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Recreational Flyer

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The Voice of Canadian Amateur Aircraft Builders $6.95

Ed Connors' Nynja

RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

From The President's Desk

Gary Wolf RAA 7379

PRODUCTION OF YOUR REC FLYER

The Recreational Flyer is unique in that it is the result of the experience and work of Canadians who build and fly amateur and ultralight aircraft. As a group we are the largest repository of technical information in this country. Each issue begins with the members who write firsthand articles and send then in to be edited by myself. George Gregory has artistic control of the magazine and does the superb layout work that you see in every issue. Ron Seyffer's printing company turns George's work into a paper magazine, and Dave Evans and the members of the Barrie-Orillia chapter bag, label, and mail the finished product. This is the flow chart that results in the Recreational Flyer.

Everything depends on the first step - writing the articles, and this has become the sticking point for the past few years. We need your input or there can be no magazine. In this issue most articles are by members of my own chapter, the KW-RAA. Chapter president Dan Oldridge put the word out and the members responded. Without their work this issue could not have gone to print. We all owe thanks to Dan Oldridge, Gord Baxter, Ed Butler, Ed Connors, Lee Coulman, Geoff Gartshore, and Tom Navratil for their fine work here.

> As a group we are the largest repository of technical information in this country.

Many of our members are engineers who have great technical skills but as a group engineers do not appear to write essays. No matter, just send your work in point form and we will turn it into paragraphs. Please email to garywolf@rogers.com. The next issue will go to print when we have enough material, It depends on you to set the wheels in motion.

ROTAX 900 SERIES SEMINARS

Chris Staines of London - St. Thomas chapter will present two seminars this spring. Chris has operated a 914 turbo for twenty years and he has attended numerous Rotax maintenance courses and seminars. As an early adopter of the 914 he has extensive firsthand experience maintaining Rotax engines. The material in the seminars has been reviewed by a certified ROTAX technician for accuracy.

With over 50,000 ROTAX 900 series engines produced, the only other geared aviation engine manufactured in similar numbers was the Rolls Royce Merlin of wartime fame. Learn how this unique design combines class leading light weight and high efficiency to make it the choice in 80 percent of light sport aircraft.

The first seminar will start with origins of this design, then examine the features and innovative ideas behind the light weight and high efficiency, followed by an overview of the individual engine systems.

The second evening will highlight safe installation, operation and maintenance tips. You will learn why traditional Lycoming and Continen-

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features

columns

(George Gregory)

Above: 1931 Student Prince, Arlington Fly-In, July 2017. George Gregory photo.
On the cover: Ed Connors' Nynja Advanced Ultralight

How I went from building RV's to building a Onex

By Gord Baxter

REPEAT OFFENDER

I AM PRESENTLY BUILDING a Onex, which is the single seat folding wing airplane developed by Sonex. The kit was five years old when I bought it from the second owner and it had very little done to it up to that point. I bought it in July of 2016 and hauled it home, then left for two weeks in Oshkosh. The construction started in August of 2016. After one year (Aug. 2017) I have the wings and tail finished, the fuselage is on the gear, the canopy is finished and I have engine hung and the panel is being worked on. I will give some details of the pros and cons of the Sonex kits during my build but maybe first I should give some background history to justify my claim as a "repeat offender". That is a term used by the Van's Aircraft builders when you have built and flown more than one of Van's designs.

I took my flight training in 1963 on the Fleet 80 "Canuck" which is like a side by side J-3 Cub, there were three of them at Breslau at that time. I soloed the Canuck in 6 ½ hours and passed my flight test and got my PPL in June 1964 at age nineteen. I joined the EAA in 1966 when I attended the Rockford, Illinois fly-in (before it moved to Oshkosh) and got hooked on homebuilt airplanes.

I joined the local EAA Chapter 164 (now RAA 164) here in Breslau, Ontario in 1970. Ken Pritchard was president and he had built a Stits Playboy, C-FRCA. There were numerous projects being built at the time. I joined in by starting a Volksplane 2 for which I eventually had wings and tail ready to cover and the fuselage on the gear by 1975. As with so many pilots/projects "life" intervened and the project was abandoned. After that I spent the next six years flying hang gliders, something that was more affordable at the time.

I ended up buying a flying VP-2 with a Continental 65 hp (C-GTYL) in 1985, sold it after a year and bought a 1956 Forney Ercoupe (C-FNLX) in 1986. I started building my RV-6 (C-FMEV) in Jan. 1988 and made the first flight in Sept. 1992. Incidentally, the Ercoupe was sold in 1989 to pay for the engine in the RV-6. I flew C-FMEV into the U.S.A. many times, including trips to Oshkosh, Wisconsin in 1993 and again in 1995. With an IO-360 180 hp and constant speed prop it gave a solid 200 mph cruise. I sold it in 1998 after six years and 450 hours of flight time.

During that period I had started a contract build on a second RV-6 in 1995 and had it 80 percent done by 1998 when the owner of that project decided to sell it and buy my RV-6 instead. He still owns it today with 1300 hours on it.

In 1999 I started an RV-8. That project also reached about 80 percent by 2002 with the tail and wings done and the fuselage on the gear and a zero time 200 hp angle valve Lycoming sitting in the corner of my shop in a crate. After some soul searching I decided to sell the project to pay off my mortgage and get debt free.

In 2005 I started building my RV-7 (C-FDGB) and made the first flight in September 2009 after four and a half years of construction. One month after that first flight (Oct. 2009) I was approached by someone to mentor him and help him build an RV-7. On that one we worked together and that plane's first flight was in the spring of 2015.

Some of the author's previous projects.

I must add to the story the fact that my wife Donna did ALL the flush riveting on the first four RV's while I bucked. She found it easier to run the rivet gun, holding it with two hands rather than trying to hold a heavy bucking bar with two fingers inside a wing. They say there are 15 thousand rivets in an RV - times four airframes = 60,000 rivets; she has become an expert with the rivet gun.

In 2014 I was approached by another pilot to mentor and work with him on his RV-14. For about a year I was working on both of those projects, finishing the -7 and the new project, the -14 at the same time...

I must add to the story the fact that my wife Donna did ALL the flush riveting on the first four RV's while I bucked.

it got a little crazy working on two projects at once. Long story short, I worked on the -14 for two years, building the tail and the wings, which finished my commitment on that project.

Of note...in 2015 I sold my RV-7 (C-FDGB) and presently have no airplane to fly. I enjoy flying but I like to build even more, thus the Onex project.

Van's Aircraft has set the bar very high in regard to the quality and completeness of their kits, and Sonex could learn a lot from these folks. Van's airplanes also set the "gold standard" when it comes to re-sale. Personally, I couldn't see doing another RV after thirty years of continuous RV building; I needed to try something different. After researching "what's next" I was about ready to "pull the trigger" on the single seat Panther which is kind of a clone of an RV-3, when the pre-owned Onex kit became available. The Panther is from Florida and can handle a 0-320 Lycoming which I would much prefer over the VW engine. The Panther also has folding wings which can get you a cheaper hangar space with some luck.

I think too much is made about fuel consumption, going with fuel injection and electronic ignition you can save maybe 1 gal per hour. Yes it will do that but if you don't fly much, like forty hours a year, fuel is not the big expense. It is the hangar and insurance that are the biggest issues. If I can fold the wings on my Onex, park it in the corner of a hangar for less than half a month's rent (one of the big items in the equation) it makes flying more affordable...just saying.

In the next issue I will "drill down" on some of the Sonex issues that I have dealt with. Sonex tried a little too hard to make their kits affordable and they cheaped out...like the mechanical go kart brakes and that mickey mouse tail wheel they provide...ugh.

Bottom line is the finished airplane (Sonex) will cost more than you thought...and will be worth less than you thought...and take longer to build than you thought. That's my observation so far with the Sonex airplanes (*to be continued next issue*).

THE BUTLER FAMILY PROJECTS

WE PURCHASED a Bakeng Duce in December of 2014 in Moncton NB and decided to give it a ground up restoration that took thirty months. The tubular fuselage and tail feathers were stripped and painted with 2 part epoxy paint and then covered with Stits. The wings, flaps, and ailerons, all of wood construction were stripped and treated/sealed with West System and then covered with Randolph. New bucket seats were installed. All new control cables were installed, along with new 800 x 6 tires and also a new engine cowl.

The engine is a Lycoming 0-290D2 which was major overhauled in 2006. We installed a new MA3SPA M/S carburetor, external oil filter assembly, overhauled the mags, installed new plugs and wiring, and all new engine baffles. The Propeller is a Sensenich 74 x 52 with 210 hours since overhaul.

Our Croton Flyer / TWAMK1, which is an amateur built agplane, was featured on the cover of the October 2007 Rec Flyer. It gets flown regularly, and these two planes should fly well together.

We have another project under construction. It is a one-off all aluminum tri-gear retractable, 2 seat tandem with a 470 Continental and constant speed 3 blade prop. The engine will be equipped with a 500cfm 2 barrel Holley. The engine which will be installed into it is from a Cessna 182, and the engine nacelle is of Beechcraft origin. One will not fit to the other without some modifications to both.

The first problem we encountered was that the oil cooler on the right front side of the engine had to go. An aluminum cover plate was fabricated using the base of the old cooler for a pattern. Two holes were drilled and tapped to accept oil lines which will connect the engine to an external oil cooler. The second problem was the oil pan. It was too deep from the front of the engine back approximately 10". It has been flattened out and is now close to the bottom of the case in that area.

Next came the up-draft carb and induction system under the engine.

It turns out Holley conversions for Continentals have been around for years.

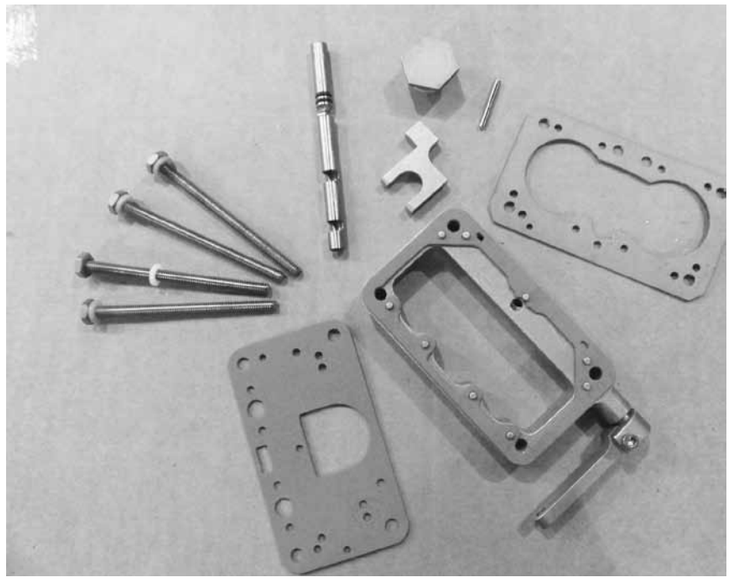
For reasons of space that had to go.

There are several types of 0-470 engines and luckily there are two or three that are equipped with downdraft carbs, namely Bendix PSD-5C. We found the necessary parts for the downdraft version in Denver. Thankfully the lads down there needed the parts we had so a swap was arranged, and it didn't take too long to find a PSD-5C carb. Then it didn't take too long to find out the overhaul on that carb had to be done in the western USA and the cost for the overhaul would be $3,500 US plus shipping and handling. Very quickly we realized that dog wouldn't hunt, so we needed another plan. What about a Holley carb?

It turns out Holley conversions for Continentals have been around for years. We discussed this option with one of our best farmer friends who owns and flies an RV-4, Starduster Too and a D11 Jodel, all of which he built from scratch. In his younger days he built race cars and built up his own high performance engines, all equipped with Holley carbs. Although he had never heard of a Holley on a Continental he felt that it would work and if it was his choice between the PSD-5C and a Holley he would do the Holley hands-down. His recommendation for type and size was a 500CFM 2 barrel Holley for the 470. However, it would require a mixture control kit to make the conversion work in an airplane.

