiff for frivolous lawsuits, the likes of which make headlines and inspire other opportunists to hire a lawyer to make a fortune. Almost everything associated with aviation is a target. Negligent Entrustment is sure to grow in Canada as it has been long considered a "sleeper" of sorts, an underused additional source for finding liability in certain circumstances.

I suspect there is plenty of room for negligence lawsuits directed at small aviation charter operators. As well, FBO's who supply rental aircraft can be on dangerous ground and facing prosecution from survivors and family members of airplane renters who meet

If the FBO rents the aircraft to the pilot, can the FBO still be held responsible for what turns out to be the pilot's mistakes? Sometimes, the answer is yes.

with an accident. Let's assume the renter/pilot is properly licensed and meets all the requirements of Transport Canada. If the FBO rents the aircraft to the pilot, can the FBO still be held responsible for what turns out to be the pilot's mistakes?

Sometimes, the answer is yes. A good example is this story from 2010. An FBO/flight school in San Jose, California was successfully sued by the family of a passenger who was killed in the crash of a rental airplane belonging to that FBO. A young pilot had just recently received his private pilot certificate (known in Canada as a license). He was comfortable flying the FBO's Piper Archer in which he had been "checked out" by one of their instructors. The renter was considered a good pilot.

One day the pilot showed up to rent the Archer. He told the FBO that he wanted to fly two friends to Lake Tahoe airport, which is 6,250' ASL. The pilot hadn't obtained the mountain-flying instruction, but the FBO rented the aircraft to him anyway.

The pilot landed at Lake Tahoe airport without incident. But he wasn't prepared for the effects of the altitude, heat, and weight of the aircraft on takeoff. When he attempted to depart, he crashed, killing himself as well as his two passengers.

The family of one of the passengers sued the FBO, arguing it should never have rented the plane to the pilot for this particular trip. The jury agreed and held the FBO liable.

During the appeal, the FBO argued that the pilot held a license that legally entitled him to fly anywhere he wanted, including mountain airports like Lake Tahoe. If the pilot was competent in the eyes of the FAA, he should have been deemed competent in the eyes of the court.

The court of appeal disagreed, and affirmed the jury's verdict against the FBO. Though the young pilot may have been a competent pilot generally, that wasn't the issue. The FBO knew that, notwithstanding his license, the pilot wasn't competent for the particu-

lar flight he had planned. The appeals court ruled that the jury properly held the FBO liable for the accident under the law of "negligent entrustment".

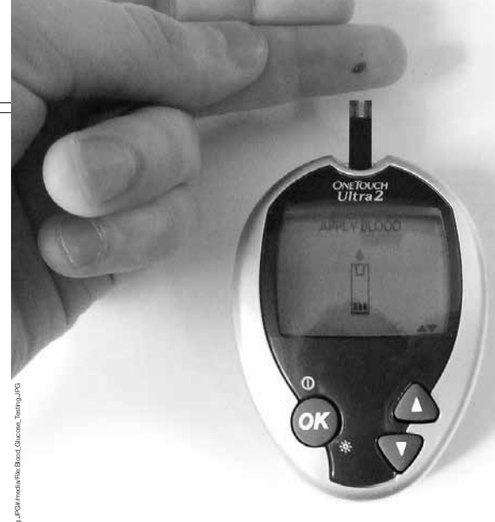
This is really not that complicated, at least in the eyes of the law. In my opinion though, it's the law that is flawed, and although it must be interpreted as written, it should not have been written in the first place. Go back to the commercial host liability explained at the beginning of this article. That too is something that should be scrapped. When I was a young boy, I was taught responsibility! When I did something, it was my decision, therefore my responsibility. When my bicycle was lost, it wasn't anyone's fault but mine. It was my decision if I drank too much beer to drive home from a pub too. We never thought to try blaming someone else. But in today's world, things are different. The question is which came first? Was it the laws or the people refusing to take responsibility for their own actions?

...there is no doubt that more and more, people are demanding that the government should take over the care, the decision-making and the management of just about everything in society

I understand and expect there are many out there who would disagree. But there is no doubt that more and more, people are demanding that the government should take over the care, the decision-making and the management of just about everything in society! Buyer beware, due diligence, social and personal responsibility are all disappearing as choices that individuals should be making for themselves. We're turning in to a brainless society, feeling secure with someone else, some form of government or marketing board or regulatory body being there to care for us. If we trip on a curb, it's the fault of the business that happens to share that sidewalk. If a pilot makes a mistake, the blame is shifted to the airplane manufacturer for allowing a fool-proof machine out the doors of the factory.

It's near time the madness was brought under control, lest we all become robots, cared for by the state.

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.*



"Blood Glucose Testing" by DavidsBSOwn work. Licensed under CC BY-SA 3.0 via Wikipedia - https://en.wikipedia.org/wiki/File:Blood_Glucose_Testing_JPG#/media/File:Blood_Glucose_Testing.JPG

Diabetes

and my Pilot License / RAA Member, anonymous by request

Disclaimer: This article is not intended to provide any advice or any guidance to anybody. It is simply motivated by a desire to share my adventure with fellow pilots as we can expect that more and more of us will be impacted by a diabetes diagnosis since this illness is now recognized as the fastest growing disease in North America. It is really becoming big business. Should anybody find anything or any information to be of value in this article- great, but keep in mind that this reflects my personal situation and it may not be relevant to your situation. As we so often hear or read, consult your doctor.

ON ONE OF MY relatively recent aviation medicals, the nurse remarked that my urine sample showed a higher than normal level of sugar. After the usual process, the CAME signed my medical and gave me a requisition for blood work to further investigate the situation. At the follow-up visit a month or so later, I was informed that my blood sugar was too high, that I had diabetes, that Transport Canada would want to get involved very closely. The CAME then gave me a prescription for MedFormin, a well known diabetes medication, and sent me to see a specialist. I eventually received a letter from Transport Canada informing me of the next steps and giving me the link to the relevant CAR (no longer valid). Just Google Transport Canada Diabetes, sometimes their horrible site works and you will get in. Their letter defined what I needed to do and what I needed to provide to them and when. Having reviewed in detail the information in the CAR, I concluded that even though of this was a big and undesirable surprise, there was no cause for panic at this stage yet. After all, I never paid much attention to my dear departed grandmother when she was telling me, starting at age 5 and on: ''If you keep eating sugar like this, you will have diabetes!'' Well, it seems she turned out to be right, but we had to wait more than 50 years for it, if this was it.

At that point, my wife declared that I was going on a severe diet and our daughter did what she loves doing: research the topic on internet. As we were in late fall, I decided to enjoy the upcoming holidays and have a second look in January, including starting the medication I had been prescribed. This reflection period also provided the opportunity to become a bit smarter about all of this. And my visit with the specialist turned out to be three months down the road. I then decided to stay away from any medi-

cation; I preferred to let the specialist do his thing and tell me his perspective without anything like medication biasing the diagnosis.

My visit to the specialist can best be described as funny, except that this is a very expensive joke and this makes the whole exercise rather sad. I walked in and gave him the file I had been given: a folder containing, on a single sheet, the results of the blood work performed a few months back.

Dr: '' Please sit down. So you are diabetic. Where is your file?''

Me: ''There, in your hands.''

Dr: ''This is only a copy of your blood work, I need your medical file.''

Me: ''This is it. That's all I got.''

Dr: '' You are diabetic? Stand up! Turn around, slowly. Good. Do you smoke (No)? Do you drink (No)? You certainly don't look diabetic to me.''

Me: ''Good to hear, and I agree with you.''

Dr: ''And this doctor (referring to my CAME) diagnosed you on the basis of a single blood analysis? This is totally unacceptable; I will send him my thoughts on this! We normally follow a patient for at least six months before we make a diagnosis like that. Did he give you medication?''

Me: ''Yes but I don't take it because I wanted to see you first.''

Dr: ''Very good thinking!

And the discussion went on for a while along those lines. Eventually, and this in the same half hour visit:

Dr: ''You did right to not take that prescription; it is not good for you. I'll give you a better one! By the way, do you have a good insurance?''

Me: ''I do.''

Dr: ''OK then, I'll give you something else, it is more expensive, but much better.''

Sugar is in everything we buy and eat, not just in sweet things. It is nearly impossible to avoid unless you take drastic measures.

I am sure all of you see the irony in this. And then, he signed me up to some information sessions about diabetes and life with diabetes where I did get some valuable information about the illness in general, and a bit about diet and exercise; the last two we already had in our family life to a good extent. As a parting gift, he also gave a device to measure my blood sugar before and after meals. This is more like a gift from hell: the sensor is actually very cheap but the test strips will break your bank account, just like those high quality do-it-all printers we can buy for extremely low prices, but we go broke buying the ink cartridges. Bottom line, the major outcome of this visit with the specialist was that I should take the pills he had just prescribed me because they are better, and I should check my blood sugar regularly. Most readers have noted, I am sure, that after expressing his dismay at the CAME who diagnosed me on such ''skimpy'' information and prescribed me some medication, he prescribed me an even better, or at least more expensive, medication and launched me down the path of dealing with my new found disease with basic advice about improving my diet and exercise. He also provided me with requisitions for a whole assortment of tests relevant to the various symptoms of diabetes, and a bunch of other things while we are at it: heart condition under stress, kidneys, eyes, and on and on. The results of all those tests simply confirmed that I was in great physical condition, with no ailment of any kind. At least, this offered the secondary benefit of a thorough check-up, which I would not have done otherwise as I did not feel I needed anything like that. Well, for once in my life, my insurance was useful.

By this time this specialist and these tests had confirmed my suspicions: I do not have diabetes, my blood sugar count is just too high. I accepted the fact that if I were to keep eating, drinking, and partying as if I were still 25 years old, I would definitely have a problem, and that problem might be what they call diabetes. I will skip details of the several months that followed and summarize the actions we took to deal with my so called diabetes.

We changed our life style. First thing was to reduce sugar intake, no dessert, pastries, toast and jam in the morning, soft drinks, etc… Sadly though, this is simply not enough. Sugar is in everything we buy and eat, not just in sweet things. It is nearly impossible to avoid unless you take drastic measures. We totally eliminated processed foods from our diet, reduced the size or volume of our meals, no more two or three helpings of that fantastic cake, or any other desserts for that matter, no alcohol except for a bit of red wine once in a while (I found it tends to help lower my blood sugar), and regular exercise, which honestly I had been neglecting. As I gradually worked into this, I could see some positive results fairly quickly: small but consistent weight loss, increasingly better sleep, better overall sensation of health and energy, and so on. Of course, as things improved, I eventually felt I could relax and go back to some good old habits. As you probably expect, things regressed and ''diabetes'' was trying to come back; what did I expect, my system is still the same old one with years of abuse. Well, time to get really serious. We did and the results are there. On my last two visits with the CAME, he had absolutely no problem with my health condition and my doctor just cannot understand how come my last two blood analyses show that my blood sugar is within the appropriate range, and why my health condition and all the tests I was given do not support a diabetes diagnosis. Despite my reassurance that I am not taking any medication, he keeps insisting that what he prescribed is obviously working well and he prescribed some more medication with increase strength. And he is very impressed that I have no side effects from the drugs.

You make what you want of this story, but the truth is that I am feeling much better, much healthier, and I don't take medication, and I don't believe I have diabetes. Quite honestly, I was looking at this change in life style as a horrible pain and it was not. I would say that a determination not to stuff my body with chemicals (I never took medication during my whole life) and a very strong desire to prove the doctors wrong was sufficient motivation. By the way, on a recent holiday to Cuba, I discovered that a single Cuban beer actually does reduce my blood sugar quite significantly. I think that is because it is just plain pure beer, it is not enhanced with innumerable chemicals. Ultimately, I am grateful for my CAME's diagnosis, right or wrong, as it served me as a good wake-up call to adapt my life style to my age and pay a bit more attention to my health. And we also enjoy a significant reduction in our grocery bills which results in more 100LL money.

