



Skywriter



Monthly Newsletter of the Calgary Ultralight Flying Club

September
January 2001

From The Cockpit

by Brian Vasseur

Several months ago I agreed to do a followup with the Transportation Safety Board to get some more information on the type of ultralight incidents occurring in Canada to see as a group if we could begin to do something to improve the situation. So far I'm not having much luck at all getting any information from anyone. So far the best incident summaries are found in the COPA magazine but it's only a sampling of what is really happening. The TSB does have a website with summaries

going back about 5 years but unless you fly a PA-31 or a helicopter commercially they're not of any use.

This situation is becoming very frustrating for me as we had another recent death just a few weeks ago. I'd like to believe that if we are able to digest some information and inform our club of the results it may make somebody aware of something new and allow them to change their behavior.

I believe this is becoming an important issue for us now because passenger carrying is just over the horizon. While in the past we were usually the only victims of our carelessness, this won't always be the case in the future. Having a few high profile lawsuits and accompanying media coverage could put us in a position where

we won't be able to afford ultralight insurance which would effectively kill off our sector in aviation.

Maybe I sound a bit paranoid, but a month ago I wouldn't have believed Cessna would have been successfully sued for \$480 Million because of a seat latch in one of their small airplanes. While Canadian judges have been a lot more realistic we're starting to see a few very expensive lawsuits in the courts. Maybe Canada isn't too far behind.

It's my impression that making changes to the ultralight community to improve our safety record won't be that hard to do. Our club has been very successful in sharing our knowledge and experience and there's no question that's having a positive effect on our club's success. I plan to keep working hard to ensure we get the information we need to promote safety and grow our sector of aviation. →



Dave Procyshen taxiing out for a flight in his Beaver 550. Photo by Adrian Anderson

Don't forget the first meeting after the summer:

Thursday, September 13th at 7:00pm

Northeast Armoury.

For Sale

Accessories - New GSC 60" 3-blade prop \$500. Used GSC 64" 2-blade prop \$200. Rotax 503 DCSI, 15TTE, A-box cagless bearings, exhaust, fresh tuneup, \$2600. Russ White 250-353-2492 (09/01)

Skyseeker 2 - 1983, less than 20 hours on Rotax 503 and airframe. Very good shape, stored since new but needs new skins. Skis and long range tanks included. Engine can be sold separately. Asking \$3200, Darren Reeve 239-5334 or e-mail: reeve_darren@hotmail.com (9/01)

Aircraft Parts and Accessories - 1999 Rotax 503DCDI, dual carbs, "B" box, 95 hrs. total time, runs beautifully, \$3800 Firm. Ivoprop, 2-blade LH, 95 hrs. excellent condition, \$350. Tennessee Propellers brand wooden 2-blade prop, leading edge protection, 60 hours, excellent condition, \$300. Pair of aircraft skis, high quality, axle-mount type, great condition \$500. Magellan 300 GPS and panel mount, full manual \$100. Call Stu Simpson at (403) 255-6998 or e-mail at simpsont@cadvision.com (9/01)

Trailer - Custom 24 ft aluminum trailer ready to enclose. Buy for cost \$2500. And get the airplane inside for free. Russ White 250-353-2492. (8/01)

1995 TEAM Himax - 314TT, 60hrs SMOH on Rotax 503DC, 2-blade ground adjustable prop, good panel, spinner, speed fairings, VHF antenna, large cockpit, always hangared. Great performance and handling. Only \$9500. Call Stu at (403) 255-6998 or e-mail simpsont@cadvision.com for pics and info. (6/01)

Avid STOL - 250 hrs as US Experimental N17AF. 5 hrs since total rebuild and new 582 E-Box. \$18,000 or \$11,000 without engine. A 503 would be more than adequate for this aircraft. Will take new or late model Rotax 912 in trade. Ed D'Antoni 403 247-6621(5/01)

