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Recreational Flyer

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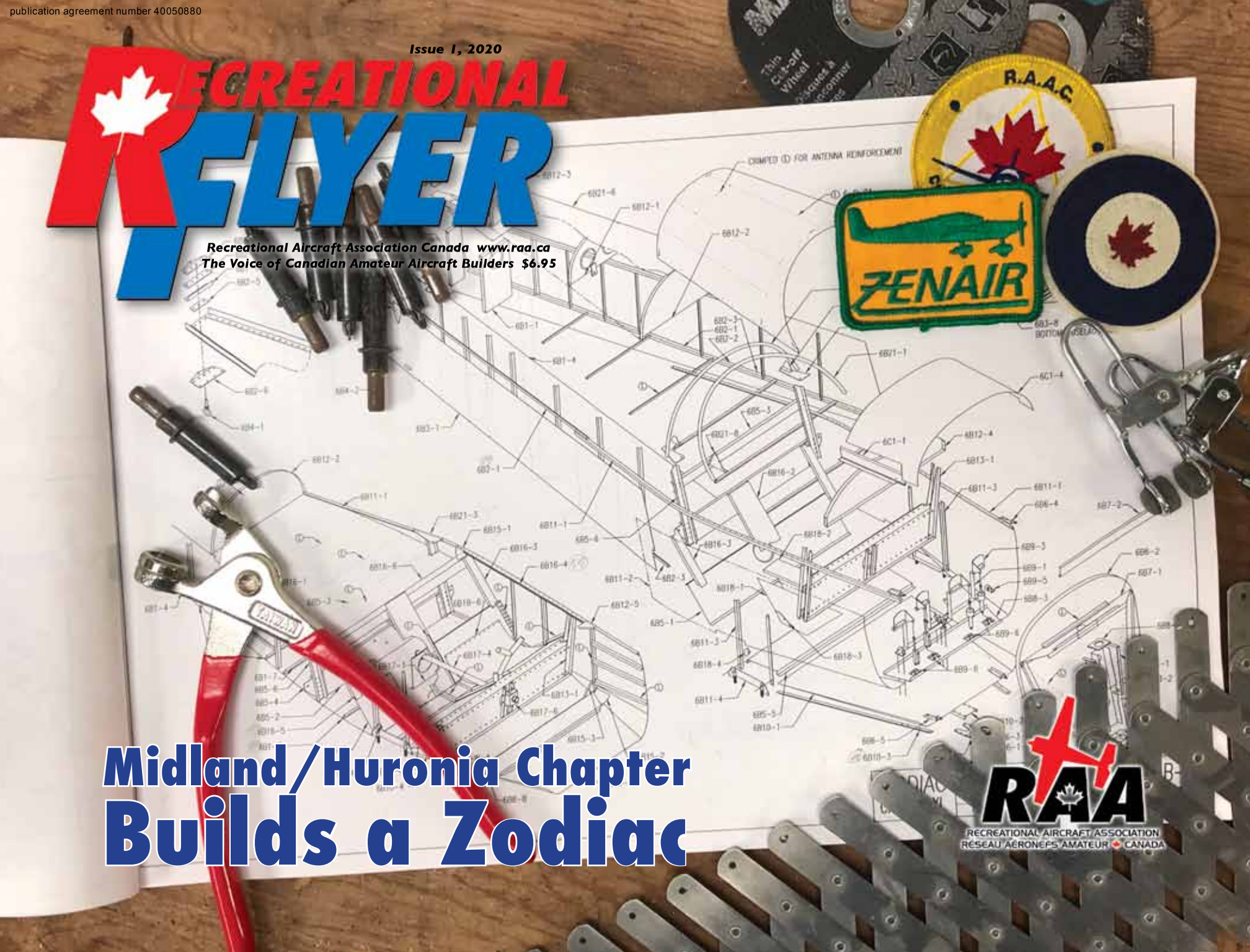

Midland/Huronia Chapter Builds a Zodiac

RAA
RECREATIONAL AIRCRAFT ASSOCIATION
RÉSEAU AÉRONEFS AMATEUR CANADA

From The President's Desk

Gary Wolf RAA 7379

Lawrence Shaw

2019 was marked by the passing of Lawrence Shaw, a Canadian who had a great effect on amateur aviation. Lawrence was a president of RAA Canada and a founding member of the Orillia chapter. He began the Lake St. John annual fly-in that ran for twenty-five years. In the seventies Lawrence went across Canada signing up flying clubs to join the national organization that became RAA Canada. He scratch built a Smith Miniplane in 1962, and in 2002 a Wheeler Express which after the demise of the company became largely his own design, the Auriga RG. We all owe a debt of gratitude to this determined RAA member and he is greatly missed.

In the seventies Lawrence went across Canada signing up flying clubs to join the national organization that became RAA Canada

Superior Crankshaft Proposed AD

Owners of Lycoming 360 engines with Superior Air Parts crankshafts might be affected by an AD proposed by the FAA. Crankshaft part numbers SL36500-A20 and SL36500-A31 are affected, but only specific serial numbers of each model.

Three in-flight crankshaft failures have prompted this proposed AD but the cause has yet to be determined. Superior and the FAA are working to determine the reason for the failures. Note that this AD is not in effect at present – it is a proposed AD.

Czech Aircraft Works Ballistic Parachutes

In the early 2000's the Czech Aircraft Works was a licensed manufacturer of certain Zenith Aircraft models and some were imported into Canada. Belgium's Air Accident Investigation Unit has contacted RAA Canada about that factory's unsafe installation of BRS and other ballistic parachutes in certain examples of the licensed Zenith 601XL that they produced. The parachute is mounted between the panel and the firewall and it exits from a panel in front of the canopy on the passenger side. The four straps that connect to the airframe have been incorrectly routed so that some can be trapped, resulting in all load being placed on one or two straps, with the aircraft held in an attitude that is unsafe.

If you own an example or know someone who does please contact RAA Canada to have the details forwarded.

Rotax Fuel Pump Mandatory Alert

Fuel injected Rotax 912i and 915iA engines must have their fuel pumps replaced. Pumps with part# 889696, 889697, 888698, 888699 are affected by

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The Recreational Aircraft Association Canada

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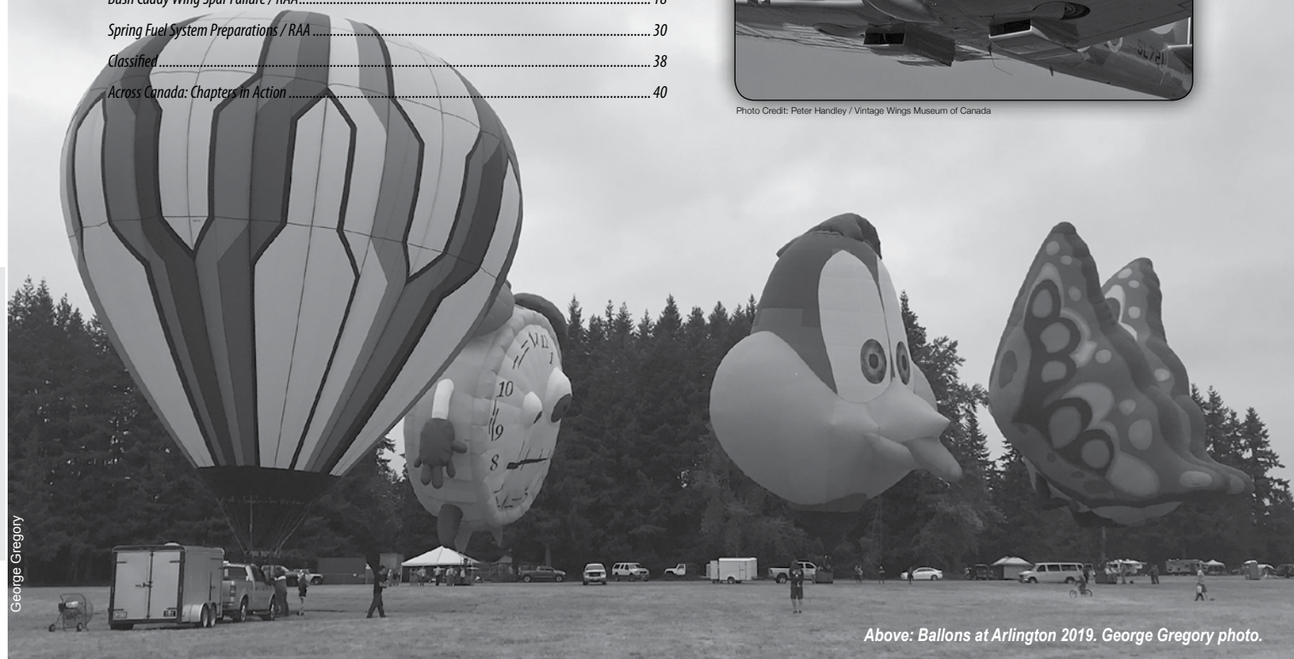
features

columns

Photo Credit: Peter Handley / Vintage Wings Museum of Canada



George Gregory

Above: Ballons at Arlington 2019. George Gregory photo.

Just Do It

Mike Davenport

It was one of those rare winter days in the Fraser Valley of BC as the air was calm and the ceiling and visibility were unlimited. It seemed like a very good day to go flying. I've got the time and there is gas in the plane and there is no reason not to. How does it get any better than that?

The drive to the airport is always uncontrolled chaos. Drivers rushing from one red light to the next, passing me and I'm 10 over the limit, making right turns from the left lane, tailgating and then passing only to meet again at the next light. But somehow we survive the journey with no damage or injury to anything but with an increased stress level.

After that journey, the peace and quiet of the hangar provides the calm needed for flight. It is calming to check the fuel and oil levels, things that need to be known and are totally controllable by me the pilot. I'm still slightly smug about being a pilot even after the decades since that first solo. I do the walk around in the hangar and it takes my total concentration as I move things that should and try to move others that shouldn't. A look for water in the sump that is never there. That focus completely calms the stress of the drive to the airport. This is good because I don't want to fly all stressed out. It is too nice a day for that.

It is soon time to push the airplane outside and to close the hangar doors. No need to lock them as I won't be gone that long.

Fuel on the fullest tank, mixture rich, throttle set, prime three full strokes, turn on the master, open the window and yell "clear" and turn the key. It is a good idea to actually confirm that no one is standing out there. The starter turns the prop through two to three blades and the Franklin starts all lumpy as usual. As I watch the oil pressure rise, the engine smooths and settles to its homey comfortable six cylinder rumble and I turn the radio on and check the ATIS. I confirm that it hasn't changed since I checked earlier by cell phone and the plane is pointed in the right direction. A call to tower to request taxi clearance to the active also confirms what the ATIS told me and they give me a transponder code and clear me to taxi to the run up bay. It is an awkward reach clear across the cabin to set in the code but not a big deal. Once set, I taxi to the run up bay where I do the final control checks including doors and belts and the all-important engine run-up.

Brakes set, mixture rich, area clear, increase power to 1700 rpm, oil pressure is good, temperatures starting to come up but need to add another strip of duct tape to block off more of the oil cooler, after all it is January. Left mag shows an acceptable rpm drop, so does the right mag. Check the carb heat at 1700 and again at idle. Controls checked for freedom and direction of movement. Do it again with the flaps set at the first notch as the Stinson has a stop preventing full back stick without that notch of flaps. So all is well and there is no reason not to do this, go flying, that is.