As a footnote, last spring I came across an article in a scientific magazine about an independent research conducted by a group of medical doctors (15) to assess the merits of the various drugs on the market, in the treatment of approximately 8 or so specific diseases. They were motivated by the proliferation of new drugs and their doubtful efficacy. Their study took more than 12 years and concluded that more than 90% of drugs currently prescribed for those illnesses are ineffective. For obvious reasons, I was particularly interested in their findings relative to diabetes. They concluded that MedFormin (initially prescribed by my CAME), the first drug that was ever developed for diabetes back in the 50's, is still the only one that proves to be really effective, and it is the cheapest.

The Anonymous Member *is a person who turned his diagnosis around by making lifestyle choices. He's been able to avoid the medications with their side effects with moderated eating and exercise. Our hats are off to him!*

Rejection Letter
courtesy aviationhumor.net

Dear HR Manager,

Thank you for your letter of February 1. After careful consideration, I regret to inform you that I am unable to accept your refusal to offer me a position in your Airline.

This year I have been particularly fortunate in receiving an unusually large number of rejection letters. With such a varied and promising field of candidates, it is impossible for me to accept all refusals.

Despite your Airlines outstanding qualifications and previous experience in rejecting applicants, I find that your rejection does not meet my needs at this time. Therefore, I will assume the position in your Airline this August.

I look forward to seeing you then.

Sincerely, Interviewee

Saving Money? Économiser?

Or just taking undue risks? *Ou prendre de mauvais risques?*

By JC Audet **Par JC Audet**

IT WAS A GORGEOUS DAY for a fun flight in my Long-EZ. My taxi clearance was taking me to the furthest point possible on the airport for take-off. Upon obtaining take-off clearance, I started moving to position. I immediately sensed a very unusual vibration, then large oscillations in the nose wheel. I advised the controller that I might have a flat nose wheel tire, shut down, and got out to investigate. My diagnosis was right. With the controller's and airport personnel support, we got the Long-EZ back to its parking site on the airport without further incident.

I had some difficulty understanding how I could have taxied almost three kilometers without any indication of a flat tire, and then in less than one or two minutes have a totally deflated nose tire. And we could not see anything on the taxiway that could have caused that flat tire. I removed the wheel and took it home for investigation and repair as required. The nose wheel on a Long-EZ is a Scott Tail Wheel and the tire and tube are readily available. A close inspection of the tube revealed the problem. The side of the tube showed a wear line approximately 2 cm long with a small hole somewhere along its length. That small hole (nail was inserted for reference purposes) was big enough to allow the fully inflated tire to deflate within a minute. A second hole in progress is seen next to the first one.

Running my fingers inside the tire, I found the culprit. My nose tire was old with cracks in the side walls, but certainly not old enough to discard it, and those cracks were small and would not cause any problem. Or so I thought anyway. One of those sidewall cracks eventually got deep enough to reach the inside layer of the tire and to tear that layer. The tear in that inside layer would flex open and closed with every turn of the wheel, pinching the tube in the process, and eventually cutting it open. So, approximately $100.00 later at Aircraft Spruce, the nose wheel tire and tube were replaced and the wheel was back in place.

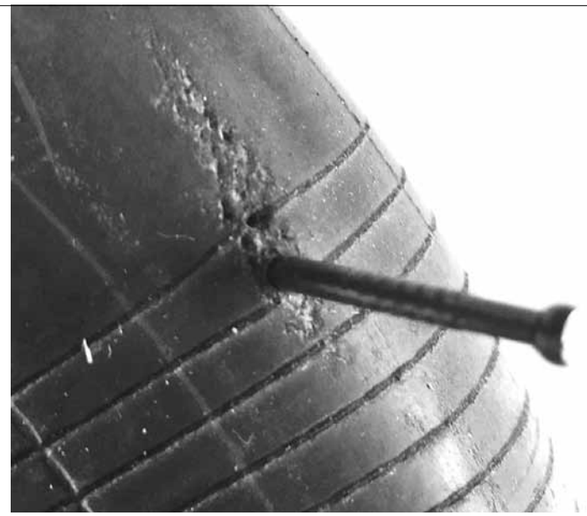
I was extremely lucky that I had to do such a long taxi on that day. This was a situation where the tube could have let go at any moment. In a scenario where my taxiing would have been a bit shorter, the tube would have deflated when airborne or upon landing. I believe this would have very probably resulted in tearing the nose gear off the aircraft.

A few months prior, I had changed my two main wheel tires and tubes and assessed that the nose tire and tube were good for a while yet. This saved me a few dollars at the moment. I was very fortunate that this event did not result in a more serious incident or accident. Did I save anything? Well, I got a few more landings out of that tire, but I could have had a seriously damaged aircraft in the process, if not worse.

LA JOURNÉE ÉTAIT PARFAIT pour une envolée plaisante dans mon Long-EZ. Mon authorization de circuler m'imposait le plus long trajet possible sur mon aéroport de départ, près de trois km. Ayant obtenu l'authorization de décoller, j'ai tenté de rouler en position mais une forte vibration au train avant m'en empêcha. J'ai du arrêter le moteur et descendre investigué pour constater que j'avais une pneu avant dégonflé. Avec le support des contrôleurs et du personnel au sol, j'ai regagné mon point d'attache.

Le plus intriguant était que j'avais circulé près de trois km sans difficulté et en moins de deux minutes, j'avais un pneu avant complètement dégonflé. Et une inspection du taxiway n'a identifié aucune cause potentielle pour ce problème. J'ai démonté et amené la roue chez moi pour effectuer les réparations necessaires. La roue avant sur mon Long-EZ est une Scott Tail Wheel utilisée sur de nombreux avions à train conventionnel. L'inspection de la chambre à air révéla que le côté de la chambre avait une marque évidente d'usure d'environ 2 cm et un petit trou le long de cette marque. Ce petit trou, avec un clou inséré pour référence, était suffisant pour l'air s'échappe très rapidement. Un second trou en voie de développement est visible juste à gauche du clou.

En passant les doigts à l'intérieur du pneu, j'ai trouvé



la cause de ce dommage. Mon pneu était vieux et avait bien quelques fentes sur les flancs, mais aucune de ces fentes n'étaient importantes au point de justifier un pneu neuf. Du moins, je le croyais bien. L'une des ces petites fentes s'est agravée au point de traverser le flanc du pneu et de déchirer, à peine, la paroi interne du pneu. Cette fissure interne s'ouvrait et se refermait à chaque révolution de la trou, pinçant et relâchant le côté de la chambre à chaque fois. Ce mouvement usait rapidement ce point sur la surface de la chambre et en arriva à percer la chambre. Au coût approximatif de $100.00 chez Aircraft Spruce, le tout était réparé et l'avion prête à voler.

Je me considére extrêmement chanceux que la piste en usage cette journée là entraînait une circulation aussi longue pour moi. La chambre à air aurait pu se dégonfler à tout moment. J'entrevois facilement avoir obtenu une circulation un peu plus courte et un décollage normal pour éventuellement faire face à un pneu avant dégonflé à l'atterrissage. Je suis convaincu que la vibration résultante aurait causer une séparation du train avant avec des dommages sérieux à l'avion, ou pire.

Peu de temps auparavant, j'avais remplacé les deux pneus et chambres de mon train principal. Sur inspection de mon train avant, j'ai jugé que le pneu était encore bon pour un bout de temps, ce qui m'économisait quelques dollars à ce moment-là. J'ai été incroyablement chanceux que cet incident n'entraîne pas des conséquences plus désastreuses. Ai-je réalisé des économies dans cette aventure? Vrai, j'ai obtenu quelques atterrissages de plus avec ce pneu mais à quels risques? Je ne pense pas que ç'a en valait le coup!

Switchblade Roadable Aircraft Development Continues

From Samson Air's Website:
Warren Blazenski, a machinist in Central Oregon, is carving metal for us, producing the wing root metal pieces for attaching the wing to the swinging wing structure. This is the piece that the wing hinges on to swing in and out, and is kept small by being mostly off the load path of the forces acting on the wing. We are fairly well done with the wing except for these metal pieces, and will begin final wing assembly soon.

The above piece bolts to the main wing beam (Spar), and to the steel brackets that clamp onto the top and bottom of the main spar to connect with the hinged beam assembly in the body. We will have to create a jig or fixture for holding all of the pieces once done, so that all is in alignment. This jig will be part of the builder assist line, but we will provide a drawing for home builders to create a simpler jig for their own use at home.

The body is through the aerodynamic cleanup phase, and now ready for carving the full-size plug, or solid shape, for the body that we will use to make molds from. You basically make the positive, then create molds from that so that when the parts are taken from the mold and assembled, you have the positive again, this time in carbon fiber as your body, or fuselage in aircraft terms. We have one set of bids, and are waiting for a second set before scheduling this month-long process to make such a large piece.

Lighting is also being worked on, and the new headlight design is shown below. The headlight is an LED light, which can be very small. It also uses much less energy, which is the main reason for our design. Aircraft have a higher electrical use due to the radios and other instruments, so any way to reduce electrical demand is considered valuable.

We will have more metal pieces next week, and are also beginning the construction of our final suspension design. We want that ready before the body is done so we have the suspension to mount underneath to support the body on its wheels.

[As of August 2015] we are building the jig, or fixture, that will hold the wings and all metal pieces in place while the assembly is bonded, drilled, bolted, and finished. While that is occuring, we are also finishing up the small bits left in the wing, like the aileron connecting rods. Below you can see the aircraft aluminum tubing used as a push/pull tube, with the end caps that attach to the bell crank near the aileron, and control interface at the root of the wing.

We also received Garnetread tires to be tested for the front wheel of the vehicle. Since we only have one front tire for steering, it makes sense to give that front tire all of the help we can. Garnet is used in sandpaper, and its use in tires is to promote traction in all weather. Garnetread tires were tested on an ice rink by the highway patrol in Washington State, and outperformed both chains and studded tires. We would like to test the tires in dry conditions as well, so will be mounting them on the ground prototype and testing with the slalom course again to see if the run times improve.

The Garnetread tires are quite a bit heavier than the existing tires, so we will see what our testing shows, and then do a cost/weight benefit analysis. The existing and Garnetread tires are shown side by side, so you can see that they are interchangeable in that regard.

The body plug (solid shape of the vehicle body) has been separated into three different components, and these components split between two different shops to reduce the time spent receiving our final body parts for assembly. We would like to have the cabin section assembled within two months, allowing us to mount the suspension and wings. The engine installation would follow, then the prop and tail.

The nose cone and a bumper section are separate pieces, to enable easy replacement if and when a Switchblade owner has an accident affecting these parts. We also have crumple zone material and construction in these areas, so it made sense to make them separate.

Having re-designed the front suspension, we had to check it with the nose cone, calculating the amount of suspension deflection we would get in a hard landing, while minimizing damage to the vehicle. There are many calculations done, and then we do a physical drop test loaded to design limits to ensure that the assembly will perform the way it should. Experimental aircraft aren't required to do such engineering, but we are producing a vehicle we would eventually want to certify, and we also want it to be as safe as possible for you. The images below are an indication of the work that goes into this type of engineering.

