# RECREATIONAL FLYER

November - December 2007

Recreational Aircraft Association Canada www.raa.ca
The Voice of Canadian Amateur Aircraft Builders $6.95

## The Amazing

# SEAREY

RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

# from the president's desk

Gary Wolf

**Amateur Built Category Changes**

RAA was recently contacted by the Chief of MD-RA, who asked that we let our membership know that there has been an important change to the amateur-built category. An immediate call to Ottawa brought forth the information that we are no longer allowed to use parts from certified aircraft when constructing an amateur-built plane, at least this is what Transport was initially saying. Subsequent calls brought the news that the FAA was unhappy with our Builder Assist regulations, and they wanted Transport to provide an export document for Canadian amateur-builts being sold into the US, a document that would ensure that these aircraft had not been built from formerly certified aircraft or under the Builder Assist provisions of CARS 507. For the full story, please read the article in this issue.

**Montreal - Toronto -Windsor Airspace Review**

Tom Martin and I attended the most recent NavCanada meeting which dealt with proposed changes to the southern Ontario airspace. It has been nearly twenty years since this airspace was overhauled, and during that time there have been many ad hoc changes. The general public are now using more of the airspace and the VFR recreational pilots will undoubtedly be affected. NavCanada is asking for your input so that they may know how we currently use airspace in southern Ontario. The www.navcanada.ca website has a Montreal -Toronto-Windsor survey which is fairly difficult to fill out, but please persevere and stake your claim to the airspace you currently use. There is also a box for suggestions, and this is your chance to have your say. For once NavCanada are asking for input, so please take fifteen mnutes to let them know that we are here. If we sit back and do nothing, we could end up with only narrow VFR corridors and expanded Class C or D airspace.

**Canadian Dollar and US Imports**

Remember when our dollar traded at a 20% discount to the US? We mentally added one third to everything we saw in the US catalogs, and built our aircraft from expensive parts. Now that the Canadian dollar is trading at par or even above the US dollar, parts are a bargain and so are US aircraft. This is not a good time to be selling a Canadian plane into the US, but it is a great time to be buying an American plane. For amateur-built aircraft the import procedure has recently been streamlined; MD-RA now handles the import inspections for Transport Canada. Find a US amateur-built plane with 100 logged flight hours, pay the provincial tax and GST and call MD-RA for an inspection. Your new plane will undergo an inspection equal to the Canadian amateur-built final inspection, and it will then receive a Canadian flight authority. www.md-ra.com 1-877-419-2111

For planes that fit into our Basic Ultralight category, the procedure is even simpler and the supply is larger. The US has recently been cracking down on their "fat ultralights", planes that had for years been flying illegally because they did not meet the 254 pound empty weight requirement of the US ultralight category. Many of these planes weigh 350-500 pounds so they will fit nicely into our 1200 pound gross weight Basic Ultralight category. Barnstormers.com is full of planes on offer, and to register in Canada it is necessary only to pa the taxes, fill in the 26-0521 form, and pay the $110 registration fee. Here is the link to the full requirements: http://www.tc.gc.ca/CivilAviation/general/ccarcs/ultralight.htm.

Because Basic ultralights have no build standard or inspection, passenger carrying is not allowed, and the pilot must wear a helmet. If the plane has a second seat, a second pilot may occupy it if he also wears a helmet. What you cannot do is take your kids or Granny for rides unless they too have licenses.

It is remotely possible that you might find a US plane that meets our Advanced Ultralight category, but to register as one requires the cooperation of the manufacturer. The Advanced Ultralight category places liability on the manufacturers, and they are usually unwilling to assume this liability unless that are making a sale.

*continued on page 34*

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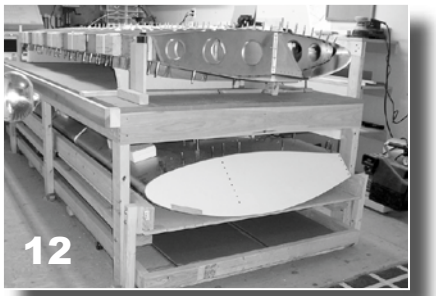
*The Recreational Flyer is published bi-monthly by the Recreational Aircraft Association Publishing Company, Brampton Airport, Cheltenham, ON L0P 1C0. The Recreational Flyer is devoted to the aerospace sciences. The intention of the magazine is to promote education and safety through its members to the general public. 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.*

# features






Dennis Vogan

# Team Canada

## Takes the Memphis 100

### by Wayne Hadath RAA #8753

**In horse racing there is a long held belief that racing improves the breed. In aviation it is rare for our planes to be raced, so we take our opinions from those willing to give them. For example, everyone knows that a glass smooth paint job is worth a few miles per hour to your plane. Everyone takes this on faith. However two Canadian pilots entered the Memphis 100 race with their F1 Rockets, finished first and second in a field of highly modified American planes, and created a lot more questions than answers.**

LONG BEFORE THE RACE STARTED there was a lot of posturing and bluster on the email lists, the usual head games found in racing. Some had $100K pumped-up engines, three or four were high time fighter pilots, and one had a tuned exhaust, special cold air induction, and who knows what else. When we met

**We steal the plasticene from our kids. Tom's kids are old enough that they don't care about plasticene, and mine are learning how to share.**


Rained out in Jackson, Tennesee

the day before the race in Memphis, if a slick paint job provides any speed advantage, most of them had it.

Tom Martin and I set out with the intention of enjoying the race and learning something, Just as much, we wanted to spend some time with the group of Rocket builders and aviation enthusiasts down there, and have an evening on Beale Street in Memphis listening to the live jazz and getting a feel for the town. We decided not to go to Graceland, saving that for later when we could bring our wives along. This trip was one for the guys.

Tom and I are both very interested in learning how to improve the performance of our airplanes, and we have each other to test against. We live within fifteen minutes of each other (at Rocket speeds) and frequently head up to see whose latest streamlining modification has worked better. Some mods have ended up slower, and fortunately both of our planes are finished in primer, so we can easily make all the aero mods we want. This is a cut and try process. We both enjoy this and it helps us to understand our airplanes. Neither of is spending big dollars on the modifications – all we are buying is bits of aluminum, and some epoxy and cloth. We steal the plasticene from our kids. Tom's kids are old enough that they don't care about plasticene, and mine are learning how to share.

## The Planes

Both our planes have IO 540's, the currently recommended engine for the F1 Rockets. Tom built up his engine himself, and installed high compression pistons and a single side electronic ignition. Mine is a zero time overhaul of a stock 260 hp IO540 D4A5 built by Bart Lalonde at Aerosport Power in Kamloops. Tom's has Airflow Performance injection, while mine has the stock Bendix. I run two conventional Slick magnetos, preferring these to electronic. When Bart built my engine he flow tested the cylinders so that all six cylinders would have fuel flows within half a gallon of each other. This allows lean of peak operation for fuel economy and engine cooling when I am not racing. Bart set my injection to consume 23 gph with everything pushed forward.When I lean for cruise I can run 10.5 gph at 60% power, giving a cruise speed of 210 mph. This works well for cross countries and for heading to the races.

Tom and I both run the standard Vetterman six-into-two exhaust with no silencers, but a six cylinder has a smoother exhaust note that is less offensive than a high output four cylinder. Tom runs a three blade composite MT constant speed, while I run a three blade aluminum Hartzell.prop. Tom is of the opinion that a Hartzell offers a top speed advantage, but the manufacturer of the F1 Rocket argues that the MT is its equal.

Tom and I had our final inspections a couple years ago, and since that time we have enjoyed fine tuning the aerodynamics of our planes. We started with the stock fairings and ended up with most of the intersection fairings substantially modified or made from scratch. My philosophy is that if my eye likes the look and my hand likes the feel, that is what I would do.

**Speed Secrets, top down: Exhaust outlets were cut flush with cowling; landing gear fairing was blended to the wheel pant fairing; forward fuselage and fairings received a lot of attention to improve airflow**

## My philosophy is that if my eye likes the look and my hand likes the feel, that is what I would do.

Neither of us has a wind tunnel, but our speeds seem to bear out that at some level this approach has merit. We spent a lot of time running our hands over the aluminum and fiberglass looking for ripples and discontinuities. Priming and sanding removed these, and Tom's plane is extremely smooth.

We also have paid attention to bug splatters, and if the impact zone is long and narrow, we presume that air is moving smoothly over that part. Nature's own tuft testing. In areas where the splatters are circular, there must be some drag associated with that airflow. We have addressed these areas. Right above the air intake scoop there have been many bug splatters and Tom has addressed this with a circular intake scoop. I intend to deal with this over the winter. Tom has gone further than I have in some areas and has even made a wheel pant for his tailwheel.

Both our planes have a slight concavity of the lower fuselage sides immediately aft of the firewall. We used microballoons and epoxy to correct this. The fitting of the wing root fairings and the transition of the landing gear legs to the fuselage was improved at the same time. The Harmon Rockets have an even greater concavity in this area, and the F1 almost completely corrected this. We just finished the job.

We both paid meticulous attention to fairing the fuel drains and other projections that are usually out of sight on the bottom side of the wings. We even cut the ends of our exhaust stacks so that they would not project into the airstream. We have downturns at the outlets, and the bottom sides were trimmed parallel with the airstream. Prior to cutting, I could see from the colouring of the stainless steel that the forward edge of each pipe was running cooler than the rest. This is what we ended up cutting off.

We also paid attention to the air heading to the injection, with Tom's cowlings being more heavily modified than mine. We felt that there might be a restriction to the flow of air, so we opened up and smoothed the funnel after the air filter. The funnel was originally tapered to about 2-1/2", and I opened it up to 3", prefaced by a generously radiused bellmouth. Subsequent manifold pressure comparisons showed that I had gained half an inch of manifold pressure with this modification.

Weight has always been one of our major consid-


Race Briefing. Do and Don'ts

erations, another reason that we have our planes in primer. I figure that with one thin coat of primer my paint job weighs eight pounds. I shot one and a half gallons and sanded much of it off. Some of the other competitors have numerous heavy layers of clearcoat. Our planes have no interior beyond the minimum. Tom has a sling seat, while I have light upholstered cushions. We have both found these comfortable enough for flights to BC and Texas. The racing experts say that weight means little to top speed, but we are not so sure. Next spring we will be doing back to back experiments to determine the effect of weight on these aircraft.

Throughout all of this Tom and I have been careful to avoid the demon tweak syndrome. We refuse to do anything that would reduce the safety or stability of our Rockets. These are our daily drivers and we want to make sure that we still enjoy our planes.

## PreRace

Our strategy was to get to the race early so that we could prerun the course. At a previous race we had learned that running a race without knowing the course can certainly affect your time. Prerunning means that you know the terrain and the turn points, where the towers are, where the start point is, and where the alternate landing spots are. Landmarks before the turns can be noted, and the GPS coordinates can be verified. This makes a large difference to the comfort level during the race. Approaching an unfamiliar turn at 250 mph can be distracting and there is nothing good about being unprepared. Tom and I preran the course on Friday in the company of other pilots using the same strategy. After running the course it became apparent that low level flight would be possible and safe for much of the race. The land is as flat as a pancake and no one lived anywhere nearby, so low level racing would be legal. The course is a triangle, so part of my strategy was to fly high with a tailwind and low when the wind was on the nose. This race is a 100 mile SARL (http://www.sportairrace.org/index.html) sanctioned race, with a flying start and flying finish. There are many classes of aircraft entering – this is sport racing – and a flying


**Ready to Rock: the Canadians prepare to amaze. Tom's aircraft in the foreground.**

start accommodates them all. Before the race there is a half hour safety briefing which must be attended by all entrants. The fastest aircraft start first, and the slowest start last, to avoid congestion in the corners. The planes are lined up on the taxiway in order of speed, and sometimes this can be difficult to determine accurately. Airspeed indicators do lie, and sometimes the pilots do too. The intent is to prevent sandbaggers from overtaking others in the corners. Why would anyone want to start from behind the slower planes? Well it is a lot more fun if you are passing a lot of planes during the race. One Lancair pilot started near the back of the pack and was on the radio the whole time telling everyone that he was coming up on them. He was supposed to have started second, but for him this was the point of the race. Fortunately he never caught me. I started in seventh overall position, fourth in the Rocket class.

