NEWSLETTER

Carb Heat

Hot Air and Flying Rumours
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October 2004

Inside:

Next Meeting:

Thursday, October 21st. 8:00 PM
National Aviation Museum
BUSH Theatre

Feature Presentation

CH601 Flight Test experiences –Martin Poettcker

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President's Page by Gary Palmer

Despite being blessed with a marvellous start to Fall, cool weather is on our doorstep. That must mean it is time to get serious about some of the postponed maintenance work around the chapter. I am sure we can count on a continued good turnout to insure our chapter clubhouse is properly prepared to face winter's worst.

A reminder that we remain on our normal third Thursday of the month schedule and expect to continue for future meetings.

Saturday October 23rd Chapter work day:

Dick Moore has **4 major chapter work projects** planned for a **9:00 AM start Saturday October** 23rd, with a rain date of Sunday October 24th. The projects are:

1. Replacement of the east-facing window.
2. Replacement of the south facing door and related rotting structure with exterior cladding, and interior drywall.
3. Replacement of the exterior door for the washroom add-on with a proper steel clad door.
4. Construction of an insulated run for the new well system to prevent winter freeze-up.

Dick reminds workers to **come equipped with basic carpentry tools** such as hammers, screw drivers, etc to make the day more productive. In all likelihood we will need to schedule some follow-up work for the finishing details such as interior painting.

October Elections.

The upcoming October 21st meeting will mark our annual elections: The positions up for election are:

1. President
2. Web Master
3. Membership Secretary
4. Technical Information Officer.

As in past years, if you are interested in running for one of these positions, please contact **Lars Eif** who is the nominations chairman, or a member of the executive team. Lars will manage the election process, but as in past years I expect that will only take 10 minutes, leaving lots of time for our featured speaker.

September 16th meeting summary:

Our Oshkosh picture show provided a good introduction to the start of the fall meeting season. As I had predicted, **Cory Bird's** beautiful lemon yellow **Symmetry** won **Grand Champion plans built** as well as a **Stan Dzik** design contribution award for the innovations incorporated. The Canadian built **Nexus Mustang** of **Richard Eaves** won a **Bronze Lindy**.

Upcoming meetings/Events.

Oct 21st	**Martin Poettcker** will provide an update on the ongoing testing of his new engine and PSRU installation and retrace some of the material that we missed at the May meeting when the video system broke down.
Nov 18th	**Russell Holmes** will describe the conversion of his Kitfox to amphibious floats and the construction of a hanger to house his new amphibious bird along with initial flight tests.

Thursday September 21st 8:00 PM: "CH601 Flight Test experiences –Martin Poettcker".

Martin has spent a lot of time methodically chasing down cooling problems and other minor issues discovered in his early test flights. I know Martin will dazzle you with the details of his sleuthing to get to the bottom of various cooling system challenges; see you there!

Gary

CO2 Fuel Transfer System

By Curtis Hillier

God, I love to fly…

We have invented ways to get ourselves into the air and at a reasonably level of assurance that we will survive the ordeal.

I am lucky to be flying a great little aircraft where I spend at least half the flight wondering how those tiny little wings can keep me aloft, and the other half navigating and being blown away that I can actually do this flying thing.

My Davis DA-2B can carry two people at 180 pounds, a pair of headsets and some maps, a drink and a disposable air sick bag and something for me to relieve myself should this be necessary….

What it cannot do is carry a lot of fuel to keep me aloft. The header tank holds approximately 76 litres depending on if you want to loose some when you bank hard right, but of course this requires me to carry light weight passengers.

In my case I love to fly with a friend so I can unload some of the navigation and focus on the sight seeing. While I am on the south beach diet, and the weight watchers program and the blue lagoon diet….. , I began to realize that if I offload the passenger and take on the navigation myself, I could carry that weight in fuel. Hmmm 180 pounds of fuel is over 100 litres and at my 15 litres cruise burn, I can stay aloft for a total of almost 12 hours! Yea that otta crank the bladder!

So as any good experimenter I went off to solve the inevitable issues of extra transport fuel. The last thing you want to do when you are at 6500 feet is come back down to refuel!