Classifieds On The Internet:
http://tvsac.net/BS1.html - more ads from our Kamloops chapter
http://www.lyncrest.org/sfcclassifieds.html - more ads from our Winnipeg chapter

CarterCopter Shifts Focus to Production

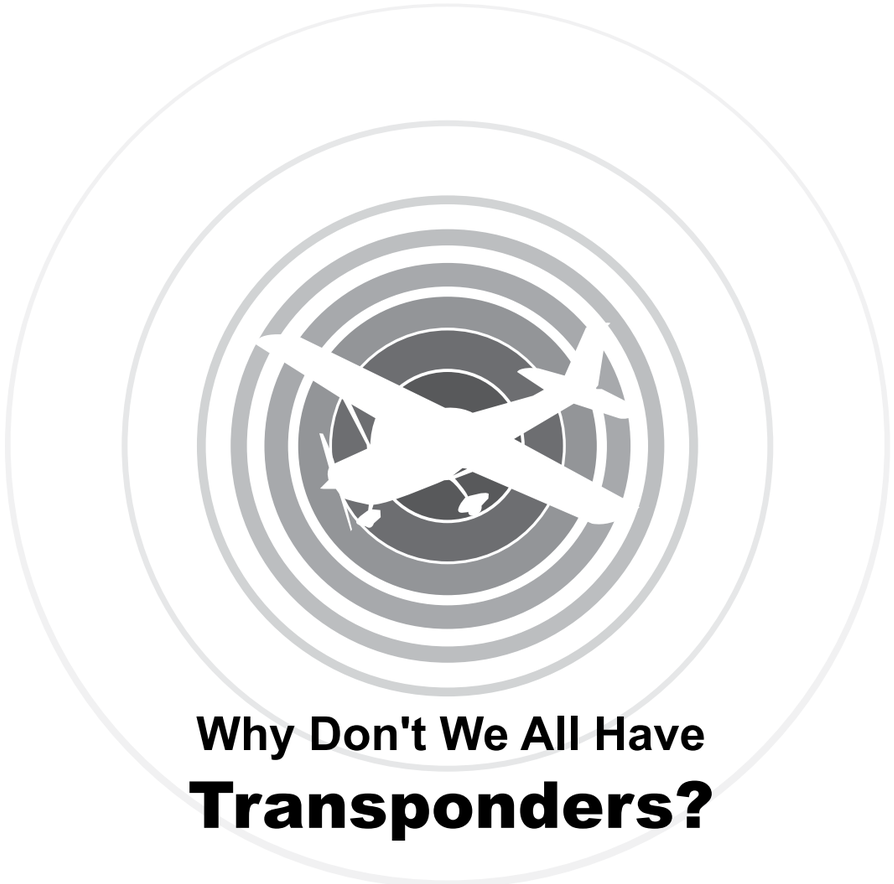
Photo Credit: Carter Aviation

Carter Aviation Technologies, LLC (Carter) is ramping down its developmental flight test program and refocusing on moving the CarterCopter into production. Tests to date have rendered the Mu-1 barrier as moot and flight above Mu-1 as routine, cruise efficiencies have been demonstrated 2 – 2.5 times higher than conventional rotorcraft, and jump takeoff performance has exceeded expectations. "This is a tough transition for me. I'm an engineer at heart so continuing to expand the envelope, fine tune the technology, break additional records and the like make me smile every day," exclaimed Jay Carter. "Yet the time has come, and some would say overdue, to shift gears and focus on getting the technology into the marketplace".

Carter will continue to demonstrate the aircraft periodically with both private and public exhibitions. The private demonstrations will be aimed at specific parties interested in producing CarterCopters , and the public demonstrations will serve to continue to grow awareness and interest in Slowed Rotor / Compound (SR/CTM) Technology.

With most of Carter's demonstration goals achieved for their Personal Air Vehicle (PAV – pictured above), Carter will begin putting more resources into identifying parties and developing partnerships that will ultimately put the technology into production. "As part of our shift in focus and resources, I have asked Jon Tatro, our current and continuing President of International Affairs, to spearhead our production campaign," explained Jay Carter. "Jon will take on the additional duties of Executive Vice President for Joint Ventures & Licensing. He has already been performing many of these duties so this assignment is intended to both recognize that as well as prioritize it as our number one business objective."

Jon joined Carter in 2013, bringing over 30 years of aerospace experience with him to include better than two decades working for Bell Helicopter in a variety of capacities including Director of Advanced Concepts. He was appointed in 2007 and continues to serve today on the American Helicopter Society International Board of Directors. "Jon has the right experience at the right time to help Carter move into production. He understands our technology as well as the rotorcraft market and we couldn't be happier about having him onboard," commented Jay Carter.



Why Don't We All Have Transponders?

Lee Coulman

This question was in my frontal lobe this last weekend as we participated in the Family Day at Waterloo International. We penetrated the Class C, transponder Mode C airspace to display and talk about our airplanes. We were welcomed, whether we had a transponder or not. The broader question about transponders was asked in a Nav Canada consultative meeting in March of this year. The answer seemed obvious to me: for air safety.

A SIMILAR QUESTION was asked at Oshkosh to a seminar group about the Zaon traffic alert system. That system used other transponders to plot their position relative to you. Anyway, the answer was that "Yes, we all have transponders with Mode C altitude alerting" and "yes, we want to know where that other traffic is". What's the matter with the rest of us? With ADS-B requirements for travel in the US beginning in 2020, what is the answer for pilots in Canada?

I'm biased. My background is RADAR and I want to know where that traffic is. Everyday I'm flying in busy airspace I marvel at, "I never saw that traffic", even when advised by ATC where to look. This weekend at CYKF, I on was on left base while there was a small homebuilt on right base, with a weak radio. "Advise traffic in sight, you're #2" …"Looking for traffic"…."Negative traffic". We need every aid we can get. At least the tower ATC has RADAR, with position and range, along with altitude from Mode C; and a "mark-one eyeball". Some of us have trouble with our older model "mark-1", especially when the traffic is obscured by the background.

In the enroute environment, with no direct ATC involvement, should we be transponding? Kurtis Arnold of Nav Canada suggested in the meeting that we should. A pivotal incident was sited about that place south of CYKF with those airplanes without engines that can apparently climb as high as 7000 feet. A 747 had a close encounter with an airplane looking thing. Now we know why "Transponder Required above 6500 ft." appears on the VNC maps in the Toronto Class B airspace. With mode C transponders, not only will we be seen by ATC radar but the airliner's TCAS will also see us in height and position.

So why aren't we all equipped with Mode C transponders? Is it the complexity, the initial cost, maintenance or confusion over the requirements and standards?

A transponder installation can be complicated. At the very least it needs to be connected to the static port to obtain the pressure altitude. A separate encoder may be required but some of us have Electronic Flight Instruments (EFIS) that have encoder outputs. Some transponders require a parallel (14 wire) and others have serial. The EFIS solution usually gives some options to help for one or the other. A transponder antenna is also needed which has to be properly located for best performance. The antenna coaxial cable needs to be of high quality and as short of a length. Often half of the transmitter power is lost in the cable! Further complexity is created if you need to be ADS-B compliant and fly in the States. Adding a transponder has been considered as a major modification. More to come on this topic.

The initial cost can be staggering if we don't think we need it for air safety. The cost will vary with how far you want to go with trying to be compliant with emerging ADS-B standards. It is wise to balance air safety with reliability and future standards. That old King KT76 may look like a bargain today but it has a limited life power tube that is expensive, and consumes more power than newer equipment. It may not be easily updated may end up costing you more when you trash it and rewire your panel. There are other options, with a little planning.

The maintenance cost is a real killer from my perspective. A two year inspection of the static system integrity, altimeter, encoder and transponder is required. The cost for this can be as low as $400, but don't hold your breath. Is this really necessary? I've had these tests done on my Piper Warrior when we were flying IFR. What usually happened was that there was always a "problem" and the cost would escalate quickly. One time we had to replace the pitot mast, only to find out later that there was nothing wrong with it. This test is not cheap because the test equipment is worth over $7000 and the time for the test is 2 to 4 hours. It also results in the static system being disconnected to test the altimeter independently. This usually induces some extra "leaks". By the way, it doesn't matter whether you're flying IFR or VFR, you still need the test. But, don't forget to clean your transponder antenna, especially the cheap, TED type, at regular intervals. A little contamination can create significant RF losses.

Geoff Lee of Tailwind Aviation suspects that there are a lot of airplanes out there that have not been tested for many years. He's seen a few of them as he moves his portable service around Southern Ontario. One he tested was out by 4000 feet. Imagine what that would do to an airliner on TCAS !

Regulation is the key behind implementation of transponders for the rest of us. The US is a prime example for that. The FAA NextGen program drove the experimental avionics into frenzy for free weather and traffic if you implement ADS-B out by 2020. We're not even near 2020 and look at

COPA and the RAA should be pushing Nav Canada and TC to clarify their plans with respect to transponders

the products that have become available. In contrast, what has happened in Canada?

Well we've had a mandatory ELT 406 implementation. What has that done for us, other than to drive costs by keeping the old inspection intervals, most expensive inspections and higher initial cost? Even though the new high tech batteries have a 5 year inspection interval; we're required to have our ELTs checked every year. Consequently, we are sending hazardous LiOn batteries in the mail. And who turned off the 406 MHz test confirmation email from the RCO? This was very useful in determining full system function. Anyway, it looks like this implementation is moving back onto the front burner, probably without our input or any benefits for us.

The other non-event is Nav Canada's implementation of ADS-B. Were you expecting weather and traffic information in the cockpit? The ADS-B that NavCan is pushing is basically for the big boys to cover the vast northern and transoceanic airspaces. They have added equipment in the north to track but not to provide any other services. This is the way they make money, it's not to make friends. The Aireon Satellite Network, announced for 2018, provides a means of extending the monitoring network through low earth orbit satellites. To participate, you will need a Mode S Extended Squitter transponder. This is pretty much what the FAA is requiring for ADS-B out compliance in 2020. A Mode S transponder transmits Mode C as well but needs a qualified GPS and encoder.

So what's "the plan" in Canada?

What is needed is a plan by Nav Canada and Transport Canada to encourage transponders in all of our airplanes and to make that solution compatible with our friends to the south. The FAA had enough vision and worked with the EAA and AOPA to work out a practical implementation. To stimulate a solution, the RAA, and COPA need to step forward to reduce ridiculous requirements and encourage safe and economical transponder implementation. We are all stake holders in the safety of the skies, whether it is Canada or the United States.

So what do we do in the meantime? If we are planning to have a "long term" installation that we can fly into the US, then a Mode S transponder with extended squitter is for you. This is the "international solution" that works everywhere. Plan carefully. Make sure your EFIS will support the decision and that TC will sign you off. You'll need an ADS-B in solution to get the US target and weather information.

If you are just considering VFR within Canada, then a Mode C transponder is good enough. It is unlikely that NavCanada /TC will require Mode S ADS-B into our regular airspace, even Class C airspace. There are some good solutions with integrated encoders. These kinds of configurations may help when it comes to maintenance inspections.

So, COPA and the RAA should be pushing Nav Canada and TC to clarify their plans with respect to transponders, ADS-B and air safety in Canada. The following points and issues come to mind for further discussion:

- Is Mode S(ES) encouraged for Canadian Airspace? Will it be in the future? When?
- Basic transponders with integrated GPS & encoders for simplified testing?
- Reduced cost of transponder and encoder maintenance and testing for VFR operations ie: interval, and scope?
- Clarify use of non-certified encoders and EFIS in VFR and IFR amateur built aircraft?
- Incentives for implementation of transponders and Mode C or S for all Canada aircraft?

The sooner Nav Canada and TC clarify their plans and address our concerns, the sooner we can ensure we have the right equipment in our aircraft to make the airspace above Canada safer for every pilot and passenger flying here. Without those answers, a lot of owners will continue to sit on the fence.

Lee Coulman *is the Director of Flight Safety for the KW/RAA chapter.*

Martin Jetpack Progress Update

Photo Credit: Martin Aircraft

The folks at Martin Aerospace have been busy. Here's an update on their progress gleaned from their e-newsletter:

Engine: **Feedback from our last shareholder update indicated we may have confused some people over our engine programme. For clarity we are working on three different engine types:**

- **A rotary engine as the potentially lightest and smoothest engine for the product range.**
- **A six cylinder boxer configuration (flat 6), four stroke engine. This engine is likely to suit many markets and customers. It is familiar to aviation customers and aircraft maintenance organisations.**
- **A six cylinder two stroke engine. This engine is potentially cost effective and simple to build, but is only in the concept design phase and we have not yet confirmed it will be a viable option. We will c onfirm if this engine will be a viable option later in the year.**

In the meantime we are introducing a limited number of the V4 two stroke Mk1x engines that are replacing the Mk1 engine.