## Start Your Engines

A flagman tells everyone to start their engines, and the pilots taxi in order to the runway. Each plane enters the runway when individually flagged, and takeoffs are every twenty to thirty seconds, when the flagman has determined that it is safe to release the next aircraft. The aircraft then take off and proceed to the start line which was four miles from the airport. The maximum permitted altitude was 1800 AGL in that area, so my technique was to climb to 1800 and then dive to 500 ft at the start line. For the first leg I ran at 500 ft AGL and there made my first pass, a beautiful black F1 Rocket named BlackJack, built by General Jimmy Cash of the USAF, who in past years had informed everyone in the pits that this was one fast plane. As I approached the first corner I was coming up on two other Rockets who were flying at 1000 ft, and it appeared that their strategy was to turn sharp and pull back. It is pretty cool to watch two F1 Rockets flying close together doing a high speed, high G, tight turn. The first turn was about 120 degrees, so I used the advice given to me by Howard Rhodes, fellow F1 builder/flyer and ex-military pilot. He was gracious enough to share his vast experience with a fellow competitor and suggested that one effective way for a sharp corner turn was to pull up to exchange speed for altitude, turn sharply at low airspeed, then dive back to racing speed once out of the corner. Just before the turn I climbed sharply to 1200 ft and made my turn at low G's, and was able to stay well inside the other two Rockets, but I was still behind them. After the corner I dove to 500 ft for the second leg. Shortly, I passed the Rocket that had

started in first place. This one had the $100K engine and all the bells and whistles. At this point I could see Tom and I noticed that he was getting larger, so I think that flying low provided me a wind advantage. Just before the second turn I caught up with Tom, but because I was planning to climb again I had to break left to avoid crowding him in the corner. The etiquette is that each pilot announces his approach to the turn on the common frequency, and then his actual turn. When I hit 1800 AGL in the pull up I made another tight low G turn and stayed at that altitude for most of the last leg. Shortly after turn two I passed Tom who was at that time climbing to 1800. As per the rules, I went around him on his right and let him know over the radio. Tom graciously responded that I was going to win this race.

The last leg was straight down the Mississippi with a 20 kt tailwind, so I flew it at 1800 ft AGL, and five miles from the finish I began diving to 1200 ft, the lowest I was allowed to fly in that airspace. At that time I saw groundspeeds over 280 mph just as I was crossing the line. There was no victory roll – instead I broke to the right, entered the cooldown zone then joined left downwind at 45 degrees and landed. Tom finished second, twelve seconds later, and landed just before me.

There was no bevy of bounteous beauties to greet us. This is recreational racing, and most pilots' wives wouldn't appreciate that much recreation anyway.

**Tom and I had never expected to win the race. We built our Rockets as sports planes, not as race planes, but it appears that light clean planes can win against the heavy dollar efforts.**

At the awards meeting afterwards the organizers Jeff Linebaugh and Rick Pellicciotto announced that Team Canada finished first and second, beating the next competitor by over 10 mph and one minute.

The results showed that my speed was 245.32 mph and Tom's was 244.21. The third place Rocket, flown by Ray Edmiston, had a speed 234.77 mph. The slowest Rocket, Blackjack, had a speed of 230.25 mph. The US pilots took the loss to Team Canada in a sportsmanlike manner. Howard Rhodes, who had given me the cornering advice, said that the Americans didn't just get beat, they got beat like a drum.


**How would you like to race *this*? The Hawker Sea Fury struts its stuff**

Tom and I had never expected to win the race. We built our Rockets as sports planes, not as race planes, but it appears that light clean planes can win against the heavy dollar efforts. The average builder can apply many of these simple cleanup techniques to his own plane, whatever the type. We encourage all of you to enter races. It's a lot of fun and if it motivates you to become better builders and pilots, so much the better. Entering a race gives you a focus with your toy, and the spinoff can be a more efficient airplane. As I said at the beginning, Tom and I now have more questions than answers about what creates speed. Team Canada will be entering more races in our quest for an answer.

# IMPORT

*Just a few years ago the thought of being able to import a completed amateur built aircraft other than a personal possession of a landed immigrant was a dream of many. My, how things have changed!*

## *YOUR HOMEBUILT?*

*Bill Tee*

I assume that we re all familiar with Airworthiness manual chapter 549, a document produced by Transport Canada which came into effect on June 30, 1993. Oh, so many years ago! At least if you have already built your aircraft you should be quite familiar with 549 since this document lays out what you have to do to build and fly your own aviation creation. Chapter 549 lays out certain parameters that have to be met in order to get a flight authority for your self built bird such as wing loading, maximum weight, number of seats and other important item such as what labels you need for a safe and legal airplane.

Now lets jump ahead to 13 June 2006. What happens here is that an exemption from section 549.01 is put into effect. Why an exemption rather than change 549? Speed is the answer! To change 549 it may take years for the changes to go through the system whereas to issue an exemption takes very little time. Eventually 549 will be changed or replaced with a newer document that will incorporate the data in the exemption.

So what does this exemption do for us? Well, for one thing it permits a builder to legally engage 'experts' to virtually construct an amateur built aircraft.. However those who work on your project are not the builder. YOU are the builder and will always be the builder! The person who owns the kit or plans is the builder, even if you never lay a hand on your pet. You are the prime contractor and are fully responsible for all the work that you have hired out or have allocated to others just as though you did it yourself. Keep a good eye on those who are creating your project because in the end it is your neck that is on the line and your name that appears on the ident plate [and all other required documents] .Also any questions re the project an inspector may ask will be asked of you and you alone. You are expected to have the answers, so to avoid embarrassment keep in touch with what is going on.

However the main theme of this article is the importation from a foreign country of a completed and flying amateur built aircraft and it is this exemption from 549 that allows this to happen.

Of course the first thing that you want to do if contemplating the importation of an amateur built aircraft is ensure that it meets Canadian requirements which is basically 5000 lbs. max gross weight and of course that it meets the maximum empty weight requirement to ensure adequate capacity for occupants and fuel. If wing loading is excessive it will

fall into the high performance category and you will need a licence endorsement in order to fly it legally [see Transport Canada for details]. If your import comes with more than four seats you might as well take out the extras to save weight as they cannot be legally occupied in this country by people when registered here. When you have chosen your likely candidate do not go any further before you get in touch with MDRA at 1-877-419-2111 in London Ontario for further instructions.

Next of course as with any aircraft you would want to examine the aircraft and its records to ensure that it meets your quality standards. Remember, when the aircraft lands here it will be subject to a 'final' inspection where the inspector will not only check it for labels and equipment [fire ex, ELT, fuel shut off valves, gascolator etc] but for the apparent quality of construction and any unsafe features such as bad corrosion and apparent cracks in the structure. Keep in mind that the inspector will not be able to do a complete inspection of closed areas and that a pre closing inspection is not required in aircraft built in the USA. British built homebuilts are subject to at least the standards of our programme and in some cases then some.

Another thing to watch out for is that the fire proof ident plate is on the aircraft, both when you first view it and also when you take delivery. It has been said that cases have arisen where in order to supposedly reduce liability the builder will a have removed this vital item. Without the ident plate in place the aircraft can only be imported as a project and would be subject to all inspections required of a bird built here. These could without doubt entail the stripping of skins in order for the inspector to examine the internal structure and you are now officially the 'builder' with your name on the new ident plate. Composite aircraft could be a real problem! Are you sure that the builder does not have other ulterior motives in eliminating the traceability of the aircraft by removal of the ident plate? The ident plate on the aircraft must stay with the plane for its life so the one that you get on your plane is the one that you live with and it is not to be altered or replaced. Do not even blank off the 'experimental' line on the ident plate although the 'experimental' label inside / on the aircraft must be removed. Only with the permission of TC can an ident plate be altered or replaced.

Ensure that the aircraft has at least 100 hours of air time on the airframe. This is in lieu of a pre cover inspection. It is assumed that if the aircraft has lasted at least 100 hours of flying there must be a degree of structural integrity prevalent. These rules are directed mainly to aircraft imported from the USA but there are amateur built aircraft from other countries flying in this country. If you wish to import an aircraft from places other than the USA such as the UK which has a more thorough inspection programme than the Americans you should contact your local TC rep to see if the 100 hour flight requirement is still required.

Be also aware that you cannot get a Canadian registration until you can provide proof that the foreign registration has officially been cancelled. To bring the aircraft into Canada of course one can dismantle it and ship it or fly it in with it original foreign registration which would subsequently be cancelled after arrival. Alternately a provisional Canadian registration can be applied in the country of origin and the aircraft ferried into Canada on a ferry permit where it will undergo the prescribed 'final' inspection.

Many times I have been asked about importing a partly built home built aircraft. This is usually OK providing the project is in such a condition that an inspector can inspect all the structure except any closed areas that were closed by the kit supplier at his facility.[the 549 exemption also decrees that such items need not be subsequently inspected]. Any components that you may assemble at the kit suppliers or any other facility anywhere including completed aircraft are not exempt from the requirement for a pre cover / closing inspection, done by a T.C. approved inspector, even if it is built under expert supervision.

*As with any transaction it is 'buyer beware'. Research your proposed purchase thoroughly and if possible review its history.*

As with any transaction it is 'buyer beware'. Research your proposed purchase thoroughly and if possible review its history. Remember, log books are not always to be trusted so use your common sense or review the item with a knowledgeable person. If something looks too good to be true, it usually is!

**The First Mission:**

# Build It!

*Building my own aircraft: what a wonderful idea, but then some good reasoning took over. 'Will I be able to complete such a formidable task? The first step was clear; some detailed research was required. One of the top issues for success that surfaced in many articles was the ability to work effectively on the project. It has to be easy to put in time as the opportunity arises. The best solution is to build at home, and right in the house if possible. This article is about some of the decisions I made and the workshop I created in my basement that I hope will maximize the likelihood of finishing my aircraft.*

The first step was clear, some detailed research was required. One of the top issues for success that surfaced in many articles was the ability to work effectively on the project. It has to be easy to put in time as the opportunity arises. The best solution is to build at home, and right in the house if possible. This article is about some of the decisions I made and the workshop I created in my basement that I hope will maximize the likelihood of finishing my aircraft.

I must confess, I was a little fortunate with my house layout. I had a single car sized store room at the back of my attached garage that was filled with items long since used. It was amazing how my new project helped quickly designate these items as 'junk'. However, would this available space be enough, as the store room size was only 11' by 17'9"?

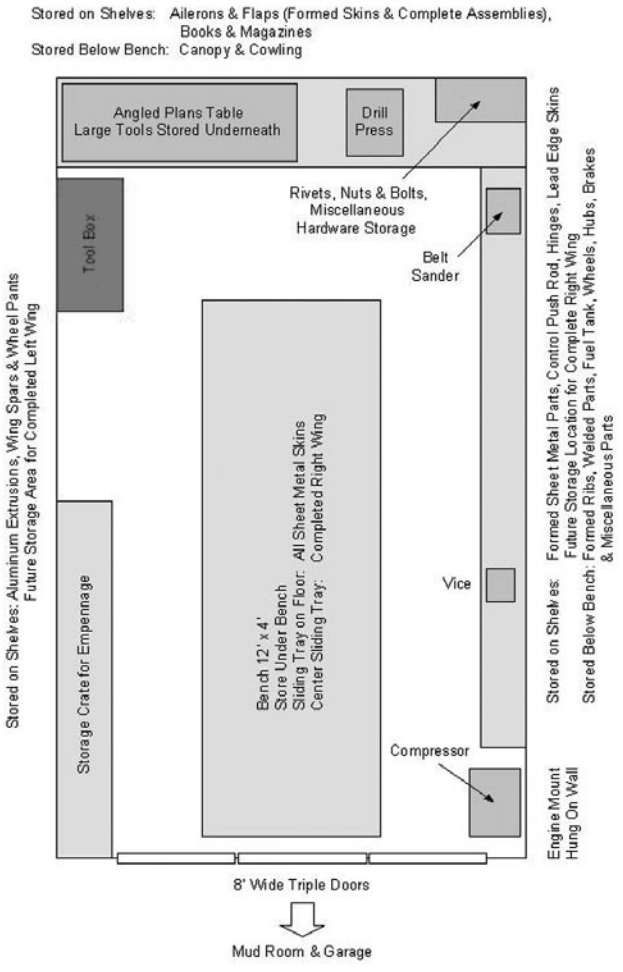
You may find it interesting that my choice of aircraft was partly decide by this available space. After all, my first rather long mission for the aircraft is to get it built. I also wanted to store the aircraft, wings off of course, in the same space if finding a home for it at some point became a problem. Choosing an aluminum aircraft would also mean less demand for controlling the environment for proper glue or epoxy setup, plus it would avoid any fumes getting into the house.

Hmm…..small aluminum aircraft….pulled rivets, I'm a one person team on this project….exciting performance and good looks….. wings come off relatively easily…. great plans and support…..Sonex looked like a good fit for me and the store room.

Scratch building seemed too much for me, so I decided a kit would be the best approach. However, this added to demands on the space I had available, as it would also be required to store all the parts. Though I could buy the parts as I went, this adds significantly to shipping charges, plus it has not been unheard of that kit companies can have some difficulties on occasion. Therefore, I decided to purchase the entire kit.

So there we have it. A full Sonex kit would be procured, the store room would be converted to my new aircraft workshop, all the parts would be stored in it, and believe it or not, I planned to store all the completed parts in the shop as I progressed.