Zodiac CH601 for rent - \$65.00 per hour with instructor, or \$50.00 per hour wet. Aircraft can be kept at Indus or Springbank. Please call 40-617-1831 for

more details.(5/01)

1994 Tundra - ser. #26, 503 electric start, long range tanks, trim control, new paint/fabric.(Nov./2000) TT 90hr. engine 70hr. Flies hands off. Very gentle roll rate. \$14,500 Call Garrett at 874-6447 or e-mail kommair@telusplanet.net. (5/01)

1999 Chinook Plus 2 - Advanced Ultralight, always hangared, 34 hrs TTSN, Rotax 503, DCDI, electric start, oil injection, 3 blade prop, extended cabin, hydraulic brakes, tundra tires, new skis, excellent condition, \$23,000 OBO. Jim (403) 547-6714 or venturiae@home.com. (4/01)

Rotax 503 - new, OTT, single carb, new muffler, \$3500 OBO. Chuck Duff 938-6157 (4/01)

Flying-Flea HM-293 - famous Mignet Aircraft redesigned by Grunberg as an ultralight. More than 100 flying. French plans and brochure with English translation, \$110.00, mailing included. Paul Pontois, 1890 Rang des Chutes, Ste-Ursule, Quebec J0K 3M0 819-228-3159 (4/01)

Super Koala - Rotax 503, DCDI, Culver wood prop. Airspeed, Altimeter, Tach, CHT, EGT, Hour meter, Fuel gauge. Heated cockpit. Less than 200 TT on new engine and airframe. This is an attractive, predictable and easy to fly taildragger. Open to any serious offers. Dale (403)293-3826. (4/01)

Renegade Spirit - TT 260, 65hp Rotax 532 70 hrs since rebuild, excellent condition, always hangared, see pictures and details at www.skywalker.ca, REDUCED, \$22,000. Bob Kirkby 403-569-9541 (2/01)

Forward ads to Bob Kirkby 569-9541.

Ads reprinted from the St. Albert Flying Club Newsletter

ICOM A21 Transceiver - comes with car cigarette lighter adaptor, ptt, protective cover, \$425. Chris Barre 780-963-1598.

1984 Gentex heli flight helmet - has clear ratcheted visor, Sigtronics electrical

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Hirth F-23 - used 6 hrs, 40 Hp, \$2,800.00 Dan (780) 452-2491

Skywriter

Skywriter is the official newsletter of the Calgary Ultralight Flying Club and is published 12 times per year. Forward your articles and letters to:

Editor: Bob Kirkby 569-9541
e-mail: kirkby@skywalker.ca

Assistant-editor: Bernie Kespe (see below)

Calgary Ultralight Flying Club

Meetings of the Calgary Ultralight Flying Club are held on the second Thursday of every month, except July and August, at 7:00 pm, at the Northeast Armoury, 1227 - 38 Avenue NE.

President: Brian Vasseur 226-5281
e-mail: vasseurb@cadvision.com

Vice-President: Bob Kooyman 281-2621
e-mail: kooyman-eng@home.com

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e-mail: mitchell@cadvision.com

Past President: Wilf Stark 935-4248
e-mail: wstark@compuserve.com

Visit the CUFC web site:
www.cadvision.com/cufc/

Flying Events

September 9 - Fred Herzog Memorial fly-in breakfast, St. Albert, AB

September 15 - Rocky Mountain House annual fly-in breakfast, 8:00am to 11:30am. Info call Charlie 403-722-3205

A Bushmaster Adventure, Part 2

by Stu Simpson

We rejoin the author during the quest to fly his newly acquired Sylvaire Bushmaster home from Edmonton to Kirkby Field.

The weather office had quoted a 10-knot tailwind for my trip home. Instead, I found a stronger headwind. There was a thunderstorm ahead with more building along my route. And my fuel gauge seemed to be slipping a little quicker than I expected. I wondered how I was going to get out of this one.