How many times have I done this, taken off from this exact spot?

First as a student pilot, then as a renter of Cherokees and 172s. Then I brought home the Q2. That was a scary little plane that wanted all of the runway, whether taking off or landing. Then there was an RV6, a Mooney Mite, the Fleet Finch, a Porterfield, and an Emeraude. All different and yet strangely alike. Each required constant attention but some more than others. But those were other days.

Today a check of the approach shows that it is clear with no one on final and a call to tower provides confirmation as she clears me for take-off.

I add a bit of power and roll into position. We're using 01 today and there is a great view of snow on the north shore mountains. But time to pay attention. EZB likes to turn

left when power is added, especially when light like she is today. So I ease the power in holding the wheel back until she feel light, lift the tail and let her run under full power and when she's ready, she will fly. Flaps up and 90 indicated with 2500 rpm on the tach results in a satisfying 1000 fpm rate of climb. I mean, what should it be? After all the airport is at sea level and the air is cold.

I turn towards the east with the mountains on my left and the tower clears me out of the zone with the admonishment to have a "nice flight". A quick thankyou and I'm on my way.

I've done this many hundreds of times but each time it feels fresh and so rewarding. As I said before, I learned to fly from this field and over the years have flown a dozen different aircraft to and from here and it never gets old.

First and foremost, the family Stinson that I've owned for over 28 years is just two years younger than me. I was born in '44 and she was built in '46 and we're both doing reasonably well and growing older together.

The trip today has no purpose other than to stay current and enjoy the day. The air is smooth and there is no one else in the practise area so why not practise.

First some slow flight, carb heat on, power back and airspeed to 70. She feels mushy and just a little uncomfortable there. Add a notch of flaps and she tightens back up and feels happier. Add power and roll into a tight left turn followed by one to the right. Rollout and power off and into a stall. Recover in a couple of hundred feet. Carb heat off and clean up the flaps, add power and then another series of steep turns left and right. It feels good to get the kinks worked out. The Stinson is no Pitts but neither am I. It just feels good.

It's time to go home and see if I still remember how to land the old girl. Being a taildragger, it is always a matter of some debate as to who's flying who. If there is a grass runway I will try 3 point stall landings but on pavement, I prefer wheel landings; this in spite of constant criticism by my best friend and former flight instructor.

I change frequency and check the ATIS and find the runway is unchanged from when I left and is more or less into the wind so I will probably be cleared for a right down wind but then maybe not. It could be a left downwind It all depends on the traffic.

I listen out on the tower frequency and learn that there is only one other plane in the circuit and sure enough, my call gets me a downwind right clearance for a touch and go.

Once on the downwind, I switch to the fullest tank, reduce throttle and add carb heat slowing to flap speed and drop the first notch of flaps. As I near the end of the downwind leg, the tower calls me number 2 to land and I turn base as I spot my traffic. He is well ahead so no need for heroics. Turn to final, carb heat off and set full flaps and work on getting over the road that crosses the approach without hitting any trucks and touch down at 70. Add some power, remove one notch of flaps, add full power and take off to do it all over again.

Some times that first landing is the best of the day and while there is a temptation to "quit while you are ahead", it is always wiser to do a few more and be truly current. At least that's my story and I am sticking to it.

All things—good or otherwise—do come to an end and after two more circuits, it is time for a full stop landing and taxi back to the hangar. A feeling of satisfaction results in a minor hot dogging exhibition as I kill the power while coasting to a stop in front of the hangar and at the last second apply one brake to turn the tail to the door. Sorry, but I just can't resist.

It's time to put the airplane away once more. As I get older it also gets harder to do this by myself. You see, there is a slight rise to the hangar door and if the 1400 pound empty weight airplane is full of fuel, it is almost but not quite too much for me. To all things there are solutions though.

A few years ago I had back surgery and to aid in putting the airplane away, installed an electric winch with a cable that runs along the floor and can be attached to the tailwheel to tow the airplane into its spot. Works like a charm. Necessity is the mother of invention.

***Mike Davenport** has been involved with the BC's Lower Mainland aviation scene for decades and has worked with Chapter 85 (Vancouver). He flies a creampuff Stinson 108.*

Peter Handley/Vintage Wings of Canada

Vintage Wings of Canada

Dennis Bergstrom/Vintage Wings of Canada

Richard Allnutt/Vintage Wings of Canada

Peter Handley/Vintage Wings of Canada

Richard Allnutt/Vintage Wings of Canada

Vintage Wings of Canada Museum

Don Hatch

While on a recent trip to Ottawa, I crossed the river and traveled a short distance east to the Vintage Wings of Canada museum located at the Gatineau-Ottawa Executive Airport. This non-profit museum was founded by former Cognos CEO and philanthropist Michael Porter. All aircraft are either in flying condition or being restored to flying condition. Almost all are WW II warbirds.

When you walk into the hangar, you are confronted with the large profile of a Westland Lysander. To the right is a Curtis-Wright P-40 Tomahawk, and to the left of the Lysander is a Fleet Cornell and two Chipmunks, all in their brilliant yellow colouring, the trademark of RCAF trainers. Proceeding to the right past the Lysander are the three aircraft that are not warbirds. The first is a sleek low-winged single engine plane owned by Michael Potter. I did not recognize the name, but it is used by stunt pilots at airshows. Next is a de Havilland DH-83 Fox Moth. It was an RAF aircraft, but was the personal airplane of the Prince of Wales, who became King Edward VIII for a short time, and then abdicated the throne to his brother King George VI in 1936.

Then we come to an immaculately restored DH-C3 Beaver on floats. It is owned by Michael Potter and he uses it to fly to his cottage. Moving to the left we come upon an open cockpit Fleet Finch trainer, and a Hawker Hurricane under extensive restoration. Then there is a North American P-51 Mustang and next to it is my favourite warbird, a Mark IX Supermarine Spitfire. Behind the Spitfire is a Vought Corsair under restoration and a flying North American Harvard.

One of my purposes for visiting this museum was to see if I could get permission to have my picture taken while sitting in a Spitfire. I asked, but they were very reluctant, so I had to be satisfied with a picture of me beside the Spit. Other than that slight disappointment, I was thrilled to be able to roam around these famous aircraft. But you cannot roam alone. You must be with a group, or with a single guide. I was fortunate to have a single guide who explained a lot of facts that I would not have known on my own. I have been to other great aircraft museums including the Canadian Aviation and Space Museum in Ottawa and the Canadian Warplane Heritage Museum at the Hamilton International Airport. These are larger than the Gatineau museum and some aircraft do fly at Hamilton, but I believe only Vintage Wings is a Canadian museum dedicated to getting all their aircraft into the air. If you are ever in the Ottawa area, this museum is well worth a visit.

OUT OF AFRICA

UK Light Aircraft Association
as submitted by Bill Weir

The following is a direct copy from the UK LIGHT AIRCRAFT ASSOCIATION's 'Light Aviation'. I think this article has merit for us. To begin Patricia Mawuli Porter's personal story is unbelievable. In this article she describes how she or they promoted airplane building. We might learn. The use of a 3D printer to make the buck for the nose bowl is worth noting and the persuasions concerning a fuel injected engine in an aircraft gives one food for thought.

"Having shared my aviation and engineering skills with young people of West Africa, I wanted to do something similar in the UK, as it is dear to my heart to share the amazingness of building aeroplanes with others especially the young, even more especially women/girls/other minorities in the sector - the under- represented in aviation. I chose the Zenair CH750 STOL for two reasons, it is an excellent aeroplane to build/fly (and my husband and I are the UK Zenair agents), and we could make it happen.

One of the first rivets to be pulled was on the 13 January 2017, by our daughter Gwen, on her first birthday. She was subsequently the first official passenger after the aircraft gained its Permit to Fly on the 29 August this year, possibly becoming the youngest person to fly into the 2019 Rally! The journey to building this aircraft was aimed at providing a large number of short, sharp exposures to as many people I could reach rather than the more common approach which involves a small number of people over a length period. Consequently, I took sections of the aeroplane into schools, clubs, universities etc. gave a talk on building airplanes and let those present pull a rivet.

This was not as easy as it sounds, taking a flaperon, slat or rudder, tools, compressor etc. in car for a few hundred miles joyride so to speak for an hour and pull some rivets, with a toddler in tow [and my husband Johnathan] called for a number of expenses which we had not planned for – fuel, hotels, and consequently, we unfortunately had to rein in the participation to groups who were ab le to visit our home workshop which reduced involvement somewhat.

Such is the challenge of exposing others to aviation. All the same, over 300 people were involved in the build from just pulling a rivet to helping bolt on the undercarriage, of which 75 percent were under the age of 25 years old and/or female. Those who did participate enjoyed the experience, but this project was about more than just building an aeroplane. Having built, repaired or renovated many other aircraft, this was my first bull in the UK and so I had to learn the LAA rules and methods, which may have slowed things down a bit, but were certainly good for reflections on build methods and mods' and this particular airframe has a number of very specific mods and features.

It will get in and out of the shortest strips in the country [and could probably land on several helipads too] and is just a dream to fly.

Improved windshield seal

The stock Zenair rubber profile on the bottom of the windshield is well known. However, when in Africa we always molded a fiberglass fairing for greater strength and the elimination of water ingress. The mod sailed through the LAA, being a relatively simple upgrade. The outcome has been very pleasing to the eye and is a great improvement upon 'in cockpit conditions'.

Improved pitot

The stock pitot system runs inside the wing and has the pitot tube hung at eye level under the wing. Having had more than 40 blocked pitots over our joint 6,000+ flying hours, Jonathan and I decided to develop an alternative pitot system, one that has resulted in excellent, repeatable speed readings down to 25kt. The system is composed of a 3D printed pitot carrier, which allows a pitot tube to sit six inches ahead of the slat leading edge. It has a 30" angle slant filed into the tip and then runs down the inside of the wing strut to the cockpit. Typically, when flying STOL, airspeed readings can get a bit wobbly at higher angles of attack, but not with this modified pitot.

Easy access engine cowl

The airframe has the Rotax 912iS fitted at the pointy end, an engine we know well from having been involved in hot weather test program during its development for Rotax. In our opinion, the factory provided cowling did not give sufficient clearance for the 912iS's larger size so after much tweaking and adjustment we finally decided it was time to develop our own cowling. Carefully reviewing our requirements, we settled on hinged access to the engine compartment a la Piper. The 3D printer went into overdrive, and we finally put together a nose bowl plug that morphed over many days of trimming and adjusting into the GA looking cowling that now adorns the aircraft. Interestingly the result matches or beats the official performance figures, while providing us with excellent temperature control too. During testing we had to work hard to get the regulator on the Rotax fuse box to stay within acceptable temperature limits, finally dedicating a specially produced inlet and 3D printed carbon fibre/resin blower, to ensure we kept the temps where we wanted them. It would be interesting to know if others have used a thermocouple to check the inflight temps of this known issue with the 912iS installation.

The header tank

When working with injected engines the risk of engine issues from interrupted fuel supply is much greater than with a carbureted engine. Running at three any air that gets into the system risks creating a blip in engine running, or at times complete engine stoppage. The answer in many aircraft is to fit a header tank – and that is something we spent a lot of time getting right in Africa for those 200-foot flights over villages dropping health education packages.