What next? Head to the web. It just happens that there is a gentleman in Gilbert Arizona who fabricates and sells the exact mixture control kit for a 500 CFM 2 barrel Holley, the carb of choice for the, you guessed it, 0-470 Continental engine. Oh by the way, the price is $435.00 US for a brand new Holley 500 CFM 2 barrel carb, and the mixture control kit costs $150.00 US. So down to Pheonix we went to meet Tom McNeilly and purchase the kit. He has built and sold several hundred of these conversion kits and they look good.

The kit fit perfectly into the new Holley. That brought on another issue; the Holley wouldn't bolt up to the Continental downdraft manifold which was made to fit the PSD-5C. We tubbed out the existing manifold, then designed and had a riser adapter fabricated which allowed for the Holley to



bolt up. Another aluminum riser was fabricated for the top of the Holley so as to elevate the carb heat box to clear the top of the engine.

Our farm strip is located 3 miles north-west of Petrolia, Ontario.

Plugs have been installed in the holes in the cylinder heads where the primer leads were. The Holley is equipped with a choke, negating the need for primers. I haven't pulled a choke out on an engine since owning a 4020 John Deere gasser. Chokes work. Never did like primers much.

You are probably wondering what the comparison is between the Holley 2 barrel and the Bendix single barrel. I measured the throat of the Bendix and that of the Holley 2 Barrel. The Holley has 155% larger throat area. The 0-470L engine is rated at 230hp at 2600. The I0-470L (fuel injected version) is 260hp at 2600. From what I am told and have read, this Holley equipped engine should range into the 250-260 hp range. We'll see.

We are going with a glass panel so the vacuum pump is no longer needed and is up for sale. Both Bendix mags are on the shelf and for sale, as they are being replaced with EFI dual electronic ignition. The 24 Volt starter has been replaced with a new lighter one, and the generator has been replaced with a 24v alternator. Fuel will be provided by a dual electric fuel pump system.

That pretty much does it for now; more later. If anyone out there has a Holley equipped airplane, we would like to hear from you.

Call us at 519-882-3125. Ed and Tyler Butler

Electronic Stall Warning Device

Dan Oldridge

DURING THE TIME I have owned the Highlander, there have been very few times that I have questioned the design of the aircraft. Based on the original Avid Flyer and of course very similar in construction to the Kitfox series of aircraft, the Highlander uses two aluminum spar tubes in each wing, with the leading edge of the wing actually being the front spar tube. This is an excellent design for a high lift wing and has been used in a number of great aircraft, but the one disadvantage I have found is the inability to mount a traditional stall warning reed-type device in the leading edge of the wing. What I needed was a way to get a stall warning without cutting into the spar or messing with the leading edge of the wing.

After looking at a number of possible solutions, I decided to install an electronic stall warning device linked to my lift reserve indicator system. Given the information available on the usefulness of the lift reserve indicator and that it basically accounts for changes in angle of attack, aircraft speed, aircraft bank, and a number of other factors, this seemed like the logical approach to installing a stall warning device. Since I already have a visual indication of "loss of lift", all I needed was a way to get an audible warning or some other means of grabbing my attention when the plane gets close to a stall. I had noticed a number of times that the bright red alarm LED's on my MGL instruments grabbed my attention quickly when any of the flight or engine parameters were out of the programmed ranges, so maybe what I needed was a super-bright red LED to draw my attention to the reading showing on the lift reserve indicator.

The lift reserve indicator or angle of attack indicator works on differential air pressure between two sources that are slightly offset to generate a different pressure with varying angles of attack of the wing. There is an LRI or AOA design shown on the RAA Canada website that I used to construct the one in my Highlander a few years ago. The beauty of this simple system is that there are no moving parts other than the needle on the gauge in the cockpit. Although I personally added a short 1/8" wide strip of reflective tape to the needle in the gauge to make it much easier to see, the Lift Reserve Indicator (AOA) system basically looks like what appears in figure 1.

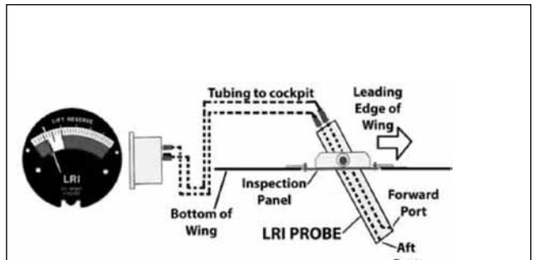


figure 1


figure 2

Construction details of the AirSoob AOA/LRI can be found at… http://www.raa.ca/magazine_pdf/tech%20articles/Angle%20of%20Attack%20Meter.pdf

Since there is a pressure differential generated in the tubes to the gauge when the plane is moving through the air, I just needed a way to measure it electronically and turn on a switch when it dropped below a certain level. But of course nothing is ever that simple. Without a means of enabling the warning only when the aircraft is above a certain speed… maybe 25 knots (30 mph) or so, the stall warning would be going off the whole time the aircraft is on the ground.

Airspeed switches would work, but they are over $60 each and only handle about 20 milliamps through the contacts, which could reduce reliability in this application. After researching options I determined that my best solution used high efficiency furnace air pressure switches that were adjustable and handle in excess of 1 amp of current through the contacts, leaving a huge margin of safety and increased long term reliability. To top it off they are light weight and have both a normally open and a normally closed contact.

The unit pictured in figure 2 is made by Cleveland Controls and is easily available on EBay or other online retail sites. Shipping can get a bit pricey from the USA so be careful ordering and remember that two are required. You may be able to combine the shipping for one fee. Another possibility is talking to your local heating contractor who may have them or even be able to scrounge one or two from a replaced furnace that would normally be scrapped. The new units come complete with an Allen key used to adjust the threshold of the switch through a small hole in the back.

The pressure sensors I used are Cleveland Controls RSS-495-011 Air Pressure Switches, which are adjustable from .25 to 1.0" W.C. On the Lift Reserve Indicator, this translates to a range of about mid-red (below stall) to the transition point between yellow and green ranges on a properly calibrated LRI system. The nice thing about these units is that it accepts both 1/8 and 1/4 inch air lines from the pitot-static and AOA (Lift Reserve) systems.

Figure 3, two pressure switches.

You could also use Cleveland Air Sensing Switches – model number NS2-0000-05, which are slightly smaller and adjustable over a much wider range of .1 to 10" W.C. (way beyond the range required for this system), but be aware that they only come with 1/4 inch air connections, so reducing tee's will be required if your pitot-static system has smaller air lines.

The first unit is connected into the pitot-static system with tees and adjusted to trigger the switch at about 20 to 25 knots… well above taxi speed. To test the proper level, hook up a small tube to the pitot tube and apply a very small amount of air pressure by using a small rubber bulb or blowing very gently into the tube after swallowing any saliva in your mouth first. Watch the airspeed indicator and adjust the set screw on the pressure switch to adjust the trigger point. You will hear a click when the switch operates or you can hook up a small battery, LED and resistor in line with the pressure sensor switch to aid with testing and calibration.

The second unit should be hooked into the lift reserve system with tees and tested in a similar manner by feeding a small tube into the upper tube of the probe and lightly pressurizing it as described earlier. I used a length of small heat shrink tubing, which fit nicely into the probe holes to accomplish this. Adjust the set point of the switch to trigger as the LRI transitions midway through the yellow range. This is a very good starting point. Eventually, you may find that you prefer it to come on just a bit sooner as it transitions from the green range into the yellow, but I like mine mid-yellow and have never felt the need to adjust it yet (figure 3, above).

To wire up the system, use the normally open contacts on the airspeed switch and the normally closed contacts on the LRI switch and wire them in series with the indicator LED and a resistor to limit the current through the LED. The LED that I used has a maximum current rating of 20 milliamps so I used a 680 ohm, ½ watt resistor that I already had in my parts cabinet to drive it near full brightness.

R=E/I or (13.8V-1.6V*)/.02A = 610 ohms

* The red LED takes about 1.6 to 1.8 volts to operate.

If you can find a 620 ohm resistor you can drive the LED at full brightness, but the next highest standard resistor value is 680 ohms, which

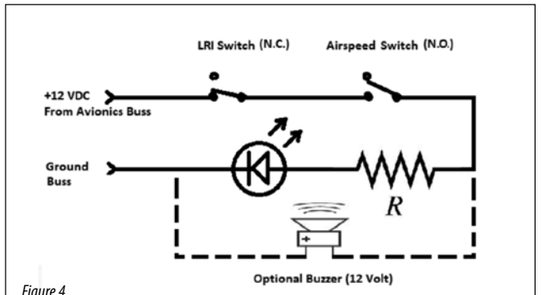


Figure 4

Figure 5

yields 18 milliamps at 13.8 volts and drops to just over 15 ma. at 12 volts. Since I already had a number of 680 ohm resistors in my parts cabinet, that's what I used on mine.

Figure 4, (left top) shows what the circuit looks like schematically. The circuit is quite simple to connect, but use good quality aircraft grade connectors and Mil. Spec. wire for reliable connections.

The LED (figure 5) should be as bright as possible and mounted in a location that will grab your attention quickly in the event of an impending stall.

Figue 6 shows the working system is shown in the full context of what it looks like in the cockpit and just how bright the warning LED appears as the plane gets close to the stall speed… in this case due to landing my float plane on a small lake in Eastern Ontario. I was landing toward the sun so there is a lot of reflection of the aircraft interior off the iPads and gauges.

The warning light also comes on during the take-off roll as the airspeed reaches 20-25 knots, which also acts as a guide for rotation in my aircraft. During climb-out, as the needle in the lift reserve indicator climbs toward the green range, the warning light goes out again. During upper air work practice, the light cycles on and off as lift and airspeed vary. This gives me an opportunity to check the function and calibration of the stall warning system.

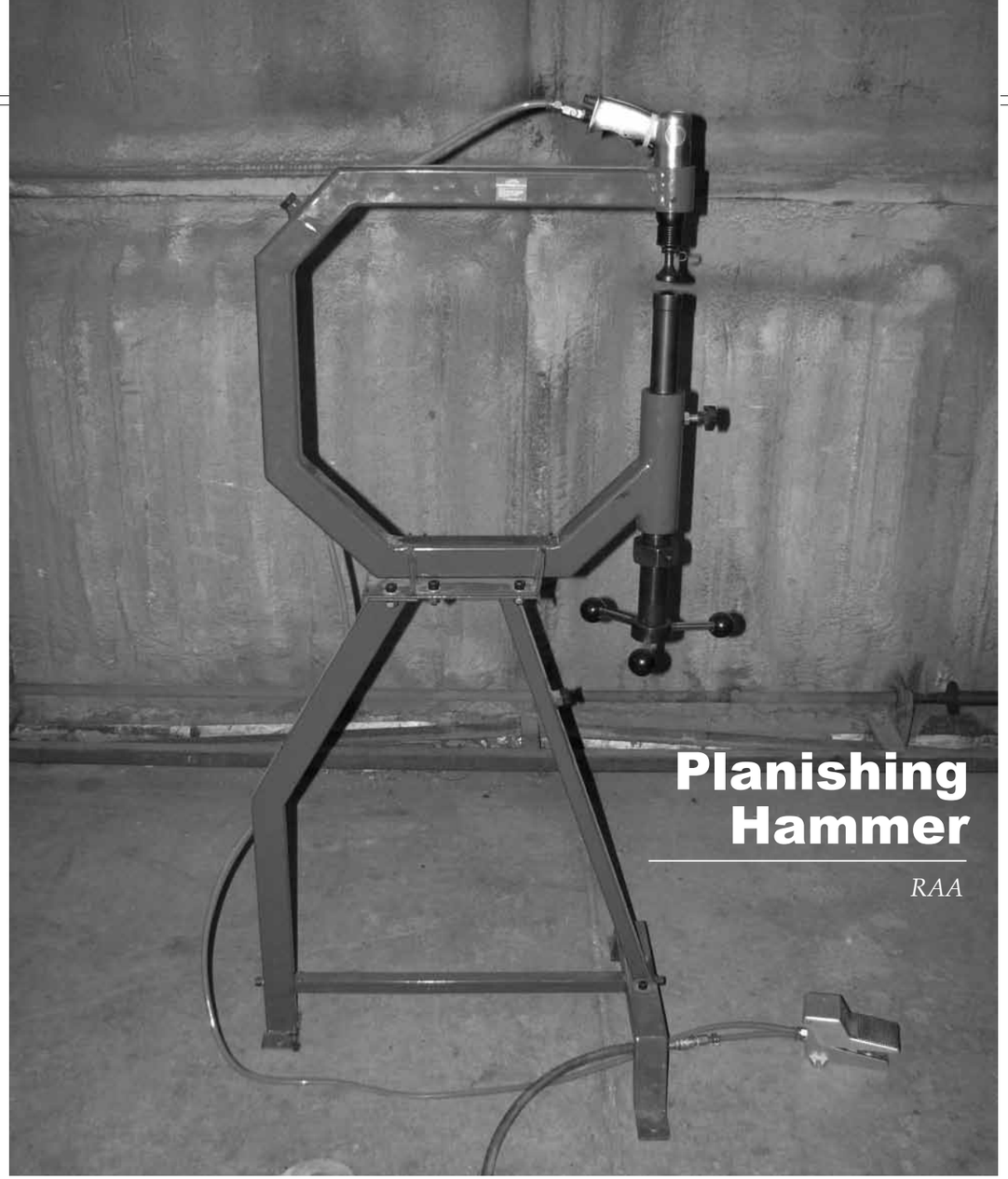
In the schematic, I have shown this electronic stall warning device with an optional buzzer in the circuit diagram, but did not install the buzzer since I had other plans for the Highlander.