The only saving virtue was the Bushmaster. What a great plane! The handling was superb. It felt as good or better than my Himax despite being so much bigger. The controls were light, smooth and precise and it had great response to turbulence. I know the Himax's cockpit is big and comfortable, but the Bushmaster's seems the size of the average living room. I immediately felt right at home and was loving every minute of it.

Now, about that thunderstorm. Things were looking up a bit. The storm was moving directly east and appeared to be on a track to take it south of Edmonton International. It looked like the Bushmaster and I would be able to sneak around behind it. I decided now would be a good time for a sandwich.

After my in-flight meal (no movie) I found myself well south of the control zone, but the headwind was really slowing me down. Chris said he usually planned for no more than two hours of flying, which gave a comfortable reserve of half an hour. I did some quick mental arithmetic looking at the map, figuring my ground speed and counting the miles until Lacombe. It was sure going to be tight; more so because of another thunderstorm off to the west headed for the same place as me. It meant there would be more pressure at Lacombe to get refuelled and headed south again.



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Three things seemed to be headed to a simultaneous convergence point; my steady, but slow progress toward Lacombe, the next thunderstorm's steady, but slow progress toward Lacombe, and the fuel gauge's steady, but somewhat quicker progress toward empty. I was determined to win the race.

The Lacombe airport finally came into view and before long I was overhead for a left-hand downwind to Runway 16. Runway numbers have rarely looked sweeter to me than those ones did. I taxied to the south end and shut down. Peering into the tank, I realized I was nearly on fumes. That one was a little too close.

Well, no sense worrying about it now that I was down and safe. Best to concentrate on getting fuel and getting back into the air. Bernie and Carl showed up a few minutes later. Bernie scooted me down the road to a gas station, then we zipped back and filled up. The 8-gallon tank took nearly 8 gallons.

The Biggest, Blackest, Meanest Monster

Firing up again, I decided I could really get used to this electric start thing. I taxied all the way back up to the button of 16 and pushed the throttle forward. The takeoff run was a bit less on the pavement than on the grass and in short order the Bushmaster was airborne and climbing south toward Bishell's strip near

Carstairs. I figure I beat the storm by 15 minutes.

Red Deer appeared a few minutes later and I noticed the wind had eased off just a bit. I'd be lying if I said I wasn't enjoying this. After all, who doesn't like a good honest aerial adventure?

Peering ahead, it looked like more adventure was headed my way. There was yet another thunderstorm growing like blazes southwest of Innisfail. I could tell right away that this one could be a crusher. Sure enough, as I passed the east end of Red Deer, I was seeing lightning and an unbelievable downpour from the storm's core. It was the biggest, blackest, meanest monster I've seen while flying. Naturally, it was headed right for me.

I knew getting to Bishell's was going to be a bit tight fuel-wise, so I had to plot my course to get the most direct route while remaining clear of the storm from hell. As it happened, I just managed to clip the south-eastern edge of the cell. I felt like a guy who'd jumped a subway car just as the doors slammed shut. I saw some lightning and had a short blast of turbulence and rain. I silently thanked Chris for getting a prop with leading edge protection. Most unnerving though, was actually hearing thunder over the noise of the Bushmaster. I even had earplugs in!

(Continued on page 4)

South of, and well clear of the storm, I discovered the wind direction had switched. Now it was from the west at about 15 knots. So with the south-westerly course I needed to get to Bishell's, the wind now had exactly the same effect as the south-easterly breeze I'd battled to that point, only from the other side of the plane. I resolved to stop cursing and taking the weatherman's name in vain once I got home.

Navigating to Bishell's was an additional challenge. It had been a number of years since my last low level ultralight flight north of his place, so I was really depending on my map. I didn't have the sissy GPS because I didn't have time to learn how it worked before leaving Chris's strip. Besides, there was the seed plant near Bishell's, just over there. Good thing I didn't miss it. See, real men don't need GPS.