Parachute**: We have secured a parachute with very fast deployment characteristics. If auto-deployed the Jetpack will not exceed 10m/s vertical velocity during its descent, which allows for a survivable recovery. The next step is to develop this design towards production readiness. We will put together some more technical detail around the parachute programme and share that with shareholders when completed.**

Flight Control System (FCS): **We are preparing for the first new FCS to be fitted to a test aircraft. The system is based on a commercially available system. We have acquired new aviation grade joysticks and fully digitally controlled control vane actuators. The architecture is open to accommodate other system components. This new system is a significant step towards a reliable and safe fly by wire system.**

Next Generation Jetpack

The Next Generation (NG) Jetpack is our internal acronym for the commercial Jetpack. Focus is on a new lighter, safer and easier to manufacture airframe. The design is being done to meet aircraft standards and using certified aircraft materials. The second element is a new landing gear design to provide maximum performance for normal use cases and protection in case of hard or even crash landings. Work is being performed in partnership with an expert company specialising in aircraft composite design.

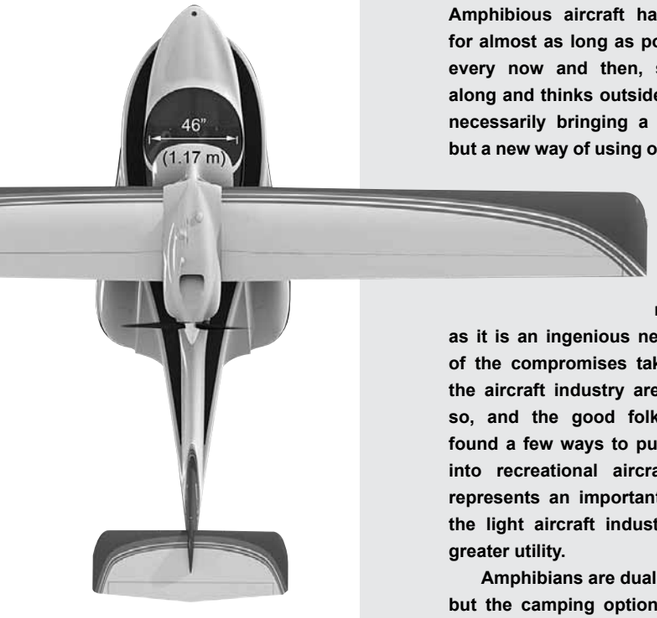
Production: **Organisationally, we are progressing towards attaining CAA certification as a Part 148 (Manufacturing Organisation). Additionally, we are establishing a lean assembly system to support production of one jetpack per day in a single shift operation.**

We will have by the final part of 2016 three flying P12 models, two of which will be manned flight capable. In addition we are designing and building a half siz e unmanned test vehicle that could be capable of lifting up to 50Kg. This will allow rapid prototype testing of all the various components of the NG Jetpack de-risking the programme prior to the delivery of the pre-production NG aircraft.

Test Schedule**: Design Substantiation and testing is ongoing as the design elements mature. This will all come together in the first half of 2016.**

Flight Testing - Flight Operations will be commencing the in depth Developmental Test and Evaluation (DT&E) program on the P12 series of air craft in Q3, 2015. The outcomes of this test program are to explore further the full flight envelope of the P12 series of aircraft, and provide this information back to the engineering design team to ensure that lessons learned are applied to the NG aircraft. Furthermore, the flight model will be confirmed through rigorous flight profiles, with this data being used to improve the accuracy and validity of the simulator flight model - a pivotal process for increasing the overall safety of jetpack operations. The DT&E program should be completed in early 2016, in time to commence a rapid DT&E program on the NG aircraft prior to production.

MVP Aircraft Demonstrate Camping Option at Oshkosh



Amphibious aircraft have been around for almost as long as powered flight. Yet every now and then, someone comes along and thinks outside of the box - not necessarily bringing a new technology, but a new way of using off the shelf items.

One such example is the MVP (Most Versatile Plane). It's not so much new tech as it is an ingenious new system. Some of the compromises taken as givens in the aircraft industry are not necessarily so, and the good folks at MVP have found a few ways to put some extra fun into recreational aircraft. As such, it represents an important direction in for the light aircraft industry: one towards greater utility.

Amphibians are dual use to start with, but the camping option is an intriguing touch. It deploys in 20 seconds without having to leave the aircraft and features a sleeping area four feet wide and nine feet long - plenty of room for two people to sleep side by side. The tent can be extended and set up on the water without having to get out of the aircraft.

Owners tend to be outdoorsy types, and the design plays well to their sensibilities. Besides being a two place light sport aircraft, the instrument panel also folds down to allow a deck to mount a fishing chair on and the tent can be pulled back to provide a shade area while fishing as well.

Their website states: "Team MVP would like to thank everybody who came to see us this year at the Seaplane base. Your enthusiasm for this project reinforces our own and makes this exciting and challenging ride all worth it. The 'MVP World Tour' was delighted to return to EAA AirVenture Oshkosh at the Seaplane base with all our friends and to have visitors come from all over the globe to visit us specifically.

This year we put together the very first MVP Tent prototype not only to showcase but validate the MVP's camping application. The tent was very well received and the MVP was (as usual) a showstopper".

The aircraft will be produced intially in two facilities: at the Glasair plant in Arlington WA (http://www.glasairaviation.com/) and Fibercraft Inc. (Spruce Creek, Fl. http://www.fibercraftinc.com/).

In case you missed it there's a YouTube video taken right at the Seaplane base during OSH: http://bit.ly/1XH7SnV

Above: Fishing and camping a few minutes after landing. What's not to love? Note: this is an earlier version of the tent. Images by glasair.wordpress.com and MVP aero.com

John Macready

Why Build?

Vancouver's Chapter 85 starts a Zenair 750 Cruzer

George Gregory

We've always had a chapter airplane. It's one of the reasons I joined way back in 1992; having just retired as an instructor, I was looking for a cheaper way to fly and associate with people who were interested in building airplanes. Chapter 85 had two club airplanes at the time, and a whole bunch of experienced builders. I'd meant to connect with them for years and never had. By then, it just seemed the thing to do, and I've never looked back.

I've been a member for 22 years now. I flew many happy hours on the J-5 and the Turbi before purchasing my own C-172 in 1997. But I have yet to build anything.

Time passed. The J-5 left us, and by 2014 the Turbi, built by charter member C.R. "Gogi" Goguillot, was showing its age. It was sold to a member from the prairies to be refurbished and serve with further distinction.

And the chapter wanted a replacement. Alternatives were then considered: homebuilt, factory built, high wing, low wing, tandem, side by side. We even considered trikes (too unconventional for some tastes) and autogyros (which would have been neat, but involved a whole new world of retraining and relicensing, even though quick to build).

In March of 2015, it was decided by the executive to build a new, relatively conventional club aircraft. All metal construction seemed the most desirable option (lower maintenance), and a Canadian aircraft seemed right - especially considering the value of the American dollar compared to the Loonie. Eventually, the decision narrowed down to two fine indigenous designs: the Murphy Rebel or the Zenair 750 Cruzer. In the final analysis, the nosedragger Cruzer - with its wide range of engine options - was found to be the best fit, and a kit was ordered. Zenair responded enthusiastically to our call and pledged

John Macready

It's no secret that the median age of flying organizations of any sort (perhaps excepting the hang gliding and paragliding crowd) is definitely tending to late middle age. If we are to perpetuate our clubs, we need to expose a younger crowd to not just flying, but building.

to help the Chapter any way it could. Factory staff will be visiting our facilities shortly to ensure nothing falls through the cracks with our team-approach to the kit-assembly process. We welcome Zenair's expertise with Quick-Build projects (read about the One-Week-Wonder); it is also nice to work with a company known for its excellent technical support and after-sale service. At this writing, the kit is on its way to us from Ontario. Builders' groups have been designated, and the process is open for all to witness.

What do we hope to accomplish?

Of course we *want* a club aircraft. As I said, we'd had one from long before I joined the chapter, and it's something that both serves the members and acts as a potential draw to those outside the club. It's also always been meant as a way - for members who are building aircraft of their own - to stay current as pilots.

Another reason is that the construction of this aircraft, done by many members, will enhance the knowledge of best practice in the construction of their own aircraft. This is so much a part of the RAA's *raison d'etre* that it barely requires mention. That is what we are all about: a community of people excited about crafting our own wings, a group that together promotes the educational aspects of building an aircraft, *and* the proper way to go about it. Some can't afford to start a project on their own, or distrust their own ability. What better than for the group to pool resources and knowledge? Everybody wins.

But another exciting possibility is that of opening the club up to young people. It's no secret that the median age of flying organizations of any sort (perhaps excepting the hang gliding and paragliding crowd) is definitely tending to late middle age. If we are to perpetuate our clubs, we need to expose a younger crowd to not just flying, but building. And youth are living in an increasingly virtual world composed of pixels, online relationships that are a mile wide and only an inch deep. It's a chance to build depth and real-world satisfaction into the lives of youth. Many will know of what I speak: seeing something fly that you built with your own hands changes you somehow, in a profound and improved way. My own experience with aircraft construction has so far been limited to a number of preteen attempts to fly with oversized kites and the eventual success of a plans-built hang glider when I was 15. That, and the mentoring hand of a neighbour, affected me in so many positive ways.

So we're on our way. It's going to be an exciting ride, and I'm proud to be part of an organization that possesses the courage and vision to move forward like this. Stay tuned - we'll be putting updates in the Recreational Flyer from time to time, and progress can also be found on the Chapter's facebook page at *https://www.facebook.com/RAA.Chapter85.*

George Gregory *is Chapter 85's resident roadable aircraft nut, and holds private and commercial ratings. He flies as a civilian volunteer with the Royal Canadian Air Cadets and is getting started on a Van's RV-12.*

Gear Leg Speed Secrets

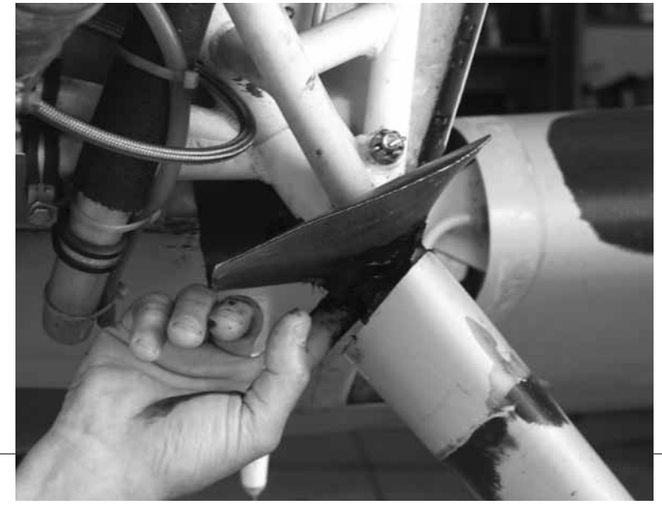
RAA

Wayne Hadath's F-1 Rocket race plane is a good example of continued development that returns increased speed. He leaves the engine alone and concentrates on reducing drag. Wayne has been taping the fairings on the tapered rod gearlegs to improve the transitions, but found that during a race the tape was blowing off. He reasoned that some of the high pressure air inside the cowling must be exiting through the leg-to-cowling fairings and pressurizing the gearlegs. Ideally it would all go through the lower exit from the cowl and straight rearwards down the belly of the plane.

Having jets of high pressure air squirting out of the intersections cannot be good for the smooth flow of air because it makes for turbulence, and the result is drag.

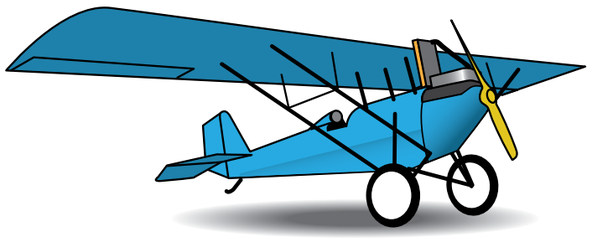
Wayne made gaskets from the silicone sheet material used to seal the edges of the engine air dam to the cowling. He sealed these gaskets to the gearlegs with black silicone goop, and positive cowl pressure forces them flat against the inside of the cowling.

This is a trick that can be applied to most of the RV tailwheel aircraft, as well as to other aircraft that have the main gear attached to the engine mount.