In the next article I have included a couple of links where you can see the stall warning system operating in conjunction with another little bit of technology repurposed from the automotive aftermarket!

There is certainly something to be said for amateur-built aircraft and our ability to make improvements and modifications to our aircraft that improve operation and safety.


Figure 6. The LED can be seen in the centre of the dashboard just below the Lift Reserve Indicator.

Dan Oldridge *is the president of the Kitchener-Waterloo chapter and proud member of RAA Canada. Dan was a career firefighter and Deputy Fire Chief when he retired in 2012, but his early background was in electronics. Since his retirement he built a Just Aircraft Highlander and Zenair 1450 Amphibious floats. He has made a number of interesting modifications to his plane and is a regular contributor to the Recreational Flyer magazine. Dan also writes a monthly newsletter for the KW chapter of RAA and maintains their website at www.kwraa.net.*



Planishing Hammer

RAA

PLANISHING IS THE ACT of hammering metal against a die to smooth it, and historically this was done with a polished hammer and a metal dolly. In the 1930's pneumatic planishing hammers became available, and now these are available as inexpensive ($200) shop tools that will hold an array of forming and finishing dies. Harbor Freight and Eastwood Company sell entry level machines in the US, and in Canada Princess Auto carries an almost identical machine.

A common air hammer is mounted in the upper leg of the c-frame, while the lower leg holds the lower die on top of a large jack screw

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ADS on a B-Grade Budget

Lee Coulman

I COULD RESIST no longer…resistance was futile. Free weather and free traffic to supplement FltPlan GO on my iPad and Android phone was just too much. My background in ATC RADAR was being destroyed as I selected an upstart ADS-B device for my amateur built Searey. Why couldn't I resist?

The cost and capability of the package I bought overwhelmed my curiosity. For the price of a good dual band ADS-B receiver I could get ADS-B in and out with a few extras. It had started some time ago when my iPad was loaded with FltPlan Go as I now had a moving map display to supplement my Garmin AERA GPS navigator and Dynon EFIS. All that information at my fingertips is just simply addictive. But, since I'm so frugal, my iPad didn't have a GPS, so I bought a good standalone GPS that could pick up the GLONASS and GPS satellites. Then of course I needed to keep the batteries charged. Well, that didn't happen all of the time. When one was charged up, the other wasn't and so on. Given those shortcomings and that sometimes the standalone GPS would fail due to cooking on the panel, I also put in a low noise USB power source to cut down on the battery failures and to reduce VHF radio noise.

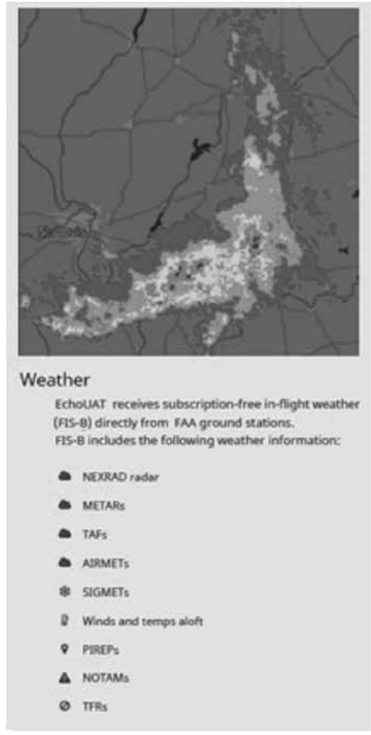
On the other hand, if I had an ADS-B receiver I could find my buddy Dan Oldridge with his Highlander with ADS-B out capability. We had flown to the COPA AGM in Yarmouth last year and had seen our conflicting traffic from ADS-B on his Foreflight display along with tidbits of FAA weather along the US border. It was enticing.

The tipping point happened when

uAvionix came up with simple and cost effective solutions. This was an opportunity to get traffic and weather in a nice tight set of packages with no daggling wires and no batteries. The only downside is that it only had ADS-B OUT using the US UAT format, not the international 1090 extended squitter (ES). It was all for under $2000 Canadian! Try buying a transponder for that price.

With an amateur built aircraft I could do this simply because I can. I believe this is one of the major reasons why we are in the growing sector of GA in Canada.

All that was needed in order to install it was to add power and find places for some very small boxes and



an antenna. My airplane doesn't have a high quality GPS like a Garmin 430 WAAS GPS so I selected the uAvionix GPS SkyFYX. This GPS is no slouch, as it has all the special features to meet the stringent FAA compliant features including RAIM. You don't get this feature in even a good handheld aviation GPS. Also, I don't have to pay to update the database with this GPS. It is so smart for being dumb.

I also don't have a very sophisticated EFIS. My Dynon D10A EFIS talks to my Garmin GPS but not much

else. A more sophisticated Garmin G3x, GRT or Dynon Skyview would open a lot more possibilities, but add to the complexity and cost.

The simpler configuration cuts down on the cost and complexity. Just add power and an antenna and there it is.

The small boxes are much more amenable to placing in convenient locations, closer to their antennae or other connections. You don't need panel space, which I don't really have.

The Echo UAT box is only 80g and the SkyFYX WAAS GPS only 100g. The power consumption is very low and needs a single breaker to power everything. The overall weight penalty for my airplane was 1.3 lbs. The iPad or Android runs the "Echo" app which sets up the echoUAT names and codes. You can set it and forget it. My old Microair transponder transmits my squawk code and barometric altitude. These are auto'magic'ally picked up and retransmitted along with the GPS altitude and position on the UAT frequency. Ah yes, and then there is the Wi-Fi connection of control and data to the iPad which was pretty much seamless.

So how did this installation work out?

The layout in the aircraft is shown in the following pictures. The installation happened very easily as the wiring is so simple. The only difficulty is finding an antenna location that is 2 metres away from the transponder and at least a metre from the VHF antenna, and is mostly in the clear from any obstructions or blockages. The placement is critical for getting superior results compared to the portables in most airplanes. The antenna is vertically polarized so was placed pointing up on my amphibian for obvious reasons. The coax (RG400) length is important, so you can't place it more than about 9 ft. from the transmitter, to achieve a loss of less than 1.5 dB. There is a structural tube that allowed coax rout-

continued on page 32

Your Magnetic Compass: Do You Know How to Swing It?

Geoff Gartshore, RAA# 9406

Fig. 1

I CURRENTLY OWN AND FLY a Zenith CH 200 amateur-built It is a great little aircraft – fast and durable.

The existing overhead magnetic compass soon developed a cracked mount, and was in poor condition. I recently replaced it with a new overhead compass, and my first task after that was to adjust it and swing it. When I mentioned this to other pilots, I was surprised to learn; a) many did not know how to adjust their own compass, nor how to swing it; b) some did not know this is an annual requirement (CARS Standard 625 Appendix C Item 10).

Your magnetic compass is one of the few required instruments in an aircraft, including ultralights and amateur-builts.

While we know it is prone to various types of errors (lagging, leading during turns, deviations related to latitude, etc.), it is still your primary VFR navigation backup in the event of a failure with your GPS (unit or battery), or your Directional Gyro (power or vacuum failure).

If you own a certified aircraft, your AME will do the annual compass swing for you as part of the Annual. However, if you own and operate an Ultralight or Amateur-built aircraft, as most RAA members do, chances are you are doing much of your own maintenance – if so, knowing how to adjust and swing your magnetic compass is important.

So here's a brief "How To" on the subject.

Compass Adjustments

Your magnetic compass is designed with two brass adjusting screws, typically located under a panel cover at the front of the compass (see photos 3 and 4). One screw, often labeled N-S, is for adjustments on a north and south heading. The second screw (E-W), is for adjustments on an east and west heading. When making any adjustments (to be described below), make sure you use a brass slotted screwdriver (available at Aircraft Spruce) to avoid magnetic interference during adjusting. I carry my brass adjuster on my aircraft key ring.

Before Swinging Your Magnetic Compass

Before beginning a compass swing, the following tips are important:

Ensure the area where the compass swing is performed is free of any steel structures, underground pipes or cables, or any other equipment that produces magnetic fields. An airport compass rose painted on the ground is typically located in an area free of such magnetic influences.

When doing the compass swing remove any magnetic or ferrous items from your pockets. Use only non-magnetic tools when adjusting the compass screws (see Photo 5).

If there is any equipment on board the aircraft that has any magnetic effect on the compass, ensure such equipment is secured in the position it would be in during normal flight.

Check the maintenance manual to ensure your aircraft is properly configured before beginning the compass swing.

Performing the Compass Swing

Mechanics either perform a compass swing using an airport compass rose, or they use a calibrated master compass to align the aircraft during the swing.

If you plan to do the compass swing yourself, I recommend you utilize an airport compass rose if possible (see Photo 6). A proper and well maintained compass rose will have all the key cardinal directions mapped, enabling you to position your aircraft along each point and complete the compass swing adjustments while in the aircraft.

If you choose to do a compass swing without the benefit of an airport compass rose, you will need to care-

Fig. 2

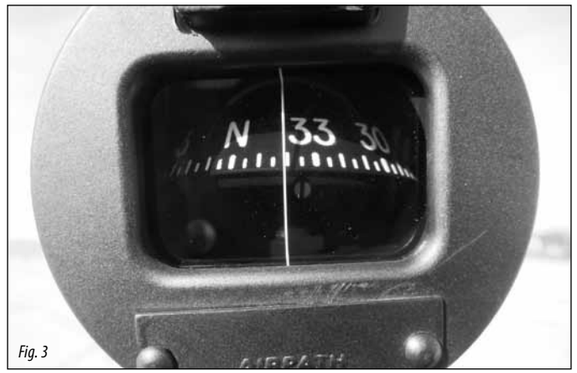


Fig. 3

Fig. 4

Fig. 5

Fig 1, opposite: Geoff and his Zenith.

Fig 2. New Airpath overhead compass mounted in the Zenith CH 200.

Fig 3. Compass compensator screws located under the front panel.