I dropped into the circuit at Glen's with the fuel gauge on my mind and a crosswind on the ground. I put the Bushmaster down just right though, even spending a quarter of a mile on one wheel with the left wing down into the wind. The Bushmaster is that good.

Glen Bishell couldn't wipe the grin off his face as he examined my new plane. I knew darn well he was comparing it to his own Bushmaster, and frankly, so was I. We pilots are like that. I think Glen was pleased that there was someone else on the block with a plane like his.

Bernie and Carl beat me there, and I spotted Carl lugging a can of gas out toward me. Boy, was I lucky to have those two along. Thanks, boys.

The Bushmaster didn't use as much fuel as I thought on this leg, so I was pleased to still have a bit left over in the refuelling can. The shortest and easiest leg was next; the one home to Kirkby

Field. The northwest breeze at 15 or so would make a perfect tailwind.

Last Leg

I launched out of Bishell's with a smile on my face and the anticipation of the wind finally blowing my way. Even the



Stu and the Bushmaster are a good fit. Thunder clouds threaten to the west. Photo by Carl Forman

thunderstorm ahead couldn't dampen my spirits. I was going to dodge it easily by going around the backside.

I used a radio for the whole trip, but only in receive mode because the Bushmaster didn't come with an antenna. I had mixed feelings about having it now. As I approached the Beiseker highway I tuned in Calgary International's tower frequency. Turns out the wind had shifted. Again.

This time it was a whopper. The tower was reporting winds of 250 at 20 gusting 35. To hell with my newly made vow of verbal chastity toward the weatherman. This was just dirty pool. I started cursing everything meteorological I could think of, including forecasters, their ancestors and the next three generations of their offspring!

Then the wind booted the Bushmaster's tail to the left and I snapped back to the job at hand. I fed in a healthy amount of right rudder and started crabbing

(yawing, this time) to keep from winding up in Winnipeg.

The ride was surprisingly smooth and in due course I was over top the home 'drome. Kirkby Field looked as good as it always does and I said an out loud prayer this time, thanking Bob for putting in the east-west runway.

Lining up on final, I was immensely impressed with how my new plane was handling the hurricane we were in. There was quite a jolt as the wind fought through the trees near the end of the runway, then I greased it on at nearly a crawl. I rounded the corner heading north along runway 34 and threw the stick into the wind. The Bushmaster's big slab-sided fuselage felt the crosswind a lot more than the Himax ever did, but it was still

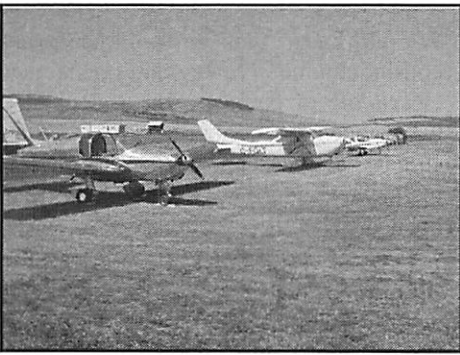
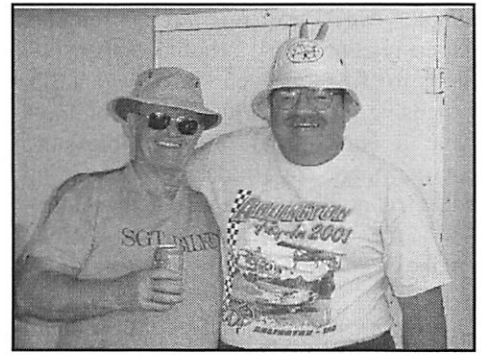
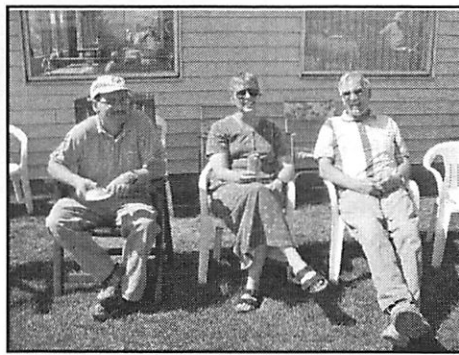
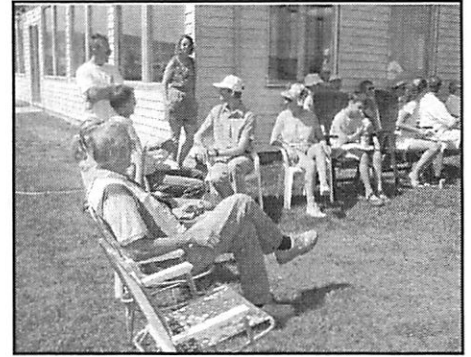
easily controllable. Yup, I'd found me a winner.