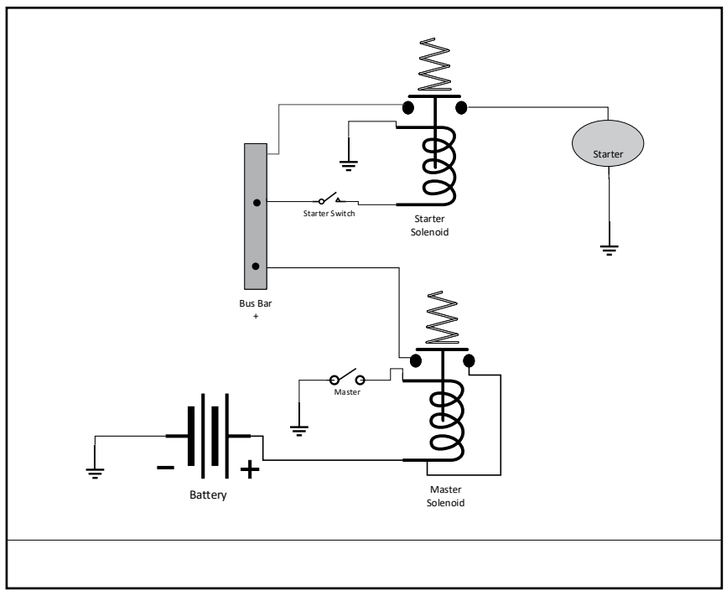
We needed something that would be flexible, so we designed it to lake a load cell [for fuel levels] a fuel pressure sender [for low fuel warning] and even an additional port for ferry tank. The design was put together to ensure that warm fuel returning from the engine would not be sucked straight back out; instead it acts as a sort of fuel cooler. Not only did the header tank work, it exceeded expectations. Fuel temperatures are minimal and replenishment when run low during tests was quicker than the engine could manage to deplete the tank, even at wide open throttle.

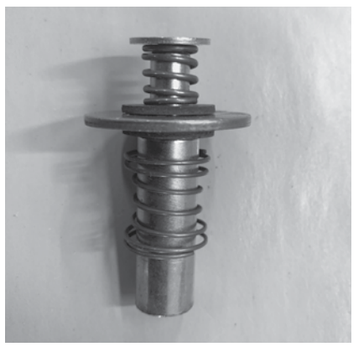
We ran the wing tanks off, one on and both on and in all configurations the system worked flawlessly giving us total confidence in continued fuel supply regardless of potential unporting of wing tanks during any phase of flight.

But how does she fly? The simple answer is, of all the airplanes I have built this one is most special so far. It flies hands off in climb, the descent and the cruise, and has loads of space – width-wise, headroom-wise and baggage area-wise. It will get in and out of the shortest strips in the country [and could probably land on several helipads too] and is just a dream to fly.

Starter Solenoids

Jeff Deuchar





Opposite, how the unit goes together, with a good view of the connection that goes to your starter switch. Left, a very basic diagram for a starting circuit. Above, the main plunger within the solenoid. The large copper washer is held between two fibrous non- conducting washers and an internal fibrous washer to ensure no electrical transfer to the plunger. This large copper washer is what makes contact across the solenoid. The small washer on top is the one that came off, rendering the whole solenoid useless.

Recently I had a customer's plane have an intermittent starter solenoid issue which was coupled with an intermittent starter issue, making troubleshooting a real head scratcher. Then a couple months later I flew my plane to Red Deer from Wetaskiwin (50 NM), had some avionics work completed and when ready to leave the plane would not start.

I will show you the best way to trouble shoot one of these units as well as how they work.

Basically, a starter circuit has the battery, master solenoid (activated by the master switch), starter solenoid (activated by the starter switch), and the starter itself (which in most cases also contains a solenoid). Both solenoids and starter must also be grounded to complete the circuit. In my aircraft (PA24) there is a shower of sparks activated by the starter switch as well. In my case when I turned on the master and turned the mag switch to start all I heard was the shower of sparks unit. On the opposite page we see a very basic diagram for a starting circuit. This may not match yours exactly, but it gives a good idea for illustration purposes. The "To auxiliary igniter device" is, in my case, going to the shower of sparks.

So why all the solenoids? To answer that we need to understand what a solenoid (also called relay) is used for. Basically, if you look at the wire coming from your battery you will notice it is as thick as your baby finger. To have a simple switch that can handle the power running through that wire, the switch would have to be very large. The solution is to make a little mini-magnet using electromagnetism (remember school science?) to pull a large contact point down to make a contact across this large wire. When you turn on your master switch, you will normally hear a click as the solenoid is engaged. Yes there is arcing in the solenoid as it connects the two large wires (one into the solenoid and one out), but this is all contained within the solenoid housing so normally doesn't cause you any issues, but eventually like all mechanical devices all the arcing will cause wear and tear.

So down to trouble shooting my starter solenoid issue: I first checked my base voltage across the battery (12.57 v in my case), then I checked the bus side of the solenoid (12.45 v in my case), the Ener (in the diagram above) line with the starter switch engaged (12.45 v in my case). So now I had eliminated the possibility of a problem with the master solenoid, main bus, and switch, since I had power on all. Then I checked from the starter solenoid to the starter (the opposite point on the solenoid from the one I tested earlier) and found zero volts. So now I knew that the solenoid had an issue. Luckily, I had a spare solenoid but unfortunately it was at home. I have many great flying friends so one helped me out. With the new solenoid installed the plane fired right up.

Now let's talk about starter solenoid installation. Some planes (especially) trainers install the solenoids upside down (or maybe right side up depending on your point of view) with the coil having to pull the plunger up against gravity and the spring. Why is this done? Imagine some of the hard landings that training aircraft endure. If you hit hard enough to overcome the spring (and it's not that big) then your starter will engage and you will lose teeth from your flywheel, or shed teeth into the accessory case of your engine. So, I mount all my starter solenoids working against gravity. It may never happen, but it sure is cheap insurance. I have built two amateur built aircraft (F1 Rocket and Wagabond) and both are mounted inverted and both are mounted on the cabin side of the firewall.

After I got home I needed to know why my solenoid failed and especially why it had failed without warning. I cut the top off (they are pressed on and I didn't see any other good way to open it up). Once open I found that the staked-on washer at the end of the pull plunger had disengaged. So now when the plunger pulled down it didn't pull the large washer down that makes the contact across the points, as the spring held it away.

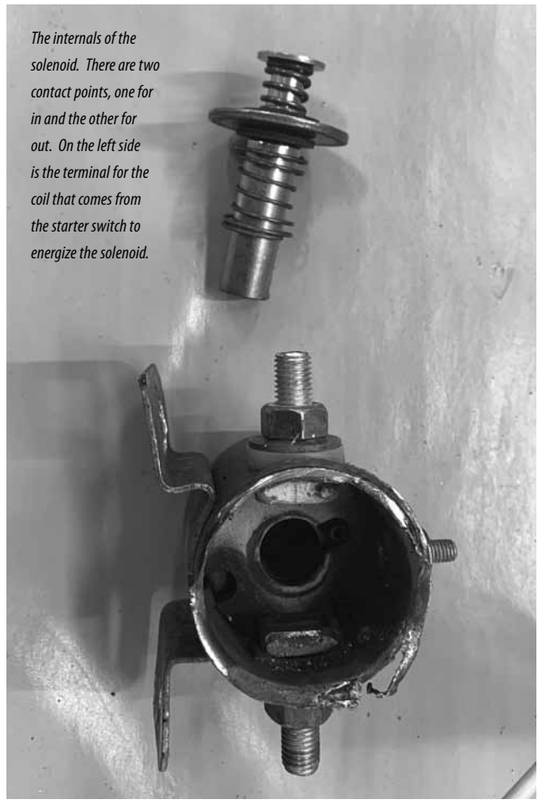
Above, we see the main plunger that resides within the solenoid. The large copper washer is held between two fibrous non- conducting wash-

My wife asked me how come we didn't notice it failing...

ers and an internal fibrous washer to ensure no electrical transfer to the plunger. This large copper washer is what makes contact across the solenoid. The small washer on top is the one that came off, rendering the whole solenoid useless. The photo on the right shows the internals of the solenoid. There are two contact points, one for in and the other for out. On the left side is the terminal for the coil that comes from the starter switch to energize the solenoid.

The whole assembly is grounded via the case. Some of the newer, better made ones have a separate ground wire for the coil to ensure that the ground won't be a problem.

My Mrs. asked me how come we didn't notice it failing? We had just returned from a trip to Vegas with the plane and I am glad it happened close to home. I explained that the failure mode was not possible to predict. She has suggested that we had better carry a spare on board! If we were really in a remote area I would jumper the solenoid, as hand propping isn't my best option (three blade propeller and IO 540).



The internals of the solenoid. There are two contact points, one for in and the other for out. On the left side is the terminal for the coil that comes from the starter switch to energize the solenoid.

***Jeff Deuchar** is an AME and commercial pilot with 2200 hours. He has built an F1 Rocket and a Wag-a Bond, both of which are flown regularly. He is currently restoring a 1938 Stearman and a 1946 Ercoupe. He is a member of COPA, EAA and RAA and lives in Wetaskawin, AB.*

Coronavirus and the aircraft owner

Many of us are at the age when we are now being cautioned not to be in a crowd, which means that travel by airline or train could be a risk. You would be in tight quarters while in lineups and then have to sit in a waiting room. The current belief is that the virus is spread by droplets that can live for several days on surfaces, which can include seats in waiting rooms, airliners, and trains. If there were a subsequent outbreak that included the passengers of an airliner or train the warning comes many days or weeks after the trip, when it is difficult to decide whether the affected person had the disease during the trip or caught it afterwards.

Compare to the owner of a private aircraft. The owner can choose who will be his passenger(s) and for most of us the risk is usually limited to one, and at most three passengers. Exposure is minimal. The plane has either been tied down outside or it has been hangared by itself or with a couple other planes. Most private aircraft fly at most once a week and usually less, and this time of the year almost never, so transmission of the virus since the outbreak would be unlikely.

When else would the aircraft owner com into contact with random people? Refueling is one possibility but the refueling person never gets inside the plane, so again the likelihood of transmission is minimal. If in doubt, stand upwind of the plane while it is being refueled.

Travel by a private self owned private plane has its advantages.

WHEN THINGS GO SOUR AT 3000 FEET

Some thoughts on decision making in an emergency/by Fred Grootarz

We all know of the Miracle on the Hudson. It's an amazing story of incredible heroic human action by Cptn. Sullenberger (affectionately known as "Sully" since then) and his first Officer Jeff Skiles of how to safely land a large airliner A320 in the Hudson River, after simultaneous bird strikes disabled both jet engines at an altitude of only 3000 feet during the climb out from La Guardia Airport. All 150 passengers and crew survived the crash water landing with only a few minor injuries; a true Miracle on the Hudson.

The other day I was surfing on You Tube for some aviation stories, when I came across a 12 min video in which Cptn. Sully recalled the events of that short flight in his cool and collective voice. I couldn't help but thinking how I would have reacted in a catastrophic event like this, a bird strike or anything else that would have resulted in instant loss of engine power, that would happen at 3000 feet. La Guardia's runway elevation is only 21 ft/ 6 m above sea level, so there is basically no difference between ASL and AGL.

