



EAA602 Log Book

Adirondack Chapter Newsletter

January/February 2009

Page 1



HOMEBUILDERS



From The Presidents Desk

by Tim Cowper

Happy New Year 602! The 2009 flying season is in full swing already, for some of us. Gratz to those who have skis on their planes. To start the year off, we're organizing another February Ice Fly-in at the Sport Island Pub on Sacandaga. Last year was a great success. I'll probably be driving up, since I'm currently grounded (for reasons mentioned in our last newsletter) but hopefully we can equal or exceed last years turnout of airplanes. This will be just the thing to start the aviation momentum moving in the right direction, and carry us through these tough winter months. A few of us have had some setbacks lately, but I see some good times ahead for 602. We have much to plan, for the coming months, so please come to the meeting on the 26th, at the main hangar at FulCo, so we can talk about everything going on. After the business portion of the club meeting, Pat Morris is going to host an interactive builders discussion. He recently swapped out the Rotax 582 on his Flightstar and replaced it with a HKS, and he's going to share his experience of reconfiguring the airplane, weight and balance, etc. We have quite a few members with significant building experience and hopefully we'll get lots of input on this important topic. As always, if anyone has any ideas about future presentations for our meetings, field trips, or anything else in regards to the club please come and make your voice heard. And, we need newsletter articles! See you at the meeting!

Tim

Come see the our club pictures on
our web page in living color at:
www.eaa602.org

Notes From Your Editor

by Doug Sterling



As most of you know, I sold my FlightStar last November. Well it was an interesting sale, or should I say, after the sale. The fellow who bought the plane was a super nice guy from Broken Arrow, Oklahoma. It took him 2 days driving to get here and 3 days to get back after. He was a Sport Pilot student at the time and tried to convince his instructor to sign him off to fly the plane back. Yea - fat chance.

Anyway - when he returned home he started to send e-mails about his progress with the plane. You talk about dedicated - he sent me mails every few days for 2 weeks and every week for another month. You guys who are going for your licenses should take note on how persistence makes it work.

The day after his arrival home he had the plane back together, test flown and he was signed off to solo. Within 5 days he had 7 hours and 44 takeoffs and landings with consistent 15 kt. winds (some gutsy guy). He flew every morning and evening from the time he

Continued Next Page

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had gotten home. By the time another week had passed, he had 15 hours and 70 takeoffs and landings. Another week and he was over 20 hours and 100 takeoffs and landings. That is some dedication for less than 3 weeks of flying a plane just around the airport area. 3 more weeks and he had 40 hours and 160 takeoffs and landings between bad weather and a bad ice storm (is this guy intense?). I know a lot of pilots who don't put that many hours on in a year. Well now he is stopped for the season (it gets bad in Oklahoma in the winter just like here) but he is ready for his checkride in the spring. That is real determination to get his ticket.

Enough of this gibberish; On to club stuff. I went to a meeting of EAA-353 Glens Falls Chapter and UL-90 on the 10th. UL-90 decided to close the chapter and incorporate their membership into EAA-353. Both clubs were suffering from apathy and this combination should result in a stronger presents in the Glens Falls area. The now combined chapters want to start up the fly in that used to be at the Glens Falls Airport and would like our chapter to cosponsor it with them. The possibilities are endless so I want to discuss it at the meeting this Monday. Come with your suggestions and we will see what we can come up with.

Well it's deep winter in the Adirondacks and the snow is flying. Our regular ski flyer Tim Devine finally has his skis on and has been testing them out. Haven't heard how it's going but I haven't seen any debris on the runway so I guess they are working OK. Also as most of you know Darryl has been working on skis for his Hawk and is ready for taxi testing. Good luck and hope to hear about it at the meeting on Monday. Also - did you hear the rumor about his partner Kevin. Seems he got tired of sharing a plane with Darryl and found a Hawk for himself. It was a flying plane but he decided to take it apart (in order to get it into his cellar through a regular door) and give it a complete go through. Great idea as we know how some people are about building planes. No one in the area knows more about Hawks than Kevin and Darryl. After being Tech Counselor on the first Hawk (Darryls) I can't wait to see what a great job they will do on this one. These guys are such meticulous builders. It will be great seeing the 2 of them formation flying to events this summer although I think Kevin will have to

peddle his 65HP very hard to keep up with Darryls 80 HP.