I tied the Bushmaster outside for the night and came back the next day to rip the wings off. With Bernie and Bob helping, the wings were soon hanging above the Himax and the fuselage was safe at home in my garage. There was no hangar at Kirkby Field big enough to house it.

So what's next? A new engine is definitely a priority. The Bushmaster really needs 65 horsepower, or so. Maybe one of the new auto conversions would work. I have to sell my Himax, too, because my wife says I can't be an airline. Bob and I will be building a new hangar soon, and hopefully I'll be back in the air in no time.

It was quite a trip flying my new plane to its new home. It's a great ride and I'm thrilled to own it. I expect I'll never forget my first Bushmaster adventure, and I sure hope to have many more. ➔

The Second Annual CUFC BBQ was held on August 12th at Dave Boulton's place. Judging by the happy faces it was a great success.



The 32 degree heat discouraged most from flying in. Although the turnout was great only four aircraft graced the flightline.

Shade was much sought after.

Photos courtesy Graham Millington

Two Stroke/Four Stroke The Choice Is Yours

compiled by Bernie Kespe

The time has come - you have spent long hours on research to aide you in deciding which flying machine, you will build. You have successfully allotted finances and convinced your spouses that this is IT. I've gotta have it.

Plans or kit built there is always one major hurdle, you guessed it, the engine. For some of us, the choice is fairly simple, we'll use an aircraft engine, expensive, not very reliable, expensive, hard to find, heaven forbid a TBO, expensive. But, we lucky homebuilders have a choice, the very reliable auto engine, made by the millions, cutting edge technology (more about that later), andcheap, and myriads of two stroke engines

Our dream machine is lets say, a small replica WWI fighter. Power required is 50-60 HP. It must have a basic electrical system, and be simple. Which will it be? Two stroke or four stroke. Well the answer is obvious. the two stroke, of course.

Two stroke engines are the ultimate in simplicity. A single cylinder engine has only three moving parts, a piston, a connecting rod, and a crankshaft. A twin

cylinder version, has an additional rod and piston, for a total of five, a triple will have seven. If you chose a rotary disc variety you'll have to add the disc and drive gears. The ubiquitous Rotaxes have both versions. The electrical system has no actual moving parts per say. A stator containing charging coils as well as ignition coils only if it has electronic ignition. If it has . . .yuk.. points, another moving part, and a fly wheel containing magnets.

Two strokes have no crankcases, no oil pumps. Lubrication is accomplished by merely adding oil to your fuel. This will necessitate a mixing regimen (and contrary to popular practice, don't mix it the night before, more later). Some two strokes have automatic oil injection systems, eliminating the mixing process.

Because of their simplicity, they are lighter in weight. It is known that two strokes fire at every revolution, so as a result they have twice the power. This is yet another myth. They spin faster than four strokes, another myth. TBOs are more numerous than four strokes, around

500 hrs, but considering the average flying time of 50 hrs. per year, that's ten years before TBO. But why the suspicion towards them?