What struck me from this video is the fact that 3000 feet is an altitude that is quite common for us to fly as VFR pilots with our little single engine airplanes. Therefore, besides being in a large airliner, a lot of the emergency scenario also applies to us VFR flyers. Catastrophic engine failures for airliners at high altitudes usually give the crew some extra time to deal with an emergency descent, i.e. go through the full list of the various emergency procedures and checklists and also to look for a suitable airport to land at. But at 3000 feet above the earth, we are basically forced to maneuver on the same playing field under very similar conditions and available options as Captain Sully faced on that US Airways flight 1549.

Other than the fact that Captain Sully also had to worry about his 150 passengers and crew, the principal decision making process is very much the same as you and I in our little single engine airplane would have to make. His thoughts and decision making apply also to us as single

continued on page 33

Barry Meek

Dealing With Problems:

Right way / Wrong way

I was there to buy a shirt. The J.C. Penny department store was having a sale on shirts that I had looked at the week before. When driving by, and in a hurry to get somewhere else, I noticed a flashing sign outside the store advertising menswear on sale. Not many cars in the lot that evening … I could stop, buy a shirt and be out in ten minutes. I went for it. Big mistake!

The checkout lineups were busy, two cash registers were operating, but about the time I was ready to pay for the shirt, one of the cashiers had a problem with her machine. Things went downhill pretty fast. The other lady asked if she could help. Then a supervisor was called. Soon, all three of them were at one register discussing the problem, all trying to help. Meantime, the customers were ignored. There we were, all standing there with our money out, and no one to take it!

Now to the part of this story that involves aviation. On the night of December 29, 1972, an L-1011 jetliner flew into the Florida Everglades while approaching to land at Miami airport. One hundred and one souls on board were killed. The crew did not have an indication that the gear was down and locked. They abandoned the approach and went into a holding pattern at 2,000 feet to deal with the problem. While the plane was flying on autopilot, they initially checked the indicator lights. The first officer was unable to remove the tiny bulb, so the captain attempted to help by leaning across the cockpit to reach it. Doing so, apparently he somehow disengaged the autopilot, and soon the jet was in a slow descent over the pitch black swamplands. No one noticed.

After a discussion, the flight engineer was sent into a "cubby hole" beneath the cockpit to visually check the nose gear. While he was doing that, the plane descended through 1700 feet, triggering an alert chime. That chime went unheard because it was located above the engineers (now empty) seat.

It so happened that there was a company technical expert on board. He offered his help. After a briefing on the trouble, he descended into the "cubby hole" to trouble shoot the gear problem. The entire crew was kept busy with this conversation and with heading changes from Miami Approach control. Slowly but surely, the jet was descending and the airspeed rising slowly. The throttles were retarded to ease the speed back. Meanwhile the approach controller noticed 900 feet on his altitude readout, but thought it must have been an error. He waited for another sweep to ascertain the position, but his attention was diverted momentarily to another aircraft in his sector.

Eventually, the flight was given a heading change. As the first officer eased the yoke into the turn he noticed for the first time that they were flying through the black sky at only 500 feet. It was too late.

During all that time and maneuvering, no one had noticed the change of altitude. A group of highly professional airmen had become so engrossed in their minor problem that, along with their faith in the autopilot, they allowed themselves to fly into the ground.

Flight crews are trained to have one pilot stay with the controls while the others work out problems. Still, when the real thing comes along, it's human nature to want to help out. All pilots are taught to "fly the airplane" first, and deal with the problems as they become able to. All of this is easy to say, but we first must overcome some strong instincts of human nature. When there are problems, when something abnormal arises, the mind tends to "lock in" on that problem, and in our minds, time seems to stand still. That is all well and good if the problem is with a stationary problem we're working on, such as a crossword puzzle, a carpentry project or something on the workbench in the garage. But it is another story, and new rules must apply when trouble is in an airplane... or in the retail store environment.

Mostly, it is common sense. Unfortunately, that is not something that can be taught.

The problem with the cash register in the department store, and the landing gear indicator lights were both very poorly managed. Both had negative consequences, even if in the case of the airliner, over one hundred people lost their lives. The menswear store merely lost a few sales as customers got fed up waiting for three clerks to settle a problem on one cash register. There is nothing new to learn from these accounts. Mostly, it is common sense. Unfortunately, that is not something that can be taught.

***Barry Meek** is a commercial pilot who flies summer contracts for various operators in western Canada. He is a retired ambulance paramedic, mountain bike guide and broadcaster. His articles have appeared in the COPA Flight, The Aviation News Journal and the Recreational Flyer. He now resides in Vernon, B.C. and in Lake Havasu City, Arizona.*

Bushcaddy Wing Spar Failure

In spring 2019 a member was flying his 4 seat Bushcaddy L-164 on a gusty day when his passenger saw one aileron fluttering and the wingtip oscillating up and down. Shortly the other wing bent upwards and remained there. The cruise speed had been 135 mph and when the pilot slowed to 70 mph the flutter stopped. Fortunately the pilot was able to get the plane safely on the ground. An inspection showed that the wing skin had buckled just inboard of the lift strut attach point. Later when the aluminum skin was removed it became apparent that the forward and rear C-channel spars and all the stringers had failed just inboard of the lift strut attach axis, and their upper flanges had buckled upwards. The front spar of this aircraft has a lightening hole just inboard of the lift strut attach point and the forward spar buckle was directly above it.

HISTORY

The aircraft company currently known as Bushcaddy has had four owners, the latest in China. The planes were originally built in the 1990's by Delisle in Quebec and were known as C.A.D.I's. Around year 2000 the company was sold to Canadian Light Aircraft Sales and Service (CLASS), also in Quebec. In 2011 an Australian based in Quebec took over and now the rights are with a company in China.

SPAR DETAILS

The Delisle C.A.D.I. was originally designed with a C-Channel front spar formed from ".050 6061t6 aluminum sheet, with a height of 6.5" and formed flanges with a width of 1.25", this to support a 2200 pound aircraft. By comparison a 1600 pound Rebel has a spar over 8" tall with much thicker extruded aluminum caps. The Zenair 750 and Pegazair, both at ~1400 pounds, also have 8" tall spars with thick extrusions as spar caps.

CLASS redesigned the spar to thicken it to .063", so adding approximately ¼ more beam strength but when they produced the 2500 gross four seat L164 model it looks as if they retained the same spar for their earlier kits. The designer at CLASS told me in 2010 that he had again thickened the spar to .080 but this was not what was in the most recent L164 2500 gross failed wing – it had .063".

A Bushcaddy builder in Australia asked the designer whether there had been an actual load test

performed on any of the Bushcaddy wings and the answer was that there had not. The design strength had been determined by calculation.

In Canada and the USA there is no requirement for a plans or kit seller to state G ratings for any parts or aircraft, nor is there any requirement to do any testing. The inspection programs monitor build and assembly quality. It is up to the buyer to ask the right questions and to determine whether the answers are to be trusted.

FAILURE MODE

The forward spar has two lightening holes just inboard of the lift strut attach point. When the outer section of the wing bent upwards it hinged on the lift strut attach, and the upper flange of the spar suffered a buckle failure above one of the holes. This is the same as happened to a 2 seat 2200 gross Delisle C.A.D.I in 2009. There was also a similar failure in the early 2000's in the USA. The TSB did a full investigation of the 2009 C.A.D.I. wing failure (report #LP096/2009) and found that its spar had been formed from .050" 6061t6 aluminum. Their calculations showed that at 2200 lb. the spar would fail completely at just 3 G's. By comparison a Normal category certified aircraft must prove 5.7 G's to failure so that wing was about half the usually expected strength.

SOLUTIONS?

The rights to the design are now in the hands of a Chinese company. RAA found its address and their rep told this L164 owner that they would have

...his passenger saw one aileron fluttering and the wingtip oscillating up and down. Shortly the other wing bent upwards and remained there.

a look at the problem after Chinese New Year was over, but now that coronavirus has slowed that country's industries an answer might not be quickly forthcoming.

Many kit aircraft come with a build manual but not a set of dimensioned construction plans. Since there is no representation in North America the owner of this L164 has decided to reverse engineer the spar and have a pair fabricated in Canada. However he has not been able to find an aero engineer who will determine how much additional thickness the spar must have to make the wings safe for 2500 pounds gross.

There are quite a few C.A.D.I and Bushcaddy aircraft registered in Canada and likely more under construction. RAA has contacted some and Transport Canada has offered to do the same. There is no AD process for amateur aircraft so no directives will be issued. Transport Canada's position has long been that each amateur aircraft is a unique one-off project so there is no point in having AD's.

If you are currently building a Bushcaddy or C.A.D.I. or know of anyone building or flying please make them aware of the situation.

SHADE TREE SPAR DESIGN

Wing spars are similar to floor joists in function. If a floor is supported on 2x4's on 1 foot centres it will be very springy. Increase the joist to a 2x6 and it will be firmer but still rather springy. Go to a 2x8 and it starts to become rigid, and a 2x12 will make it very solid.

Depth of the spar is very important because a beam gains rigidity roughly in proportion to the square of its depth. A 2x12 will have ~four times the strength of a 2x6. It would take about four 2x6's laminated together to equal the strength of one 2x12, so double its weight. This is the reason that the Murphy, Pegazair, and Zenair all have tall spars – the strength can be had without carrying much extra weight.

The wing of the C.A.D.I and Bushcaddy could accommodate a spar almost 8" tall at the 40% chord position but the designer chose to fit the spar well forward where the rib height is 6.5" This allows the fuselage to have the carrythrough at the top of the windshield instead of being a headbanger, perhaps the reason the wing was designed with a 6.5" tall spar.

President's Message / cont'd from page 2

this recall. A credit for labour will be given in this program. Replacement is not optional – Rotax deems this to be a Mandatory Alert. Contact your Rotax service for details.

Delisle CADI/ CLASS Bushcaddy Spars

Please read this issue's article on the failure of the wing spar of a Bushcaddy L164. This is similar to two other earlier failures in Delisle CADI aircraft. Although the latest failure was reported to the TSB the details have not made it to the CADORS. Transport Canada has also been informed but at this writing it appears that there has been no notice given. This is not unusual because Transport does not have an AD process for non certified aircraft. If you know any owners or builders please make them aware of the situation.

Chapter Annual Reports

As usual, please send in your annual chapter membership reports that must include the names and contact information for:

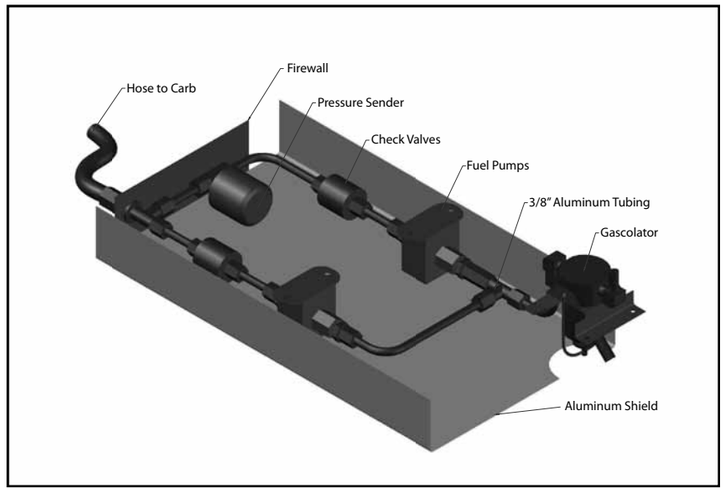
President, Treasurer, Secretary, plus two other specifically named members. Also please include a full chapter membership list with names and contact information. This is a requirement to have your chapter meetings and events covered under the RAA Chapter Liability Insurance Policy.