Above: Wayne tapes the top and bottom intersections of the fairings to improve the transitions. Right, a full tube of silicone seal was used, top and bottom of the silicone sheet.

OLD NUMBER ONE



Scoring a piece of Homebuilding History:
The Tiger Boys' Model A Pietenpol Serial Number 1

Gary Wolf

Bob Revell demonstrates the starting method.

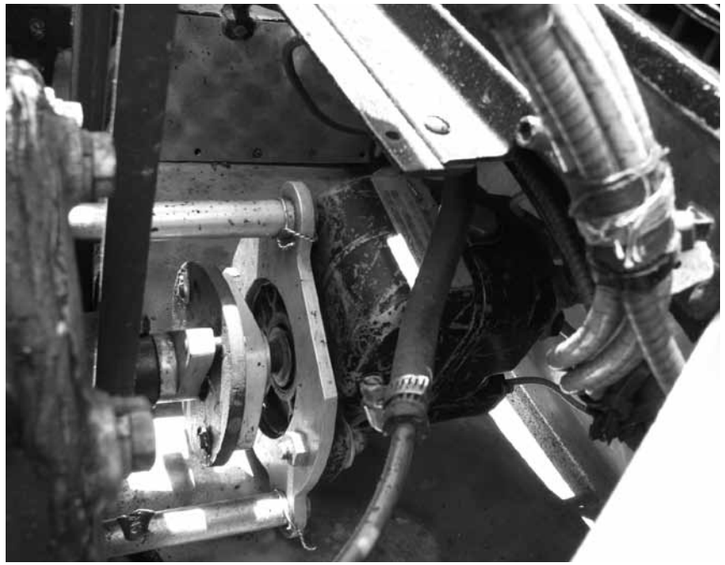
Eric Dumigan

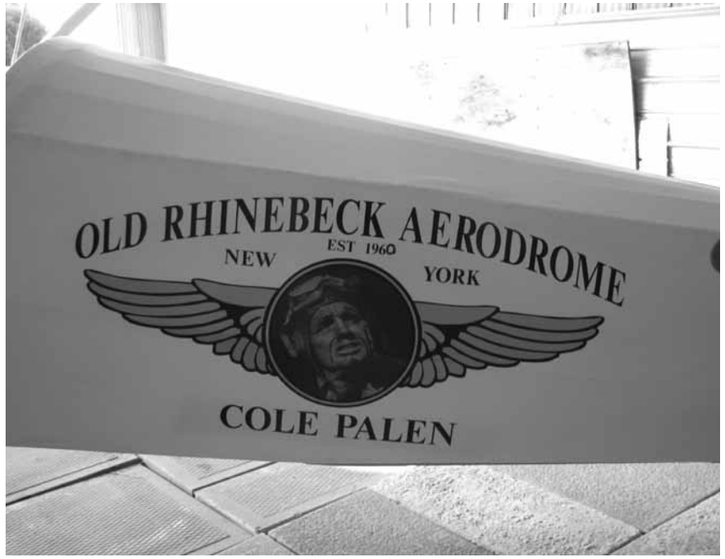
Step back in time some ninety years. Automobiles were being sold in great numbers, many at prices low enough that the average working man could afford one. Henry Ford had perfected the assembly line manufacture of low cost vehicles and Model T's had been made in the millions. In 1928 Ford brought out their radically improved Model A that was again a market winner, with more horsepower, a conventional gearchange, and a real ignition system that could be advanced and retarded.

The problem remained that even excellent cars had to suffer with a road system that was mostly dirt, frequently rutted, and all but impassible when raining. A Model A could reach sixty mph but the average speed going cross country was a fraction of that.

Aviation was in a golden era, and a good supply of war surplus aircraft enabled barnstormers to introduce many to the novelty of flight. Unencumbered by roads, an airplane could travel in a straight line at much higher speeds. Able to use even a small pasture as a landing strip, a plane like the Jenny could go places that were impossible for an automobile. This was the era in which Bernie Pietenpol found himself as a young man in Cherry Grove Minnesota, a town of 800 souls, definitely off the beaten path in the bottom corner of Minnesota.

Bernie had a passion to fly but he could not afford to buy even a war surplus Jenny. He wanted to build his own plane from plans, but then as now the cost of an aircraft engine was very high. There were a few planes available to be built from kits or plans, such as the Longster, the Heath Parasol and the Corben Ace, They used expensive engines and they were all single seaters, while Pietenpol wanted





Top: the mag is driven through a leather disc. Above, Cole Palen's Rhinebeck erodrome owned Piet #1 for some thirty years

something affordable to be able to take a passenger to share the joy of flight. He built a Longster but shortly traded it for something larger, but he was not satisfied with either plane. The auto wrecking yards were full of Model T engines and he hoped to design a plane around one. He tried but unfortunately the T made only 20 hp, not enough to get two people into the air consistently.

In the fall of 1927 Ford introduced the Model A with its 200 cubic engine that made 40 hp at 2200 rpms, and at 250 pounds it looked like a good candidate to power an aircraft. The engine was a great improvement over the Model T, now doubled in horsepower and incorporating pumps for water-cooling and lubrication. Bernie bought a Model A engine and began to design a plane to exploit its virtues. He had only a grade eight education but he was a smart fellow who had a natural understanding of engineering. Modern Mechanics and Inventions magazine was the techy's bible of the day, and it supplied serialized plans and a lot of rule of thumb engineering for would-be amateur designers.

The Fuselage

Pietenpol considered building a steel tube fuselage but this was beyond his skills and pocketbook so he chose Sitka spruce and plywood as his construction materials, with casein glue to hold everything together. He used 1" square spruce for the four longerons and on the shop floor laid out a two foot wide, two holer truss fuselage that was two feet deep where the rear main gear attached, tapering to 21 inches at the firewall and to 11 inches at the

Again, everything is wired, and here leather wear pads prevent chafe

tailpost. The upper longeron was dead straight in side view and the lower longeron was pulled into a fair curve. Each bay was triangulated with 1 x ¾ diagonals with 1/8" plywood corner gussets, all held together with tiny nails and casein glue. The sides and floor of the cabin from the firewall to the rear of the pilot's seat were sheeted with 3/16" and ¼" ply, and the plywood seats and firewall were nailed and glued into place to give torsional strength.

Metal fittings in those days meant cold rolled steel, most likely 1025. All landing gear and flight load points had metal fittings ranging in thickness for the most part from .049" to .063". The lift strut attach was made from heavier material .110" thick. In the plans that he subsequently released, Pietenpol cautioned the builders to do all bends cold in case the material might lose some strength from having been heated.

Landing gear was taken from a war surplus Jenny, wood legs and all, with a Jenny beam axle held in place by bungee wrapped around to provide some measure of shock absorption. Lateral location was by a pair of x-wires going from each lower longeron to the gearleg on the opposite side. The tail received a section of a Model T front leaf spring, trapped in a steel bracket that fastened to the tail ends of the lower longerons and the rearmost vertical post. Without brakes on the main wheels, the drag of the tail skid on the dirt provided the only stopping power.

Empennage

The horizontal tail had a constant chord of 37" and a span of 90". The stab had three spars of 1 x ¾" spruce, with the front spar rounded over to a bullnose. The front and rear spars were rabbeted to accept the ½ x 3/16" ribs laid flat. The main spar was full height so the ribs were pulled into a shallow airfoil shape. Corners were reinforced with 1/8" ply gussets and all joints were bonded with casein glue.

There were two independent elevators, called "flippers" by Pietenpol, made in the same manner as the stab. The elevator chord was the same 18" as the stab, with the remaining 1" taken up by U-shaped sheet metal hinges, three on each flipper. Between each flipper's leading edge and its main spar was bolted a .095" thick compression member to which an elevator horn was welded.

The vertical fin was 32" tall with a chord at the bottom of 18". All corners were reinforced with 1/8" ply gussets, and sheet steel fittings attached the lowest rib to the top of the stab. (None of this looks very sturdy until it is realized that the whole tail assembly was wired into place.) Near the outboard ends of the horizontal stab each spar had a fitting to run two cables per side to a point near the top of the vertical fin's main spar, and two per side to the lower longerons via a metal fitting that did double duty to assist in clamping the tail skid.

There was plenty of rudder area designed into the plane to provide good yaw control at the anticipated low landing speed. This part also used 1 x ¾" spruce spars and ½ x 3/16 spruce ribs, with gusseted corners. Three shop made sheet metal hinges

provided redundancy, and a rudder horn formed from steel sheet was attached halfway up, some 8" above the upper longeron.

The Wing

Bernie Pietenpol had done some previous experiments with wing airfoils, testing the Clark Y and some of the Gottingens. By trial and error he arrived at an undercambered airfoil that bore a resemblance to the Gottingen 36 but with a higher camber. The result was a wing that could get off the ground on low horsepower and climb at what was considered a respectable rate at the time. All undercambered airfoils suffer from excess drag but flat out speed was not the most important consideration at the time. For simplicity the wing had a constant 5 foot chord with all ribs identical. In general the lightest wing has a one piece spar, but it is difficult to find a piece of spruce long enough for the span of 28 feet. Pietenpol made the spar in two pieces with a long scarf joint at the very centre. This joint was fastened with glue and three vertical bolts to form a full length spar with no dihedral. In a parasol the entire weight of the plane hangs from the wing, negating the need for dihedral. The sides of the spar were routed out to a depth of ¼" to make a thick section I-beam, leaving full thickness at the lift strut attach point and at the root. Wing ribs were built up from ½ x ¼" spruce

Top: The Model A engine dominates the forward section of the plane Centre, controls are conventional, with a rudder bar below the passenger seat.
Left: A Tiger Boys airspeed indicator supplements the World War 1 panel item.

Pietenpol wanted something affordable to be able to take a passenger to share the joy of flight

strips, glued and gusseted with 1/16" and 1/8" plywood.

Drag/antidrag was provided by internal x-wire bracing, and at each lift strut attach point there were two compression struts of 1 x ¾" spruce.

There were no flaps, simplifying the build, and the undercambered airfoil made them largely superfluous. Each aileron was 6 feet long and 20% chord to give good roll control at the anticipated low landing speed. All aileron cables were outside the wing, the lowers running behind the lift strut and the uppers on top of the wing at about 50% chord. Again, drag was a secondary consideration.

The wing's trailing edge had a cutout at the centre 3 feet wide and hinged to allow the trailing edge to be temporarily raised to improve access to the rear cockpit. The wing bay above the passenger's head was sheeted with plywood on the lower edge to hold the weight of the metal fuel tank that supplied fuel by gravity to the engine..

The wing was supported on four vertical cabanes made from steel tube, with x-wires across to brace all bays except the left, to allow access for a passenger. Each wing had two parallel steel tube lift struts with x-wires to keep the wing from wracking. A passenger would have had to be pretty agile to clamber through the x-wires and into the forward cockpit.

Controls were conventional for the time, with a stick for pitch and roll, and a rudder bar for yaw. Rudder and elevator wires were external for much of their length, simplifying the build and maintenance, and leather was used for wear surfaces where the wires exited the fabric of the fuselage. War surplus flight instruments were located and installed in the wood panel to complete the cockpit. The entire fuselage was then covered in muslin and doped with four coats of nitrate to tighten the fabric.

The motor mount was welded up from 7/8" diameter steel tubing, with lengths of stout white ash as bearers that framed the Ford engine at crankcase level. The load was carried into the fuselage by T-shaped pieces of .110" steel sheet bolted through the longerons. Because the engine was direct drive and the thrust line was about the height of the upper longeron, the tall inline engine largely obscured the forward view from the cockpit. A cut down war surplus brass rad was then mounted directly in front of the forward cabanes, ensuring that there would definitely be no forward vision for pilot or passenger. Lindbergh was one of Pietenpol's heroes and he managed to fly the Atlantic with no forward vision, so what could be the problem with looking around a radiator?

The Model A Engine Conversion

Then as now the engine represents a major portion of the cost of an aircraft, and Pietenpol was determined to build a plane that anyone could afford to own. That ruled out real aero engines, and as the readily available Model T was underpowered, when the Model A became available he saw his

Tom Dietrich showing the lifting centre section that allows easier cockpit access

chance.