I've got the GlaStar home now (love those folding wings) and started work on the new interior. With all this snow it really makes me want to get skis for it so I can join the other snowbirds. Oh well - maybe next year.

I'm going to set up a flyin in February so be ready as I need to do it at the last minute (or a few days before) as the weather is always questionable in winter. Anyone interested in going (with or without skis), send me an E-mail ASAP and let me know so I'll send out mail directly to you as the event comes up. We could go to Lanzi's or Sport Island Pub like last year (remember we had 13 planes there). We also usually have decent packed area for planes with large wheels so let me know your desires.

One more thing - For all you guys who are going for your tickets this summer. If you want I'll do a refresher ground school to get you guys back in to the groove for your written tests. Let me know and we'll set it up - just a quickie test refresher.

See you all on Monday at FulCo.

Fly Safe, Doug

EAA602 FLY MARKET

FOR SALE

**For Sale Continental A-65 parts.
Contact Tim Devine 584-2045**

**Gauges & Other - All brand new left over
Gauges for sale. Tach, Dual CHT, Dual
EGT, Water Temperature (All Westach 2
1/4" with probes) Combo EGT-CHT, Turn
Coordinator. Tapered air filters for 447-
582. 5" Matco wheels & disc brakes. 3
Wheel pants for smaller wheels (4"-5")
All half price Call Doug 863-2409**

***If you have any aircraft related stuff
that you don't need anymore or anything
you need, list it here. You may help
someone who might need it or may find
it at a reasonable price.***



Weather Fronts

by *Tim Devine*



Last month Darryl, Kevin, Aaron and I got some late season flying in with a hop over to Round Lake and then up to Glens Falls. We decided not to land at Round Lake after a low pass revealed large puddles on the runway. We then made quick time to Glens Falls as we had a nice tail wind. After lunch we were able to practice slow flight back to our respective airports, as that tail wind was now a headwind. Kevin and I were lucky as we only had to get back to 1F2. Darryl and his son had to plow their way all the way back to Hiserts. As Kevin and I made the turn over Galway Lake to head back North it looked to me like it was again snow squalling over Gloversville.

Now that the winter flying season has finally arrived, I know that many of the club's members have put their steeds away until spring. However this year there are at least three new pilots who will be trying ski flying and those club members who keep their airplanes at plowed airports will be also taking advantage of nice winter days to get in some air time.

While winter flying offers a whole new set of challenges and rewards, it also presents us with operating in entirely different weather conditions. Just like in the summer those weather conditions can change rapidly and create dangerous flight conditions unless we as pilots are ever vigilant.

Preflight weather checks and briefings are a must, but once you are airborne it is incumbent on all of us to be always on the alert for the signs of changing weather. All of our weather conditions throughout the year are dictated by the movement and passage of weather fronts. Knowing what kinds of weather fronts are currently dictating conditions in your flight area and what the movement of those fronts' means

can be an invaluable tool for all aviators. The NOAA and Weather Channel websites offer some really good instructional materials on weather fronts and how to read them.

Knowing what basic conditions arrive with different types of fronts can help any pilot make better weather related flight decisions even if weather information is not readily available.

Cold fronts typically bring the following as their dense colder air pushes its way under the preceding warm front.

Thunderstorms and/or showery precipitation. Surface winds out of the southerly points of the compass followed by winds out of the northwest possibly strong and gusty. Falling altimeter settings. Turbulence and icing.

Once the cold front passes, you can expect these conditions:

Clearing Skies,
Low dew points,
Lower freezing levels,
Rising altimeters' and possible strong and gusty surface winds out of the northwest.