Ray McNally

RAA Midland's CH-601XLB Project

Back in the fall of 2015 the Midland/Huronia RAA chapter had been discussing ways to stimulate interest and perhaps attract new members to the organization, when it became known that there was a partially completed Zenair CH-601-XL project for sale locally. The fuselage was sitting on the gear and one wing was partially assembled, apparently almost ready for pre-cover inspection. The asking price was reasonable and included many of the parts needed for completion (sans engine). Since this was early December and the fuselage and wing were sitting outside, the chapter made a decision to proceed and to get the project under cover before the first snowfall.

Later we learned that that this model had a mandatory upgrade directive in effect involving both wings, the tail structure, the centre section main spar and other areas of the fuselage. We also recognized that due to the total projected funding required to complete the project, ownership would have to be assumed by a group of individuals who were willing to put in the required labour, underwrite the costs, refund the seed money to the chapter and eventually become the named owners of the aircraft. A group was formed that consisted of Bob Gow, Dan Laurin, Jim Huntington, Steve McGovarin, Ray McNally and Ian Reed (Jim has since dropped out). The group decided that in order to facilitate future possible changes within the group, we should register the plane as being owned by a corporation so that any changes in shares would not involve Transport Canada but only require an update to the corporation status. One of the concerns with corporate ownership was the question of future maintenance. It took some effort to find anyone at Transport who was willing and able to discuss the provisions in the regulations allowing the owner of an amateur-built aircraft to perform mainte-



Top: members completing the second wing of the Zenith. Above, since the Zenith's intended engine came with a high wing (read gravity feed) Cessna, a fuel pump system had to be designed to accomodate the Zenith's low-wing fuel tanks.

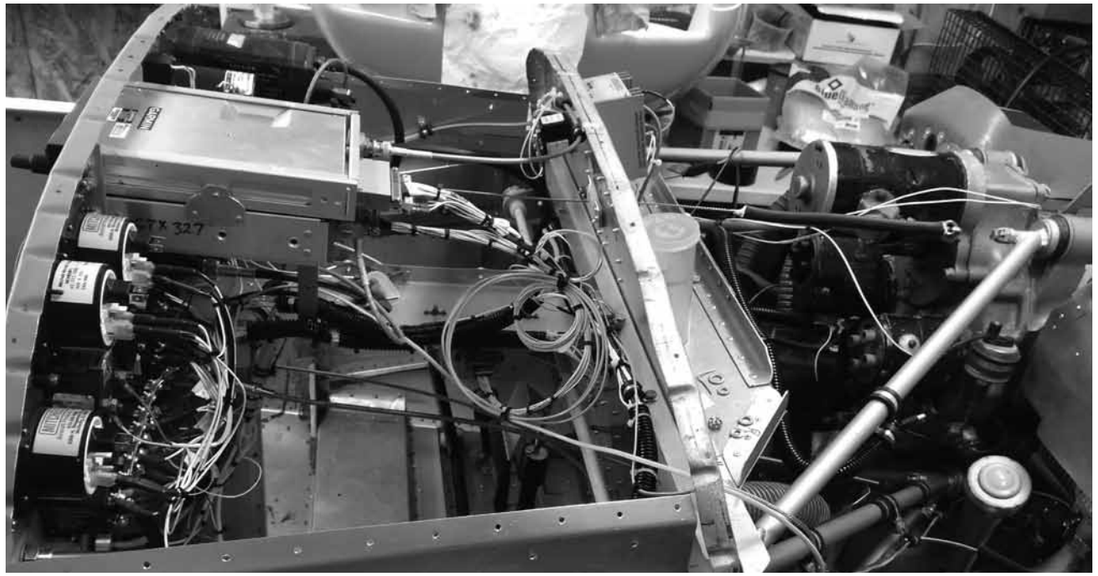
Back in the fall of 2015 the Midland/ Huronia RAA chapter had been discussing ways to stimulate interest and perhaps attract new members to the organization

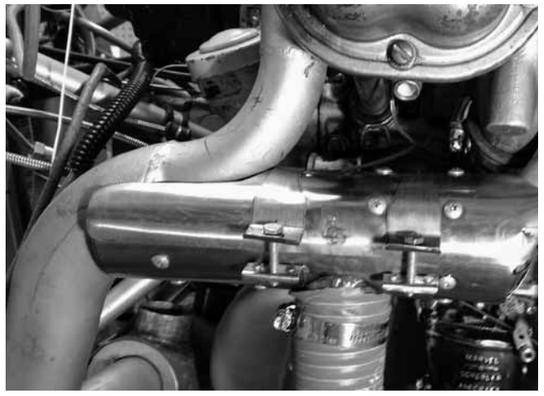
nance and submit the Annual Airworthiness Information Report (AAIR). Finally we got the answer that if the individual signing off the maintenance can document that he/she is a principal of the corporate owner, the AAIR report would be accepted by Transport. The now registered corporate name is "Huronia Avi8ors Club".

The first few build sessions in January 2016 were accomplished in Ian Reed's heated garage, where the existing wing was disassembled and the upgrade accomplished. When the warmer weather arrived, the group fabricated a 12' x 20', insulated, heated shop in the corner of Bob Gow's hangar wherein the project proceeded. We found that the assembly of the second wing took about the same effort as the upgrade of the first. Unfortunately phone pictures from the early stages of the build were lost in a canoe upset and dunking.

The pre-cover inspection was accomplished in July of 2017, with six minor snags. The snags were cleared and we proceeded to close the wings and tail assemblies. At about that time, a used Continental O-200 engine became available and was purchased. The magnetos, carburettor and ignition wires were sent out for overhaul. Inspection of the cylinder heads showed that one of the rocker arm bearing tabs on number one cylinder was broken off. This dictated the purchase of one new cylinder and dye penetration inspection of the other three. Those three were also honed and valve lapped. One accessory the engine did not have was a carb heat muff, so we fabricated our own with some scrap stainless on hand. The engine package also included a damaged Warp Drive propeller, so three new blades were ordered.

Another issue with the engine was the fact that it was initially intended for use with a high wing C-150 gravity feed fuel system and therefore has no engine driven fuel pump and no provision to add one. To compensate for this shortcoming, a redundant electric fuel pump system was





Above: the engine did not have was a carb heat muff, so we fabricated our own. Top and bottom right: , because the project as purchased came with the standaard Zenith Centre stick, the build team had to devise a dual throttle system. This was done with a countershaft mounted on the rear of the firewall activated by push-pull controls on each side of the panel to a single cable.

designed (opposite page). To handle the possibility of a complete electrical system failure, a back-up battery system was installed which is set up to remain charged but is separated from the main system and will power only the fuel pumps if selected.

Although some of us would have preferred to have a dual stick control system with a central throttle, the project already had a single stick system installed, so we were faced with devising a dual throttle system in order to allow both occupants to fly with one hand on the throttle and one on the stick. This was accomplished with a counter-shaft mounted on the rear of the firewall, activated by push-pull controls on each side of the panel and a single control cable extending from an arm on the centre of the shaft through the firewall to the carburettor (see previous page). The panel is populated with a mixture of new and used instruments, including a new Garmin com radio and Garmin transponder. The ELT is an Artex 406/121.5 type mounted on the deck behind the pilot's seat. The upper attach points for the shoulder harnesses were strengthened and moved to higher anchor points on the rear turtle-deck (refer pic 6). To keep wires out of the way, the intercom headset plugs are also located on the deck behind the seats,

Zenith 601XLB Specs (Jabiru 3300)

Wingspan	27ft
Wing Area	132 sq ft
Length	20ft
Height	6.5 ft
Empty Weight	695 lb
Useful Load	695lb
Gross Wt.	1,320lb
Wing loading	9.85 psf
Max cruise	138mph
75% cruise (8,000 ft TAS)	160mph
Vne	160mph
Stall speed (clean)	51mph
Stall speed (flaps)	44mph
Rate of Climb	1200fpm
Takeoff Roll	500ft
Landing Roll	500ft
Range	662mils
Endurance	4.8 hours
Load Factor (Ultimate)	+6/-4 G

Opposite: the panel is populated with a mixture of new and used instruments, including a new Garmin com radio and Garmin transponder (refer pic 5). The ELT is an Artex 406/121.5 type mounted on the deck behind the pilot's seat. Left, the upper attach points for the shoulder harnesses were strengthened and moved to higher anchor points on the rear turtle-deck. To keep wires out of the way, the intercom headset plugs are also located on the deck behind the seats.

A two-part PPG urethane automotive paint was selected with the intention to cover the whole surface with a white colour base and then add trim using vinyl decals. We purchased the paint from Car Quest who mix to automotive colour codes, therefore we selected the code from one of our cars and submitted that. The primer supplied for the fibreglass parts was different from the etching primer used on bare aluminum. Jim used our homemade cantilever rotisserie jig.in painting the aircraft; this jig worked well to prevent runs in the paint. The painted product is now back in Bob's hangar awaiting warmer weather to allow work in the unheated space

There are many more tasks yet to complete, such as timing the mags, measuring usable fuel capacity, fuel flow checks, engine start up, final assembly, trim application, final inspection, registration, insurance, flight permit and more that have not yet surfaced.

Ray McNally *is a member of the Midland/Huronia chapter and one of the principals in the Zenith Build Team.*

601 XLB or 650B: What's the difference?

The Zenith 650 is basically an upgraded version of the 601-XLB. It has a sportier looking rudder that makes no difference in the handling of the airplane. The wing incidence is slightly different, giving a better forward view in flight, but the biggest visual difference is the canopy, which is a larger two piece affair with an improved latch engaged by a lever between the seats. It is considered simpler and superior, and looks pretty cool to boot. The wing tips on at 650 are one large piece of fiberglass whereas the 601 has a smaller piece at the front and the rear of the wingtip is made out of sheet aluminum. There is no significant difference in performance between the two aircraft.

Wing Upgrade

In the early 2000s there were some incidents of in-flight breakups of 601-XLs. A modification was designed and an AD issued, grounding all unmodified aircraft. If you are building or buying a used XL make sure the modification has been done; it won't get a C of A without the mod. The upgraded version has been rigorously examined and no further issues have been reported. The "B" refers to the upgraded verion of the 601XL or 650.

Bearhawk Aircraft Announces First Deliveries of New Bearhawk Companion Kits

AUSTIN, TEXAS, JANUARY 24, 2020 – Bearhawk Aircraft announced today the first two Bearhawk Companion kits have arrived at their respective customer's hangars. The new Bearhawk Companion is a side-by-side two-place aircraft. Introduced in August 2019, the Companion is STOL capable, cruises at 130–150 MPH, and carries from 950 to 1,150 lb. of payload.

Joining the Bearhawk lineup, the Companion complements other Bearhawk aircraft ranging in size from 1,320 lb. (LSA) to 2,500 lb. gross weight with two or four seats. All models enjoy significant payload capability and durable construction. Designed by Bob Barrows, Bearhawk aircraft feature aluminum wings completely flush riveted, a super strong steel tube fuselage, and fast cruise speeds with excellent slow speed manners.