I am now 600 hours into the project having completed the empennage and had it inspected, completed the right wing, aileron and flap ready for inspection, and am well into completing the left wing. Surprisingly the workshop seems to be working out well and looks like it will meet my overall requirements. Here is how I organized my workshop




Though aluminum and rivets are not sensitive to temperature, I certainly am. So the first step after cleaning out the store room was to add insulation. As it had a concrete floor, I decided it also needed insulating, so I put down 1" x 3" strapping and ¾" Styrofoam covered with ½" ply. This has ensure my feet never get cold while wearing just sneakers or light shoes even in mid winter when the shop takes a while to heat up. The outside concrete wall got the regular 2"x 4" treatment with glass insulation and drywall. A one kilowatt heater gets the shop comfortable in about 15 minutes on the coldest days. I decide not to hook the force air central heating into the workshop, even though the furnace room was just on the other side of the left wall. This was a good 'house friendly" step as any dust generated and occasional fumes from zinc chromate primer are kept out of the living area.

What would work as a suitable bench height was a bit of a guess. The 4'x 12' bench I new would need to be low allowing me to work easily on large assemblies, so I set it at 28". This has been an acceptable height for the empennage and wings, but a box to stand on is anticipated when working around the fuselage. After all, I'm only 5'6" tall. The 2' deep bench at the rear of the shop is 38" high along with the 1' deep shelves on the right side. At just below elbow height, the narrow shelf is a surprisingly comfortable

**Figure 1: Work in progress, assemble part storage and raw materials all in the same floor space**

work surface where I do a lot of the detailed work and don't get 'crowded' by the wall just behind it. Surfaces are ¾" MDF, which has a hard smooth flat surface easy to sweep clean of aluminum swarf and other damaging debris. It also takes screws well with a pilot hole, which has been important for securing the various wooden jigs I am continually fabricating when that third or forth hand is required. Below the 4'x12' bench, is a tray that roles on the floor containing all my large sheet components and another large sliding shelf where I currently store my completed right wing.

When opened up, the Sonex plans take up a large space and I wanted a dedicated location for this valuable and regularly scrutinized asset. The plans table is 5'6" x 2'4" with a 4" lip at the bottom. It is mounted at 30 degrees and hinged at the wall. The lip includes a handle allowing me to lift the table and store long clamps, rulers and power tool boxes beneath it. No space can be wasted.

*Planning a well organized workshop that meets your individual needs is a very important first step. After all, you are going to potentially spend a thousand hours or much more in it.*

In such a small workshop, it would be easy to damage my finished assemblies while handling long or large components. I therefore took the time to build a crate for the empennage so it could be safely stored along the left wall. The top of the crate is also a useful shelf for odds and ends. I'll also protect the wings with particle board when they get stored up on the walls.

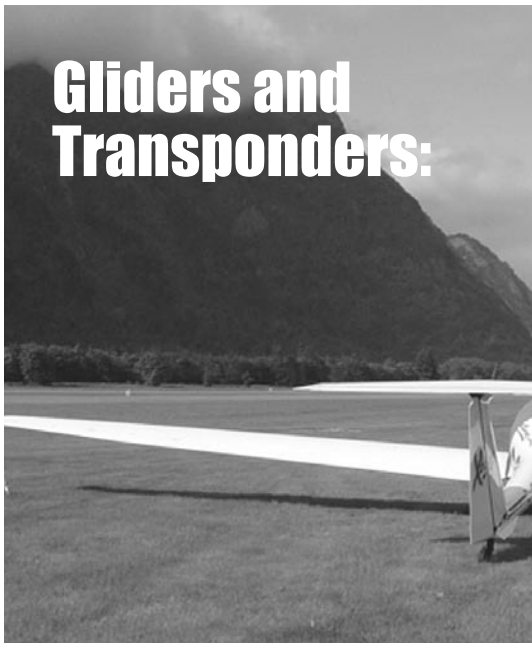
So far I have been very pleased with how my workshop is accommodating my needs. I have yet to make any changes to what I first constructed. I can see it may become quite cramped as the fuselage gets completed, but then the end will be in sight and the

**Figure 2: I spend hours studying these plans, the height and angle has certainly helped my back.**

suffering hopefully limited. This is definitely a one man shop as it is not practical for two people to pass on the two side alleys.

Planning a well organized workshop that meets your individual needs is a very important first step. After all, you are going to potentially spend a thousand hours or much more in it. MDRA clearly recognizes the importance of your work area, as a comfortable and well lit workshop is one of their check list items. Just don't over do it and forget to build that aircraft.

# Gliders and Transponders:



**Sailplanes Exempt From Transponer Requirement**
**By Ken Armstrong**

I AM RESPONDING to the President's Message in the July-August 2007 *Recreational Flyer*. As a director of both RAA and COPA, I am well aware of our goals to foster and promote a broad spectrum of aviation in Canada and thus was surprised by many of the comments espoused by the president of RAA. Firstly, he is slinging arrows in the wrong direction. The "unfathomable reason" Mr. Wolfe was unable to deduce for sailplanes having a transponder exemption is common knowledge. It has to do with the fact these gliders to not have engines to drive alternators or generators to provide the necessary amperage for the demanding draw of a transponder. (They do however carry portable radios with internal batteries for cross country and local flying to remain in touch with other aircraft, controllers, towers and their glider operations ground station.)

The reason gliders do not file flight plans relates to the very nature of soaring which dictates the glider goes where the lift is so they can remain aloft and the location of rising air is elusive and constantly changing. Glider pilots often land at a different airport or a field well removed from their departure airport and then use their cell phones to call their base for a tow or a trailer retrieve. This is the nature of glider flying and the technology derived from these high performance aircraft is often utilized in our homebuilts, corporate and airline aircraft. Moreover the number of pilots trained in gliding fill our cockpits to enhance our aviation transportation system. Consider the thousands of quality aviatiors produced by the Air Cadet gliding program and the contribution that one program makes to minimize the pilot shortage Canada is suffering.

The real culprit in the airspace conflict you refer to is NavCanada, an organization that continually bows to the demands of airlines – their primary revenue source. The issue has evolved because of the recent airspace grab by NavCanada over the glider facilities that have been operating for roughly half a century.

You flying friend in the corporate world, undoubtedly with two pilots in the cockpit, will of course know that when he is flying in VMC conditions he needs to be looking for conflicting traffic – and indeed he was as he saw the glider and took evasive action – that's the way VFR works. Moreover, gliders aren't all that difficult to see as they typically have wingspans the size of the corporate jets and are turning much of the time they are flying thereby providing a more visible target and the glider pilots' heads are out of the cockpit as soaring is very much a visual maneuvering flight skill. Kindly recall that gliders have as much right to the airspace as corporate aircraft – and amateurbuilts. Mind you, NavCanada is trying to change that regulation and provide priority to airliners etc. This is simply another draconian measure in a chain of actions that NavCanada has undertaken to impede general aviation.

*Kindly recall that gliders have as much right to the airspace as corporate aircraft*

I don't think of a corporate jet as "agile," as its flight envelope dictates otherwise. Moreover, a 200 seat airliner would in most circumstances incur little damage should it fly through a glider – so let's not get dramatic. Nonetheless, the real point here is that in the "see and be seen" world of VFR flying, we must be ever vigilant. Most of us who have been flying for decades have had near misses. In fact, some of mine were during IFR flight due to controller errors and some of those same instances occurred in VMC conditions when I took the evasive action in a heavy twin to avoid other IFR traffic. Anyone who flys IFR and believes a controller will always keep them clear of traffic and terrain is an accident looking for a place to happen….

However, the primary question that arises from our President's knee jerk reaction is: "Who do we support at RAA?" Are we in existence to provide arguments for commercial aviation and NavCanada, or, is it our wish to support all of general/personal aviation – a portion of which is the very significant group of aviators who fly gliders? Would we want to have transponders on ultralights, self launching aircraft and parachutist next? After all, they can fly quite high too!

# Two Views

**Gary Wolf's Response:**

My previous article was not written in a vacuum. I first tried to get some answers from the sailplane association and the various clubs, but the only rep who would speak took the position that gliders have owned the airspace for over forty years, and Westjet and others will just have to accommodate.

*If they do not wish to spend the two thousand dollars, they have the same choice as every other non-transponder pilot - stay out of the transponder airspace.*

He also said that since Westjet caused the current problem, they should pay for the gliders' Mode C transponders. Two meetings did not have any effect on that position, so I finally gave up hoping for some middle ground.

At one time I could have agreed with many of your points, but the airspace is becoming crowded and the public will not stand for private aircraft endangering their safety. Mode C transponder airspace presupposes that every plane in it will have a transponder so that radar and TCAS will recognize every target. At one time it was physically impossible for a sailplane to carry a transponder, but nowadays a Micro-Air fits into a standard 2-1/8" panel hole, weighs under two pounds, and draws 3/4 of an amp. Even the pilots of basic ultralights and hang gliders who wish to enter the transponder airspace must be Mode C transponder equipped to enter the new YYZ transponder airspace, and fortunately battery technology has progressed to the point where this is now possible. If they do not wish to spend the two thousand dollars, they have the same choice as every other non-transponder pilot -stay out of the transponder airspace. In Ontario the new 6500 ft floor leaves a 5000 ft vertical band for the non-transponder VFR crowd, certainly enough for most of us.

When every plane using Mode C transponder airspace is actually using this equipment, the VFR situation will become improved. Currently the controllers vector heavies through low altitudes because the risk to the public is the same whether or not they are in transponder airspace. Right now no one can fault a controller for exposing an airliner's passengers to undue risk, when there is no guarantee that the Mode C transponder airspace is actually quarantined. Once every target in the YYZ Mode C transponder airspace is transponder equipped, why would a controller choose to risk the public by routing them through non-transponder airspace?

Heavies and corporate jets are routinely told by controllers to descend through cloud, and then to maintain VFR. The problem is that to maximize their use of the thermal, sailplanes tend to ignore the 500 ft clear of cloud requirement and instead park right at cloudbase. A Mode C transponder would at least make it possible to know that the sailplane is there, before the heavy breaks through the base of the cloud. Since I wrote that last article I have attended another NavCanada airspace review, and it appears that the glider community has recently modified its position -they now admit that they will likely have to stay out or else buy and install transponders, same as everyone else. They have asked for a local modification of the current 65 nm YYZ circle to assist in their operations, and in the meeting RAA supported them on this.

Please remember, we do not own the airspace - we borrow the use of it from the Canadian public, and to them we are all just rich playboys with expensive toys. An unsupportable position on transponders will fall on deaf ears.

# Across Canada

*RAA Chapters in Action*

### RAA London-St.Thomas

Security changes have been in proces at the St. Thomas Airport. Now, you must apply for a security gate pass to get form the car parth khrough the electronically controlled gates to the hangars. This is part of a Transport Canada initiative to tighten security for smaller airports, not just St. Thomas.

President Angus McKenzie reported on his recent moose hunting trip to the Killarney area, flying there in his float equipped Murphy Rebel. While he was away from camp trying to call a moose, a bear found and ate the food he had submerged in the lake to keep cool. MD-RA Inspector Bob Buchanan reported on the recent MD-RA inspectors upgrade meeting in London.

Three members spoke on their favourite fabric systems. Ron Riley, a 10,000 hour pilot and restoration specialist, explained the mysteries of fabric and traditional dope. Mike Frijters described the Poly Fiber system, and Richard Danbrook explained how to cover and finish using exterior latex paint.

### Chapter 85 (Vancouver)

After years of service, President Gerard van Dijk made way for new Prez Tim Nichols. Thanks, Gerard, for all your work!

Joan Cox wrote a piece in the Chapter newsletter about their trip down to Reno in support of member Adrian Cooper's Cassutte, Miss T'witchie. A great adventure!

The RV-7 being built by Joan and husband Chris is approaching completion. The painting is being done in the chapter shop. Hopefully an article on this soon?

The December meeting was the Chapter's annual Wine and Cheese party. It was well attended with a good selection of food and deserts availiable. We also had a very short ( so appropriate for the "meeting") thank you and introduction speech by Gerard. All seemed to have a good time among the seasonal decor and wonky floor. The club's Turbi is flying nicely in cold (by BC standards) weather.

The January meeting will feature Jim Lovelace, of "Wings Over Canada" fame.

### RAA Toronto Region (Brampton)

Our October meeting was addressed by Gary Wolf, who brought us up to date on the changes to the airspace above and around Brampton Airport. Our November meeting was addressd by Jan Dadson, whose beautiful Glastar was recently featured on the cover of the Rec Flyer. Jan is overly modest about his accomplshment in building this plane. The RAA-TR Christmas Party will be December 1st at the Brampton Flying Club, and we are having an Old Fashioned Turkey Dinner with all the trimmngs.

### Kitchener Waterloo RAA

Tom Mills spoke at the November meeting on the topic of his just completed Cuby, that has just undergone a complete four year restoration. The plane even received a fresh engine and propellor. First flight was in the early afternoon, right before the chapter meeting. Our December meeting was a Christmas party at the local golf club, where Mike

Left to right, Wayne Hadath, Ted Strange, David Moore, Clare Snyder at a KW-RAA Wednesday coffee meeting.