Two strokes have some inherent maladies. They fire at every revolution, which means that spark plug life is shorter than their cousin. Considering that all those "strokes" occurring two at a

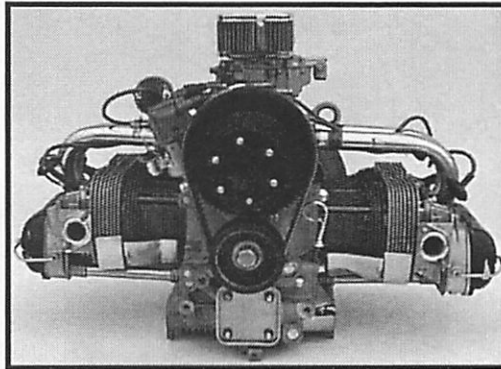
time with oil in the fuel, fuel consumption is higher than the cousin. The time allotted for breathing fresh mix, and exhausting spent gasses is much shorter, add to that during the exhaust cycle, intake is taking place. While the spent gasses are leaving, fresh

mixture is being introduced into the combustion chamber at the same time, in the hopes of pushing the spent stuff out. Some of the fresh mix goes out as well.

We all know that in the four stroke cousin, conduits (valves) are opened and closed off to complete the four cycles, two strokes have none of these. They simply have strategically placed "holes" in the cylinder walls, closed off or opened when the piston passes them. This bit of curiosity adds problems to the simplicity. The cylinder is subject to distortion due the wide contrast of heating and cooling, and the "holes" the piston passes by, are detrimental to piston ring life i.e. short TBO.

As for producing twice as much power because they fire at every revolution is just a myth. Dynamometer tests have proven otherwise. In the case of aircraft application, two strokes have to spin much faster in order to achieve their power rating from their small size. Prop reductions are a must, and in most cases, are somewhere near 3:1, as opposed to the cousin's re-drive's higher ratio. Gear ratios are backwards, high number low ratio, low number, high ratio, but you already knew that.

(Continued on page 7)



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Your Choice - continued from page 6

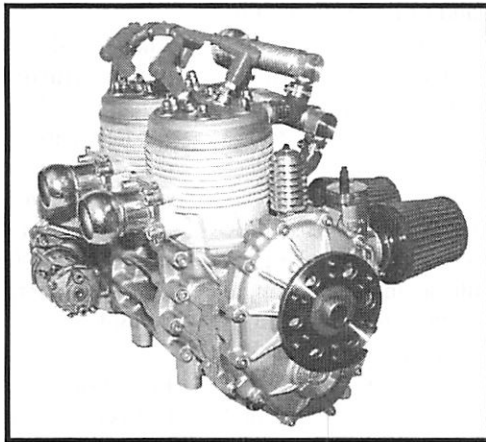
Where a two stroke really shines is in the ability to extract more power for it's small size. Modifying a two stroke to achieve, three to four horsepower per cubic inch displacement is a simple matter of properly locating all the holes in the cylinder walls, and devising an exact (tuned) exhaust system, which must be done one per cylinder. Imagine a 582 Rotax making 98 to 120 hp. It's quite feasible and easy to do, but there will be a price to pay, fuel consumption and reliability. Fuel mixtures more than 12 hrs. old will destroy them. Automatic mixers, though appropriate for a normal engine, are detrimental for high performance. Surprisingly, in order to achieve such high power numbers, two strokes will spin as much as 2000 RPMs less than an equal size cousin.

By the way, the Clerk cycle engine (2 stroke) came on the scene two years before the Otto cycle engine (four cycle) 1877 and 1879 respectively.

The four stroke engine is somewhat more complex. In addition to a piston, rod, and crankshaft, it also requires valves, springs, camshaft, a valve train, oil pump, a sump, gears, belts or chains to drive all these extra goodies. They are usually larger in displacement, i.e. 585cc (2 stroke) for 65 hp vs. 1100cc for the same performance. Of course the added parts for the same power will surely add up to a heavier engine.