Greg Charest took delivery of the first Bearhawk Companion kit this month. In selecting the Bearhawk Companion, Charest desired an aircraft with proven strength and a wide performance envelope. His dilemma was deciding between the Bearhawk 4-Place and Bearhawk Patrol, then the Companion was introduced.

Charest resides in the Boston, Massachusetts area. "Weather this year has been back and forth, between cold and warm," he stated. "A little luck with warm weather helped with an uneventful kit delivery and the Companion is under cover for a couple of weeks while work on the shop is completed."

While a first time aircraft builder, Charest stated he has a close friend in Vermont with whom he's worked on aircraft before. He's expecting his friend to help with the large assemblies. "Like many other first time builders, I am a little nervous about being able to complete such a big project. Fortunately, there is great support available from Mark Goldberg at AviPro and a very active Bearhawk builder community. Bob and Mark want to see the first build go well," declared Charest.

From owning and fixing Cessnas, to his current Aeronca Champ, Charest is looking forward to having a plane built with new parts. "I'm super excited about eventually being able to fly and maintain a new airplane, rather than something built in the 1970s," he exclaimed.

A second Bearhawk Companion customer, Chad Marks of Montana, received his Companion kit also this month. "I'm going thru things right now. This is my first time to build an aircraft. It's all new to me," he stated. Marks has a degree in aviation. While educated in aircraft and systems, he admits all of his background is from college. Marks has been interested in flying for years, but it was always financially impossible. Now Marks says he's fulfilling a lifelong dream. Following research on available aircraft, Marks concluded with the Bearhawk. Living in Montana, "This type of backcountry aircraft was what I wanted," he said. "Metal wings, payload, speed, all I read about it fit the criteria. Tubular frame, sturdy, reliable," he went on.

Like Charest, community help was important in the decision. "I have not yet been able to get my hands on a finished flying Bearhawk kit. However, Mark Goldberg has been super responsive," noted Marks. He chose the Companion because he did not want a full four-seater, nor for economy's sake a larger engine. Marks is looking forward to flying with and teaching his daughter one day, so a tandem aircraft seemed less suitable than one with side-by-side seating. Marks says he expects the Companion will fly like the Bearhawk Patrol, though with greater payload and without the higher cost of ownership of the Bearhawk 4-Place.

Buyers have been clamoring for a side-by-side, two-place aircraft with all the great features of the Bearhawk designs. The Bearhawk Companion delivers with its design based on the Patrol's wings and a fuselage derived from the 4-Place. The result is a very rugged utility plane with a large area for cargo, i.e. a "sporty SUV/pickup" version of the Bearhawk.

The Bearhawk Companion will appeal to backcountry and cross-country flyers alike. Side-by-side seating is preferred by some for its two-passenger configuration with both occupants having a broad view through the windshield. The arrangement also allows full access to the instrument panel. This can be advantageous for pilot training, flights into instrument conditions, and for "pinch hitter" pilots who may be called upon to take over the aircraft controls.

The Bearhawk Companion can be powered by the lower cost and readily available Lycoming 4-cylinder engines including the 320/360/370/375 variants and IO-390 providing 150–210 hp. A large cargo area will occupy the cabin behind the seats. The new two-place Companion offers 2,200 lb. gross weight, an increase of 200 lb. over the tandem Patrol. The Bearhawk Companion will be capable of carrying 225 lb. of cargo in the baggage area (likely to be increased after flight testing).

The Bearhawk is a Go Anywhere aircraft that performs a variety of flying activities. The 4-Place Bearhawk fills a utility and transport role extremely well with its large cabin. The Bearhawk Patrol is a tandem two-place version that excels at accessing remote airstrips. The Bearhawk LSA is a lightweight design that meets U.S. Sport Pilot requirements. The NEW Bearhawk Companion is a side-by-side 2-place model with superior strength and payload capability. Each aircraft shares backcountry qualities that include stable slow flight and higher than expected cruise speeds. Bearhawk Aircraft manufactures high quality quick-build kits for the Bearhawk 4-Place, Bearhawk Patrol, Bearhawk LSA, and now the Bearhawk Companion.

For more information on Bearhawk Aircraft, visit www.bearhawkaircraft.com, or contact Bearhawk at info@bearhawkaircraft.com or 1-877-528-4776.

RAA Brampton Coming Events

Sat., May 2. Brampton CNC3--09:00 Spring Work Party @ RAA-TR Hangar, north end of Brampton-Caledon airport. An annual event to get ready for the summer season, starting with next week's Chili Party. Bring work gloves and a willingness to have some fun while pitching in. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Sat., May 9. Brampton CNC3-- 18:00 Chili Party – Our annual kick-off to the summer season, this is one of the Favourites. A full pot-luck banquet with salads and desserts. Cost is nominal, no charge to those bringing chili. Salads, desserts and rolls will be provided. Bring a full pot! RAA-TR Hangar, north end of Brampton-Caledon airport. Pres. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Mon., June 8. Brampton CNC3—17:00 Monday Night BBQs begin! Every Monday night to Sept. 2nd. Join us for our Legendary Monday Night summer BBQ. Going strong into our 14th season. Burgers, sausage, and all fresh trimmings. Nominal cost. RAA-TR Hangar, north end of Brampton-Caledon airport. Pres. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Sat., July 11. Brampton CNC3— 09:00 - 15:00 Flea Market. New this year, this will be a "parts swap" for amateur-builders. Have any parts that are surplus to your requirements? Acquired something that wouldn't do the job? Bring it out to the Flea Market! Bring your serviceable Parts, tools, and materials to sell at the Flea Market! Final terms TBD. Please be prepared to take home your unsold goods. RAA-TR Hangar, north end of Brampton-Caledon airport. Pres. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Mon., Sept. 7. Brampton CNC3—18:00 pm Grand Finale, Fall Feast. The last Monday night BBQ of the season. One of the largest turn-outs. Last year had roast beef and roast pork, roast potatoes, fresh corn on the cob, and a variety of desserts. Nominal cost. RAA-TR Hangar, north end of Brampton-Caledon airport CNC3. Pres. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Sat., Dec. 12. Brampton CNC3--Christmas Dinner & Silent Auction, Cocktails @ 6pm, Dinner @ 7pm The Do-Not-Miss event of the year in the Wings Restaurant at Brampton-Caledon airport. Completion, and First Flight awards are presented, among other recognition awards, followed by a key-note speaker. Donations to the Silent Auction gratefully received. All proceeds to RAA-TR. Pres. Pres. Fred Grootarz, 905 212-9333, fred@acronav.com ; V.P. Alain Ouellet, 416-709-2020, aouellet@icecanada.com

Opposite: Mr.Funnel, available from Aircraft Spruce, has a stainless mesh that is impregnated with Teflon and it will remove free water and dirt down to .005". Unfortunately water can also become emulsified with gasoline and a bumpy car drive to the airfield can cause this to happen. And so, we test.
First, fill water to theh zero line and add fuel to the top line...

Spring Fuel System Preparations

RAA

Fuel problems cause a large percentage of engine running problems and sometimes off-field landings, but it is not difficult to minimize the conditions that contribute to these.

Ethanol

If you are using auto gas the first step is to buy fuel that is free of ethanol. Ethanol attracts water and when the fuel becomes cooled at altitude the water can be precipitated, which will impair engine operation. Water droplets can bridge a carb jet, causing lean running or even engine stoppage. In a 2 stroke engine the ethanol can wash the oil from cylinder walls, causing piston seizures. A seized 2 stroke can have plenty of oil in the fuel but the cylinder walls and crankcase walls can be completely dry, the result of using fuel with a high percentage of ethanol.

Ethanol is also hard on the fuel system components and it can leach the plasticizers from a composite tank, leaving it as a soft, leaky bag. If the fuel tank is structural, as in an early Kitfox, the drag-antidrag strength of the wing will be impaired. Recently produced composite tanks usually use resins that resist ethanol but why test something so critical?

Most auto fuel now contains up to 10% ethanol. Some companies blend their highest octane fuel without ethanol but occasionally human factors intrude and a gas station can end up with ethanol in a pump that is supposed to be free of it.

Testing for Ethanol

Aircraft Spruce sells a fuel sampling tube that is calibrated to indicate percentage of ethanol in gasoline. Fill to the zero line with water, add a sample of fuel to the top line, and shake it all up. The water will draw any ethanol out of the fuel sample, and when the bubbles settle the water level will have risen and the ethanol percentage may be read from the graduations on the side of the sampling tube. Before taking the fuel sample it is important to pump several litres of fuel into a spare receptacle (your car's tank or the lawnmower gas can), this to empty the fuel hose of whatever the previous customer bought. Then take your sample and if it is free from ethanol fill your jerrycans.

Excluding Water

Water must be kept out of our fuel, and a funnel with a fine mesh sieve can remove much of this. A chamois will also work if you don't mind flying with a gas soaked cloth on board. The Mr. Funnel has a stainless mesh that is impregnated with Teflon and it will remove free water and dirt down to .005". Unfortunately water can also become emulsified with gasoline and a bumpy car drive to the airfield can cause this to happen. It is good practice to let the jerrycans stand to allow the water to coalesce and form droplets large enough to be removed by the mesh. The Mr. Funnel is made of a plastic that is impregnated with carbon so that a ground wire may be used to prevent static electricity buildup.

The Gascolator

A gascolator with a steel bowl can be affected by water in the fuel. A popular gascolator is plated with a gold coloured material that is somewhat but not completely resistant to water. Filling an airplane's fuel tank with water-bearing gasoline can result in the water precipitating and filling the gascolator with water, the reason we take fuel samples before flying. Water can cause rusting of any ferrous components, including a steel gascolator bowl. The rust flakes can then block the gascolator's filter screen and the carb can become undersupplied with fuel, causing a lean condition. Rust can also keep the fuel drain's o-ring from sealing, resulting in a drip drip drip. Of course you will be removing and inspecting at annual but it is worth unwiring and removing the bowl a few times each season, especially if you sometimes cannot filter the fuel going into your tank.

...Above, shake the water and fuel up and then let them settle and separate; and (right) the line of separation indicates 8% ethanol in this sample

The gascolator bowl gasket can also be affected by fuel, especially if it contains ethanol, allowing leaks around its perimeter as the rubber hardens and loses its sealing properties. Spruce sells replacement gaskets resistant even to ethanol fuel and a fresh gasket should be installed at every annual, and perhaps more often.

The Fuel Tanks

Almost every fuel tank has a spot that is lower than its drain fitting. Before you fly this season take a critical look at yours and if necessary lift the nose or tail to drain all of last year's fuel. Flushing with fresh filtered fuel will help to clean out the last bits. This is also a good time to remove the fuel hoses for inspection and possibly replacement.

The Carb

Last fall did you drain the carb, or at least shut off the fuel and run the engine until it coughed and died? If not and you use auto fuel expect that the jets, especially the idle jet, can be clogged. Auto fuel is formulated for a life of one month after which it forms a nasty hard precipitate that can block passages and jets. In a fuel injected car the system pressure is high and the computer compensates for dirty injectors. A carbureted aircraft engine uses Bernoulli, so only atmospheric pressure and little cleaning action. If you have cleaned the whole fuel system and filled with fresh fuel but the engine runs poorly the carb jets should be removed and soaked in carb cleaner. In extreme cases it can be necessary to use tiny number drills or welding torch tip cleaners. This is delicate work but it can be done. Next fall remove the drain bolt to leave the carb empty of fuel.