Thorp was the Emcee. Mac and Pat McCulloch made the arrangements for the dinner, and bought and wrapped all the door prizes. As usual, Mike roasted the members lightly in his post-dinner show.

Kelowna RAA member Ted Strange dropped by for a visit with the Wednesday morning coffee crowd, en route to a cruise around Cape Horn. Ted entertained us with news of his Canuck restoration and heard about the changes to the Toronto area airspace.

### RAA Flamborough

Neil Mont shared stories about his favourite pastime - night flying. His Davis DA-2 is now equipped with a transponder, which he says very quickly puts him on side with the air traffic controllers. For landing lights Neil recommends Canadian Tire 50 watt fog lights. Frank Ball's November newsletter included an article on Bill Spring, who is acknowledged to be an expert on Hummelbirds. Bill revised the Hummel drawings and produced an instructional video of its construction. He encouraged members to persevere until their planes are completed and flying.

### RAA Oshawa

President Jim Morrison encouraged members to keep flying through the winter, but to take extra caution including a survival kit, warm clothing, and a working ELT. The chapter dinner and awards night is December 8th, and Weldon Howell and Peter Snaith are selling tickets. The November newsletter included the news that Precision Airmotive had discontinued the production of aircraft carburetors due to a lawsuit and non availability of insurance. (Editor's note - another company picked up the rights within a couple of weeks).

### Kamloops RAA -Thompson Valley Sport Aircraft Club

President Dick Suttie reports that several new pilots are interested in moving to the club's Knutsford strip. Some have recently moved to the area and others are locals interested in buying or building planes. Bill Huxley and Camille Villeneuve have been doing a lot of flying through the scenic mountains. Dick has been busy ribstitching the wings of his Super Koala, when he hasn't been travelling to Europe for holidays. The chapter Christmas party and gift exchange is as usual at the ABC restaurant, and copies of the chapter's calendar will be on sale for $10. The online newsletter has a for sale section featuring a Moni motorglider and a Sonerai 2L. http://www.ocis.net/tvsac/newsletter.html

# TC Changes the Rules

## An Update From Gary Wolf

**THE CHIEF OF MD-RA HAS CALLED to say that there is an immediate change in a Transport policy that has for the past few years been allowing Canadians to dismantle an old certified plane, and rebuild it as an Amateur-Built, using some of the original parts.**

**MD-RA has now been instructed by Transport Canada that they are not to open any more files for conversion of formerly certified planes to be rebuilt as Amateur-Built aircraft. Builders who already have a file with MD-RA will be allowed to go through the inspection process and receive a flight authority, however no new applications will be accepted. There has been no directive yet to explain how Transport would deal with swap meet components that are incorporated into Amateur-Builts.**

**These conversions still had to meet the 51% requirement, and they could no longer be called by their certified name. We have always been able to find parts at swap meets and incorporate them into our Amateur-Builts. To deregister a certified plane and reduce it to a pile of parts just saved a lot of shopping around. All used components are inspected at the precover or final inspection to ensure that safety is maintained. Standard procedure was that MD-RA has always contacted Transport for an individual ruling anytime a builder applied to use a major component from a certified plane. The Transport rep who made these rulings is the same person who has now shut down the use of formerly certified components.**

**Keep in mind that there is a CARAC process in Ottawa, at which all stakeholders meet to propose and approve changes to the regulations, and RAA has long been part of this. Experienced people can then provide input when major changes are being made. In this latest decision, by changing policy instead of regulations, Transport has sidestepped taking input from the stakeholders. This latest change is a kneejerk reaction to questions the FAA has about our category in Canada.**

**I immediately called Transport's rep to ask how this new policy would be implemented, and the first answer was very evasive. It quickly became clear that the rep had shot from the hip, and had no answers that made any sense. At first he said that we could deregister a plane, sell the parts off at swap meets, and the purchasers could use them in A-B projects, however it would be illegal for the owner of the deregistered plane to use the same components himself. He then said that we could reuse only two formerly certified components –two wing ribs, and nothing more. The lack of logic did not seem to bother this worthy. I asked a simple question, "Where is the line now drawn between building from a deregistered certified plane, and starting with a pile of swap meet parts?" His answer was that I should stop asking questions, and instead write the interpretation myself. This is exactly how Transport handled the Builder Assist regulations –they wrote a loosely worded document, and RAA board members had many meetings with Transport until we ended up with the current wording. The travel costs for the Ottawa meetings were very expensive for a volunteer association, and I am not willing to work for free again while Transport's reps sit back and collect their salaries.**

**Next step was to swim upstream at Transport to see if anyone could give a logical answer. The Chief of Policy Development was very accommodating, and explained that the FAA was concerned about Canadian conversions from certified to A-B, and do not want any of these being sold into the US.**

**Transport has sidestepped taking input from the stakeholders**

They had been asking that Transport provide an export document for Canadian A-B aircraft that were sold into the US, something that Transport was unwilling to do. The FAA were also looking askance at our Builder Assist regulations, because they require that the builder perform 51% of the work himself. Transport managed to convince the FAA that the number of Builder Assist and formerly certified aircraft was very small. It now appears that the deal that was struck is that we may no longer deregister an old certified plane and use its parts to construct an Amateur-Built aircraft. There might also be repercussions for Builder Assist.

I explained that the new policy would leave many Canadians with useless piles of formerly usable and valuable components that had lost their tracking and could not be reused in certified aircraft. I also pointed out that if the FAA really were concerned about Builder Assist, they should first have a look in their own backyard. Even the simplest internet search will reveal that the US is full of companies offering to build Amateur-Built planes for Americans who do not have the time or skill to do this for themselves. In Canada we have legitimized what had been going on for years, while the Americans seem to prefer that their builders lie in their paperwork. If the FAA continues to look askance at our legal Builder Assist aircraft, the logical course would be for Canadians to do as the Americans builders do.

Since that first contact, the Chief and I have had daily phone calls and emails, in an attempt to establish a policy for the reuse of formerly certified components. He soon became willing to allow the use of major components no matter where they originated, but for the 51% evaluation they would be given no credit, even if for example a wing were fully unriveted for the precover inspection. The justification for the A-B category is education and recreation, and to rerivet a wing is not a simple process. It certainly results in a lot of education, but this work is considered by Transport to be maintenance and at present it will not be credited towards the 51% evaluation. If it were necessary to replace a wing rib or tip, credit would be given only for that work. I compared this a Van's fastbuild wing, to which the builder installs a rib and the tip, and is then credited for having built a wing. Apparently the FAA is asking a similar question and is reconsidering how to evaluate fastbuild parts. You should expect that Transport's future policy for fastbuild will mirror whatever the FAA decides.

I have been asking for a written clarification, a clear explanation of what will be allowed and what will not, and I have explained that it is in Transport's own interest to do this very soon. Until Transport writes a clear policy, builders will be reluctant to buy any used certified parts, and they will want a ruling for each and every part they do purchase. I offered to print the names and phone numbers of the Transport personnel who make the decisions, and they quickly understood how important it is to write a clear explanation, and to do this in a timely manner.

**What is curious in all of this is that neither the FAA or Transport ever mention the word "safety" as a reason for their new policies. The test should always be whether the finished plane is a safe one.**

At this point I would not recommend opening an MD-RA file for anything that could be considered to be a formerly certified aircraft, especially if you live far from Ottawa where the decisions are made. Far flung Transport offices will find it easier to deny than to approve, and until we have a few test cases in Ontario that will likely continue to be the case. Several Ontario RAA members have already opened new files for projects that incorporate major pieces from certified aircraft, and we will keep you abreast of the decisions that are made on these. Please do not call MD-RA for clarifications –they do not make these decisions; this is Transport's turf.

Regarding Builder Assist, if you ever plan to sell or fly your plane into the US, it might be prudent to minimize the inclusion of this information in your builder's log. It is sad that the process might encourage honest men to become liars, but unless the FAA changes their opinion, how are we to act?

What is curious in all of this is that neither the FAA or Transport ever mention the word "safety" as a reason for their new policies. The test should always be whether the finished plane is a safe one. Instead they appear to be focusing on whether T's are crossed and I's are dotted. Of course this is to be expected because they are regulators and not builders. An uncomfortably large number of these regulators are not even pilots. And this is the system under which we build our aircraft.


Lee Coulman

# SEAREY

## Fun In (And Out) Of The Water

It's not pressurized. It won't hang around FL180. It's not even fast. But the SeaRey will paste the biggest permanent grin across your face! Not only is it a great flier, the places it takes me, the people I've met and camaraderie I've experience are unlike anything I've had before in this sport. Yeah, I know: the concept of an amphibian is not something new or revolutionary. But amphibians generally represent a compromise of some regime of performance by nature of the beast: not the best at being a plane or a boat. However, this little aircraft seems to defy the rules here without breaking the bank! / by Dennis Vogan

C-FBSE is one of the earliest SeaRey kits Progressive Aerodyne out of Florida produced back in the mid 90's. I purchased locally in 2002 as a partially completed project. Since this kit was made there have been several factory improvements to the SeaRey: the most significant being the hull design which has only made the water-handling characteristics better. Many have referred to the latest hull design as the 'Land-O-Matic' hull. It's the most forgiving on the water with its deeper 'V', increased forward volume and shaped step design.

FBSE has PA's very first hull design. Although this hull is the least forgiving in water compared to later hull designs, it does have its benefits. First, it's one of the lightest. While it's shallow V limits the wave heights for water landings, take-off from water is incredibly short and fast. It's on the step by the time the throttle hits the stop and is off the water in less than 250 feet. But in the end, it does make me a better pilot.

Water landings in general are easy in the SeaRey with touchdown speeds as low as 45-50 mph. Crosswind water landings and step turns are also a breeze.

In their literature, PA suggests the plane can be built in 400-500 hours. I truly believe that in a project like building an aircraft, you have to enjoy the journey, not just the destination. So in the end, I blew the estimate out the window and spent about 1800 hours building. I confess that I do have a bad habit of making the most mundane task a major project. Eventually friends learned to not ask, "When is the first flight?"

Lee Coulman

**SeaRey Construction:**

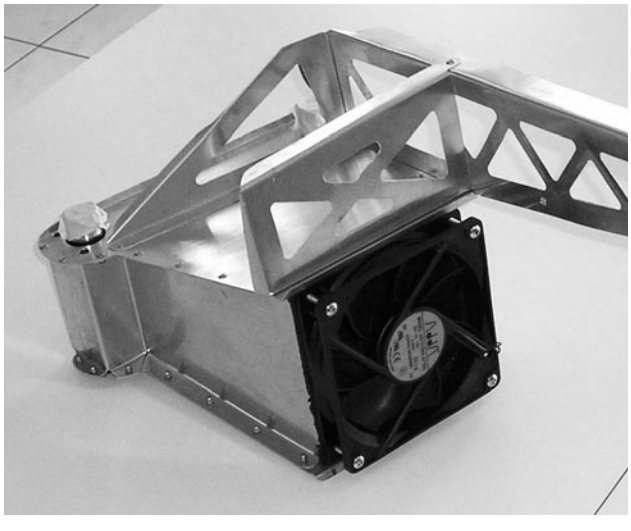
Once tucked into my garage, FBSE was completely disassembled in order to start from the beginning and ensure all's done correctly. Early on I visited Progressive Aerodyne in Florida and left with a load of parts for several design mods that had taken place since this kit left their factory.

The SeaRey's roots stem from ultralight linage. The fuselage construction is a bolt-together aluminum frame inside a fiberglass fuselage shell. All flying surfaces are fabric on aluminum. The aluminum components come all predrilled, deburred and anodized, ready to start assembling out of the box. They're very precisely made and the kit goes together remarkably well. It comes with an excellent manual providing exploded views accompanied by the bill of materials for each assembly step. I learned early on in the building that if something wasn't going together right, it's more likely I did something wrong as opposed to mistakes in the kit. The fiberglass parts are a bit rough in my case and I found some extra care was needed when fitting them.

When building the wings or fuselage, you don't have to concern yourself with squaring up frames or making sure the wings are perfectly flat when assembled. The design takes care of all that. If you get it together and have all bolts where they should be, it will be true. You'll see this as you get bring it all together.

PA's kits come equipped with hardware suitable for an aircraft registered as an AULA, but the plane has become simply too heavy to build in this category. So for Canadian SeaReys, some design changes are needed right off the bat in areas such as rudder controls, fuel system and fasteners in order to meet standards under the Amateur-Build category. Several bolts must be substituted with drilled shank bolts for castle nuts and cotter pins.

The heart of the fuselage frame is the main bulkhead assembly that houses the retractable landing gear. A manual retract system comes as standard equipment, using either a bungee cord or steel

**Top Down: the coolant overflow chamber; the Rotax instalation, PA's supplied heater. the kit is considered first class.**

spring to counterbalance the weight of the mains and retract the tail wheel. While it's quite complex, it is a very clever design, using an over-centre locking linkage to prevent the gear from inadvertently changing position. To operate the gear, you need to release the over-centre locks and pull/push a lever located on the centre frame member near your feet. When tuned properly, it works very well but is high maintenance. FBSE has been equipped with the new electric system that's available as an upgrade from Progressive Aerodyne. The picture shows the new bulkhead with electric linear actuators installed.