The Model A Ford engine had a rudimentary pressure oil system that needed improvement to assure engine longevity under the higher stresses imparted by an airplane. Pietenpol dismantled the engine and ran external pressure lines to improve the lubrication of the main bearings. He also added baffles to the oil pan to ensure that the pump would still find the oil when the plane climbed or dove.

The shaft of the water pump was shortened and the drive pulley was moved closer to the engine. The end of the camshaft was drilled and tapped to accept a length of threaded rod which became the drive for the tach cable. The crankshaft had poor oil sealing at the snout end so Pietenpol made up a rudimentary cup-shaped crank seal to minimize the amount of oil being thrown around.. The thrust bearing of the Ford was left as-is and proved to be adequate for use in an aero engine. A metal shelf was fabricated to hold a war surplus magneto in line with the crank, and a coupler was made using a disc of thick leather as part of the mag drive.

The updraft intake manifold had its vertical section shortened and realigned to pull the carb closer to the engine block and to level it when the

Left: this catch on the lower surface keeps the access panel held down in flight. Centre: the pilot's eye view is of the brass radiator. The passenger gets warm air whether he/she wants it or not, but there are usually no complaints. One advantage is that warm air in the face tells the pilot the turns are co-ordinated. Right: even the aileron cables are outdoors.

Tiger Boys

The Tiger Boys, Tom Dietrich and Bob Revell are lifelong aviation enthusiasts. Tom began building balsa models when he was in short pants in the early fifties and later operated his own hobby shop for twenty-five years. He was a member of the Canadian Scale Model Team, representing Canada in the world Cup with his Spitfire. Bob Revell's uncle began the Revell model kit company, but instead of building models Bob built a Baby Ace on floats and named it the Water Baby. About 1970 Tom got a hangar at Guelph Ontario and began working on full sized aircraft himself, beginning with a Yale that he had bought from the estate sale of a prolific local collector. Bob was by this time running the restaurant at Guelph Airpark and took an interest in Tom's work. They formed a partnership, began restoring Tiger Moths, and the Tiger Boys Flying Museum was born. This is not a dusty refuge for old aircraft and old men who will never fly again- the mission of the Tiger Boys is to restore every aircraft to flying condition and to have each flown regularly. To encourage young fellows to fly they lend their planes to be flown and displayed at aviation events all over the province. Every September they have an open house and flying weekend when the public are invited, and even allowed to go for rides in their vintage collection.

When there is this much enthusiasm in one place it is natural that others will be attracted to it. Shortly after getting the hangar many of their modeling friends and local aviation enthusiasts began dropping by to lend a hand sanding, varnishing, covering, riveting, and whatever else was necessary to return barn finds back into airworthy aircraft. They meet every Wednesday and there is never a lack of work. Tom and Bob have been making contacts for four decades up and down the eastern US and Canada, and they still make several trips per year to trade and buy an engine here, a fuselage there, and a wing somewhere else. Many of the projects have little documentation but most require so much work that they easily fit the 51% requirements of a new build in Canada's Amateur category, and some of the lightweights even fit into our Basic UL category.

Bernie Pietenpol's Model A powered Pietenpol Aircamper with serial #1 is the latest addition to the flying museum. For some thirty years this plane had been in Cole Palen's Old Rhinebeck Museum in New York State, doing shows and jumping the occasional ride. When the museum closed, the Tiger Boys wanted to buy it but they just missed the chance. The Pietenpol had been bought by a couple of Americans who never flew it, just took the wing off and put it into storage. It stayed there gathering dust until the Tigers tempted them with the offer of a flying Cessna 140 in trade, and the Pietenpol was trailered back to Guelph.

The Tiger Boys and their crew set to cleaning it up and restoring it to airworthiness. The painting of Rhinebeck's Cole Palen was preserved on the cotton muslin-covered fuselage. The plane had earlier undergone a restoration and one of the changes was to install a St. Croix 76" wood prop that was a much better match to the engine's power characteristics. The Piet was recently registered in Canada's Basic UL category with the next available marks, C-IKRO, so the two cartoon crows Heckle and Jeckle were painted on the boot cowl. The wing was recovered in Dacron and doped using Randolph in the original silver-grey colour.

A few weeks ago Steve Gray made the first Canadian flight for C-IKRO at Guelph Airpark. The inline engine pulled strongly and smoothly, and the Pietenpol was off the ground after a roll of only a few hundred feet. Climb was moderate and Tom compared it to their 1935 Taylor E-2 Cub, powered by a 40 hp Continental sidevalve engine. The Cub had another seven feet of span but the Pietenpol undercambered airfoil made up the difference. A few days later another of the Tiger crew, Fern Villeneuve, had a flight in the Piet. Fern Villeneuve is the same age as the Piet and he was the first team leader of the RCAF's Golden Hawks aerobatic team. Steve gave Fern some advice before his flight and off he flew over the countryside, as he had when he was a teenager flying a J-3 Cub right after the war.

The Model A Pietenpol #1 will now join the other historic flying aircraft in the Tiger Boys' collection. Other notable aircraft include Gus Chisholm's 1955 Corbin Baby Ace, their recently acquired Jodel D-9 built in 1959 by Ben Keillor, several Tiger Moths, and a 1937 Thruxton Jackaroo 4 seat conversion of a Tiger Moth, one of three in the world. .The Tiger Boys team is currently restoring a Gypsy Moth, a Cornell, and Curtiss Jenny Canuck.

If you wish to visit the museum be prepared to roll up your sleeves and help with the restoration work. The hangars are at Guelph Airpark in Ontario and the main workshop is open most days when Tom and Bob are not away at an airshow.

For more information: *Tiger Boys Aeroplane Works and Flying Museum, CNC4 Guelph Ontario www.tigerboys.com*

plane was in the flight attitude. Four individual short steel stacks replaced the heavy cast iron exhaust manifold.

Fitting a prop was simply a matter of removing the flywheel and adapting a short length of Model T axle shaft held with long bolts. Pietenpol found that a war surplus Lawrence prop was a good match for the Ford engine except that he had to turn up a bushing from birch to centre the prop on the shaft. When all was done he had an engine that made 40 hp at 2200 rpms, at a weight of 244 pounds, not too bad for 200 cubic inches at such a low rpm, especially keeping in mind that it was a sidevalve with a compression ratio of only 4.4:1. Later on there became available aftermarket aluminum cylinder heads that saved some pounds and added some compression ratio to raise the power output.

The Model A Pietenpol flew, and more amazingly it flew well. Unhampered by the bad roads of the day, a Model A engine could make more miles per day in a Pietenpol that it could in the Ford car, and it could do it on less fuel. Bernie Pietenpol had achieved his goal.

The aviation pundit of the day was the writer Weston Farmer who had predicted that an auto engine could never be successful in an aircraft, so Bernie Pietenpol flew it over and showed him that the Ford Model A had actually done it. Farmer then serialized Pietenpol's drawings in his Modern Mechanics magazine and Pietenpol was in the aviation business. He tried selling complete planes but made only a few before he realized that selling plans and parts was a better business. He died in 1985 but his family still sells plans and component packages to this day, quite a legacy for an unschooled farm boy.

Many different engines have been used in the Pietenpol in the past 85 years. Most popular are the Continental 65 and 85, but auto engines have been successful too. In the early Sixties Pietenpol himself converted a Corvair and found it to be suitable for his planes. Some builders have even used Subaru and other car engines, and since the plane will fly with a heavy Ford engine, anything else results in more payload, more climb, and more speed.

It is not expensive to build a Pietenpol. The family sells plans for $110, and Aircraft Spruce sells wood subkits at ridiculously low prices. A wing kit costs $1100, the fuselage is $600, and the entire tail costs under $120. The Pietenpol is a ball of fun to fly and thousands have discovered what fun it is to tool around the sky, elbows out, going nowhere in any particular hurry, just experiencing the pleasure of open cockpit flight.

Canadian Pietenpols

Brian Kenney's A-65 Pietenpol

I built a Continental engine powered Pietenpol Air Camper with an A-65 (65 horsepower). It has over 800 hours on it. I wanted to build one with a Model A (or Model B) Ford engine because that was the original design and they look and sound so cool. My thinking was that after I flew with the A-65 for a while I would perhaps convert it to the Model A engine. This has never happened and never will, but I still like the Model A-engined Pietenpols. If I were to have one with a Model A it would be a Sky Scout, a single seat version of the two seat Air Camper. Here is my logic:

Model A-powered Pietenpols are like any aircraft -they are a compromise. They fly in many ways better than one powered by a Continental (or other aircraft engine). The heavier engine has a shorter nose and in general a more forward centre of gravity. It handles with more directional and pitch stability. The Model A is smooth as an electric motor and appears to be quieter, and the sound on the ground is like music to my ears.

The airplane has a rad in front of the passenger and there is restricted forward visibility. Passenges will get warm air all the time whether they want it or not. They mostly want it and if they don't it is still not a huge problem. The performance of the airplane can be adequate with two people and I have had rides in 4 Air Campers, most of those on quite warm days. I weighed about 190lb at the time. This comes at a cost and not all Air Campers with Fords are true two seaters. A Model A powered single seater is a good performer.

So what is the limitation of the Model A? The way to describe this is to compare it to endurance car racing. In such a car you can have speed or you can have reliability but it is a delicate balance between the two and as a generality you can't have both. The Model A engine in the car was rated at 40 horsepower. I believe that it can in an aircraft produce more than 60 horsepower. This can be done because it is 200 cubic inch in displacement. The ones I have had rides in were producing at least 50 horsepower based on the way they performed. The main factor in output is rpm. The higher the rpm the more power.

If you extract too much power bad things happen. There is an extensive study of the engine on the internet, and crank strength and crank and rod bearings are a main limitation. Engine failure in this mode will not be comfortable for the pilot. Some people limit the rpm and produce much less power for reliability but suffer with insufficient power. Some people seem to get the balance correct and get acceptable if not perfect service out of this almost 90 year old engine.

Flying on only 40 horsepower makes sense and can Improve durability and reliability and therefore the confidence in this powerplant. Even then if I had a Model A-powered one seater I still would not take off on a 500 mile cross country. I am not that mentally strong and I am tempted to say, also not that foolish.

Brian Kenney

Scott Knowlton's Pietenpol Project

Scott had long had an interest in building a Pietenpol, possibly one with a steel tube fuselage. Bernie Pietenpol made plans available many years ago for builders who preferred steel tube to wood. Brian Kenny took Scott for a ride in C-FAUK. Scott then soloed in it and he came back determined to build in wood. The plane felt solid and building in wood meant that there would not have to be the danger of welding in a garage.

Scott sourced much of his wood from a specialty lumberyard and some from Aircraft Spruce, and he is using West System epoxy for bonding. His intent is to use a C-85, and this will allow the incorporation of an electric starter if he should choose to go that route.

Opposite: Brian Kenney propped his Piet for Scott Knowlton's first flight. Right, Scott Knowlton sitting in his project and dreaming of flights to come.

Busy Bee Drilling Jig

RAA

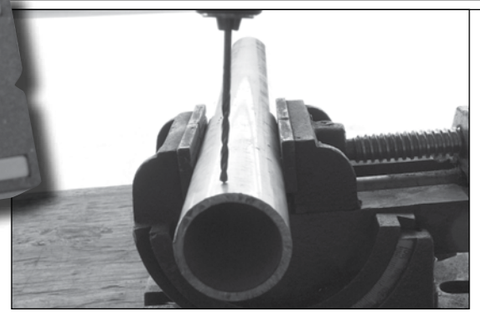
BUSY BEE TOOLS now carries the Milescraft DrillBlock, a handy and inexpensive addition to a tool crib, either your own or the chapter's. When using a hand drill it is very difficult to drill a hole that is truly square to the surface. For thin riveted skins it does not matter much if you are off by a few degrees, but for thicker sections that will be bolted it can be a deal breaker if the bolt hole is drilled crooked.