Runup

Before flying it is good practise to tie the tail to a post and run the engine at full throttle for at least ten minutes. I am always amazed when pilots instead decide to take a test flight to clear up any running problems. These are not motorcycles or snowmobiles that can just pull over to the side of the road. If the engine will not run perfectly for at least ten minutes while on the ground there is no reason to expect that this will improve when in the air.

Aircraft Spruce:
Mr Funnel medium size:
01-01054 ..... $33.50
Gasohol tester: 05-03439 ..... $8.50

3,000 Feet / continued from page 15

engine pilots.

His first thoughts about the event:

"I was aware that it happened I could feel my pulse shooting up my spine and my blood pressure increasing rapidly".

"Tunnel Vision of this distress set in".

"This can't be happening, this doesn't happen to me".

"Then I realized that this flight would not end up on a runway with the airplane undamaged. I was OK with that, as long as I could solve the problem".

This is the same predictable reaction most of us pilots would likely have; first a moment of disbelief. The next thought following this disbelief is that you realize that it is real and you had better do something about it if you want to stay alive. Now comes a very crucial part in your decision making process that will either get you to a relatively safe and survivable landing, or result in catastrophic consequences.

We have been taught that the first thing to do after an engine failure is to get the airplane into the best glide speed (as per POH) and trim so the airplane can fly almost on its own while you have time to consider your next move. We call that "Aviate".

Realizing that his airplane was descending at about two floors per second, Cptn. Sully had to make some very quick key decisions at this point. There was no time to pull out a checklist and follow standard operation procedures for this kind of an event. He then decided to set clear priorities. "I chose to do only the highest priority items; I chose the first two items I remembered on the checklist. Then I had to discipline myself to ignore everything I did not have time to do as being only distractions and detriments." He didn't reach that conclusion out of a hat; this is where his years of flying experience and repeated training kicked in. He didn't freak out or start to panic. Instead he kept focused on the task at hand. That took a lot of discipline.

The cardinal aviation rule applies the same: Aviate, Navigate, Communicate.

His training had also taught him that effective multitasking is a myth. "When we think we are multitasking, we are in fact switching rapidly between tasks and are not doing either of them well. So I chose not to do too much."

Next step: Assessing the situation.

"There were two possible runways to land on, (Teterboro Airport 10 miles ahead, or Newark, even further away), but there was not enough time to get there; and the only other suitable place to land was the Hudson River".

Translating that into a typical scenario for our type of flying: Figure out the time and distance we would have available before we would make contact with the ground. Quickly assess the available options where to land. We learned that the typical gliding distance of a small airplane like a Cessna 172 is about 1.5 nm per 1000 feet altitude. At 3000 feet, that means about 6 minutes of perfect gliding time (Altitude x 2), and a max gliding distance of 4.5 nm. Plus allowance for wind influence at the time.

Unlike Captain Sully and his big Airbus jet over the densely populated New York City area, we normally take off from airports which more often than not have lots of rural relatively unpopulated countryside around them. If a return to the departure airport is not technically feasible, landing in a field is probably the best alternative. Remember, that if you start turning, you lose altitude during your bank, and it reduces your time and distance to land somewhere, unless you are sure you will make your anticipated landing spot. If it is all trees and forest within your limited landing area in front of you, then you should try to fly the airplane into the upper parts of the trees at the lowest speed you can get the airplane to fly without stalling. Your velocity at time of impact makes a big difference. Landing on a road is a dangerous option, since it is difficult to see hydro lines crossing the road until you are too close and it is too late. All these decisions fall under the "Navigate" part.

Once Captain Sully had assessed the situation and evaluated his available options, he took control of the aircraft and made a quick, short but to the point distress call to */continued*

3,000 feet / continued

the aircraft controller in La Guardia. That was his "Communicate" part. Until this point his First Officer Jeff Skiles had been flying the airplane. Being an airline crew, they had the luxury of two trained pilots on the flight deck, and thus they could (and did) split certain duties during flight. That allowed First Officer Skiles to watch and observe Cpt. Sully as well as reading aloud the speed and altitude during the final crucial moments before impact with the water, so Cpt. Sully could concentrate on getting the airplane at the right moment into the required slightly nose up attitude at impact.

Unfortunately we single engine pilots normally do not have the luxury of having a trained pilot sitting next to us in case of crisis. That makes the "Navigate" part a lot harder on us. However, a lot of this skill can be learned through proper and repeated training.

I do not want to explore any detailed available options if this bird strike /engine out scenario would have happened to us, since it is unlikely that we would have taken off from a busy commercial airport like La Guardia. Our best off-airport landing would possibly have been an open football field, or a wide road, but both options would have been equally dangerous. A landing in the Hudson would definitively not have been an option for us. There our landing would not have been as successful as the one of Captain Sully.

However, what made me think and write about this is the fact that in principle the thought process, and flying decisions in an emergency are basically the same for professional airline pilots in large airliners as we would have to go through when the unexpected emergency out of nowhere pops up during flight.

For more:
https://www.youtube.com/watch?v=w6EblErBJqw

The cardinal aviation rule applies the same: Aviate, Navigate, Communicate. The quicker you can get over the initial shock of disbelief, you need to:

1. Get the airplane configured into best glide speed and trimmed accordingly.
2. Quickly figure out how much time and distance you have available before impact.
3. Make sure you have a true Situational Awareness as to where you are in the sky at this moment.
3. Assess the available options.
4. Make a principle decision and stick to it.
5. Maintain control over your airplane and fly it controlled into the impact site at the lowest possible speed.

Safe Flying!

Fred Grootarz *is president of RAA 41 based at Brampton Airport. Fred does an annual round of Ontario chapters to present his recurrency seminars that keep local pilots current and legal.*

PAL-V Q & A

The PAL-V Roadable Aircraft is approaching certification. From their website, some questions (and answers) for the curious:

Can you tell more about the engine solution?

The dual engine propulsion drive train is based on two fully certified airplane engine from Rotax. one of the leading manufacturers in aviation engines.

What about safety?

The PAL-V LIBERTY has been developed by using proven state-of-the-art technologies from the aerospace and automotive industries. In the air, the underlying gyroplane technology guarantees a stable flying platform that supports safe landing even in the very unlikely event of a total power failure. Which in itself is very unlikely thanks to its unique two engine propulsion solution.

A gyroplane as such is already a very safe way of flying. However by a rigid focus on flight safety PAL-V has taken it to the next level. By making small compromises on specification it created the safest gyroplane ever built.

Unlike most small airplanes and gyroplanes the PAL-V LIBERTY is certified under the very strict safety regime of EASA (Europe) and FAA (USA). Many countries in the world follow the same rules.

On the road, the PAL-V LIBERTY is complying with the applicable road safety requirements.

An inherent safety aspect is that in case of bad weather conditions you can drive (part of) your journey. This does make your planning much more certain but also increases your safety options dramatically.

Will regulators allow the use of PAL-Vs?

The PAL-V LIBERTY is designed within the current certification and regulations frameworks for the vast majority of countries in the world. No rules or regulations need to be changed to be allowed to use the vehicle.

What market does PAL-V aim for with the Liberty?

PAL-V distinguishes two markets in personal flying mobility, urban mobility and City-to-City mobility. At this moment PAL-V aims for City-to-City mobility, where you take-off outside a city, land in front of another city and finally drive into the city.

Why start with the city-to-city market?

There are a few reasons why PAL-V deliberately choose for City-to-City mobility. One of them is that there is no need for additional infrastructure to support a vehicle like the PAL-V. Because the PAL-V can be fueled up at any gas station and you can park your PAL-V in your own garage there is no need for a hangar or fuel station at the airstrip. The PAL-V only needs a grass strip to land or take-off, which are abundantly available and often can be created easily. Because the PAL-V complies to existing regulations it is also allowed to land at normal airports or airfields. Another reason is that there is no need to change any regulations to the PAL-V to open up the City-to-City mobility, which makes the PAL-V a viable flying car without barriers.

Why not urban mobility?

We are convinced that there will be a market for urban mobility. However, not for the coming decade. There are some major challenges that need to be addressed. One of them is the noise that aircraft make. The PAL-V is relatively quiet compared to helicopters but it still produces propeller noise. Although you might think that electric engines would resolve that issue, it doesn't. The main source for the noise pollution comes from the blades of the rotor and propeller, especially when using drone or helicopter technology. The other challenge is the level of safety required to fly over urban areas.

On top new regulations have to be out in place and the infrastructure needs to be created in the form of vertiports and traffic management.

What specs does it have?

Please view: https://www.pal-v.com/en/explore-pal-v

Why is the gyroplane concept chosen?

Safety first: in case of engine failure the gyroplane can be landed normally in a very small area equivalent to a tennis court. Landing without an engine can be done with +/- 30 km/h (18mph) ground speed on a very small spot (30 meters or 100ft). This makes emergency landing, in combination with the unique double redundant drive train of the PAL-V LIBERTY, multiple time safer than a comparable aircraft or helicopter.

Advantages compared to a conventional airplane:

Safety again: contrary to fixed-wing airplanes, it cannot stall and crosswind landings are easier and safer than with a fixed wing airplane.

Convenience and comfort: in turbulent air it still flies smoothly with excellent stability due to its high rotor speed. You will only experience 20% of the turbulence of a comparable fixed wing aircraft.

Versatility: Because a gyroplane can fly very slowly, it needs very little space to land. Take-off distance ranges from only 90m to 200m (300ft-650ft). As it deals much better with turbulence and cross wind you can safely fly a PAL-V LIBERTY while fixed wing airplanes have to stay on the ground.

Fun and effectiveness: wide speed range, with a low minimum horizontal speed (from 50 km/h up to 180 km/h or 30mph-112mph). The PAL-V LIBERTY exhibits very positive slow flight envelope characteristics, even slow glides are possible up to safe vertical descends.

Advantages compared to a helicopter:

Safety and ease of operation: a gyroplane is very easy and safe to fly because it is a stable mechanical system. A comparable helicopter is the opposite: this is an unstable system, kept in the air by the skills of the pilot using both hand and feet. A helicopter is much harder to fly and therefore much riskier and challenging to operate.

Versatility: unlike a helicopter, a gyroplane cannot take off or land vertically. Although you may think this to be an important limitation, in practice it is NOT thanks to the driving capability of the PAL-V LIBERTY. Since you can drive the PAL-V LIBERTY to your destination, it is much more useful and versatile even than a helicopter: taking off nearby is good enough and it does not require anybody to stay behind to guard your aircraft at the landing spot. Also landing a helicopter at the spots where you would like to land is very often not allowed or possible because of noise and safety, making helicopter use in practice very cumbersome. Therefore helicopters are not as practical and useful as a PAL-V LIBERTY.

Cheaper to own and operate: a PAL-V Gyroplane has significant lower cost of ownership compared to a helicopter, yet can accomplish most missions that a helicopter can plus other ones. Since you park it in your garage, costly hangar space it not required.

What happens when more PAL-Vs take to the sky?

The great news is that because PAL-V is designed within todays existing regulatory framework, all the tools are in place for safe management of transportation in the sky including 2nd Generation air traffic control. Rules and regulations are in place under the International Civil Aviation Organization (ICAO) to allow the use of the first PAL-V LIBERTYs.