Fig 4. Front panel typically swings up to access the brass compensator screws for compass adjustments.

Fig 5. Adjust each compensator screw using a brass screwdriver (non-ferrous) to avoid compass deviation during adjustments.

Fig 6: Typical airport compass rose (source: google images.ca).

fully select the swing location, and then either enlist the help of a friend to guide you in the compass bearings, or manually move the aircraft each time to the bearings yourself. Having done both types of procedures, I have found using a compass rose to be the easiest and most efficient way to swing a compass.

It is important to do the compass swing with the aircraft engine running, and with all instruments turned on that would typically be running in flight (such as lights, radio, transponder, GPS).

With the engine on and the aircraft properly configured, align the aircraft to the 0 degree (north) heading on the compass rose. If the compass is not in alignment with magnetic north, adjust the N-S compensator brass screw on the compass with a brass screwdriver until the compass reads 0 (or 360) degrees.

Align the aircraft to the 90 degree (East) heading on the rose. If the compass does not read 90 degrees, adjust the E-W compensator screw until the compass needle is aligned with 90 degrees (East).

Align the aircraft to the 180 degree (South) heading on the rose. Note the indicated heading on the compass. If it is not 180 degrees, adjust the N-S compensator screw to remove half the difference between 180 degrees and the actual reading. For example, if the compass reads 184 while the aircraft is positioned along the 180 degree compass rose, adjust the N-S compensator screw until the compass reads 182 degrees.

Align the aircraft to the 270 degree heading (West) on the compass rose. If the compass does not read 270, adjust the E-W compensator screw to split the difference as in Step 3.

Now you can align the aircraft around all the headings on the compass rose, noting the actual heading values at each 30 degree position on the rose. You want to see no more than a 10 degree difference in the values. If all your values are consistently more than 10 degrees off, it is time to replace your compass, or at least re-locate it in the aircraft if magnetic interference is suspected. Write the recorded values on your compass correction card.

After the swing, check the compass when aligned on a runway. Then, fly the aircraft on various headings, and cross-check your compass readings with both your GPS and your DG (constantly updated with the GPS). This will give you a better indication of how the magnetic compass is really performing. I have found by experience that apparent errors on your compass correction card on the ground are less pronounced in the air when cross-checked in this manner.

Happy flying in the right direction! R

Geoff Gartshore *currently has 775 hours over 16 years of flying the following aircraft types – Cessna 172, Katana DA-20, Cessna 140, Luscombe, Tiger Moth, X Air Advanced Ultralight (owned for 8 years), and Zenith CH 200 (currently owned).*

Flying the Beautiful BC Coast

ALTHOUGH I WANTED TO FLY planes much earlier in my life, I did not get my private pilot license until 2006 at the age of 56, with the float endorsement coming a year later.

Having limited opportunities to further fly on floats, I flew mostly on wheels (C-172) out of the Victoria Flying Club. It was fantastic and I took every opportunity to fly. But here along the BC coast the number of aerodromes is limited, so, even though no two flights are ever the same, eventually one may fly to the same places several times a season. This changed 2 years ago for us when our Kitfox 7 Supersport (1550 lbs gross weight) on 1450 Zenair floats was finished and ready to fly. It took 8 years of part time work to get to this point but the rewards of flying this little sport plane and being able to land anywhere where there is water was well worth the wait!

I am fortunate that in spite of her preliminary doubts, my wife took to this mode of recreation very keenly. Hard to resist. What used to take several days motoring on our sailboat we can now visit with the plane in one afternoon, stop at a marine pub for dinner on the way back and still be home well before dark!

Half of the first summer was spent flying off the 25 defect-free hours within 25 nautical miles of the base (Long Harbour on Salt Spring Island) which was around the Southern Gulf Islands. Truly beautiful with many places to

From the top down: Scenic Princess Inlet ; the author's plane moored at Savory Island, about an hour by air northwest of Vancouver, BC; Silva Bay on Gabriola Island, between the Mainland and Vancouver Island.

Above: the Thormanby Islands; right, the west coast of Vancouver Island near Tofino. Opposite: the author flying his pride and joy, and (far right) the wife and aviation mascot Bumbles the Corgi, who both enjoy their time exploring the spectacular coastal scenery.

land, visit and eat at. But it was great to break out of the 25 nm envelope in August that year, enabling us to go to farther destinations like Desolation Sound, Savary Island, the Sunshine Coast, the West Coast and yes the first visit to an alpine Lake, Lake Lovely Water.

This past summer was the second season flying and even though I did not get to do many of the flights I planned in minute detail over the winter, we continued to expand our envelope around the Georgia Strait basin and the surrounding mountains. This past summer was quite unsettled weather-wise which usually produces bumpy rides over land and in narrow inlets. But with enough favourable days we visited Desolation sound a few times, anchored the plane at Masons landing and walked up for a swim to Hague Lake with fine white sand beaches, as well as Unwin Lake reached by a short trail from the sea, followed by a nice dinner in Heriot Bay Inn, just a short flight away. We also re-visited Savary Island with its warm salt water swimming and beautiful white sand beaches. Princess Louisa Inlet with its magic waterfall is only about 1 hour and 15 minutes from the base and yet in the past 40+ boating years we never visited it on the boat as it would mean a day of motoring up the inlet and a day back. A piece of cake flying, smooth flight over Georgia Strait and then to the end of the long but spectacular Jarvis Inlet, through a narrow pass over Malibu Rapids to the Inlet with pristine clear waters (close to a glassy water landing that day), magical waterfall and spectacular beauty that only nature can create!

Our longest flight of the season was to Friendly Cove (Yuquot) on Nootka Island where Capt. Cook became the first European to set foot on B.C. soil in 1778, and which later became a subject of dispute between Britain and Spain, eventually ending with the signing of Nootka Treaty in 1794 thus averting an all out war between Britain and Spain. We also flew over Cougar Annie's Garden, owned by a truly eccentric BC character who in the early 20th century carved out a nugget of civilization in the wilderness on Hesquiat Harbour. She went through several husbands, ran a post office there and sent seeds and cuttings all over the world. The flight back past Hot Springs Cove and along the Pacific Rim National Park was, as always, breathtaking in the low afternoon sun over the Pacific. We then took a route along Alberni Canal over Cameron lake and back along the noticeably more inhabited east coast of Vancouver Island.

The very last flight of the season was to Nanaimo Harbour and the Dingy Dock Pub for a superb Sunday brunch. Short taxi afterwards to Newcastle Island for a long walk - with our Corgi dog Bumble of course; yes he seems to love flying to places too, voluntarily wearing his Mutt Muffs to protect his ears.

Salt water float flying has its own challenges such as corrosion and tides. We pull the plane up on a floating dock and thoroughly wash it with fresh water between flights. There are always vulnerable spots on the airframe that need to be watched and tended to, but so far I am impressed that there is absolutely no corrosion on the Zenair aluminum floats, inside or outside. Whatever fasteners and parts on the plane we could replace with aircraft stainless steel we did.

The tides, just like the wind, have to be worked with. When we beach the plane in a rising tide it does not take long for the plane to float while we may be away, in a falling tide we might find it high and dry. So we now use an anchor (netting filled with rocks from the shore), a 20 foot bungee cord (available in marine stores) off the bow and a landline from the stern in such a way that the plane settles in the water a few yards from the shore, unaffected by the tide or potentially rough bottom beneath the floats.

The two summers we have flown the plane we have barely scratched the surface of the endless possibilities of places to go, enjoy and things to learn. We are looking forward to next season when we would like to fly to more swimming lakes and perhaps farther afield like the spectacular Chilcotin Mountains.

***Tom Navratil** lives on Salt Spring Island, BC. His airplane is a Kitfox 7 Super Sport C-GXCZ on Zenair Floats. He can be reached at saltspringhomes@gmail.com.*

Feature

The two summers we have flown the plane we have barely scratched the surface of the endless possibilities of places to go, enjoy and things to learn.

Building My

Nynja

By Ed Connors

I have to admit that building a new plane, the Nynja, was partly my wife's idea. It was late fall 2012 and most of my major home and property improvements were completed so she was concerned about the approaching winter and no project to keep me busy. So when she suggested that I build the plane that she so frequently saw on my computer screen, I did not need much convincing.

I owned a Skyranger kit built advanced ultralight aircraft, designed and manufactured by Best Off Aircraft in France. I hangared it at Juergensen Airfield, north of Fergus, ON and flew it as often as I could. It is a side by side tricycle geared two seat aircraft powered by the 80 HP Rotax 912UL. I enjoyed the plane very much and wanted to build the new model called the Nynja, which had a fuselage covered in glass fiber panels, a pod-like instrument panel, a shorter wing that was covered in a new material called XLam, and flew a little faster. The recommended engine for the Nynja was the 100 HP Rotax 912ULS. I was planning to build it in my heated workshop/garage. My previous experience was building a Challenger ultralight in 1993.

I placed the order in December 2012. The kit, comprised of seven cartons and one wooden crate, was shipped sea freight to Montreal, QC in January 2013. During the trip, the wooden crate which contained the major part of the kit was completely destroyed. The kit manufacturer responded immediately by getting another crate ready and air shipping it from Paris to Montreal. It was thentrucked to me in Guelph. The delay was approximately six weeks. I discovered later that in the rush to get another kit ready, many items such as the fuselage bracing cables and tail parts were a mix of other models and caused some confusion but eventually got resolved. Also, the replace-

Left, the Nynja's steering assembly. The firewall is not yet installed in this picture. Right, the pod-like instrument panel, sans instruments.

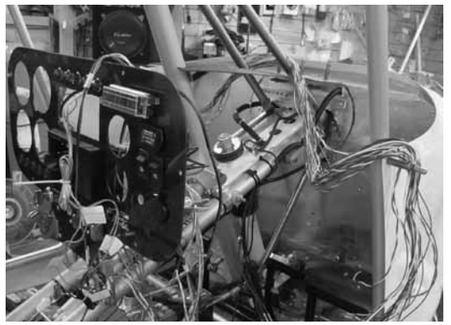
ment smoked Lexan polycarbonate glazing for the windshield, windows, and doors was not pre-marked, which made it much more time consuming. The Nynja kit is quite comprehensive and was very easy to assemble. The kit is supplied with a two hundred and fifty page manual that is also available online. Each step is explained in detail with drawings, photographs and a recommended assembly order. During the assembly, I had my Skyranger to fly and did not feel the need to rush the build. The two planes are similar in construction and the fact that I had previously read the Skyranger manual many times made it even easier. I built the Nynja over a two and a half year period. It can be built in much less time, but I approached it as a part-time project. At one point, I did not work on it for six months.

The Nynja is a side by side two seat advanced ultralight that comes with a choice of a center control stick with two throttles, or two control sticks with a center throttle. I opted for the latter. It is constructed mostly of pin-jointed aluminum tubes. This means a bolted structure where the bolts are loaded in shear against the tube walls and results in a practical structure which assembles quickly and is easy to inspect. There are no large welded assemblies that would require specialist techniques or cost large sums of money to replace, so it is a practical construction and well suited to owner maintenance and repair. For added safety, I installed a BRS 6-1350 HD ballistic parachute and had my friend Mike Shave install the rocket and igniter. To fit the parachute, I unfortunately had to give up some storage space which is noticeable when I have a passenger.

The fuselage and wing assembly was relatively simple. All tubes and parts are supplied with the hardware pre-mounted. The fuselage bracing cables are supplied ready for installation. Within months of assembly it was in the driveway with the uncovered wings temporarily installed to check for fit.

The main landing gear consists of two formed 2017 aluminum legs that attach to a 40mm diameter high strength steel cross tube. The legs are simple and robust and flex to provide shock absorption. Drag loads are handled by a steel triangular structure which bolts to each leg and is hidden inside the fuselage. The front landing gear is made from the same 40mm diameter high strength steel as the main landing gear cross member and slides within a lower guide. It uses a stack of thick rubber washers in compression to provide shock absorption.