I began by assessing the fuel transfer pumps, and how to integrate this (temporarily) into the aircraft without major changes, (so I could carry the occasional passenger). I weighed the options of a belly tank, a seat replacement tank and just plain red gasoline containers.

As a start to assess the hardships of fuel transfer in flight I investigated the possible headaches and risks associated with this idea:

1) How do I strap the tank down?
2) How do I connect the line to the header tank?
3) What mechanism do I use to get the fuel up to the header tank?
4) How in the world would I get out of the aircraft in case of an emergency or worse yet fire in the cockpit?

Entry And Exiting

4) Starting with the last first, I decided that I can barely get out of the aircraft on a good day when I am feeling great, so stumbling over a fuel would probably be no worse. I decided to approach the issue from the angle of “make every attempt to ensure this would not be necessary”.

Connection To The Header Tank

2) This was going to be easy, in my case there were only two ways to get fuel safely into the header tank. Either force it back up into the tank from the shutoff, risking flooding the engine, or get it into the filler neck somehow. The second option seemed the best for me as the header tank has a short exposed portion just above the panel and should be relatively easy to drill out and install a port. I decided to use the filler neck so as not to disturb the head pressure which has proven it’s reliability so far. I secured some zero drip quick disconnect fittings for the job and will make a plastic adaptor to direct the fuel down into the tank away from the vent in the cap.

Strapping It Down

1) I decided to use a seat belt for initial testing and not worry about the seat tank until later in the project. I had a good look at Grant Estes fuel transfer system and decided that although he used an electrical fuel transfer pump, I admired his handy-work. I decided to adapt his design for my own purposes. So standard, CSA certified, carry them to a gasoline station, red poly tanks it was.

Transfer Mechanism

3) Hmmmmm. I wanted to maximise the range I could get and minimise the parts weight. For the prototype, I decided to use readily available, off the shelf brass fittings and search for light weight aluminium aircraft grade stuff at Oshkosh 2005. I fabricated a replacement stopper out of nylon for the tank fuel exit. I used all very low cost components to allow economical replacement should they have a limited life span. I waned to be able to shut off the fuel flow as well as the fuel pumping system so I used a shut off valve on the exit. I decided to use pressure to push the fuel up to the header tank.

The Design

The exit stopper is a bock of nylon made to the same dimensions as the pouring spout of the 15 litre fuel container (used for the prototype). The stopper has two ¼ inch pipe threads to accept the shut off valve and a tubing fitting. On the end of the tubing fitting (inside the tank), I pressed on a length of stiff plastic tubing to act as the exit tube.

Now the interesting part: My son and I were discussing fuel in the cockpit and transferring it and the risks involved. My first idea was to use a Schrader valve and push the fuel out by a few pumps of a bicycle pump. My son reminded me that CO2 was a fire extinguisher and that it would not burn. Ahhh I remember the reckless days as a youth watching my friends put out lit matched by throwing them into a can of gasoline. Why the match went out and did not burn, was that the conditions near the surface had such a high density of fuel vapours and a lack of oxygen, that the match could not begin to ignite the vapours (at the ideal mixture point) before it traveled further into the dense vapour and was cooled by entering the liquid fuel. OK this was not a bright thing to do but interesting side note is that if you want to limit the risk of combustion, try to make the environment as non combustible and risk free as possible. My son showed me to the paint ball guns and explained that the CO2 cylinders were cheep, easily changed and economical to get refilled.

So the idea is to force the fuel out with a bit of pressure from the gaseous CO2 from a CO2 paint ball cylinder. These are available in a variety of sizes, based on some loosey goosy math, and using 22 degrees temperature in the cockpit, a 12 gram cylinder should push around 6 litres of fuel out of the gas container until the pressure was equalized. Interesting thing about gases…. At zero degrees C the pressure in the tiny cylinder is only around 300 PSI but at a 40 degree cockpit temperature, it can grow to around 1500 PSI… quite a range! It was important that I did not create a new risk by exposing myself to any unnecessary shrapnel on a hot sunny day!

Using the CO2 cylinder will provide me with an incombustible environment in the fuel container as well as a reasonable level of safety in the cock pit due to the consumer protective over-design built into the cylinders.