Another update for FBSE was PA's new elevator trim system. A linear actuator mounted on the tail drives scissor linkage that raises or lowers the horizontal stab's LE. I've used an RAC trim position sensor to monitor trim position from the cockpit.

The panel is always a great place to express yourself. I started by making a blank with carbon fibre in a clear-coat epoxy, more for the look. I installed any required mounting brackets on the back before applying the final carbon lay-up on the front in order to hide rivet heads in the lay-up.

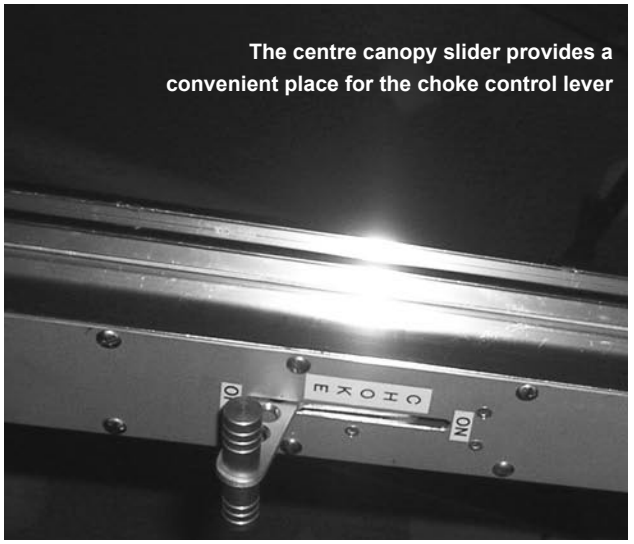
UV protection for the epoxy was provided with Endura® clearcoat. Panel labels were made with a label maker loaded with white-on-clear substrate. Looks great with a low cost.

Originally I had planned to install an electric attitude indicator. About this time Dynon started shipping their D-10 EFIS for an initial cost only slightly higher that the gyro, so the EFIS won out.

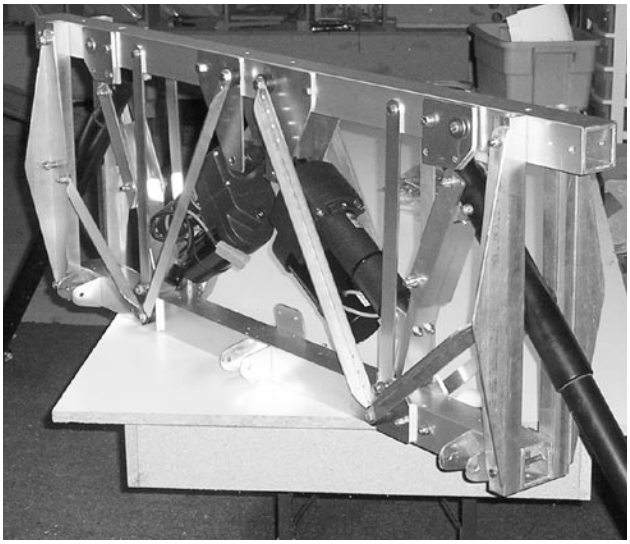
The business end was finished with a glare shield made from a fiberglass lay-up molded on a simple cardboard form shaped like the foredeck, then covered in a carved PE foam padding and upholstered in black vinyl. It gives the interior a nice finishing touch.

The centre canopy support rail turned out to be a perfect place to house a few components. Panel lighting is provided by array of super-bright red LED's on the overhead canopy rail focused on each instrument. Dimming is provided via a homemade dimmer circuit using a 555 timer chip. In the end, the white letters and instrument markings on the back carbon fibre and instruments provide an excellent contrast in the dark. Although it's not registered for night flight, FBSE does have all the required lighting and instruments for flying at night.

The engine installation is truly a challenge in this aircraft. With the Rotax 912 on top and aft of the wing, the cable runs are very long to get from the cockpit up to the engine through the 2″ wide pylon. It's critical that they're routed in such a way as to not restrict the spring return action for choke




The centre canopy slider provides a convenient place for the choke control lever



and throttle controls. The choke control lever was incorporated into the canopy rail (opposite, top) making the cable run a smooth arc up to the engine. A matching carb heat control lever is installed just ahead (cool-looking aluminum knobs courtesy of Ikea Aviation Supply). The throttle in this aircraft is a lever between the seats, making the cable run more of a challenge to conceal while keeping bends to a minimum.

PA made a change to the standard throttle setup on the Bing carbs. In order to have power applied when you push on the throttle lever, the throttle arms on the carbs must be reversed so they now spring-to-idle. The standard 912 setup has the Bing carbs spring to full throttle in the event a cable breaks. PA's argument is that they've experienced spring failures but never a cable failure to date. In addition, to stick with conventional setup would require a bellcrank to reverse cable directions: keep it simple.

Wire runs from the panel to engine are in excess of 20 feet in length, so you're flying around with a lot of copper! Optimizing wire sizes for the loads they'll carry is a good idea. Those that have the heavy-duty starter are running 4-ga cable to drive it.

**The Searey's front office. Top Right, the gear retraction set-up. The manual version is complex but works well; PA now offers a powered version as an option.**

**It's always a laugh** *when it comes time for the first test fit of the wings and tail. It means bringing this 'thing' all the neighbors have seen concealed in the garage for so long out into the sunlight.*

The 912's cooling system installation was complicated by the addition of a cabin heater. Although commercial heater units are readily available, they're generally quite heavy and restricting to coolant flow with their small rad tubes. I made an aluminum heater weighing just a few ounces. The heaters radiator is connected in series ahead of the main radiator in the engine cooling circuit, so it's always hot. A blower supplies plenty of hot air up front when needed. The pic shows a cooling fan on the heater. This has been replaced with a 4" marine bilge blower for higher CFM. Now it sure keeps the feet warm and blow-dries the dog when he's sleeping up in the nose.

In the end I spent twice the time planning the engine installation than executing. It all came together well and I'm pleased with the end result. But there was one more job left: install a coolant overflow reservoir. I had everything so compact that there was no convenient spot to install this. In the end, I molded one out of fiberglass designed to wrap around the oil reservoir within the space available. Talk about anal!

The original brake system used on the first SeaReys incorporated Azusa mechanical 5" drum brakes with one or two (for split brake control) hand controls mounted on the throttle lever. I used this system for the first year and never got used to it. Most have no problem with it but I prefer to have my hands free for doing other cockpit tasks while warming up the engine. So I made dual heel brake controls and installed them on the foot pan. Works great for me. Kits now come with hydraulic brakes with a single hand control lever to be mounted on the control stick.

It's always a laugh when it comes time for the first test fit of the wings and tail. It means bringing this 'thing' all the neighbors have seen concealed in the garage for so long out into the sunlight.


**First time in the water. BIG time fun. Water handling is no problem, but taxiing into the wind can be challenging because of the small difference between speed for takeoff and taxiing on the step. Ground handling is a non-event and crosswind landings in both modes are easy.**

Passers-by always make a double take when driving by. Cars would sometimes come to a screeching halt to see if they really saw a plane in the middle of the neighborhood! Wings went on well and the center wing cover panels were fabricated while the plane was together.

By December the fabric was on and I was ready to start spraying. Since I was working in my garage, I resigned myself to the fact I won't be continuing until the spring when the temperature climbs again. About that time a friend was in process of moving his manufacturing business to a larger facility. He extended an open invitation to use the site he's vacating since it will be sitting virtually empty while he completes his move. What a stroke of luck! I was back in business. It took exactly one month to complete the painting in a warm, bright, 80,000 square-foot paint booth. The entire aircraft is finished in Aerothane.

By March the painting was finished and FBSE was trucked off to Kitchener Airport. Final assembly in preparation for inspection took another month.

**First Flight:**

First Flight of BSE took place on July 1, 2005. In advance, John Dunlop, the local distributor for Progressive Aerodyne, was able to provide the transition training and seaplane endorsement time in his own SeaRey. With a gaggle of friends watching from the restaurant's deck at YKF, I taxied to the end of 25 and sat for a moment to double-check everything. Slowly, I advanced the throttle, concentrating on the instruments to make sure everything's as it should be. Eventually I decided it's time to rotate and climb. The motion from a gentle pulling on the stick told me instantly that I'd already left the ground and it's time to look outside. BSE took off more like a helicopter! The rest of the flight was uneventful. The guys in the tower were terrific; giving me all the time I needed and kept the circuit clear while I

**C-FBSE Specs & Performance Data**

| | |
|---|---|
| **Length** | **22' '5"** |
| **Wing Span** | **30' 10"** |
| **Height** | **77"** |
| **Wing Area** | **157 squ feet** |
| **Empty Weight** | **903 lbs.** |
| **Gross Weight** | **1370 lbs** |
| **Useful Load** | **467 lbs** |
| **Cabin Width** | **44"** |
| **Horsepower** | **80** |
| **Fuel Capacity** | **27 US gal** |

| | SOLO | GROSS |
|---|---|---|
| **Cruise Speed (mph):** | **85** | **80** |
| **Stall Speed: Clean:** | **42** | **44** |
| **Flaps 20°:** | **38** | **40** |
| **Top Speed (mph):** | **100** | **95** |
| **VNE (mph):** | **115** | **115** |
| **Rate of Climb (fpm):** | **700** | **400** |
| **Best Climb Speed (mph):** | **70** | **70** |
| **Best Glide Speed (mph):** | **70** | **70** |
| **Takeoff (Land, ft):** | **200** | **400** |
| **Takeoff (Water, ft)** | **250** | **450** |

**Christian and Beckwith Islands in Georgian Bay from 6500 feet.**

was up. Subsequent flights took me out of the circuit for stalls and other flight envelope testing. The only glitch in the plane was lack of response from the transponder and that was fixed in short order. This is when I discovered this was one of the first hulls that PA had made with carbon/Kevlar cloth and the carbon prevented transmission through the hull from the internal antenna.

I never realized just how long 25 hours is. After finishing all the flight-testing, circuits and just hanging around up there was starting to wear thin on me. I discovered Lake Bellwood fell within the restricted distance from home base. All Right! Up came the wheels and I was off to the lake for some water practice. The first water landing was awesomely uneventful! This is when I decided I never want a wheels-only aircraft again. Wow: think I'll just sit wear this stupid grin here for a while! What an awesome plane! What a place to be with a plane: drifting in the breeze just off the beach.

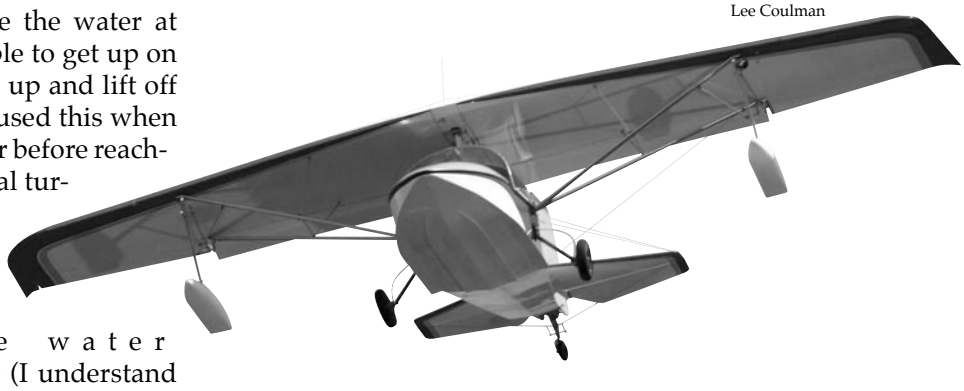
I finished the first 25 hours within a month. Landing after the 25th hour, I jumped in the car and drove straight to Transport Canada's office in North York to get the paperwork done before they closed. As luck would have it, this happened to be the same day an Air France jet ran off the end of the runway at Pearson in a storm and the highway was plugged solid. I still made it just before they closed and they were happy to do it on the spot for me. Awesome: freedom!! I could now go places in FBSE.

### Flight Characteristics

On the water, step taxiing is easy at *airspeeds* ranging 25-35 mph. Step taxiing on breezy days can be challenging into the wind as the difference between speed for transition onto the step and for take-off becomes almost nil. In this case, it wants to either sink into displacement mode or fly! Take-off from water happens surprisingly fast. The plane is up on the step as soon as the throttle is pushed in, thanks to the "A"-hull design. From there it doesn't take

long to gain speed and leave the water at about 50 mph. I find it's simple to get up on the step, turn around, throttle up and lift off in a very short distance. I've used this when I've wanted to get off the water before reaching an area with some potential turbulence or rough water. With the influence of the pusher prop on the large vertical stab/rudder right behind, I was able to do away with the water rudder and haven't missed it (I understand it's no longer a standard part of the kit).