The wing structure is a development from the traditional "ladder style" ultralight wings. Leading and trailing edge tubular spars are spaced by tubular rungs. Drag and anti drag loads are reacted by internal wire bracing. The XLam wing and tail coverings are pre sewn envelopes or "socks" made of a trilaminate fabric consisting of an internal weave or "scrim" sandwiched between two polyester films with the outside layer having a UV protection applied in manufacture. This is a shiny wipe-clean film that



Above, the forward fibreglass fairings and some of the wiring installation; the composite panels are not load bearing but do much for the streamlining and visual appeal of the Nynja. Right, the fuselage aft of the cabin is likewise covered with an attractive composite shell.

stays looking good far longer than Dacron sailcloth as well as having a far longer UV life. The kit is supplied with the flaps, ailerons, horizontal and vertical stabs, rudder and elevator surfaces pre-covered.

With the drag and anti drag wires temporarily detached, the wing frame scissors to allow inserting into the envelopes. Pre shaped tube battens are inserted in pockets in the coverings to form the aerofoil shape. This shape is further stabilized with spacer blocks inserted between the upper and lower batten ribs, a patented system unique to the Nynja. Fabric tension is provided by screw jacks in the root battens. The span-wise tension this produces results in a taut skin and limited sag between the battened ribs. The coverings can be easily removed and reused to provide access for maintenance and repairs.

Controls for the Nynja are fairly common. Roll is transmitted to differential movement part-span ailerons through cables. Yaw and nose wheel steering are effected by dual control foot pedals with movement to the rudder through cables. Pitch control is transmitted by movement of dual control sticks with movement transmitted to a conventional elevator through cables. Braking is effected by console mounted hand operated hydraulic disc brakes. Electric flaps, pitch and rudder trims are effected by linear actuators with panel mounted toggle switches.

The kit is supplied with an aluminum firewall and a thin fire protection and noise attenuation material. I installed the supplied item on the engine side and sourced a 10 mm thick ceramic blanket for the cockpit side. The heat side of the blanket is covered with stainless steel, and the other side is aluminum and can be glued into position. The

Above: the Nynja's fuselage sans the fibreglass covering. The aircraft's descent from its Skyranger roots are obvious, and as such the composite on the Nynja is not structural. Simple, light, effective. Below, the author and his pride and joy. The Nynja also has 3.5 feet lopped off the wingspan, yielding a claimed cruise of 109 mph.

main purpose of this added blanket is for fire protection but I achieved some noise reduction with the added material as well.

Two 30 L plastic fuel tanks are supplied with the kit. These are installed behind the seats and have minimal effect on weight and balance. The fuel plumbing is a mix of flexible hose and aluminum tube with an auxiliary Facet fuel pump as a back-up. There is a fuel return line to the tanks as recommended by the engine manufacturer.

The Rotax 912ULS was supplied without the oil plumbing done and the recommended quick connect fittings were not easily installed. Again I counted on Mike Shave to fabricate a special tool that enabled me to install them. I also installed a ThermoStasis oil thermostat to reduce warm-up time at start-up and opted for a CKT stainless steel muffler which significantly reduces the engine noise. It also has a shroud for cabin heat which makes it more comfortable in cold weather. The engine came with the "soft start" feature, but it was not installed. My friend Mac McCullough volunteered for the installation as he had previous experience with that operation when installing his engine. My propeller of choice was the ground adjustable three blade Warp Drive with

Building the Nynja was a very positive experience... It can be off the ground in a few hundred feet and the landing roll a few hundred more. It is comfortable and the visibility is great.

tapered tips and nickel leading edge protection. I use mostly grass strips so for safety reasons have adjusted it for take-off performance and gave up the 6-8 mph in cruise.

The design and installation of the instrument panel was a long process as the pod has very limited space. The carbon fiber blank panel, supplied with the kit was a good template. I started with cardboard models and progressed to wooden ones that could fit the Garmin 296 GPS, a Grand Rapids EIS, a radio, an intercom, a mode C transponder, standard flight instruments, switches and warning lights. My goal was to centralize switches, throttle and controls so that they could be easily reached from either seat. I finally settled on the current set-up after many different tries. I was fortunate to have my friend Mike Ettinger help with the wiring and do the radio, intercom and transponder installation.

The installation of the glass fiber panels and cowlings was surprisingly simple as the panels fit well and required very little trimming and adjusting. The two body panels are riveted to each other on the top and bottom

Top: the Nynja's pod-style instrument cluster was an appealing aspect of the design; above, the author has designed and installed skis for winter flying.

with only a few rivets at the rear. They are then riveted to a panel that covers the bottom under the cockpit floor and comes up under the doors. At the top, these body panels are riveted to the rear and side windows. Another panel is fitted between the under door panel and the engine cowlings and holds the bottom of the windshield in place. The engine cowlings required no trimming

and fit together well. Under the lower engine cowling, I built some ducting to improve the engine cooling.

In September 2015, after having done the weight and balance, I asked Colin King, our field instructor, to accompany me for a short first flight. Colin had purchased my Skyranger for his school, Lift-Off Aviation, and we expected the Nynja to have roughly the same flight characteristics, and it did. The controls were similar with a little more sensitivity. I noticed that it needed more nose down trim to fly hands-off and that was corrected by removing the few degrees of flap and aileron upper reflex that I had built in. No other adjustments were required.

Building the Nynja was a very positive experience. I found that certain segments were labour intensive such as the trimming and fitting of the Lexan polycarbonate for the windshield, doors and windows, followed by the instrument panel, the engine installation and the wiring. I now have 90 hours on the Nynja and it is a pleasure to fly. At 5500 RPM, or 90% power, it will cruise at 100 MPH, but I fly it mostly at 4600 RPM which gives me 85 MPH. It has a low stall speed of 38 MPH. It can be off the ground in a few hundred feet and the landing roll a few hundred more. It is comfortable and the visibility is great. Recently, I designed and built a set of snow skis for it and am looking forward to the right weather conditions to extend the flying season.

For more information on the Nynja please contact Paul Dewhurst at paul@flylight.co.uk

The Rotax 912ULS in its box.

Nynja Advanced Ultralight Specifications

The Nynja is the latest development of the original Skyranger from Best Off Aviation of Toulouse France. For the Nynja the wingspan has been decreased by 3-1/2 feet and the supported engines are the 80 and 100 hp Rotax 912 series. The original Skyranger was covered in light fabric while the Nynja has nonstructural composite fuselage cladding and trilaminate composite fabric for the flying surfaces.

Transport Canada's Advanced UL list claims an empty weight of 284 kg (626 lb) and a gross of 472 kg (1040 lb), for a payload of 414 lb. Ed Connors' plane weighs in at 632 lb with its chute and has a payload of 408 lb.

Length	*18'*
Wingspan	*28' 7"*
Wing area	*150 sq ft*
Wing loading	*6.93 lb/sq ft*
Fuel capacity	*CDN 60 litres*
Vne	*130 mph*
Cruise	*claimed 109 mph, 100 mph observed at 5500 rpm*
ROC solo	*1200 fpm (100 hp Rotax)*
ROC gross	*1000 fpm*
Stall	*38 mph observed*
Cockpit width	*40" at elbows/shoulders*

Seats not adjustable but comfortable for 6' 2"

Runway requirement: a clear approach 1000 ft runway is very comfortable. Takeoff and landing require only several hundred ft.

Manufacturer: Best Off Aviation, Toulouse France

Canadian Importer: Speedwing Aircraft Inc. Maniwaki Airport 170 Route 105, Messines QC, J0X 2J0 819-465-3974 speedwing@picanoc.ca www.skyrangercanada.com

Vertical Height Warning Device

Using a car backup alarm to assist with landings on water or land / By Dan Oldridge

Glassy water… every float plane pilot's least favourite landing scenario. How do you judge your vertical distance from a mirror-like lake? Sometimes you can use the shoreline... or buoys or other objects floating in the water, but generally there are few indications of height over glassy water.

Float plane pilots are taught to set up a long approach into the wind with a 100 ft. per minute descent rate and just wait it out until the floats break the water's surface. When they do it will still likely be a surprise as the human brain has a difficult time judging distance without any definite clues to guide us. Sometimes it's hard enough when there are waves or ripples on the water to get an accurate picture of height off the water. Many of us still find it difficult to get the transition just right when landing on a runway where all the visual clues are present. If you are still developing your flair for the flare, read on!

There are a number of electronic solutions available to measure distance, including radar, lidar and sonar. Each has its own advantages and shortcomings, but given the complexity and relative expense of radio ranging technology and laser ranging technology, in the automotive sector, car back-up alarms use the much simpler and less costly sonar system. As this technology becomes commonplace in most automobiles the prices have dropped tremendously.

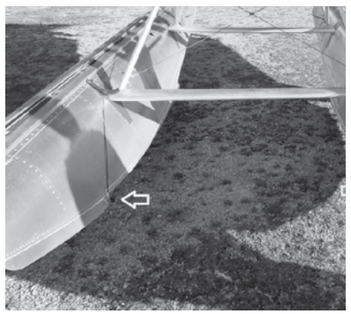
After a bit of research into the topic, I found a few people had already tried using automotive sonar systems in aircraft to determine vertical distance from the ground. Lee Coulman (a fellow RAA member) and I had discussions about the feasibility and practicality of installing such systems and technology in amateur-built aircraft.

One of our main concerns was the range of these devices, which is typically less than 2 metres (6 feet). Ideally it would be best to get notification of height above ground as early as possible, but 2 metres could be workable. Another big concern raised during our discussions was the impact of noise generated in the slipstream around aircraft, whether from the propeller or just the natural flow of air over the fuselage at flight speeds. We didn't know whether the "noise" generated by rushing air would produce high frequencies or even harmonic pulses that might interfere with the ultrasonic pulses being sent and received by the sonar ranging system's transducers or maybe even mask them totally.

While Lee pursues a micro-processor based solution that integrates with gear position and other functions in the aircraft, I decided to try an off-the-shelf car back-up alarm. Below is a photo of the device I ordered and installed to test out our ideas on how, and even whether or not, it would work for aircraft use.

I fashioned a couple of small angle brackets and drilled them to fit the sensors into. I then mounted the brackets to the splash guards on my amphibious floats with the sensors facing

downward. This positioned the transducers about 8 inches off the ground, which I figured was about the same distance a car equipped with one of these devices would park from a wall or other barrier the driver was backing up toward. I assumed this would ensure results similar to what the device was designed to provide.



A photo of sensors on my floats (courtesy Lee Coulman).

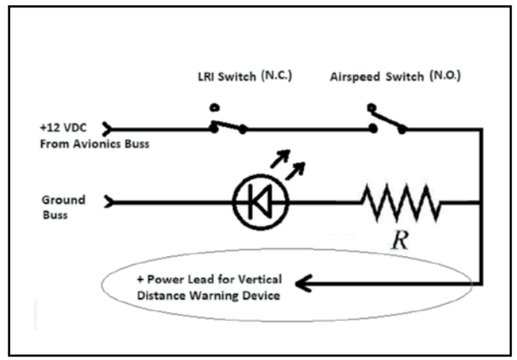
I then ran the wiring up into the cockpit and installed the junction box on the inside of the firewall and the display at the centre of the glare screen over the panel (below).

To conduct my initial tests, I connected the power lead to the avionics buss and the ground to the ground buss. When I turned on the master the unit came to life with a steady squeal and an indication of "0" metres distance and "full bars" on either side. As I taxied, the distance reading became somewhat erratic, leading me to believe it would not function as hoped. On my take-off roll, the unit continued to squeal and the readings were not stable, but as I lifted off the ground, it beeped rapidly, slowing to the occasional beep and then became a steady squeal again with erratic readings and lights as I flew away.