While the warm front moves through the area typical conditions are:

Winds shifting to out of the south,
Rising altimeter settings,
Stratus clouds over a wide area,
Steady precipitation,
Warming surface temperatures,
Higher dew points, and
Higher freezing levels and convective weather over a wide area.

Be especially wary of winter warm fronts. With all that warm air aloft over a wide spread area it is possible to experience many different types of freezing conditions. Ice, rime ice, snow, sleet, freezing rain or just rain are all possible depending on how cool the air is that the precipitation must pass through as it falls. If you are on the warm side of the front that is following retreating freezing air you can get into icing conditions on what looks like a clear day.

So if you plan on doing any winter flying, take some time to learn a little about warm and cold fronts. It will make you a better prepared pilot for not only in the winter but all year long. (Some info for this article was made possible courtesy Tom Horne AOPA.)

Tim



Contactors, Relays, and Switches

by Paul Messinger

As mentioned by Tim in the November 2008 newsletter I have been working with auto engine conversions since 1994. Briefly I am an aeronautical and electronic engineer with more than 30 years industry experience. EAA TC and FA

Contactors are widely used where the expected load currents are higher than 40 amps. This includes currents in our aircraft battery to bus, battery to battery, battery to alternator, and sometimes battery to starter. A very common contactor is the Stancor Type 70 rated for 80 amp and 150 amp surge. It is in a round metal can with a metal cap. There are many reasons NOT to use this part. First is the 12V coil is specifically NOT to be used where the 12V battery system is exposed to charging voltages as the coil is rated at 12V +/- 10% or 13.2V max. Our alternators output 14.5 volts. Stancor has a caution note to that effect including other coil voltages are available for charging systems (the ones I have purchased from a couple of major aircraft suppliers were 12V coils (16 ohms). There are other cautions including cap down mounting and use of a backup wrench to prevent turning of the stud when installing or removing the wire connections. Another caution is the requirement to always have at least a small load connected when energizing the coil to provide arcing between the contacts and burning thru the copper oxide on the contacts. This last caution is common to all contacts of any type. The minimum current to be switched is perhaps the most often ignored requirement in switching circuits.

A good place to get a better power contactor is your local auto shop. Standard brand parts at independent shops are available in high quality. All contacts require care in selection to be sure both the maximum and minimum current voltage and load requirements. The voltage being switched, and the current being switched including the inrush current must be considered. The ratings of switches typically are AC,DC or both. Unless its DC or both avoid the selection as the reliability may be affected by mis-application. I have never found a desired switch or relay that was not available in DC ratings. Most contact ratings will specify 28V use and at 12V use the selection may be more critical as at this lower voltage the voltage required to break thru the contact oxide is marginal. Here the type of contact mechanical action like a wiping motion helps. This is

another reason to avoid AC only rated contacts as the generally much higher AC voltage helps breaking thru the contact oxide but in the case of slow breaking mechanical action. AC prevents long duration arcing on contact opening.

One problem with the use of these contactors is they are generally over-designed for our use if you use my suggested battery connection approach. In a prior article the traditional two battery system uses three of these contactors. In the event of a charging system failure as many as all three may be used and with each consuming 9 watts at 12V. This can be a significant load on the battery that is essentially wasted and reduces the endurance under battery power. At a bare weight of 12.5 ounces each along with mounting hardware and the likely use of heavy wire there is 3 pounds of weight that can be reduced by my alternative approach.

The use of a diode and smaller relays and fewer control switches can together save as much as 2 pounds while reducing the electrical wasted load quite a lot.

There are at least two alternative relays that be used in place of the contactors depending on the aircraft system load. Both are low cost and in dealer stock (Newark) Matching sockets and wire crimp terminals are also available. While these relays are rated at 70 and 80 amps the fast on terminals are rated at 50 amp max. Since we always want to derate parts I suggest that the design continuous load be limited to 40 amps. The coil resistance is 90 ohms so even two in parallel is 45 ohms and that is much better than the contactor resistance of 16 ohms. (3 in parallel are close to the resistance of one contactor). One relay is the Durakool type DG85C and the other is a NTE type 51 series.