Lee Coulman



Approaches to water I generally fly between 65-75 mph, depending on winds. As I get down close to the water, I'll bring the speed back to about 50 and descend slowly, gently flying the plane onto the water. Slow down too much and the hulls attitude will drop the tail into the water first. Although this doesn't wind up as a catastrophic event, it's not a good way to end a perfectly enjoyable flight, especially when you have an audience!

In a crosswind, the aircraft can be dropped down onto the water in a crab without any problems. I found that a bit strange to get accustomed to since all my previous flying experience on land said to straighten it out before you touch down. But this just helps to make the best use of whatever water is available when landing.

On land, the SeaRey doesn't behave like your typical tail-dragger. Without the need for prop clearance at the nose, the attitude on the ground is closer to that of a plane with tricycle gear: it gives a great forward view over the nose. With the wide stance of the mains, long tail and low slung fuselage, there's no real tendency to ground loop. This was the first tail-wheel aircraft I have ever flown and transition on land was an absolute non-issue.

I'm amazed how well the SeaRey will handle runway crosswinds. On windy days, use typical crosswind procedures and it's not a problem. If the wind gets too strong, just land across the runway!

The flaps have three positions: 10, 20 and 30 degrees. 20 degrees of flap are used in just about all take-offs and landings. In windy conditions, I generally use 10 degrees on land. I stick to 20 degrees on water to main-

*With the wide stance of the mains, long tail and low slung fuselage, there's no real tendency to ground loop. This was the first tail-wheel aircraft I have ever flown and transition on land was an absolute non-issue.*

tain the attitudes with airspeeds that I'm accustomed to. I use 30 degrees of flap for checking oil and coolant in the walk-around!

In level cruise, the fuselage maintains a low nose 'helicopter' attitude due to the wing incidence designed for water work. This took me a while to get used to as the natural tendency is to lift the nose, but then it climbs! In the end this attitude just makes the view even better.

The ailerons provide more than ample roll rate, keeping in mind it's an 85 mph cruiser. Stick forces are nothing out of the ordinary.

Stalls in the SeaRey are a non-event. The stall is well announced with a slight buffet and sudden drop of the nose. Recovery is easy within about 50 feet. FBSE doesn't tend to drop either wing in a consistent manner.

The high thrust line associated with the high mounted engine does give the plane a very slight longitudinal instability. On sunny days flying over land with rising thermals, the air pockets can kick off a small divergent oscillation and it's no big deal to stop by a slight counter-force on the stick. In calm air FBSE has no problems flying hands-off. Pitch reactions to power changes are reversed to conventional tractor aircraft: applying power will lower the nose and removing power will allow the nose to lift slightly.

Since BSE has the A-hull and gets up and off the water so quickly, I've set the IVO prop for cruise performance, so I pay the penalty in climb. Solo, it's fine. Flying at max gross in the heat of summer, climb is limited.

The plane is very much a stick and rudder plane. Turns are definitely better with use of coordinated rudder and aileron.

The view from the cockpit is outstanding in all directions. Even though it's a high wing, visibility upwards is great because the leading edge is just above your head. The plane is equipped with a sliding canopy on both sides. This is not only a vital safety feature in the even you become inverted in water (God forbid!), but you can also fly with the canopies open to get that "wind in your hair and

bugs in your teeth" feeling. I found it's a good idea to close them when taxing in water. I had to cross Lake Couchiching with my daughter one day and it felt more like a submarine than plane!

Since starting to fly the SeaRey, I've had the pleasure of participated in the annual Georgian Bay Gaggle: a SeaRey fly-in that lasts typically about a week. In the past the group has based in Midland. Daily sorties by SeaRey are planned to different places all around the region. John Dunlop of Canadian Light Amphibians has been the key organizer of the event. As John has been occupied building a new SeaRey for himself, last year's gaggle was organized by Dave Lima, another local SeaRey owner. Last year the group used a small resort on a small lake near Parry Sound as the base. This was also a great SeaRey venue as we were able to have the aircraft stationed on their beach right outside our cottages.

In the three years I've participated, we've had as many as 12 planes join the gaggle with visitors coming from as far away as Florida. There are other regular SeaRey gatherings that take place in the US and Australia.

Another amazing aspect of SeaRey ownership is the worldwide support network of builders and owners who love to share their passion for this wonderful little airplane. There are two websites established: the first, called 'Splash & Dash Seaplane Delights', is a site devoted to sharing experiences usually associated with SeaRey flying. Anyone can access this site with an invite from an existing member. The second site, called the 'SeaRey Technical Site', provides a forum for builders and owners to discuss technical aspects related to building or flying the SeaRey, as well as to seek help or advice on their project. This site is accessible only by SeaRey builders or owners. Although the factory is always more than willing to provide support, one soon learns just how easy it is to post a question or share an idea on STS and watch responses from around the world start coming back and you have the opinion of several to help you make a choice.

John Dunlop started Canadian Light Amphib-


**Island hopping in the Searey. What could be better?**

ians for the sole purpose to support local builders and owners and help build a SeaRey fleet in Ontario. He's having an affect as the eastern fleet is growing. Flying a plane is one experience, but a ride in a SeaRey opens up a whole new world. RAA

*For more information, check out: http://www.seareycanada.com/Flight.htm or, http://en.wikipedia.org/wiki/SeaRey.*


**Sister Ship: C-GJIB**

# Product Review

## *Central Pneumatics English Wheel*

**# 95359-OVGA $249.99**

Many members have asked about how to use an English Wheel, and also how to build one. A US-built full sized floor model costs in the region of $2000 and takes up a lot of floorspace. Harbor Freight recently introduced a half size floor model with a wheeled undercarriage that turns this into a very handy tool for the home metalworker. The price had been in the range of $400 with a full set of lower wheels of varying radii. This machine is now on sale at $249 but at this price it comes with only one lower wheel. You could not build one at this price.

The English call this machine a raising and smoothing wheel, a name that illustrates its two main uses. The novice will find it easy to remove dents and creases from shaped aluminum panels after only a few hours of practise on other material. After a bit of skill has been gained, the next step is to make aluminum blisters and shallow fairings. For this it would be advisable to purchase the flattest and the pointiest lower wheels, which cost in the range of $30 each. These will be enough for most jobs.

Mark Townsend of Can Zac Aviation has one of these machines, and he finds it invaluable for dent removal and light shaping. He manufactures Zenith floats and uses the flattest lower wheel to stretch the flanges of the forward bottom skins.

Available from Harbor Freight Tools
www.harborfreight.com
805-388-3000

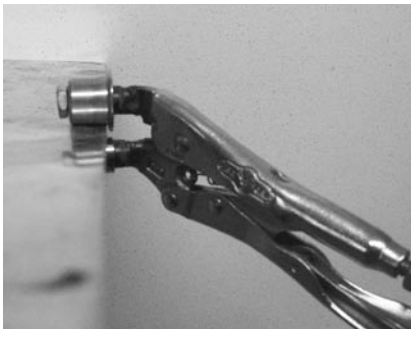
# Princess Belt Grinder

A hand held belt grinder is a very handy tool for the amateur builder. Black and Decker at one time made an electric one that was a treat to use, well balanced and light. Belton made an air powered unit in the nineties, and it too was well balanced but it was very expensive, nearly $300 at the time. Princess Auto appears to have taken some of the features of the Belton and now sells an inexpensive Power Fist model that uses a 3/4 x 20.5" abrasive belt that is available in many different grits. Unfortunately the Power Fist has many problems, the first being that some of the housing screws were stripped. We returned the unit, no questions asked with the Princess warranty, and took the replacement back to the hangar. Immediately upon powering up, the nose wheels lost their screw, and the wheels went shooting across the shop, not a good omen.

After finding the wheels and cobblng them together with another screw, more problems surfaced, mainly ergonomic. The unit is heavy, but the handle may be swiveled to centre more of the weight over the hand. Unfortunately this positions the operator's thumb close enough to the abrasive belt that contact may be made. Swiveling the handle farther away results in too much cantilevered weight, making it difficult to keep good control of the abrasive belt. One other problem -the handle is too short for a North American sized hand. The air outlet is next to the air inlet fitting, and the exhaust air chills the palm of the hand. If the unit has just been oiled, the operator's hand and sleeve become oiled by the exhaust air.

Not recommended.

*Gary Wolf, RAA Canada*



**Cleaveland Tool**
**EF 60 Edging Tool**

Awhile ago we showed how to make an edging tool for aluminum panels, using bearings from a skateborad or rollerblade. There are many companies making the same sort of tool and they all have the same problem. They require the user to cock the tool at the correct angle, so that the edge of the aluminum sheet will be just slighty bent and no more. Too aggresive an angle and the edge will become stretched, leaving it wavy. Cleaveland has addressed this operator problem with their new $39.95 tool.

The Cleaveland Tool edge forming tool has an upper roller with the correct angle cut into it, so the operator just sets the vise-grip to the thickness of the sheet and then pulls the rollers down its length. The edge will then be evenly set down and the panel will be a tight fit onto its mating surface. This tool works well, and it is not worth the money to make your own. If you have already developed the ability to set an edge down using the conventional tool, continue on current heading. Everyone else -this is one great tool! http://www.cleavelandtoolstore.com/prodinfo.asp?number=EF60

*Gary Wolf, RAA Canada*

## President's Message

*continued from page 2*

### Australian Safety Caution

Our counterparts in Australia have emailed to say that there has recently been a double fatality in an X-Air Hanuman. Although it is not possible to say unequivocally that it was the cause, the shoulder restraints failed and the Australians have issued an airworthiness notice. X-Air made a running change to the seatbelt mounting to take the loads into the tubing clusters, instead of as a beam load into a cross tube. If you own one of these aircraft please contact the Canadian dealer, Speedwings, to be certain that your plane has the latest seatbelt fitment.

### Light Sport -Again Not Yet

I contacted Transport in the summer to find how they had been progressing with the recommendations of the Working Group. Light Sport is part of the recommendations, but Transport had put aside the entire document because it was too large to handle. I suggested that they first deal with Light Sport, and they did agree to do this. Three months later Transport have still not found the time to get started with Light Sport, and the best they can offer is that they might be able to deal with it sometime in 2008. The US and European manufacturers now have a three year head start while our manufacturers are still stuck in neutral. Non-certified aviation is definitely not a front burner item in Ottawa.

### Ethanol in Fuel

Brian Kenney is the builder of a Pietenpol and a senior fuels and additives advisor at Petro Canada. His article in this issue deals with fuel system changes necessary for ethanol fuels. So far we have ethanol only in auto fuel, but there is now movement in the US to add ethanol to 100 Low Lead. We are in for a lot of changes.

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## Converting your homebuilt to use E10 (10% ethanol) gasoline - or NOT

**Brian Kenney, Senior Advisor Fuels and Additives**
**Petro-Canada**

AS GOVERNMENTS FORCE the proliferation of ethanol in gasoline, it is potentially eliminating the lowest cost aviation fuel available today for many of us aviators. We can't do anything about the certified world but for homebuilders we can specify the fuel and design for the use of this fuel. We must also accept the dangers associated with that decision.

As I am fabricating another aircraft I am considering such a change in design. I don't know all the issues yet but I know where to start, so I am sharing with you some of my thoughts to encourage development of a safer aircraft that might be able to use E10.

### Materials

The first concern is materials. What to make the fuel components out of? Let's take the fuel tank first. This first choice would be stainless steel. This is what car companies use when they make E85 (0-85% ethanol) vehicles. For E10-only vehicles they use plastic or plastic-lined carbon steel. You can, by careful selection of epoxy, make composite tanks that are compatible. This is likely the route I would take.

What about fuel pumps? Any modern automotive fuel pump should work from a material point of view but pumps are a problem. More on this later. If you use an inline electric pump then you will see copper in the fuel on the outlet of the pump. This may plug your filter or components of your fuel system. Old diaphragm pumps from aircraft have to have new materials for the diaphragm.

Fuel lines – this is a hard one. Aluminium may work ok but I am not willing to take that chance. Ethanol under the right conditions is corrosive to aluminium. Steel is perhaps better but will corrode as well. I am worried about the lines failing and I am worried about the corrosion products. I think stainless steel may be the best. Plastic and rubber are also ok if you chose automotive materials. Pumps and plastic can be a problem because with static electricity build-up can perforate the wall of the tubing and cause a fire. This is only an issue with pump discharge lines.

What about filters, gascolators and carburetors? Automotive types are ok if designed for E10. With old aircraft parts you will need to have them anodised to eliminate the risk of corrosion. A carburetor without a float bowl (injector type carburetor) may be a better choice. Any modern car fuel system components are useable with E10 from a material compatibility point of view. Floats in carburetors need to be E10 compatible.

### Fuel System Configuration.

Gravity feed to a carburetor is the safest system with E10. It will be very hard to make a pump work properly as there is a significant danger of vapour lock. This applies to E0 and is why there are few or no STCs for aircraft that have low wings and fuel pumps.