Lee and I had agreed to go flying that day, so I met him in the air over CPR3 and we flew north to Glendale Aerodrome… also known as Williams Lake. Although the squeal persisted throughout the flight, landing was a different story. As I approached on final over the water, the squeal disappeared and the unit functioned as expected. It began beeping at about 2 metres above the lake with the beeping speeding up as I got lower and turned to a steady squeal as I touched down on the water.Success!

Once we departed Glendale Aerodrome and resumed our flight back home, I tried changing the speed of the plane and thrust of the engine in an effort to determine what parameters were affecting operation of the transducers. Both had an impact, but it was obvious it was related to the speed of the air rushing over them.

During the flight back, I had also been thinking about ways to power the unit only when required and realized that I already had the perfect power source in my stall warning system. The high power LED in my panel only comes on during takeoff and landing, so it only seemed logical to use that circuit as a power source. A quick glance at my schematic revealed the ideal power tap point, which is shown below.



I rewired the positive 12 volt lead of the vertical distance warning device (car back-up alarm) to the stall warning circuit and retested the system on numerous takeoffs and landings afterward.

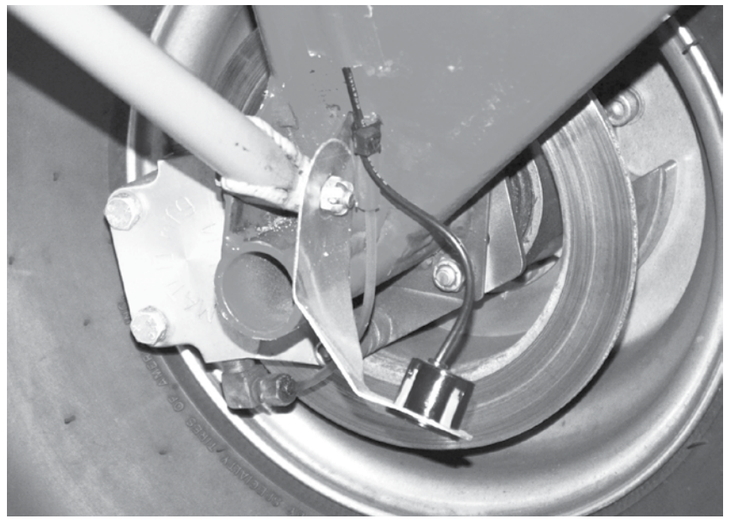
I am pleased to report that it seems to be working flawlessly! As I slow the plane to flare for landing the system beeps to indicate it is powered up and begins to show the appropriate bars and reading to indicate height from the ground. The beeping is slow to start and gains speed as the height decreases during the landing, eventually providing a steady squeal as the distance approaches zero; the same as it does when a vehicle equipped with a back-up alarm reverses toward a wall or other object.

To see the system in operation on floats check out this video… https://www.youtube.com/watch?v=Hi9zDGgQGOE

The landing was a little bumpy, and you may have to turn up the sound to hear the beeping of the Vertical Distance Warning Device (Car Back-up Alarm) in my plane in this video since I generally approach at higher RPMs when the plane is on floats. Note how the system activates just before landing as the LRI drops into the middle of the yellow band on the gauge, the beeping speeds up as I approach the water's surface and two seconds before the end of the video the plane slows enough for the system to deactivate, hence the light and beeping go off.

Given that the system came with 4 sensors, I installed the remaining two on my landing gear legs when I removed the floats and installed my bush wheels in October.

These two sensors (below) will stay attached to the gear when I switch back to floats in the spring and the original two on the floats.



To see the system in operation on wheels, check out this link… https://youtu.be/-Ugs9eoX26Y

The warning device comes on just after the flare and before the wheels touch down. You can hear the beeping speed up as the ground gets closer and steadily squealing at the point of contact. The CCD in the camera scrambled the visual display, but it does work even though I have never paid much attention to it during landing… the beeping is adequate and reassuring enough. As the plane slows down the system disengages and the warnings stop.

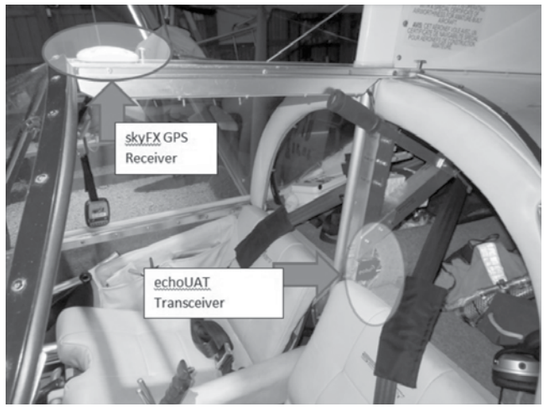
If you are thinking about this modification for your own aircraft, but don't have an LRI/AOA probe on your plane, consider adding a micro-switch on the flaps or flap handle. Since the flaps are normally only used during take-off and landing, this could provide a similar "only on when required" power supply for the Vertical Height Warning Device. It would also still be possible to install one pressure switch in the pitot line to only turn the circuit on when the airspeed is above 20-25 knots or so. If you want to get really creative, you could add a micro-switch to sense throttle position and only turn the circuit on when the engine is not at "full throttle". This switch would be in addition to the flap switch, but could turn the circuit on for landings and automatically leave it off for "full throttle" take-offs.

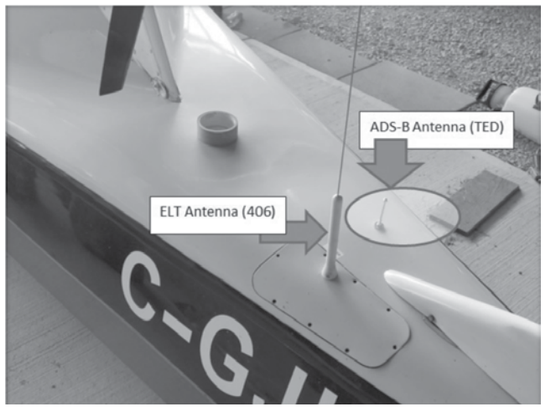
I don't expect this new ground proximity detector and warning device will change the way I perform my landings, but it's a great reassurance to hear the beeping of the vertical distance alarm going off in the background as I transition to land on the runway and especially as I get close to the water's surface during seaplane operations.

My next step is to feed the alarm into the intercom system to ensure the warnings are louder and cannot be ignored.

I believe this may be one of the least expensive, easiest, lightest and most interesting safety modifications anyone can add to an amateur-built aircraft.

Dan Oldridge *is the president of the Kitchener-Waterloo chapter and proud member of RAA Canada. Dan was a career firefighter and Deputy Fire Chief when he retired in 2012, but his early background was in electronics. Since his retirement he built a Just Aircraft Highlander and Zenair 1450 Amphibious floats. He has made a number of interesting modifications to his plane and is a regular contributor to the Recreational Flyer magazine. Dan also writes a monthly newsletter for the KW chapter of RAA and maintains their website at www.kwraa.net.*





Pictures of the installation on the author's SeaRey.

ADS / continued from page 15

ing to the antenna on the rear turtle deck. I cut up an aluminum serving tray and placed it within the Fiberglas skin to serve as a 170 cm ground plane, which is important for superior results. The echoUAT transceiver was placed behind the pilot's seats, under the engine pylon so I had some chance of seeing the mini-LEDs on the unit. The GPS was placed upon the canopy rail and only power and data had to be run to the echoUAT. Then I just needed to set up the Wi-Fi and program the echoUAT with my specifics including my registration and 24 bit ICAO code on the iPad or Android.

I did both … just because I could.

So, what did I receive?

I was surprised to see aircraft targets almost immediately. One was directly overhead at 25,000 ft. and there were others over Detroit and Buffalo at much lower altitudes. I didn't get much above 2500 AGL just north of Kitchener Waterloo but I did pick up 2 UAT towers in the USA and received METARS and TAFs as a result. This was neat and it continued to lower altitudes. I can barely hear the CYKF ATIS on VHF from my field but to receive US UAT down to these altitudes was fantastic.

The only problem… where is the Canadian weather data? Ask Nav Canada; no seriously …talk to Nav Canada. They seem to have a notion that they are fulfilling their mandate by providing us with future satellite service through AIREON. This starts in 2018, and only includes us if we purchase and install expensive additional equipment, so let's have that talk with Nav Canada to get useful and affordable ADS-B service for GA. AIREON may work well for commercial operators flying in the Arctic, but it will be out of reach for most GA pilots and owners. It took several years for the current in-plane ADS-B technology and systems to be developed by avionics manufacturers and the prices eventually came down as sales volume increased. The FAA got it right in the USA by including weather and data useful to pilots as part of their ADS-B roll-out as an early incentive. Without Canadian weather, there will be little desire for Canadian pilots to move to the AIREON system. Most pilots will continue to migrate toward, and use, the less expensive option available from our southern neighbours.

What are other jurisdictions doing?

Surprisingly, the UK CAA (TC in UK) has taken the lead by testing a uAvionix product similar to mine but with 1090ES ADS-B out and 978 UAT weather in.

Colin Chesterton, CAA future systems coordinator, said: "We are very keen to put electronic conspicuity systems into GA aircraft cockpits as soon as possible. But it's important we also include the users' requirements in our decision-making. We have a real opportunity to put in place an affordable system which will increase the safety of GA pilots and give them some really useful features, such as live weather data, and also provide controllers with the data they need to do their jobs.

There will be much more to come during the year with the various tests taking place. All will be undertaken in close cooperation with the GA community and equipment manufacturers to make sure that we can implement the findings as quickly as possible."

For now, I'm quite pleased with the installation and operation of my new ADS-B system, but I hope that our friends at Nav Canada eventually realize that the cost and complexity of their satellite-based system may preclude most GA aircraft in Canada from moving to AIREON ADS-B, especially without the added incentives of weather and airspace information that they have in the USA.

***Lee Coulman** is the Director of Flight Safety and Vice President of the KW/RAA chapter.*

President's Report / cont'd from page 2

tal operation and maintenance procedures can result in expensive repair bills if applied to Rotax engines. If you are currently operating or thinking of purchasing a ROTAX 900 series engine, these two evening sessions will provide insight into why certain procedures are followed.

Location will be 427 Wing, 2155 Crumlin Rd, London, ON N5V 3Z9

Session 1 - Tuesday April 3rd, 2018 7:30 pm; Session 2 - Tuesday May 1st, 2018 7:30 pm

Registration site is: https://goo.gl/forms/DzJoIJNCSbLgD6Af1 email is londonstthomasraa@gmail.com.

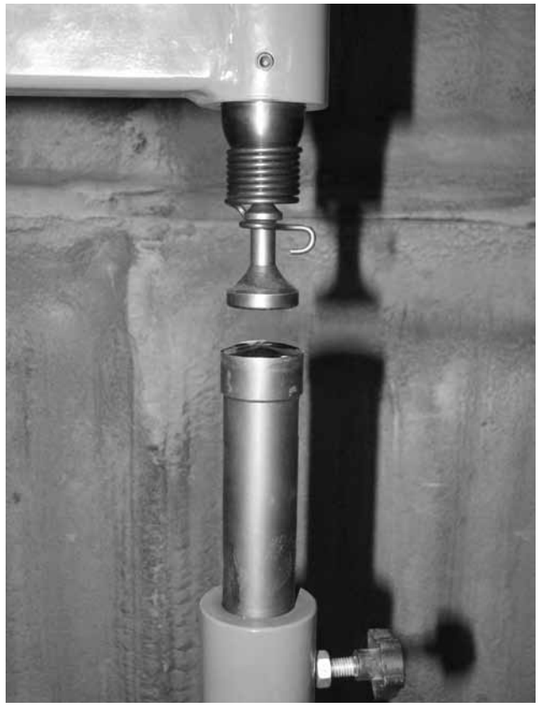
CHAPTER STATUS REPORTS

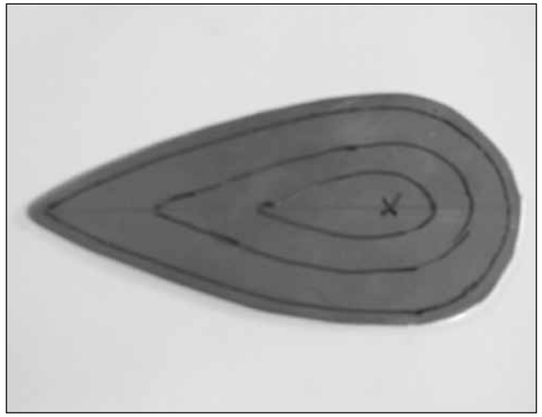
The RAA Chapter Liability policy renews mid-January and all chapters that send in a status report are automatically covered for $5 million. Each year there are some chapters that do not make the effort to send in the report and they are operating without coverage. When your chapter has elected is officers for the year please send in the names and RAA National membership numbers of the five who qualify your chapter:

President
Treasurer
Secretary

...and two other chapter members who are specifically named.