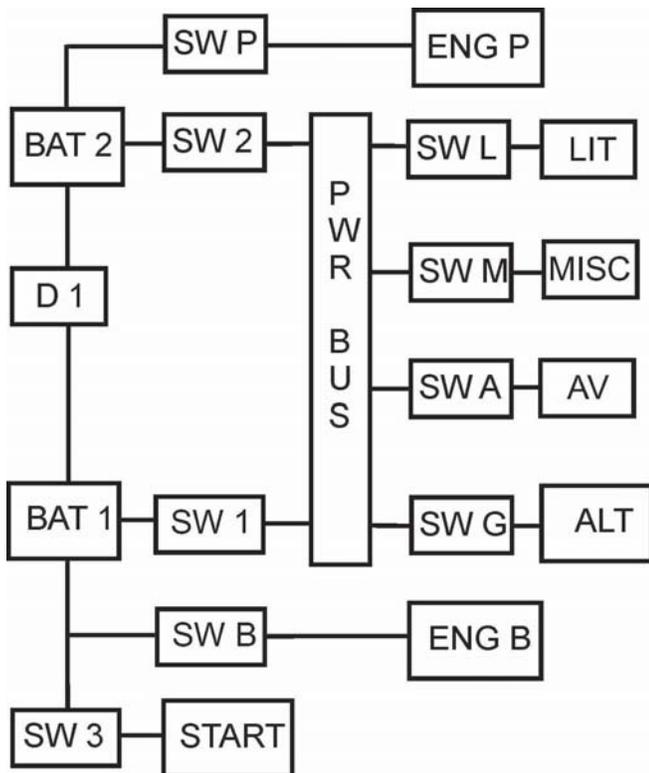
For simpler aircraft one of these relays can be used to connect each battery to the main bus. If the load is higher then two can be used in parallel and controlled by a single switch. This still saves weight and power and provided redundancy at the expense of derating depending on the loads that can exceed 40-50 amps. These relays weigh a little over one ounce each plus mounting etc. That is 1/10 the weight of the contactor!

Using this approach the builder of an auto conversion can have 3 switches that control all electrical connections to the batteries. Each engine electrical system can be connected by one relay directly to one of the two batteries. The third switch connects the batteries to the main bus.

The following diagram shows one way to design a power system for an electrically dependent engine.



Note that circuit protection devices (CB, Fuses etc) are not shown in this diagram.



There are other ways to connect the various loads but the important design feature is the ability to have a fast reliable way of turning off the electrical system in the event of smoke in the cockpit and or just before touchdown in an off field emergency landing. In the case of smoke, its important to remove as much power as possible and keep the engine running.

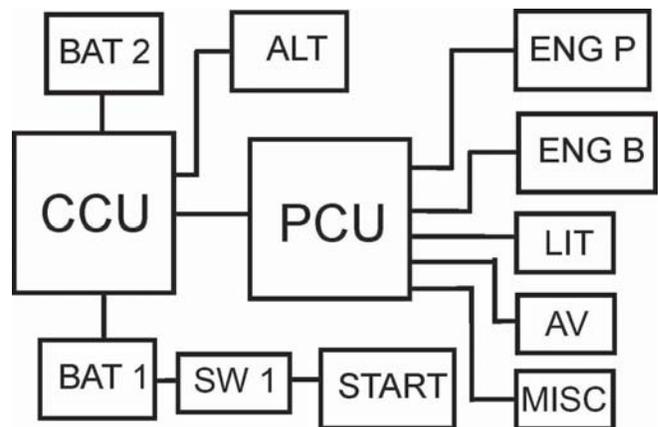
In the above example switches 1 and 2 remove power from the main bus and do not affect engine power. Switches 1 and 3 are actually relays and are controlled by a two pole panel switch. Switch 3 is a contactor controlled by a starter switch on the panel. Switches P and B can be on the panel or actuate remote relays depending on the system hardware arrangement. Switches L, M, A, and G are usually directly control power to the equipment.