So the best is a high mounted fuel tank with gravity feed through large lines to a carburetor.

I am building a low wing aircraft, so does this mean I can't do it? No, this is about minimizing risk and understanding them. I feel that I have two choices for proceeding in my low wing aircraft. Both options include a header tank in the fuselage. The header tank provides gasoline to the carburetor by gravity. Since it is not big enough for my purposes, it will be refilled by pumping from a wing tank to the header tank. If the transfer-pump vapour-locks, the fuel in the header tank is what will be used to make it to the nearest airport. A level gauge and a level alarm in the header tank are part of my design basis. My pump is a submersible in the bottom of the wing tank. I can't count on getting all the gasoline out. The pump should be designed for the lowest discharge pressure required to make the transfer. This reduces the probability of getting vapour lock. The transfer pump will run continuously with an overflow back to the wing tank from the header tank.

What if I want push the envelope and put an automotive type fuel injection system in my low wing? Well this is the hardest system and fraught with danger. I would use the same header tank system and then put the high pressure fuel pump for the injection system as low as I could below the header tank, in a cool place, with a large suction line. I might put a third pump in one of the other tanks for an emergency and in case of phase separation (more later).

### Mixture Adjustment

If I am using E10 I will need to adjust my air to fuel ratio to increase the fuel flow. If you move back and forth from E10 to E0 then you need an in-cockpit mixture control or an automatic system to compensate for it, such as an O2 control.

**Assumed Risks – Phase separation**

Ok, I am happy to put E10 in my airplane – I have researched it and have done the best I can. What additional risks am I assuming? Well the biggest one is moisture in the fuel. If you have too much in the fuel you can get phase separation. This will cause water and ethanol to come out of solution. It is temperature sensitive so it could occur as I climb. The engine will then die. Phase Separation in cars does not happen often. It is not likely because we use them too often and they get fresh fuel. It can occur occasionally at a service station when rain or ground water leaks into a tank. When Phase Separation happens, the separated phase will be almost be 10% of the volume of the fuel. This is not something you can wait to pass through the engine, as it is going to cause a total loss of engine power. A loss of power on take off and a loss power at high cruise are the most likely scenarios.

Since losing power is something most people will not want to contemplate, how do you prevent it?

You can sample the fuel on board the aircraft like we all are suppose to do. The bad news is that it is hard to detect the onset of phase separation. If the fuel is at all hazy you are at serious risk. If you drain the tank and it is clear, is it the gasoline you are looking at or is it ethanol and water? If you are using only auto fuel you cannot tell. Since it can be almost ten percent of the fuel you can't drain until you detect an interface.

There is a way to tell if what you are looking at is gasoline or ethanol and water but I can tell you from personal experience it is very hard to do. This is what I would do. I would drain from a low point drain (or multiple drain points) into a clear glass jar. I would add about the same amount of E0 and shake it. If it clear after you shake it and there is no evidence or two phases (look have to look carefully) then you are likely ok. To be absolutely sure you need to put some water finding paste on a popsicle stick, and put the stick in the sample and pull it out. You need to then look for a demarcation line. If there is one, you have phase separation. If you want more information on using water finding paste I can provide an electronic copy of the procedure we use at our service stations. Email me at bkenney@Petro-Canada.ca and I can send you one.

If the following seems impractical then human nature would tell me that you are not likely to continuously do this kind of testing. Is there a way to design your way out of this problem? The answer is not really. You have to determine is any of these ideas are practical.

One way would be to have one tank in your airplane on E10 and use it for take off and for an in-flight shutdown. You can determine if you can get it restarted in time!

Likewise you can drain your tanks and replace the fuel if your airplane has been sitting for a period of time, or drain all the fuel at the conclusion of your flying.

Don't let fuel sit in your airplane for long periods of time. Keep the plane inside. Have vents that are rain proof.

You could connect your tank vent line to a desiccant bottle while in storage. This is one idea that may be practical.

While the probability of phase separation is low it will never be zero.

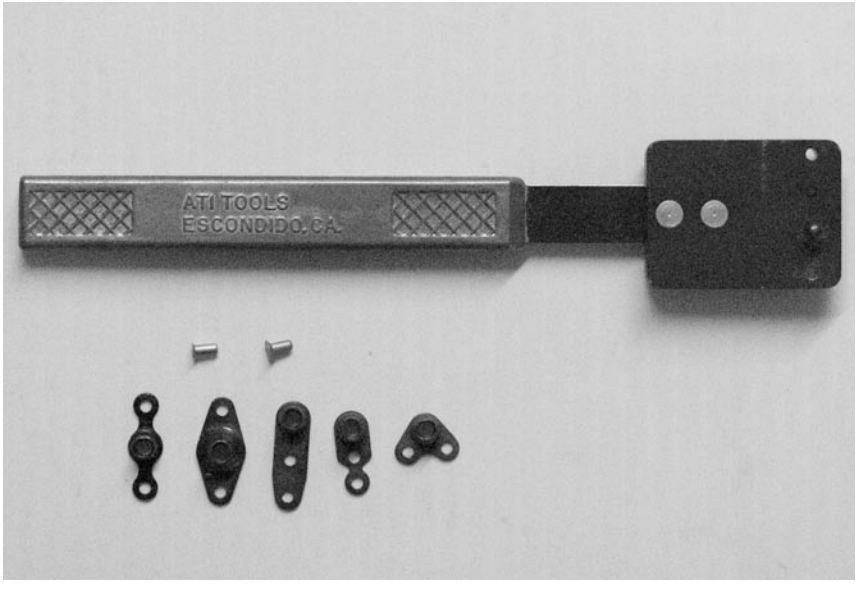
I wrote this article because some people will use E10 in their planes. Some will do it very successfully. I hope that before you use E10, you research the dangers and objectively consider if you want to deal with them. I don't want people to use E10 because Joe in the next hanger does it all the time. Joe may not know what he is doing.

## Nut Plates in Aircraft

**Tom Martin**

Weight is a big factor in the performance of these aircraft. Maintenance also plays a big factor in the continued safe operation in the life of an aircraft that could be measured in decades rather than years. Someone mentioned access panels and I agree completely. Yes we are supposed to check operational items under the floors at each annual. Ask yourself if it is more likely to be done if there are six screws to be removed or thirty five to be removed.

I often use self tapping screws to hold down floor panels that will not be removed on a regular basis, and nutplates on access panels. Self tapping metal screws get a bad wrap and should be considered by more builders. They are not particularly good where items have to be removed often, but in other cases they are a perfectly good alternative. We see them on old Cessna aircraft and they look bad as they are often loose or missing, but these aircraft are antiques and so in reality the screws have done a pretty good job. There is always the option of putting in a nut plate at a later date as well. I think that many builders get nut plate crazy and they are not without their faults. When a screw head strips, and they often do, you now have to drill out the nutplate and replace it. Sometimes it is a location that allows this sometimes not. Think maintenance. Pop rivets are also a cheap and light option for those floor panels that will likely never have to be removed. If they do then the rivets




can easily be drilled out.

Also even though number six screws and nutplates are lighter than # 8 hardware they also are not as strong and the heads tend to strip easier than a #8 screw. I try to use #8 hardware in the whole aircraft as it makes maintenance much easier and it also means one less size of screw to keep in inventory. I recently helped someone remove their cowling, on a ramp late in the day, he had three different size screws and we could not find all of them when it came time to put things back together. Fortunately another builder was there who had some extras of an odd size.

Think maintenance; you will not believe how fast your first annual inspection comes up and all those floors have to be removed.

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*Registration Mail Publication No. 09869*

*Contributing Editors:*
*Owen MacPherson*
*Don Dutton*
*George Gregory*
*Art Director and Layout:*
*George Gregory*
*Printed by Rose Printing Orillia, ON*
*The Recreational Flyer is published bi-monthly by the Recreational Aircraft Association Publishing Company, Brampton Airport, Caledon, ON L7C 2B2. Toll Free line: 1-800-387 1028 email: raa@zing-net.ca. Purchased separately, membership in RAA Canada is $35.00 per year, subscription to Rec Flyer is $35.00 per year; subscribers are elegible for reduced membership fees of $15.00 per year. Rec Flyer to have a single issue price is $6.95.*
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For information: Contact Mike Schuler 416 274 7467 email: mschuler@cbci.ca or Bob Trumbley 416 258 1424 email: bob@trumbleyhampton.on.ca.

For sale, 68" 3 blade GSC prop. 75mm pattern for Rotax 2 stroke pusher or early Rotax 912 tractor application. Appears to be unflown. $300 or best offer. Clare@snyder.on.ca or 519 574 4322

For Sale Fleet Canuck project. Serial No. 225. 4600 hours in logs.Fuselage and tail pieces recovered in Polyfiber. Wings to do. New bungees, aileron and fuselage cables. Some instruments, Narco 111B VHF. Polyfiber for wings, 18 gals plus Polyfiber coatings. Just like a Quick Built gives you a classic Canadian trainer for half the price of todays kitbuilt airplanes. No engine, but on-condition 0-200 can be had separately. $12,000. Kelowna 250-764-0880.

Cougar (like Tailwind) frame and tail feathers welded, on wheels, Lycoming 0235 zero time mounted, some instruments installed, spars and a/c plywood for wings available$16,000, (519) 945-8731 nseiler@netcore.ca.

Rotax 582 2 stroke parts. One cylinder and piston $200, dual ignition complete $200, water pump shaft $50, misc other 503/582 engine parts, send email with your needs. garywolf@rogers.com


For Sale: 1967 Beechcraft Musketeer,

fixed gear, fixed prop, low maintenance, stable IFR platform. Call Ian @ 416 318 4541 days, 905 693-0298 evenings for details 10/07

ZENITH ZODIAC 601 XL $49,900 ESTATE SALE Well built, flies great, Fun! 200+ hours. Jabiru 3300 120 HP, Sensenich composite gnd-adj prop, 5 g/hr cruise. Full 6 pk flight instruments, CHT, EGT, & FF, King com & xpndr. Options incl: dual sticks, strobes, nav/taxi/landing Lts, wheel pants, +more. Featured in RAA Mag. Owner/builder passed away. Contact Colin D. Noseworthy - located Callander, ON Canada Ph. 705-752-3665

Re-drive and components for Subaru EJ 2.2. Ross 2.17:1 Re-drive with flywheel and starter, Warp Drive 3 Blade 72" HPCF prop with spinner, all less than 200 hrs total time with original documents, also includes custom 4 into 1 SS header system. Package for $3500.00. Also have an Andair FS20-20-D2-6 duplex fuel selector for $250.00. Located Cochrane, AB, contact Gene at 403-932-4238.

EUROPA FOR SALE
Featured in the May-June issue of the Recreational Flyer. Rotax 914(turbo)Monowheel with 500 hours total time.Dual alternator,King transponder/comm.Garmin 295.Cream coloured interior.Located at London airport,hangared. Asking $58000 , call 519-494-2741, leave message. 10/07

For Sale: Dova Skylark kit, firewall back. All metal kit complete with undercarriage and blue tint canopy. Critical components like wing spars pre-assembled by the factory. Contact Dave at skylark4@telus.net or 780 434 8859. For more information on the Skylark see www.dovaaircraft.ca

SHARED HANGAR SPACE for rent, Brampton (NC3). Backs onto parking lot. Insulated, propane heat avail. Excellent work environment. Ideally suited to high-wing amateur-built. Avail immed. $315/mo. 905-857-3218 or kennan@rogers.com.