So why would anyone consider a heavier engine of the same power? Many reasons. Spark plugs fire every other revolution, longer plug life, oil is not introduced into the fuel mixture, less probability of fouling that spark plug. The larger displacement of the cousin means that it is capable of producing more torque (torque is directly related to engine displacement) at a lower engine speed, requiring a higher ratio (low number) for

a re-drive, or even direct drive. The four cycles are produced over a longer period allowing more complete cylinder filling, and a more complete exhaust of spent gasses. Cylinder filling is not used to aid in exhausting, therefore, very little or no fresh mixture is leaving while exhausting. For all this, the result is lower fuel consumption. Although the two stroke' lube system is a simple oil/gas mix, it is



Two-stroke engine


subject to changes ranging from age, heat or even chemical breakdown. The four stroke has a sump with a dedicated lubrication system. The oil is not contaminated by gas, hence better lubrication and cooling, and less possibility of breakdown. The cylinder are not filled with "holes" negating uneven heating as well as distortion. The piston moves in an obstructed cylinder, hence longer component life, i.e. longer TBOs. Albeit, the cost of TBO of the four stroke is higher, but TBO is longer, fuel consumption less, sparkplug life longer, the economy of operation should offset the higher TBO cost.

The 1100 cc can be modified to exert as much as 180 HP. This will require a myriad of highly specialized parts, the cost of which would be almost prohibitive. It will be turned up to as high as 15,000 RPMs to produce that much power, and it too will have an abbreviated life expectancy. It will not be as fuel sensitive as a two stroke.

So which will it be? Both designs can be reliable as well as unreliable. The two stroke is much lighter, far simpler, and less expensive to acquire. Power to engine weight ratio is far and away better than the cousin, but it will require far more careful attention to operate reliably. In short, finicky, would be a better description.

The four stroke will be heavier, and rely largely on the ability to develop torque at lower speed. This lower engine speed equates to longer TBOs and better fuel consumption. They are in a lower state of tune than an equivalent two stroke, making it more reliable, and most assuredly, in most cases less expensive to operate.

If weight is a consideration as for that small replica, the two stroke may be a good choice. Its simplicity will also equate to a simple and un complicated installation. If the design had the capability to handle the extra weight, the answer is easy. We can split hairs in every facet of these designs, so one must consider nearly everything we have discussed in making that final choice. →



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My Merlin Project Part 2

by Andy Gustafsson¹

In this article I am only describing the building process in very broad terms. Pictures are coming on line as the project proceeds.

With the ribs already made and gussets cut out and dressed up, it was time to start building the wings. So out to Blue Yonder Aviation I went for more airplane parts. I transported the D-cells on my pick-up truck and with the speed of a Sunday drive I made it home without problems. I got a lot of looks along the way.

With the D-cells resting in their cradles, the installation of the ribs started. All ribs are secured to the spar with .040 2024-T3 aluminum gussets. Avex blind rivets are used extensively. It was a little intimidating to get going with the first rib. Am I doing this right? A little trimming of the foam that rests on the spar is needed to make it fit just right. The root rib bottom is installed at a 90° angle from the spar and the tip rib off by a 1/4 in. at 2ft. up from the spar on the bottom of the rib. This sets the built-in wash out which is a new feature of the Merlin. A gentler stall is achieved although the stall is just a gentle mush anyway. A string line between root-and tip rib ensures that all the ribs are in perfect line.

As the wing is being finished it becomes more and more clear how strong the Merlin wing really is. Its design is actually very simple with the D-cell, incorporating the 9-in. spar being the backbone of the wing structure. The Merlin needs only a single wing strut per wing due to its design. A streamlined strut is an option.

The building manual is lagging behind due to changes of some of the beefed up wing structure. I have spoken to Wayne about this and updating is in the works.

After attaching the ribs to the D-cell it's time for the trailing edge. The aluminum edge is pre-bent and ready for riveting to the rear tips of the ribs. With the help of a string line the trailing edge installation becomes a simple operation. U-channels are riveted between the ribs to stiffen up the edge.