I began the problem of interfacing the cylinder to the fuel container by purchasing a refillable cylinder from WalMart. This cylinder can be refilled at Canadian Tire for around $5 and should provide enough CO2 to push around 100 litres. The interfacing problem was to attempt to not modify the gasoline container in any way that might jeopardise the container and to make sure the CO2 pressure was limited to around 1 PSI before it went into the container. I plan to do this by using the hose from the gun then on to a relief valve, (outside the cockpit), then back up to the vent end of the fuel container. The interface will be a simple flared fitting through a drilled hole in a replacement cap. I tested the tank after the mods were done to 30 PSI and it held for 48 hours. I also measured the pressure inside a typical fuel container when it was left out in the hot sun on a hot summer day. My un-calibrated pressure was found to be 2 to 3 PSI. So I knew I had a reasonably safe system.

The interface to the header tank filler neck will be a bit tough to do as I am concerned about starting a fire as I drilled the holes I needed….. A stand by CO2 fire extinguisher venting in the semi sealed area, with adhesive tape to catch the metal filings should do the trick. The plastic part will be designed to accept the ¼ inch pipe threaded quick disconnect but a hole will be drilled into it at an angle to force the incoming fuel to direct down into the tank rather than just into the opening where it could escape through the cap vent.

The initial ground testing went well, the pressurized air I used to move the fuel proved that the fuel would transfer 3 feet up with only a few pounds per square inch in the tank. The testing was done outside to make sure the danger was kept to a minimum. I kept an eye on the pressure gage and maintained the 2 and later the 3 psi tank pressure, and measured the time to move exactly 15 litres of fuel. It took seven minutes at 2 psi and five minutes at 3 psi. Orifice size has a lot to do with the transfer rate.

The field test of the concept was done by Martin Poettcker when he had to dump his fuel and then refill his tank to check out a fuel pump. The full test will occur later when the header tank modes are complete.

Follow up work will be to utilize a 25litre container. Most of the parts I have will work with the exception of the container inlet hose, it needs to be lengthened. I will also pull the header tank and make the mods to it. I have to manufacture the filler neck parts, and do a dry run, probably using the 15 litre tank as a beta run.

Now for that first extended endurance trip ……..

Curtis Hillier

Do you have a favourite web aviation site? Would you like to share it with other chapter members? If so please forward it to your newsletter editor via email and I will assemble them into a report in a future newsletter.

Mark your Calendars:

Some items have been copied from the COPA Flight and the RAA website.

October 13-15, BARRIE, ONTARIO: Georgian College in collaboration with Embry-Riddle Aeronautical University presents an Aircraft Icing Management Seminar. The trainer will be Capt. Edward (Buddy) Counts and guest lecturers are Paul Johnson and Doug Ingold. For more information contact Jane Daines, program manager, Georgian College, at Tel.: 705-728-1968 ext. 1625; E-mail: jdaines@georgianc.on.ca or Kay Matthews, program manager, Embry-Riddle Aeronautical University at Tel.: 866-261-2464; 386-323-8666; E-mail: Matth9b7@erau.edu. Or visit the website: www.erau.edu/omni/ec/soctapd/icing.html. To register call 705-728-1968 ext. 1698.

October 20, TORONTO, ONTARIO: Transport Canada Aviation Safety Seminar - Fatigue/Countermeasures. Considered one of the contributing factors to most accidents, this insidious danger can affect each one of us. This seminar examines all aspects of sleep deprivation and offers suggestions on how to combat fatigue. Sit in on this exciting seminar but don't fall asleep! For more information, please contact: Transport Canada System Safety at Tel: 416-952-0175; www.tc.gc.ca/OntarioRegion/civilaviation/system/seminars.htm.

November 13, KINGSTON, ONTARIO: Eighth Annual Aviation Dinner at the Italo-Canadian Club. Cocktails at 5:30, Dinner at 7 p.m. Enjoy an informal evening with good friends, good flying stories and good food! Tickets $20 per person. For more information or tickets, please contact Dave or Lois Tisdale at Tel.: 613-548-3753; E-mail tisdalel@kingston.net. Everyone welcome!

November 17, TORONTO, ONTARIO: Transport Canada Aviation Safety Seminar - A Night on Ice. Winter is fast approaching and it's that time of year to review winter operations. Refresh your memory with the pertinent facts of flying when Old Man Winter knocks at our door. Guest speaker Nick Czernkovich from Montréal's McGill University will be giving a new spin on this interesting topic. For more information, please contact: Transport Canada System Safety at Tel: 416-952-0175; www.tc.gc.ca/OntarioRegion/civilaviation/system/seminars.htm.