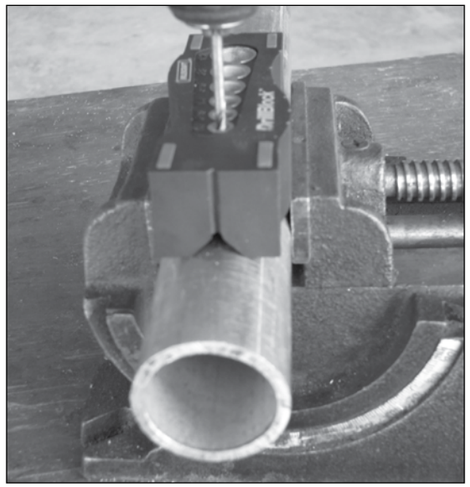
The Milescraft DrillBlock is a cast plastic block with metal drill bushings embedded. It can be held or clamped to the surface to be drilled and it holds the drill bit square to the surface. This can be very desirable when drilling a wing spar in situ, after having set up the dihedral.

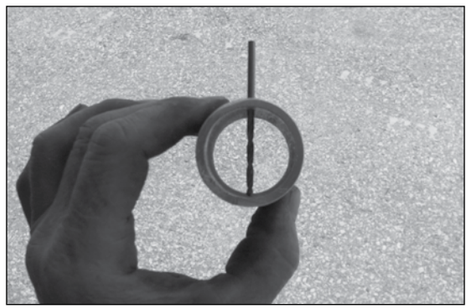
The lower surface of the Milescraft has a V block face to centre the drill to a round tube, to produce a hole that is on a true radius. This is useful even when using a drill press. With a drill press it is expected that the hole will be vertical, but by just eyeballing it is difficult to hit the centre of the tube, something that the V block accomplishes easily. For hand drilling the drill block may be held with the free hand or it may be clamped to the tube using a hose clamp.

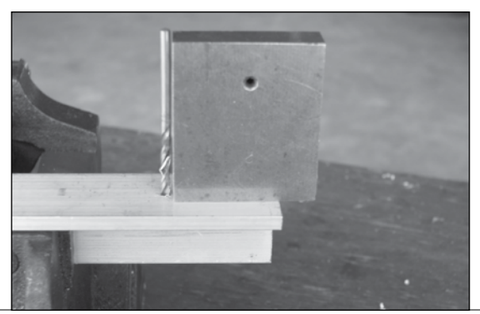
The drill bushing sizes are: 1/8. 3/16, ¼, 5/16, 3/8, ½ inches, all handy for what we do. Testing for looseness, the smaller bushings were a good sliding fit to the drill bit and the larger ones had .001-.002" of slop.

Milescraft DrillBlock #1312, priced at $12.99, sale price $9.99
Busy Bee Tools 1-800-461-2879 www.busybeetools.com





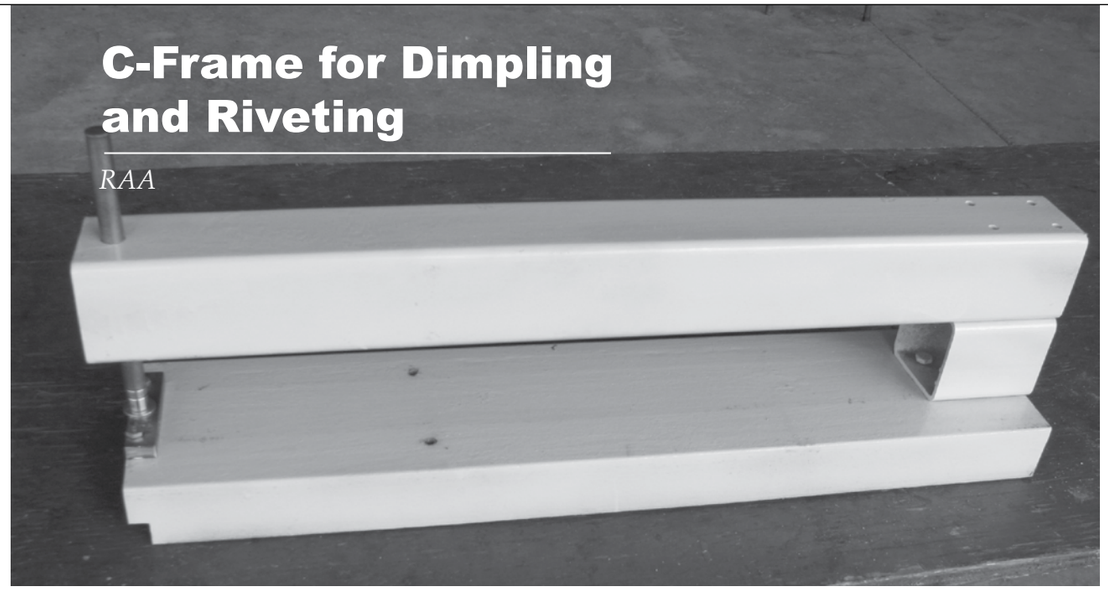




Above: The block is compact, and made of a tough plastic with metal bushings embedded
Top down, right: exaggerated here, but this mistake is easy to make when drilling round tubing. It's easy for the drill bit to go off square; the DrillBlock's V block feature centres the drill and holds it square. A 1-1/2" tube is about the practical limit for centering, given the size of the V. As can be seen, the result is pretty good. Equally square in both directions on flat stock

C-Frame for Dimpling and Riveting

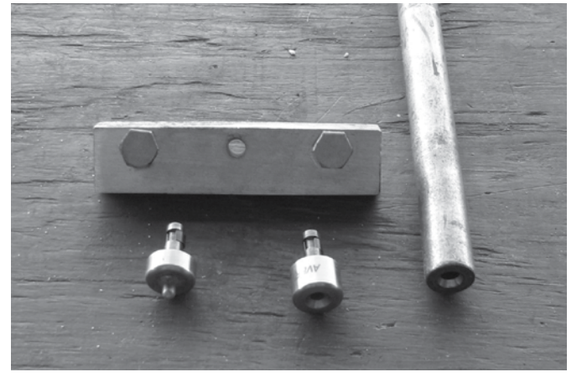
RAA

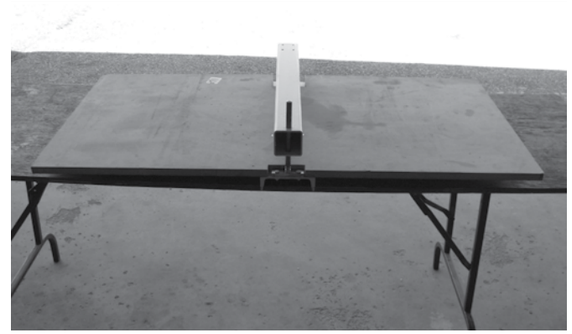


A C-FRAME FOR DIMPLING and riveting is an effective tool for the job because it keeps the faces of the tools square to each other, ensuring a centred dimple in a wingskin and a centred bucked end on a driven rivet. A C-frame accepts the usual riveting and dimpling dies that have a 3/16" shank to fit the driver of a hand pneumatic riveter. Unfortunately a C-frame is usually priced at $200 US or higher plus shipping and sales tax, so by the time it is in your hands the outlay approaches $300 CDN. Fortunately it is not very difficult to make one yourself, and you can do it for $25. The widest commonly available sheet of aluminum is 4 ft. so a C-frame with a 2 ft. throat depth will get to the centre of the sheet.

Begin with a trip to Metal Supermarket or other steel service centre and have them do the cutting for you. Expect that they will want a +/- 1/8" tolerance on all cuts.

Overarm:
2-1/2" square tubing with 1/8" wall length 28"
Riser block:
2-1/2" square tubing with 1/8" wall length 3"





Upper right: lower die block and upper die holder, drilled to fit the 3/16" shanks of the tooling. Right, a 2 x 4 sheet of MDF, notched to fit the lower die block, is fastened to the base with countersunk machine screws.

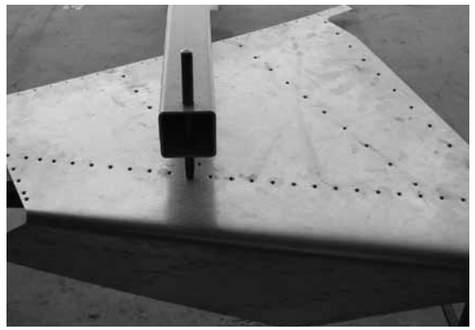
Base:
4″ or 5″ steel channel with 1/8 to 3/16″ wall length 28″
Upper die holder:
½″ dia. Cold rolled steel bar stock length 7-8″
Lower die block:
¾ x 3/8″ cold rolled steel bar stock length 3″
Hardware:
¼″ x 1″ bolts with nuts and lock washers 8 pieces
AN3 bolts with nuts, grip length to suit total thickness of lower block plus steel channel 2 pieces

Overarm
Begin by squaring up your drill press and drilling the ½″ hole at one end of the 2-1/2″ overarm. This hole must be vertical and it must be a nice sliding fit to the ½″ rod, so take your time and updrill in several steps to 15/32″, and finally with a ½″ drill bit. If you are not happy with the result just turn the square tube 90 degrees and have another try. If still not happy you can switch ends.

Lower die block
Drill a mounting holes 3/16″ diameter at each end of the die block. The centre hole will then be drilled to accept the 3/16″ shank of the riveting and dimpling dies. First take a piece of scrap steel bar stock and do a test hole to check fit, updrilling this hole in steps to #13 which is 0.185″, Check to see if the runout in your drill chuck makes this into a 3/16″ hole. If not, drill the test piece to 3/16 and check. Finally drill the real hole in your lower die block, and locate it nearer to one edge of the block. Ideally the edge of the rivet or dimple die should be flush with the edge of the lower die block.

Upper die holder
For this you need a metal lathe or a chapter member with a metal lathe. Using the same drills you used for the centre hole of the lower die block, updrill the ½″ rod to provide a nice fit for your rivet and dimple dies, and then use a countersink to provide a small chamfer. This is the last of the close tolerance work. Again, you can switch ends if you are not happy with the first result.

Riser block
Drill this block for a rectangular pattern of four through holes ¼″ diameter. The riser block later becomes the template to drill the overarm and the base..



The MDF table supports the part while the holes are being dimpled; the working end of the dimpler. Above, this end is held together with eight 1/4" bolts

Drilling the overarm.
Clamp the riser block to the opposite end of the overarm using vise grips on the webs, and drill through the overarm using the riser block as the template. Deburr the holes and bolt the two pieces together.

Drilling the base
Install the lower die block to the base and fit a dimple die into the centre hole. Fit the matching die to the upper die holder. Lightly c-clamp the assembled overarm and riser block to the base, centering it laterally. Drop the upper die holder through the ½″ holes and wiggle it around until the dimple dies fit together nicely. Then use a vise grip to clamp the riser block to the base, and remove the clamp and four bolts holding the overarm to the riser block. The riser block remains clamped to the base by the vise grip. You may now drill the base using the riser block as the template, and deburr the holes.

Assembly
Four ¼″ bolts will hold the riser block to the base and four more will hold the overarm to the riser block. As you tighten the bolts you will have to ensure that the alignment of the dies remains accurate, and a few light taps of a hammer might be necessary.

The base will extend perhaps half an inch past the riser block. You may saw this off or just ignore.

Table for the C-frame
If you are riveting skins you must support the skin so that it rests easily on the lower die. A table made of MDF will do this nicely. Measure the height of the dimple die and the lower die block and you will probably find that 5/8″ or ¾″ MDF will provide a table nearly the same height. You might have to use a washer under the dimple die or some shims under the table to make it a flush fit.
Home Depot sells precut 2′ x 4′ pieces of MDF and this is a good size as a table to support wingskins. Notch the near end of the MDF to clear your lower die block using a jigsaw. Drill and tap a couple of ¼″ holes in the base of your C-frame and drill matching countersunk holes in the MDF. Home Depot has ¼″ countersunk machine screws in their hardware aisle, and you will want 1-1/4″ or 1-1/2″ length as available.