As well include a full and accurate chapter membership list, separating National members from those who are solely chapter members. Include addresses and contact information for all. When this has been received at the office your chapter status will be valid for 2018 and your events and meetings will be covered under the new policy. Please either mail to the RAA snail mail address or email to garywolf@rogers.com.





Top Left: The upper die has a flat bottom and the lower one is crowned, so the touch point is only at the centre. Top: Cut a blank from .040 utility aluminum and draw concentric rings as a guide when forming. Above: Follow the lines while hammering and repeat until the part has been raised to sufficient height

Plannishing / continued from page 13

that may be adjusted to tighten the pinch between the two dies. A foot pedal controls the flow of air to the hammer, leaving both hands free to hold and move the sheet metal being formed.

The machine weighs only forty pounds but it consumes compressed air at a good rate, so a five hp compressor is required for continuous use, and a large tank is an asset. A set of earmuffs is a necessity because the hammering is noisy.

The upper die has a mushroom shape with a flat, polished face. Three lower doming dies are supplied in 1", 2", and 3" radii, all with polished faces.

The sheet metal is placed between the two dies and is hammered between them, with hard hammering available when the jacking screw is tightened to raise the lower die for rough forming. For smoothing, the lower die may be lowered so that the two dies just barely pinch the metal, allowing the metal to be polished by the blows.

Let's make an aluminum blister. Start with a piece of utility aluminum, usually 3003 alloy. It is ductile enough that it does not require annealing to make it workable. Snip out the ovoid shape about 3/8" large all around and with a magic marker draw concentric lines that will be used as a rough guide when hammering.

Begin by hammering just inside the perimeter of the blank and hammer the entire surface of the part evenly, but be very careful not to go over the edge of the material. The edges are not worked so they remain the original dimension. The area being hammered becomes thinner and this forces the material to blow up into a shallow bubble. When you have hammered the entire surface it will have raised into a plateau.

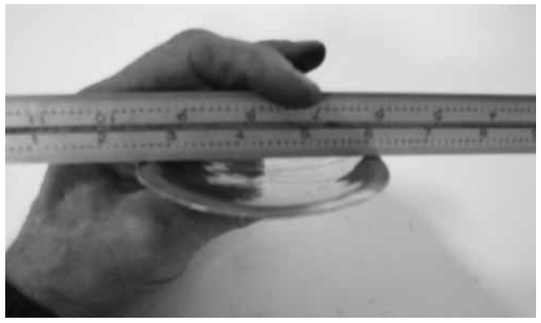
Next step is to move inwards to the next concentric line and hammer the area inside it. This will raise another plateau. Move to the next line and raise the area inside it. Eventually the part will look like a hill that has been terraced.

Now lower the jacking screw until the dies barely kiss the metal and work the entire surface of the part, again being careful not to go over the edges. The surface of the blister should now be a fair curve. If there are any low areas just raise the lower die a bit and work the low area, blending it into the surrounding area. Then lower the die to the kiss point and smooth the surface.

The edges might need a bit of trimming with shears to get a good ovoid shape. Draw a magic marker line ~3/8" inside the edge and with a set of flanging pliers run around the perimeter, gradually raising the flange to flat. Your part is done!

It might take one hour to make the first part but subsequent parts will form more quickly. If you cut your blanks to the same dimension it is not difficult to form duplicate parts.

The planishing hammer is not limited to small parts. The principle is the same for all forming. The time will vary with the area of the part, and with the height of the bubble you are forming. Even a radial cowl may be formed with this machine – it just takes time and persistence.



Top: Draw a line around the perimeter and work your way around with flanging pliers to form a flat flange Above: Within a few minutes it is possible to raise the blister to ¾", much quicker than using fibreglass.

RAA Chapters and Meetings Across Canada

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

ATLANTIC REGION

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

QUEBEC REGION

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

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

MONTREAL (LONGUEUIL): Chapter 415, Meeting in French second Wednesday at 8 pm, at CEGEP Edouard Montpetit 5555 Place de la Savane, St. Hubert, PQ. Contact president Normand Rioux at NRIOUX@lapresse.ca or J-F Alexandre info@raa415.ca

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

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

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

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

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

ONTARIO

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

COBDEN: Third Thursday of the month at the Cobden airfield clubhouse 20:00 hrs. Contact Bob McDonald 613-432-8496 or bobkim.mcdonald@gmail.com

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. Skip Reeves 705-429-5154

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

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

KITCHENER-WATERLOO. Meetings are on the second Monday of each month at 7:30pm upstairs at the Air Cadet building at CYKF except during the summer months when we have fly-ins instead.

Please contact Dan Oldridge at kwraa@execulink.com for more information or visit our newly expanded website at http://www.kwraa.net/.

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

MIDLAND/HURONIA

Meetings: first Tuesday of each month, 7:30 pm, at the Huronia Airport terminal building (CYEE). Contacts: President Rob MacDonald - 705-549-1964, Secretary Ray McNally - 705-717-2399, e-mail - raamidland@gmail.com E-mail – raa.midland@gmail.com .

NIAGARA REGION: Regular meetings occur the second Monday of every month at 7:30pm in the CARES building at St. Catharines Airport (CYSN). During the summer months though, June-September, meetings take place the second Monday of those months at 5:30pm in Hangar #4 at Welland Airport (CNQ3). Contact Elizabeth Murphy at murphage@cogeco.ca, www.raaniagara.ca

OSHAWA DISTRICT: Last Monday at 7:30 p.m. at Oshawa Executive Airport air terminal, ground floor, 1200 Airport Boulevard. Contact President: Jim Morrison, 289-675-0660, jamesmorrison190@msn.com Website raaoshawa.blogspot.ca

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

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

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

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

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

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

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

MANITOBA

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

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

SASKATCHEWAN

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

ALBERTA

CALGARY chapter meets every 4th Monday each month with exception of holiday Mondays and July & August. Meetings from 19:00-21:00 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 Dennis Fox dennis77fox@gmail.com or Secretary Bruce Flach o2fly@yahoo.ca

EDMONTON HOMEBUILT AIRCRAFT ASSOCIATION: meets second Monday - Sept. to June. Contact Pres. Roger Smeland - 780-466-9196 or Jim Gallinger 780-242 5424. Website www.ehaa.ca

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

BRITISH COLUMBIA

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

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

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

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

CHAPTER 85 RAA (DELTA): First Tuesday 7:30pm, Delta Heritage Airpark RAA Clubhouse. 4103-104th Street, Delta. Contact President Peter Whittaker pwhitt@telus.net Website www.raa85.ca.

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

THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President Darren Watt 250-573-3036

ALASKA HIGHWAY: meetings held every third Thursday of every month (except July & August) at the Taylor Fire Hall at 7:30 p.m. For more information call Gerry at 250-782-4707 or Heath at 250-785-4758.

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

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

Classifieds

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

The Recreational Flyer is pleased to offer you colour advertising within the magazine. Previously limited to the back cover, we have added 4 new colour pages which will be available with limited space for your advertising needs. Our rates for both black and white and colour ads remain very competitive and you reach a captive and qualified audience. Emails can be sent to President Gary Wolf at: garywolf@rogers.com and George Gregory at gregdesign@telus.net

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

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

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

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

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

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

Recreational Flyer Magazine

Registration Mail Publication No. 09869

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

O200 L/H muffler (CESSNA) rebuilt by Acorn Welding. $450. 28 VDC voltage regulators, 2 ea. Kelly Aerospace, P/NVR500-0101 (Cessna 337)$150. ea.

Piper Pitot static tester adapter,P/N PS56620M2-4-4, with hoses and case. $650. From the back of the Hangar.

24 volt starter, electro System p/n MHJ-4003SR, o'haul/2000. $350.00

24 volt starter prestolite, p/n MHJ-4003S serviceable. $300.00

24 volt alternator Delco Remy 50 amp. p/n 1100747 $300.00 Oil filter adapter kit Mod. BC700 for all Lycoming 235, 320, 360, 540, 720. $500.00

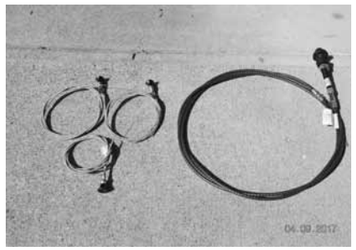
Cessna 172 nose cap cowling p/n 0552019-new. $100.00 Stabilator tip fairing p/n GF95620-07 Piper PA-200/220 $150.00 McCauley Propeller p/n 1A101GCM6948 bolt pattern 4 3/8in. $800.00 Prop spinner 10in.dia,. 12in. tall bolt pattern 4 1/2in $125.00

Cantact len Kennedy 506-622-0105, cell 506-623-8162 email - lenpat@nb.sympatico.ca Miramichi NB .

BELITE FUEL PROBE SYSTEM 1/8" A.S # 10-05866 never used $180; Sky Tec Solenoid A.S, # 07-03562 never used $50. Aerovoltz battery charger $80 Ask about 16 cell Aerovoltz lithium battery + shipping
Mike 519-762-3910 or mtyit@start.ca

AME / homebuilder retiring and selling a lifetime of collected parts - Beech Sundowner prop and exhaust, C-150 starters, Lycoming starters, ring gears, flywheels. Lots of control cables including from an RV-6 kit. Brand new Gill 35 battery. Spinners, props, you name it and it is probably here. The hangar has been sold so everything must go. Ron Fleet at Hanover airport, Ontario. fleetair@wightman.ca

New aileron trim kit – Van's part number AIL-T6 $45.00 CDN OBO Well-made wooden jig for RV 6/6A fuselage construction – open to offers Call Bob Stewart 204 853-7776 stewart@mynetset.ca



After completion of my RV7 (not for sale) I have a few brand new project left overs that I want to sell them:

1-One (1) Van's Aircraft trim cable CT23V42-DF-2-181 / Tuthill Corp (brand new)-Original price US149.00 Asking US$75.00

2-Three (3) control cables ACS-CT-A-740BL 0720 BLACK / 6 FEET (brand new)-Original price US36.50 eachAsking US$18.00 each

3- Two (2) landing lights 100W/ 12V each with reflectors only, from Duck Works (brand new) Van's complete kit sells for US$115.00 each -Asking US$50.00 for both.

4-One (1) Kuntzleman Electronics Round Tail Light with strobe and white positioning LED lights, 25 feet cable and connector (brand new still in the box). -Original price US$240.00,Asking US$80.00
Jose Lins jlinsjr@shaw.ca 778-998-2718

Basic Ultralight project for sale, all metal low wing tail wheel, not registered. Asking $8000.00 OBO, also have an EA-81 with belt redrive, willing to take trades, 701 or 750 Project or side by side 4 wheeler. Email billdonig@hotmail.com 705-842-0801.