Drilling holes for rivets has it's own hazards. One word of advice. Do not hold any part of your hand or finger in the line of the drill bit. Why am I telling you this? I did just that and drove the 1/8 th drill bit right in to the bone. (Did it smart!) But by force of habit I reached for a rivet to fill the hole. Just kidding.

The drag spar is next. This was a little tricky to measure up as the spar tube goes through 4 ribs with an increasing angle and attaches to the drag spar-strut attachment pick-up at the center of the spar web. My son Kris made the necessary calculations of the angles and this makes it very easy to figure out. (The formula will now be included in the updated building manual.) I want to be very precise in my building process to ensure that everything lines up and that the strength of the airplane is not compromised.

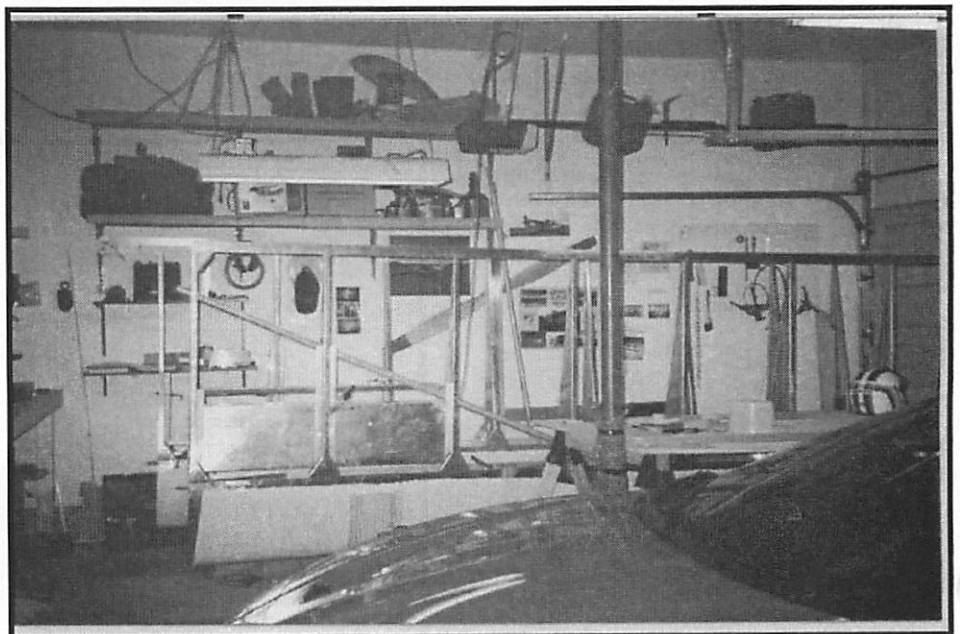
Wayne has shot a video of the wing construction, which is very helpful.

Two 10 imp. Gallon aluminum wing tanks will be installed to give the aircraft a 6 hr. + reserve range. They fit between first and third rib and go through #2 rib in each wing. This work needs a little thinking and fitting, as # 2 rib has to be rebuilt to accommodate the tanks. The installation is made with possible tank removal in mind, just in case of a leaky tank. Aluminum sheeting will cover the top of the wing where the tanks are.

Like I said earlier, it is nice to have the manufacturing plant so close. I sometimes board my Challenger II and fly down to Indus when more parts are due for pick up. One of the flights had me flying into a 3 mile limited visibility in smoke from B.C. forest fires. My eyes were burning before I got back home but the red flaming sunset sure was a site to behold.

I am now working on the ailerons and the project is going just great. Sometimes I stop and wonder if I'm building to fast, but everything seems to be straightforward and there is no guesswork so far. The plan to register my Merlin as a basic U/L will probably be changed to an advanced U/L due to an increase in gross weight allowance.

Stay tuned for the rest of the story later.



Andy's Airplane Shop