Smith Falls anytime!

JUST A QUICK NOTE TO ADVISE YOU THAT WE NOW HAVE SELF SERVE PUMPS AT **SMITHS FALLS - CYSH**. CURRENTLY THE MACHINE CAN HANDLE VISA AND MASTERCARD AND WE ARE PLANNING TO ADD AMEX IN THE FUTURE IF DEMAND WARRANTS.

So tell your friends and stop into Smiths Falls, night or day for the lowest prices and best service.
Come and see our installation. Most of the work was done ourselves by our dedicated volunteers with help from the local municipalities and of course our wives.

Floyd Graham
Smiths Falls Flying Club
613-283-1148

FOR SALE

Place your ads by phone with Bill Reed 613-831-8762 or e-mail to bill@ncf.ca
Deadline is first of the month. Ads will run for three months. You may request a two-month extension.

For Sale:	Price
Volkswagen 1600cc "Beetle" engine completely rebuilt	$1,000.
Volkswagen 1600cc "Beetle" engine partially rebuilt	$275.
Larger (6-cyl) Continental Oil Cooler (8"x9")	$50.
Lycoming accessory case dual take-off adapter (ie hydraulic and vaccuum pump	$150.
Piston Ring Set for E-185/0-470 Continental series	$100.
Continental C-85/0-200 ring set and rocker pins	
Lycoming dynafocal engine mount	$75.
Two shoulder harness inertia reels $	$10. ea
Four seat belts metal to metal like new	$20. ea
Lunkenheimer Primer	$20.
Two fuel pumps, hand-operated (wobble-type)	$20 ea
Two Scott parking brake valves (new value $150 U. S)	
Pair Goodyear 600x6 wheels and brakes	$150.
Pair wheel pants for amateur-built a/c	$50.
Vista (cockpit fresh air) Vent	$15.
Lightweight automotive starter and bracket for Lycoming	$150.
Parachute seat pack – condition unknown	$50.
Miscellaneous older instruments, gascolator	
Piper trim wheel and cables -	$15.

06/04 Garry Fancy (613) 836-2829

For Sale:	Price
1993 Hatz biplane, TTSN 240 hrs, Engine lyc 0290-d2 135hp SMOH 415. king radio, elt ,Recent refurbish, asking	$49,000.

06/04 Rick Rickards @ 905-765-6403
rickr@mountaincable.net

For Sale:	Price
Garmin 90 GPS with yoke mount bracket and power cable	$100 OBO

05/04 Keh @ 613-825-6171 email keh@canada.com

For Sale:	Price

Engine mount for a Rotax 503 (inverted) bulkhead mount	$100.
Engine mount for a Rotax 582 (upright) bulkhead mount	$200.
180 deg exhaust system for a Rotax 582	$150.
Composite cowl for a Pelican club	$350
Warp drive prop- 3 blade 68" dia.	$500
Parts for Rotax 582 including a Ducatti ignition system and many carb parts.	negotiable.

06/04 Grantley Este 613-832-1797 este@compmore.net

For Sale:	Price
Trimble Flightmate GPS in leather case with all attachments & manual.	$100.
ICOM-IC-A20 handheld nav/com in leather case with charger.	$150.

09/04 Bill Wilton 613-259-2605

Articles wanted

I am always interested in receiving submissions for this, your Newsletter. You may bring articles to the monthly meetings, or mail information to the post office box, or email bill@ncf.ca

EAA Chapter 245 Membership Application

NEW:___ RENEWAL:___ DATE:__/__/__
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Annual Dues: January 1st to December 31st. (porated after March31st for new members/subscribers).
Associate Member ____: $30.00 Newsletter plus Chapter facilities
Full Member: ____: $55.00 Newsletter, hangar, workshop, tiedowns.
(Note: there is a one time $200 initiation fee when you become a Full Member)
Newsletter subscriber ____: $30.00 Newsletter
Note Associate and full members must also be members of EAA's parent body in Oshkosh WI, USA

Make cheque payable to:
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