The recommended arrangement is to have a guarded master power off switch on the left that controls Switches 1 and 2. To the right should be Switches P and B. Thus in the event of a crash they are easy to reach to isolate the battery and reduce the possibility of a post crash fire.

The disadvantage of this approach is the ability to run either engine electrical system from either battery. Note that engine P gets power from both batteries. Battery shorts are no longer something to worry about with modern battery design. Also note that switches 1 and B are disconnected when switch 3 is energized.

Multiple failures in a single flight is remote but connecting switches P and B to the PWR BUS is an alternative at the expense of fast and simple action in the case of smoke in the cockpit.

Circuit protection will be discussed in another article as there is more to the subject that apparent. Here is an example of my new solid state design.



There are no discrete circuit breakers nor any relays other than the starter relay and one for the alternator depending on the type of alternator. These two applications currently have requirements not available at reasonable cost in solid state. I use solid state switches with built in re-settable over current protection. Current capacity ranges from under 5 amps to over 100 amps. All external wiring is point to point. Not shown are the cockpit panel switches that control the Charge Control Unit (CCU) and Power Control Unit (PCU) functions directly.

This unit style of configuration combines the functions of load switching, circuit protection and fault detection. The resulting wiring is simple connector to connector wiring that has a minimum of connections.

The type of connectors used are the D-Sub type often used with 5 amp terminals and in 15, 25 and 37 pin styles. However in the same shell size there are other terminal sizes of 10,20 and 40 amp sizes so that up to a 6 AWG wire can be used at a 40 amp rating. This way even the conductors from the battery to the CCU and PCU can carry up to 40 amps per conductor.

Questions are welcome paulm@olypen.com



Experimental Aircraft Association

Paul H. Poberezny
Founder
Chairman of the Board

December 29, 2008

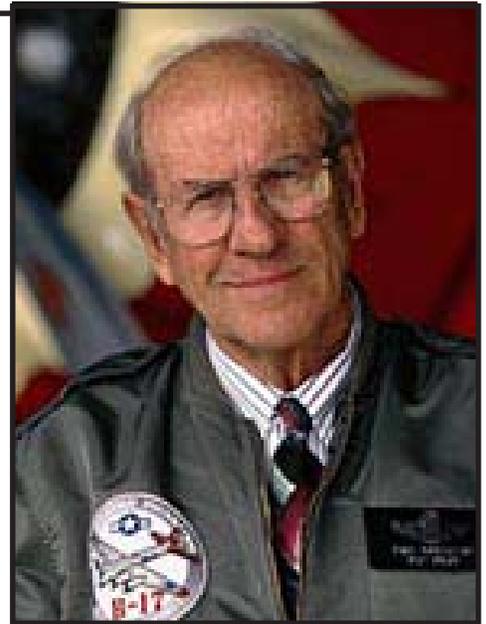
Tim Cowper
EAA602

Dear Tim,

I certainly enjoyed reading your Chapter's December newsletter and the story relative to your getting more aviation experience. I am pleased that it ended up the way it did with you avoiding injury. When I look back at my own aviation career, some 70+ years, the many forced landings I've had from my old OX-5 powered American Eagle to the jets, you did good even though it got bent a little bit.

My best to you, your family and the chapter members. Have a great new year.

Paul H. Poberezny
Founder and Chairman of the Board



EAA602

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Hadley, NY 12835**



GOD BLESS AMERICA
September 11, 2001
We will never forget.

**The Meeting This
Month Will Be At:**

**Fulton County
Airport Main
Hanger @ 7pm on
Mon. Jan. 26th**

Jan/Feb 2008

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