Maranda project on gear, at precover stage with all woodwork completed to a high standard. Includes engine mount for Lycoming. The Maranda is a spacious STOL with folding wings. The builder has passed on so I am selling for his family but now I need the space and it must go. $5000. OBO. Project is located in Erin Ontario. Please contact Brian at 519-806-8560 or brianoates@hotmail.com

SKIS FOR SALE Aluminum/Teflon skis for home built. Used one season on a Challenger, also suitable for Chinook. Full harness. Very good condition. $300 OBO. Call J.J. @ 778-684-0411. ALUMINUM WINGS Built at Edmonton factory for Griffin MKII. Wings are 136 sq. ft. for 1600 lbs. Finished with gas tanks installed. Can be used on high or low wing with modifications. $500 OBO. Call J.J. @ 778-684-0411.

ROTAX 503, 2 Carburetors, mounts for Challenger or Chinook. Runs very well. Electric and/or pull rope starter. Mechanical prop reduction. $500 OBO. Call J.J. @ 778-684-0411.

Lycoming O-235C 100 hp with a mount for a Volmer. Little history but believed to have had a top overhaul. One mag and flywheel starter and carb. $2200 Hamilton Ont. 905-662-7111

Wanted - a set of presentable wheel pants with mounting brackets and intersection fairings to fit a C-150. 519-589-8352 Ontario.

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

Classifieds On The Internet:
http://tvsac.net/BS1.html - more ads from our Kamloops chapter

ALTERNATE AIRPORT: The area directly beyond the active runway when the engine quits on take off
ALTIMETER SETTING: The place where the altimeter sets. Usually hidden by the control column during a near-minimums instrument approach.
BANK: The folks who hold the mortgage on your aircraft.
BI-PLANE: What you'll say to your bird if flying costs keep going up
CARBURETOR ICE: Phrase used by pilots when explaining accident caused by fuel exhaustion.
"CLEAR": Warning shouted two seconds after hitting the starter button.
CONTROL TOWER: A small shack on stilts inhabited by government pensioners who can't hear. When they become blind, they are sent to centres.
CRITICAL ALTITUDE: Minus six feet.
CRITICAL ENGINE: That part of your airplane which used to be under the cowl, but is now in intensive care at the maintenance shop.
DEAD RECKONING: You reckon correctly, or you are.
DE-ICER: A device designed to operate under all weather conditions, except icing.
ENGINE FAILURE: A condition which occurs when all fuel tanks become filled with air.
FIREWALL: Section of aircraft especially designed to allow all engine heat and smoke to fill the cockpit.
GLIDING DISTANCE: Half the distance from your present position to the nearest decent landing area at the time of complete power failure.
GROSS WEIGHT: Maximum permissible take off weight, plus an extra suitcase, a case of bourbon, rifle, ammo, golf bag, bowling ball, and diving weights.
HOLDING PATTERN: The term applied to the dogfight in progress over any radio facility serving a terminal airport.
RANGE: Five miles beyond the point where all fuel tanks have become filled with air.
WALKAROUND: What you do when waiting for weather to clear.
LANDING FLAP: A 4000' roll out on a 3000' runway.

Cessna: "Jones tower, Cessna 12345, student pilot, I am out of fuel."

Tower: "Roger Cessna 12345, reduce airspeed to best glide! Do you have the airfield in sight?"

Cessna: "Uh...tower, I am on the south ramp; I just want to know where the fuel truck is."

Helpful Tips

CORE CHARGES

Canada Revenue Agency has specific rules for application of HST/GST to core charges when a customer is buying a rebuilt part and the transaction involves the return of a core. In brief, if you bring your core as an exchange for credit at the time of the sale, the vendor charges tax only on the rebuilt part.

Example – a customer buys a rebuilt engine for $30,000 and at the same time turns in his old engine as a $5000 core. In a 13% province the invoice would show $3900 HST charged on the $30,000 engine.

However if the customer wishes to minimize downtime and elects to return his original engine after the rebuilt engine has been installed, the invoice would show a sale of $35,000 plus $4550 HST. Essentially the customer is paying a surcharge of $650 for the convenience of minimizing downtime. For a customer who does not have an HST/GST number there is no way to recoup the tax that was paid on the core. Returning your core engine will not result in return of the tax. You are deemed to have bought a $35,000 engine and later you sold a $5000 core to the engine rebuilder.

The full explanation is given in CRA info sheet G1-167, just google it. The document is not available on paper.

COSTCO AND THE PILOT

Many handheld radios, gps, and intercoms use AA batteries, as do cameras. Rechargeables can work well but they do not have the voltage of conventional batteries, so sometimes performance is reduced. Duracell and Energizer batteries are the gold standard but they are expensive. Fortunately Costco has house brand Kirkland batteries that perform very well at low cost. Consumers' Reports gives them a high rating, just below Duracell and Energizer, but the rating does not take into account the purchase price. Factor in the price and Kirkland is a clear winner.

Kirkland AA batteries are sold in a package of 48 at a price of $13, (26 cents each) and Duracell at 48 for $26, so 56 cents each.

Photos for your pilot license or passport are also a bargain at Costco. At one time Shoppers Drug Mart took photos for $10 but then the price rose to $15 and now $20. Costco charges $6.95.

Ink for printers is a bargain too. Costco sells OEM ink, and also refills your own cartridges. Refilling cartridges is simple – the print shop is by the entrance and they weigh your tanks to see if they are empty; they will refill cartridges while the customer shops. I have been using these for years and have never had a problem. Regular refills are $12 either black or colour, and large refills are $14.

Elevator Skin Dimpling

Tip 1: Just use the male die in the squeezer without the female (i.e. the squeezer yoke acts as the female). That's actually not my idea; saw it on the web somewhere but it actually works.

Tip 2: Using a "pop rivet" die is tricky because it's hard to angle the "mandrel" (nail) through the hole. So I came up with the following: I used a short (2-3") length of 3/32" piano wire as a mandrel, and a 3/32" "wheel collar" (both hobby store items). I filed a notch in the wire close to one end, fed it through the male die, rib, female die and wheel collar (in that order) and tightened the collar set screw in the notch. Now just run the pop rivet puller on the mandrel as usual, and once the dimple is formed undo the wheel collar and take it all apart. Sounds time consuming, but there are only a few dimples to do this way and it takes about 1 minute per.

Tip 3: Regardless of how you manage to make the dimple, if it's not quite right a turn or two by hand with a piloted countersink finishes it off perfectly, barely removing any metal at all.

Christ Sheehan, Mississauga ON

"Instrument flying is when your mind gets a grip on the fact that there is vision beyond sight."

U.S. Navy "Approach" magazine circa W.W.II.

Across Canada

RAA Chapters in Action

RAA Chapter 85 (Vancouver)

Several significant steps were taken during the remainder of 2017 on the Zenith 750 Cruzer project. Key events that involved Chapter 85 included the Annual Delta Heritage Airpark Fly In, two regular bi-annual meetings with Metro Parks Vancouver and the Annual General Meeting & Election of 2018 Executive and Directors.

The Zenith 750 Cruzer project has steadily progressed with Saturday building sessions at the Chapter 85 workshop. The Continental O-200 engine was rebuilt in Kamloops by Aero Sport Power (Progressive Air) and was picked up in April by Joe Circjel. Firewall forward work had progressed in the interim and the engine was installed in mid-May.

Work on the Cruzer fuel lines, pitot static system, brakes and hydraulics and avionics has continued along with connecting the engine controls. For the instrument panel, a Dynon Skyview was installed to give engine monitoring, flight instruments and moving map displays. Independent traditional gauges for airspeed and altimeter plus the required whiskey compass were also added together with a VAL radio, Narco transponder and an altitude encoder. An ACK-04 ELT was installed after it was refurbished and certified.

The Annual Delta Heritage Airpark Fly In was held at the end of June and was well attended with approximately 150 pancake breakfasts served and 103 BBQ lunches. This year burgers were replaced by sausages and sauerkraut or hotdogs and the usual fixings. Twenty-two airplanes flew in with most from the lower mainland and a few from Vancouver Island. The 750 Cruzer made its first public appearance and made the backdrop for the photo of all the volunteers involved in planning and expediting the fly in. The July pancake breakfast was incorporated into the fly

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Top: Newly overhauled Continental O-200 engine installed in May. Standing left to right; Eric Munzer, Mark Garner, John Macready, Sean Connelly, Cyril Henderson, Peter Murphy and Helmut Gebenus (seated). Centre, Final instrument panel layout for the Zenith 750 Cruzer with Dynon Skyview. Bottom, The Chapter 85 Zenith 750 Cruzer and volunteers at the 2017 Annual Fly In.

Chapter / continued from previous

in and Chapter 85 ran their final pancake breakfast of 2017 in October.

In September the monthly meeting was in the form of the annual Show and Shine BBQ meeting. This event is an opportunity for members to fly in or push in their completed project aircraft or those still in the works. The October meeting was the Annual General Meeting and election of officers for 2018. A full slate of Executive and 6 Directors were elected.

Since the last Presidents Message in March, both bi-annual meetings were held with Metro Parks Vancouver and their management committee for the Southwest Region which includes Delta Heritage Air Park. The management committee reviewed operating budgets and longer term plans for the airpark which involve final upgrades to Embree House for a resident caretaker. Upgrades to the septic system to which Mary's Place and the Chapter 85 Round House can eventually tie in were also begun. It was good to see that Metro Parks are investing in the airpark and are satisfied with the day to day operations by DAPCOM (Delta Airpark Operating Committee) under the leadership of John Macready.

In conclusion, the remainder of 2017 has been an active year with solid input from numerous members. Volunteer activities have been the mainstay of not only the 750 Cruzer building project, but also of the Annual Awards Banquet, the Annual Fly In, Pancake Breakfasts, the Show and Shine BBQ, Elections and the Christmas Party. All of these activities involve a considerable amount of behind the scenes work and as President, I would like to thank everyone involved and wish you all a Happy New Year.
Peter Whittaker

RAA Kamloops (Thompson Vallaey Sport Aircraft)

We had been invited to have the dinner with the main Kamloops Flying Club, at the clubhouse at the airport. There were less attendees than last year but everything went fine. Excellent food catered by the same fellow as last year, more than enough for everyone.

Harry and Pat Winterhalder came again, it is always a pleasure to see them. Some of the friendliest people in the world!

RAA London St. Thomas

The October meeting was led by Eri Bartlett, with about 25 members present, to share photographs from Oshkosh/Airventure 2017. In the November meeting, Dan Oldridge gave an outstanding presentation: not only did Dan go over the process of selecting and building a set of floats for his Just Aircraft "Highlander", but he put on a fantastic photo display of some flying trips he has done this summer. This included a tip up to the Bush Plan Museum in Sault-St.-Marie and various high definition shots taken at the Brantford Airshow. Since his retirement, Dan has become one of the most prolific builders and writers in the area.

Chris Staines continues to make progress on his GP-4, showing the chapter his progress on the retractable landing gear.

The December meeting was the annual Chili Supper, followed by a planning session.

February 17, Midland/Huronia, ON, CYEE: RAA Chapter - Ski Fly-In (Wheels also welcome). 9:00 till 13:00, for coffee, hot chocolate, pea meal burgers, and chilli. Temporary snow packed runway will be available on west side of runway 16/34. Fuel discount in effect. Unicom 122.85. For further information please contact Rob MacDonald at 705-549-1964, Ray McNally at 705-717-2399, airport at 705-526-8086 or raa.midland@gmail.com

July 14, 2018, Midland/Huronia, ON, CYEE, Unicom 122.85: Annual RAA Northern Regional Fly-In (NRFI), hosted by the Midland RAA chapter. A Transport Canada approved seminar is scheduled for 10:00. Zenair factory and the Midland Model Railway Association, both located on the field, will hold coincident open houses. Antique/Classic cars and motorcycles will also be on display. Breakfast and lunch will be available. For further information, please contact Rob MacDonald at 705-549-1967, Ray McNally at 705-717-2399. airport at 705-526-8086 or raa.midland@gmail.com

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