Continental O-200A for homebuilt. Bead blasted and painted,full electrics.C/W Log Book, accessories and baffles. 1400 Hrs. SMOH 0 STOH $5900.00 . Video clip running on test stand available. Barrie On. Jim @ joloan@csolve.net 705-721-9276

N3 Pup,1/2 VW engine,skiis,three gas tanks(main and two wing tanks),single seat.C-IBBE;hangered at Redeau Valley Kars south of Ottawa.Asking $11,500 cnd negotiable.Call Harvey Rule at 613-739-5562 or email me at harvey.rule@bell.ca

Cessna style axles bolt on type lenght 5.75 in. four 1/4 holes on1 5/16 circle with 4 spacers $50.00 pr. 2 Gerdes master brake cylinders built in park brakes $100.00 pr. Wagner HVLP never used $400.00.
Dillon M/K3 welding pistol with eye shield $225.00
Victor style welding torches with hoses & regulators 3 tips & cutting torch. $150.00. used vacuum pump modell 211cc $75.00. 2Scott master cylinders $150.00 pr. Hummelbird a/c never flown engine run 100 hrs to finish. asking $9000.00 Glen Marsh 59 Glovers Shore, Summerside P.E.I. phone 902 436 7139 or 902 836 3702

1977 Wood & Fabric, side-by-side, 630 TTAF, 110 TTE, Lycoming O-290D2B, VFR panel, night VFR approved, 8.00-6 tires, brand new seat belts, new seat cushions, new interior (7/10 exterior, 9/10 interior), This airplane has float option built into it. Located at Brampton Aprt. Contact: Peter 905-884-8598 Peter@MarandaForSale.com $30,000 OBO. www.MarandaForSale.com

Tools For Sale: Chicago Pneumatic Rivet Squeezer $400 (reg. $599.95) Sioux Rivet Gun with beehive retaining springs $130 (reg. $299.95) Hand Rivet Squeezer $75 (reg. $131.95) 90 degree angle drill $10 (reg. $24.98) Twister/Swivel Head Rivet Tool $10 (reg. $21.99) Heel/Tow Bucking Bar $10 (reg. $17.95) Anyone who's interested can email Nikki at antenbring@shaw.ca or call 652-8895. 10/07

HANGAR RENTAL: Hangar space available for winter storage at Emsdale airport (CNA4). $500 for winter season (Nov. 1 - March 31). For information contact George Pudsey, 705-636-7260 or gpudsey@aviall.com. 10/07

Corben Baby Ace built from kit. EA 82 OHC Subaru w/reduction. Wooden fixed pitch, prop by Props Inc. Orginal Haida Eagle logo on side, Blue-White ceconite fabric Stitts brand paint. $10,000 OBO. Contact Norma Swaim at 250-765-0234 or njswaim@shaw.ca also airplane plans and misc. 10/07

C-85 cylinders complete, $500.00
Phone Terry 519--323--0026 10/07

I have the plans for a Mustang II that is partly assembled. The center section wing is assembled in a jig but isn't covered in skin. The main wing spars are assembled and one rear wing spar. Parts angle 3/4 * 3/4 - 2024, angle 1" * 1" – 6061, sheet metal .025"& .040",rivets and a few other parts. Wedge ,trailing edge (magnesium). Email address: valentine@kw.igs.net Phone: 519-745-6463 10/07

Sale or Rent: 30' x 40' hangar at Brampton CNC3. Heated. Power bi-fold door. Pull-in winch for larger aircraft. Mezzanine, wash water, and secure tool lock-up. Park right outside the back door. Lots of natural light. Very clean. Excellent work environment. $590/mo; $295/mo shared; $73,000 sale. Ken 905-857-3218, kennan@rogers.com 10/07

Filage neuf (HARNESS) jamais utilisé pour moteur LYCOMING 0235. Prix $250.00. - Détecteur monoxide de carbone. $ 5.00. Alain Lacasse (819) 563-8622 10/07
AVID MK IV STOL. SN 1474D. Subaru

EA 81 engine. Warp Drive 3 blade ground adjustable propeller. Icom IC-A200 air band transceiver. AmeriKing ELT Model AK-450. Tundra Tires. Apart from final propeller pitch / cooling adjustments, aircraft ready for final inspection. Always hangared. 2 x 14 gall fuel tanks, one each wing. Blue & white colour scheme - beautiful construction. Reason for sale & low price - lost medical. Cdn $20,000 negotiable. Graham @ 604-983-3588 or seacap@shaw.ca 10/07
Wanted - one pair of metal spar wings for a Wag Aero 2+2 (PA 14). Frank Jaenicke 250-768-5691 10/07

Subaru 150 hp conversion by Crossflow, with belt redrive. Fuel injection and engine mount included. Low time. $3500 sacoutism@aol.com 819-778-144
1500 Federal Skis with Teflon Bottoms Please call Jerry Hanstke at 705-268-4098 or email mill@ntl.sympatico.com 12/07

RV-4 project. Empennage finished. Flaps and ailerons finished. Wing spars finished..(Ribs were drilled and attached with clecoes. Now removed, numbered and boxed) Fuselage on the jig. All parts primed. Good workmanship. Call for details/pictures. Asking $11000.- (519) 461-1464 ed@solairecanada.com 12/07

RV-8 Project. Empennage finished. Complete wing kit. Pre-punched skins. Main spars finished. Tanks and outboard "D" tubes are finished. Flaps and ailerons are finished Very good workmanship. Manuals, all parts and drawings included. Dynafocal engine mount. Please send an e-mail for detailed or pictures. $ 10000.- ed@solairecanada.com (519) 461-1464 12/07

Dynafocal Lycoming mount for single seater $50 Geoff Royston12/07

Subaru EA 81 engine, as pulled from car. $150 clare@snyder.on.ca 12/07

Pitts dynafocal engine mount for Lycoming $200; 3 IVO UL LH blades LH 60" $200; 2 IVO UL LH blades 68" $150; 3 IVO UL blades LH 64" slight checking, good for airboat $150; 54-27 LH wood prop (pterodactyl) $75; S&S Winnipeg antique LH 78" wood prop, suitable for clock $300; New 12" fibreglass spinner cut for 3 blade, with bulkhead drilled for 6 holes, 4-3/4 bolt circle $100. garywolf@rogers.com 519-648-3030 12/07

2 UL aluminum 4" split wheels with aluminum bolt-on axles, includes tires, $225 ; one 500-5 Cessna150 nosewheel with tire, $125; 2 Cub-type 4" aluminum wheels with integral brake drums and hydraulic brakes $250 . garywolf@rogers.com 519-648-3030

VW 1600 dual port engine with prop hub and Hapi rear casting, including new conical rubber mounts and bolts. Includes stub exhausts, but no ignition or intake system. $1000 . Also, 4 good used VW cylinders with pistons, 87mm diameter $125 garywolf@rogers.com 519-648-3030

2SI 2 stroke engine with belt redrive, stock exhaust and Mikuni carb $500 ; remains of crashed Pterodactyl Ascender, free to good home. garywolf@rogers.com 519-648-3030

Pegasair Fuselage,Tackwelded,stainless steel firewall $3000 Subaru EA 81 with gear reduction O time,$2500 Warp Drive 3 blade ground adjustable propellor very good condition $ 600 Heinz Genrich 905 648 0766 tandt@coceco.ca

Maranda AMF-S14F for sale $20,000. High wing taildragger. Stall 40. Cruise 100. Lycoming O-320. 655TT 225STOH 600 lbs useful load. Flies regularly, but my wife says I have to sell something before I'm allowed to build anything more! Fancy a vacation down south? The airplane and I are both Canadian (C-FXKH), but are currently living in Texas. If you buy it, I'll reimburse your airfare. Please see http://home.earthlink.net/~daforster/marandasale.htm for more details. Dave 281 992 2713.

## Wanted

Wanted to purchase good or rebuild able IO 540 for Steen Sky bolt project, also any airframe or parts for the same. OFFICE 1-705-653-4525 or davidcarlaw@prototyperesearch.com 10/07

WANTED
Aeronca Champ. Preferably 85 to 100 hp Continental. Located Ontario or Quebec. Contact <tingle@ionsys.com

Wanted set of lightweight floats with or without rigging suitable for Beaver RX 550. Any type considered except Lotus. garywolf@rogers.com
***See Page 34 for more ads.***

*Ads run for a maximum three issues depending on space available. Please direct all classified inquiries and ad cancellations to: classified@raa.ca and place "RAA ad" in the subject line.*

**RAAC has sets of electronic scales that are available to all members for doing the weight and balance calculations on their aircraft. Only $30 for weighing. Contact the RAA office at 1-800-387-1028 to reserve a set.**

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

# New In Canadian Skies

## Tom Mill's Cub

Shown here while I was doing my engine testing, prior to first flight, C-GFQT finally flew again after a four year restoration. Back in 1982 I had originally finished QT and then flew her to Oshkosh with a Ford Cortina engine for power, which provided many enjoyable flight hours for my family as the childred grew up. However twenty years in an open farm hangar had taken their toll on the finish and systems, and the old cast iron Cortina engine had cracked its block. This time around QT got new extruded aluminum wing spars and new aluminum ribs made by my son Jim. Gord Reed, Jim, and I built the wings in Jim's heated shop, and finished them in traditional Cub yellow dope. I rebuilt the fuselage in Peter Halsall's hangar, primed it in epoxy, and doped its new fabric. My patient wife Mary handled the interior appointments. Ron Poulstra built the C-85 with all of his best mods, and many RAA members pitched in to help with the final assembly in Wayne Hadath's hangar. Twenty-five years ago many of the parts were salvage. This time QT got a lot of polished aluminum parts including a new fuel tank and panel. She is now ready for the next generation of Mills family pilots and their kids. Jim plans to keep her hangared at CYKF so that he can fly all year. Thanks to all the RAA members who pitched in to help. We couldn't have done it without you.

# 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. President Pierre Fournier, pierre.fournier@cmcelectronics.ca (514) 645-4355*

*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. Contact Pres. Ray Fiset, 418-871-3781. rayfiset@qc.aira.com*

*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: Fourth Monday 7:30 pm, Lake Simcoe Regional Airport. Contact Treas.Gene Bemus 705-325-7585 gene@encode.com*

*COBDEN: Third Thursday 8:30 pm at Club House, Cobden Airport. Contact Pres. Clare Strutt, 819-647-5651.*

*COLLINGWOOD AND DISTRICT; The Collingwood and District RAA, Chapter 4904, meets every first Thursday of every. month, at 7:30 PM except July and August, at the Collingwood Airport or at off-site locations as projects dictate. The January meeting is a club banquet held at a local establishment. For more information contact Pres. Keith Weston at 705-444-1422 or e-mail at kcweston@georgian.net*

*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 Editor Frank Ball fdnmeball@sympatico.ca 905 822-5371*

*HAMILTON: Second Friday 8:00 pm Months of Feb, April, June, Aug, Oct, Dec, at Hamilton Airport. Contact Pres. Brian Kenney, 905-336-5190*

*KENT FLYING MACHINES: First Tuesday 7:30 pm at various locations. Contact President , Mac Mazurek 519-692-5309 macmaz@mnsi.net*

*KITCHENER-WATERLOO: Meets the third Monday of each month in the upstairs meeting room of the cadet building at CYKF, except during the summer months when we have fly-ins instead. Please contact Clare Snyder clare@snyder.on.ca*

*LONDON-ST. THOMAS: First Tuesday 7:30 pm. At the Air Force Association Building, London Airport. Contact President Angus McKenzie 519-652-2734 angus@lweb.net*

*MIDLAND-HURONIA: First Tuesday 7:30 pm Huronia Airport. Contact Tom Massey 705-526-5304, fax 526-5310*

*NIAGARA REGION: Second Monday 7:30 pm at Niagara District Airport. Contact Pres. Len Petterson swedishcowboy29@aol.com http://home.cogeco.ca/~raaniagara/*

*OSHAWA DISTRICT: Last Monday at 7:30 pm at Oshawa Airport, 420 Wing RCAF Assoc. Contact President Chris Gardiner 905-668-5703 cgardn628@rogers.com*

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

*OTTAWA/RIDEAU: Kars, Ont. 1st Tuesday. Contact: Secretary, Bill Reed 613-831-8762 bill@ncf.ca*

*SAUGEEN: Third Saturday for breakfast at Hanover Airport. Contact: Ed Melanson 519-665-2161 meled@wightman.ca*

*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 8 pm at Ch 41 Hangar on north end of Brampton Airport Contact: President, Earl Trimble 905-787-8524 northerntailwind@aol.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.*

*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*

*NORTH SASKATCHEWAN: Third Monday 7:30 pm at Westwind, Hangar #3. Contact President Garth Pippin for info at 306-666-4476*

*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 Calvin Thorne at 403 932-4325 or email: cbthorne@telus.net*

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

*GRANDE PRAIRIE: Third Tuesday, Chandelle Aviation Hangar, contact Jordie Carlson at 780-538-3800 work. or 780-538-3979 evenings. Email: jcarlson@telusplanet.net*

*MEDICINE HAT: Last Thursday of the month 7:30 pm RAAC Club Rooms, Airport. Contact Secretary, Boyne Lewis 403-527-9571 handblewis@thehat.ca*

*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 Kelowna Yacht Club. Dinner at 6:00pm, meeting at 7:30pm Contact President, Cameron Bottrill 250-558-5551 moneypit@junction.net*

*QUESNEL: First Monday/Month 7:00 p.m. at Old Terminal Building, CYQZ Airport. Contact President Jerry Van Halderen 250-249-5151 email: 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 8pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President Gerard Van Dijk 604-319-0264, vandijkg@yahoo.ca. Website http://raa85.b4.ca.*

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

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

*ALASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Richard at 782-2421 or Heath at 785-4758.*

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

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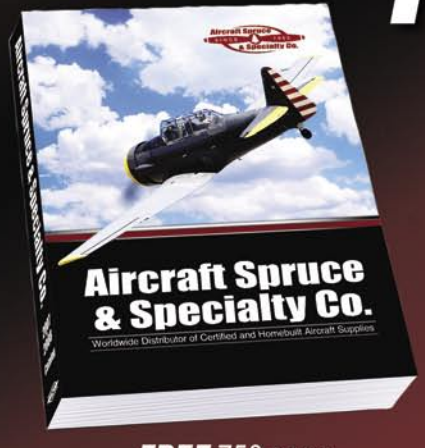


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