While you are in the hardware aisle pick up a few 3/16″ thin washers in case you need them to space up the lower dimple die. All you need now is a decent hammer and you are in business.

President's Message / cont'd from page 2

egory's pilots to understand the regulations. A drone is anonymous and small enough to be put quickly into a car trunk if the police are seen, so there are few prosecutions.

There are a couple of solutions: One would be to require something like Mode C in drones so that they could be seen on radar and TCAS. It would be handy if the owners could be identified too. Another would be to require that their gps software be programmed to limit them to legal airspace and legal altitudes. Go to the CADORS word/text section, select "Narrative" and type in "uav uas drone," then select "any of these words". It is disconcerting to see the number of close calls, especially in controlled airspace.

REGULATORY MEETING
RAA Canada will be meeting with MD-RA at the end of September to discuss recent Transport Canada changes to the Amateur Built category. In 2008 the FAA brought pressure to bear on Transport about rebuilding deregistered certified aircraft to qualify as Amateur Built. RAA Canada alone worked with Transport to find a middle ground that would allow these rebuilds to continue, while still satisfying the requirements of the FAA for entry into US airspace.

The rumblings from Ottawa are that the FAA is concerned about Builder Assist in our Amateur program. Never mind that the US is full of "two weeks to taxi" centres in which builders somehow complete and fly an aircraft that usually takes years to build. Instead the FAA appears to be concerned about what is happening in Canada.

It has always been legal to subcontract specialized work like avionics and engine building, and in the early 2000's it became legal in Canada under certain conditions to subcontract some airframe work. In both countries there has always been an underground economy of subcontractors who provide build assistance, but US builders have to claim with a straight face that they have built the whole plane themselves. If the program becomes limited or shut down, all that will happen is that builders will have to revert to lying in their paperwork. They will make liars out of honest men. Will safety be improved? – not likely. Will regulators look like they are doing something constructive? – possibly.

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. KW-RAA meets the second Tuesday of each month at 7:30 pm at the Air Cadet Building at CYKF. In summer months we have fly-ins instead of meetings. Please contact President Dan Oldridge at oldridge@golden.net .

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, 19:30 pm at the terminal building Midland/Huronia airport (CYEE) . Contacts: President Robert Gow, 705-549-2894, Secretary Ray McNally 705-717-2399

E-mail – raa.midland@gmail.com .

NIAGARA REGION: Second Monday 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 ASSOCIATION: Meetings, Second Monday, 19:30 at the Aviation Museum. Contact: President Roger Smeland (780) 466-9196 or Jim Gallinger (780) 242-5424 . Website - http://www.ehaa.ca/

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 Peter Whittaker pwhitt@telus.net 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 Darren Watt 250-573-3036

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.**

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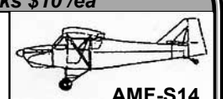

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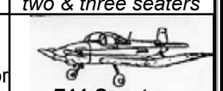

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Deadline for submissions is the first of the month preceding date of issue.
Artwork: Rates apply to camera ready artwork. Digital files are preferred and should be sent as email and in .txt format, PDF, JPEG, MS WORD, Photoshop or other common file 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.
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Recreational Aircraft Association Canada
President: Gary Wolf / Treasurer: Wayne Hadath

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

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RUTAN LONG-EZ, first flight Aug. 30, 1986. Total time 961hrs., engine overhauled at 542 hrs.Light weight starter installed. Prince PT prop. New ELT awaiting installation. Terra 720 com., Collins VOR available. Removed as planning GPS installation. Loss of licence due to medical issue.$30,000. Phone (403) 5279571, balewis@telus.net Medicine Hat AB

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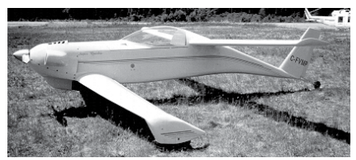

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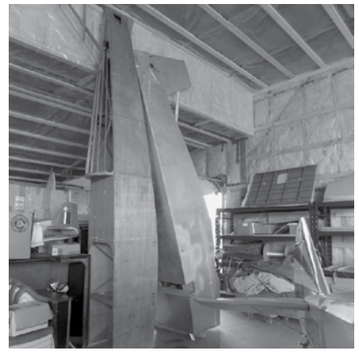

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More Classifieds on page 42

Across Canada

RAA Chapters in Action

RAA Kitchner-Waterloo

After weeks of planning and preparing for the first airport-wide Aviation Fun Day, the weather cooperated to provide us with a great day for the event. WWFC had a few similar events before, but with the cancellation of the airshow this year, the YKF management team was looking for something else to replace it.

A number of vendors, service providers, and aviation groups were invited to participate in the planning and operation of this event. I was asked at the beginning of the process if RAA would like to get on board and jumped in without hesitation knowing that it would be great exposure for our organization.

When the Air Cadets were later asked about participating, I contacted Ron Gowing about setting up a display to show aircraft building techniques. Although it split our resources between two areas, a number of our members stepped up to the plate and staffed both spots.

Almost 4000 people attended the event and everyone seems to think it was very successful. Thanks to some prior arrangements and a new YKF control tower manager, non-Mode-C aircraft were allowed into the zone to attend the event including Mike Shave's Mini-Cab and my Highlander.

Thank you to all of our members that flew in to display your aircraft and to those members that worked the displays at the Cadet building. It's great to see that even in the face of reduced numbers in our ranks that there are still a few dedicated individuals that take the time to promote RAA and build stronger links between the public and the aviation community. It makes me proud to be part of this group

We had a lot of positive comments about our displays inside and out. We have at least three good leads on potential new chapter members and got a lot of good PR for our chapter. As well, I think everyone who participated would agree it was an enjoyable experience and plan to participate again next year.

RAA London - St. Thomas

Dave Cox demonstrated a turbocharger converted to a turbine engine. It was started with a vacuum cleaner exhaust pressure applied to the inlet and then propane added to the home made combustion chamber. When the speed was stable he turned on a spark ignition with a resulting backfire start, and increase in turbine speed. Not a great deal of thrust output but a stable show and tell model. Very nice to walk around and still have a conversation with the group huddled around. Next Bill Wier's grandson demonstrated a home-made magnetic break. An Electromagnet clamps a strip of metal to the work piece while the hinged break bends the material up to the fixed metal strip. The advantage is, that you can use any length of block or strip on the top side allowing box break type of bending and more. I attached 2 links of commercial models. Apparently there is a website to make your own.

Two of Chapter 85's aircraft in attendance at the 2015 Abbotsford Airshow: Jim Stunden's recently refurbished Osprey II and President Peter Whittaker's scratch-built Zenith 601 HDS. Terry and Peter Whittaker with Clif Dawson (above) manned the chapter display with Peter's Zenith up front.

RAA Edmonton

The Edmonton Chapter participated at the Villeuve, AB airshow. On display were a Sidlinger 5/8 scale Hurricane and a Challenger under construction. The chapter had a booth up in the display area to answer questions about the chapter, homebuilt aircraft or anything else aviation.

RAA Chapter 85

Chapter 85 has had a busy summer with a good showing at the Langley Fly-In in mid-June. Perry Delano brought a wing and part of the empennage from his Zenith 701 project to add to the Chapter 85 booth. John Macready and Bruce Prior helped with booth setup and keeping it manned. David Marsden flew in with his Skylark which he designed and built. Eric Munzer brought out his newly restored Dornier 22, a 25 year project which also won the best aircraft award. President Peter Whittaker flew in with his scratch built Zenith 601 HDS and together we had an excellent display promoting home built aircraft. A big attraction was lunch which included a massive pot of homemade chili, the usual burgers and dogs, and about 2 dozen different homemade pies to choose from. The food capped off a great weather day for the fly-in.

At the end of June, Chapter 85 hosted the Annual Delta Airpark Fly-In with help from Members of the Boundary Bay Flying Club. Twenty-eight aircraft flew in, the Old English Car club had an impressive display of MG's, and the Vancouver Electric Vehicle Association (VEVA) brought out a collection of fully electric cars including a Tesla. We had two Harvards and a Boeing Stearman to add some warbird flavour to the event. This event went well with all of the help from Chapter 85 members and Boundary Bay Flying Club.

Above: Edmonton chapter members and their aircraft participate in the Villeuve Airshow.

The Abbotsford Airshow was next on the list at the beginning of August and we had the RAA Chapter 85 booth set up again. This time we were flanked by an RCAF Aurora coastal patrol aircraft on one side and two Dornier Alpha Jets on the other. I had my Zenith 601 on display and between the military aircraft, our booth and the polished aluminum of the 601, we attracted a lot of curious visitors. The common reaction was one of disbelief when told that the 601 was scratch built from plans. We worked on getting the message across that homebuilding was quite feasible if you follow the plans and take things step by step. My wife and I camped out Friday and Saturday nights in the airplane camping area set aside by Abbottsford Airport. Perry Delano, John Macready, Cliff Dawson, Bruce Prior and John de Visser helped out at the booth over the Saturday and Sunday of the airshow.

The summer was wrapped up with the Chapter 85 annual Show & Shine held on our September general meeting evening, this year, September 1st. Surprisingly for Vancouver, it rained! Undaunted, John Macready and Bruce Prior set up the BBQ in the workshop with the doors wide open and well over 30 hamburgers and dogs were cooked and served. Members and friends from around the airfield showed up and all contributed to a great Delta Airpark "informal" get together.

The final and most important event of all to cap of the summer was news from Zenair Ltd. In Midland, Ontario that the Chapter 85 building project, the Zenair 750 Cruzer project, was ready to ship. As luck would have it this was ready for shipment as my wife and I departed for Germany to begin our 2 week cycling trip from Passau, Germany to Budapest, Hungary. The final arrangements for shipping were left in the capable hands of John Macready and Perry Delano who are also coordinating the construction of the 2 work benches. The project will be documented on the Chapter 85 RAA website and a Zenair website.

In summary, Chapter 85 has had a good summer with events where homebuilding and aircraft restoration have been on display and the building project has been initiated. This has taken a lot of help from various members and displays great commitment, which is what is needed to keep our "sport" going.

RAA Midland/Huronia

The meeting commenced at 6:30 with a BBQ under the airport picnic shelter with good food, cool temperatures and 19 members and 3 guests (Don, Jack and Stephanie) present. Vice President Ian started the business meeting at 8:00.

Michael Heintz facilitated a draw for the $100.00 prize donated by Aircraft Spruce for our July 11 NRFI event. All visiting pilots were eligible to participate. The winning name drawn was John Alford, C-FSSN, who flew in from Oshawa.

The meeting moved out to the "green hangar" where we unpacked, inspected and moved inside, Eric D's amateur-built project. Bill R. donated this project to him for final assembly and finishing.

Classifieds / continued from page 39

SENSENICH PROPELLER M76 AM-2-54 with Saber bolts and includes spinner. $800 CDN OBO. Conical style motor mount up to 150 hp but from unknown plane. $350 OBO Gary Johnson 705-879-4696 Kindsay ON

1946 AERONCA CHAMP 3050 tt since new, 1030 SMOH on continental 65 ,slick mags with shielded ignition ,Hanlon -Wilson muffs,McCauley metal propeller,front seat shoulder harness ,intercom with two headsets ,maulle six in. Tail wheel,five gal(U.S.) wing tank,wing covers ,recent annual ,all a.d.'s complied with ,good ceconite fabric, good tires and glass .price $ 16,900 -416 431 2009 Bill Phipson

REBUILT GROB 102 GLIDER, all fibreglass, modified to motorglider with Rotax engine, 190 hours, flew from Lindsay Airport. Trailer is included. Selling because owner is now too old to continue flying. Glider is in Pickering. $16,000 or best offer. Hans Lohr, telephone (905) 509-2356.

Arthur Ontario CMZ2 .... TEE HANGER FOR RENT, $150 negotiable....37ft wide and 10ft high . Hanger was designed for ultralights with a high mast, but would suit most aircraft . Front section is 15ft deep and the ' Tee' part is 12ft wide and 11ft deep . N/S runway is approx. 2000ft and E/W approx. 1200ft both with clear approaches . Contact Mac at macpat@live.ca

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