Is it possible to take off and land everywhere?

No. Apart from the fact that this is not allowed by law, the PAL-V needs a space for take-off measuring about 90-200 by 20 meters (100ft-650ft by 60ft) without surrounding obstacles. In practice all small airstrips, aerodromes, glider sites and/or ultralight airfields will suffice. The PAL-V LIBERTY can operate from either concrete or grass airstrips. As the

continued on page 42

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 n.rioux1@videotron.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 Roy Rader 519-349-2641

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.

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 403-443-8434 or Secretary Bruce Flach o2fly@yahoo.ca

EDMONTON HOMEBUILT AIRCRAFT ASSOCIATION: meets second Monday - Sept. to June. Contact Michael Reimer 780-975-5263 or secretary Roger Smeland 780-466-9196. 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 250-309-4171 email: Outintheair@yahoo.ca

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 Alex Mackay mackay@physics.ubc.ca. Website www.raa85.ca.

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

THOMPSON VALLEY SPORT AIRCRAFT CLUB: Second Thursday of the month 7:30 pm Knutsford Club, contact President 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.

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

FOR SALE - Four lengths of spar grade sitka spruce. 7/8" x 6 1/4" rough, x 20 ft. This will plane down to 3/4" x 6". Located in Kenora, Ontario. I will box and wrap and carry to a shipping depot. Buyer pays shipping, or my ship costs will be added to purchase price. Cost for this material, planed, at Aircraft Spruce Canada is $14/ft, I am selling for $600 CDN. Call 807-468-4764, or email pjohnson@kmts.ca.

FOR SALE - Complete Ivoprop Magnum in flight adjustable pitch prop for sale. 4 3/4" Bolt pitch Dia. 37 hrs. on a V6 260hp Engine. (Spitfire MK 26B). Asking $2,000.00 CAD. Please contact Bob Poole at Aerostructural Inc 416-844-9440,

PARTIAL KIT for Zenair CH 640 See my Facebook photo album for progress (George Lowes). I've lost my medical. See Zenair web page for specs. http://www.zenair640.info/standard-ch-640-kits.html Kits List Price in $US: Rudder Tail 590.00, Tail (Manual Trim) 1,995.00, Wings 7,995.00, Fuel System 1,495.00, Extended Range Auxiliary Fuel Tanks 2 X 46 USgal 900.00, Nav/Strobe/Position Lights (Incandescent NOT LED) 828.00. Total List Price 13,803.00 $US. Many air tools are also available. $10,000 OBO. George Lowes 705-843-0826

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Plane Parts For Sale: EJ-25 Subaru 165 hp
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RAA London St Thomas

The December meeting was a huge success. Our attendanceat the Chili Supper was double what it was the previous year with may bringing a guest. Thank you,Flo of the 427 Wing for putting on a great meal for us.

Henry gave us a most entertaining presentation replete with beautiful photography of a week's camping and fishing north of Moosonee with his sister in celebration of her birthday. Many of us will remember the photos of mosquitos covering the screen house and the "bee keeper's" clothing they wore at all times – appropriate for the Seabee they were flying. This was the same Seabee that once belonged to Henry's father and was restored after it was demolished in 2014. It's in beautiful condition.

Phil showed some pictures of his time at last summer's AirVenture 2019 as Phil and Gerry arrived pulling their tent camper a few days ahead of opening day. Over six inches poured down over 2 days, inundating the campgrounds and closing Wittman Field (KOSH) from accepting arriving aircraft that didn't have guaranteed hard surface tiedowns. Fortunately, room was available at the inn – the Colonial Motel in this case, so all was well. Eventually, the weather cleared, and the show was on in full form. Thanks, Phil for taking us along for the ride!

Bill Weir shared two videos, one, an air arrival at Oshkosh by a young couple in a Cessna. The video included a couple of aborts in the arrival at Fisk as well as great footage of landing on runway 36 Right. Second video was an emergency road landing of a KR2 somewhere in America. Amazing footage take from a police cruiser!

Midland Huronia

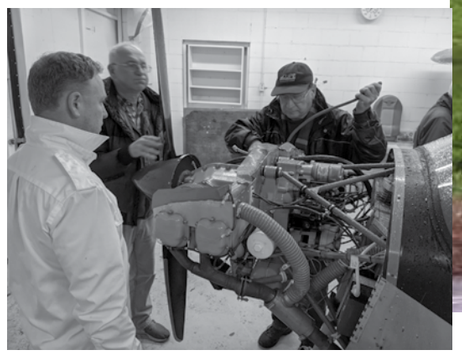
At the February meeting, Rob M reported on the Transport Canada seminar at Georgian College, which included a discussion on NOTAM changes and maintenance and airworthiness. Bob R summarized the January 18 group inspection of the Aeronca Chief wing; it was determined the wing needs work, and Rob agreed to canvas interested parties to set a date to review further options.

Details were discussed concerning the upcoming NRFI fly in scheduled for July as well as the Winter Fly-in that took place shortly after the meeting. The Zodiac build group meeting is being continued on Thursday evenings and Saturday mornings (see the feature of this issue for more information!).

Vancouver Chapter 85

We held our Annual General Meeting in October where we managed to fill all of our 2020 Executive positions by acclimation plus the usual gentle arm twisting. Our 2020 roster consists of Alex MacKay, President; Peter Whittaker, Past President; Peter Sleeman, Vice-President; Tim Novak, Secretary; Tom Boulanger, Treasurer; Cliff Dawson, Custodian and Program Directors, Sebastien Seykora and Peter Murphy. Our Directors are Shawn Connelly, John De Visser, Cyril Henderson, John Macready, Erich Munzer and Tim Saxton.

In late October, our past President Peter Whittaker, came back from his new home in Ottawa for a brief visit.



Opposite and above: members performing the annual on Chapter 85's Cruzer. It has now flown off its time and has been issued its Special Certificate of Airworthiness.

Across Canada

RAA Chapters in Action

We were very pleased to see him take his first flight in our new homebuilt Zenith 750 Cruzer. After landing, Peter had very positive comments about the performance of this aircraft for which he had played such a large role over the past 4 years. Peter has joined an EAA Chapter in Ottawa that is currently building a CH750 with a Jabiru 3300 engine.

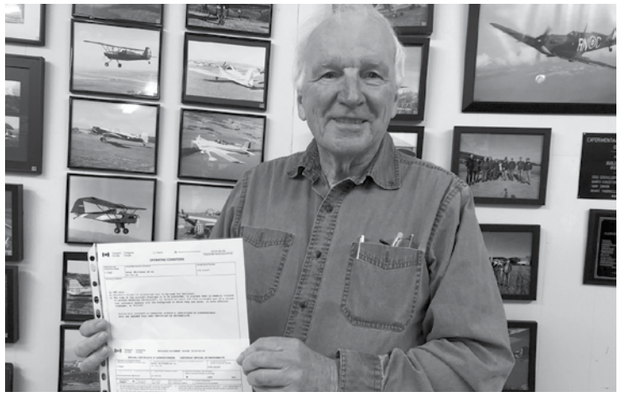
On November 11th, John Macready organised the Annual Remembrance Day Ceremony which was attended by about 200 people. Tim Novak brought a troop of Royal Canadian Air Cadets (655 Squadron, Richmond, BC) to the ceremony. The event was initiated by a flyover of four low flying Harvard's led by Mike Langford- this set off numerous car alarms in the parking lot. There were readings by Eric Klassen, Tim Novak, Tom Boulanger, Bruce Prior, and Tony Swain. Wreaths were placed by representatives of All Canadian Veterans, COPA, Flight 5 and RAA, Chapter 85.

At our regular meeting on November 5th, Peter Sleeman gave us an excellent PowerPoint presentation on what we need to know in order to fly the Cruzer. Our final event of the year was our annual pot-luck Christmas Party on Dec 3rd. There was very good attendance and we consumed a lot of superb food along with some BC red and white wine.

Above and opposite are a couple photos from today as the group continued working on the Cruzer annual as well as addressing other items. During the week, Joe had corrected the binding/loose bolt through the bushings situation of the attachments of the flapperons to the wing fittings. Today, Greg, Perry and Tim N focused on measuring and then doing some correction to allow full flapperon up and down movement at all flap settings. John M. and Eric M. and I inspected the landing gear and brakes—including repacking the bearings the rear wheels (the front wheel has a sealed bearing). Cyril worked on engine and firewall forward inspection items (when we were not in his way) and will return tomorrow to install the new valve cover

gaskets and do further engine inspecting when it is quieter.

Next week, Greg's gang will install the control movement stops and once the control movement adjustment is completed, do final inspection for the annual.



President Alex Mackay holds the Cruzer's new Special Certificate of Airworthiness. The test period is officially over!

PAL-V / continued from page 35

PAL-V popularity increases, it is expected that more and more small uncontrolled airstrips will be created. Many countries also allow for special permits on private property.

Do people need a license to fly the PAL-V?

Yes, they certainly do need a license to fly. This can be obtained through one of the many flight schools in the world. To be able to operate an airplane you will need some basic knowledge of navigation, instruments, meteorology, aerodynamics and performance. All pilots of aircraft need training and the PAL-V LIBERTY is – for the aviation aspect – no exception. To acquire a license people have to pass a theoretical exam and have a reasonable amount of training first with an instructor and later as a single pilot (solo) to learn to fly a gyroplane. The gyroplane license can usually be obtained within 30 to 40 hours of training, depending on skill and talent.

Will such a "flying car" receive certification for road and sky?

The PAL-V LIBERTY is designed within existing certification requirements on the road as well as in the sky. For flying, CS-27 (Europe) and FAR-27 (USA) are the standards on which the Type Certificate is based. For driving, the road legislation directives of the European Commission and National Highway Transportation Safety Administration (NHTSA) standards are used. The PAL-V ONE "proof of concept" prototype confirmed that the PAL-V LIBERTY can be built to meet these standards without exemptions.

Where will it be produced?

The PAL-V LIBERTY will be assembled in the Netherlands. Specific parts and systems are manufactured by leading companies from a number of countries.

What about noise?

The noise will be comparable to a small fixed wing plane. It will be much less than a helicopter.

How long does it take to change modes?

To convert from drive to fly mode or vice versa will take 5-10 minutes.

What about Vertical Take-Off and Landing (VTOL)?

Vertical take-off requires a lot of energy which would significantly decrease the range of the PAL- V. Since the PAL-V is a flying car there is far less need for vertical take-off. You simply drive to a place where you can take-off. After landing you can reach your destination by driving there, true door to door mobility. Instead of platform to platform mobility.

What about electric flying?

In aviation weight is in direct relation with performance, influencing range, speed, payload etc.... At this moment batteries are too heavy to be used for flying cars or human drones. With the current battery performance there would be no practical range left to fly or you would not be able to carry any passengers or payload because of the efficiency and the weight of the batteries.

When does PAL-V expect to fly with electricity?

In the road map of PAL-V we have concepts ready to be implemented with electric propulsion. However, at the current development speed of batteries, we do not expect to see electric PAL-Vs within the upcoming 10 years. Apart from battery efficiency, the technology also needs to mature before it can pass the strict aviation certification.

What about a three or four seater?

PAL-V has a road map for future products but at the moment the main focus is the PAL-V Liberty which for now can carry two passengers which is sufficient to cover a very big portion of the market.

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