



# EAA602 Log Book

Adirondack Chapter Newsletter  
March 2006



## From The Presidents Desk



Well, flying season is upon us. It came up fast and now it's time to solidify some plans that we've been thinking about all winter. Although it will be mostly administrative, the March 27th meeting is an important one. Among other things, we will be discussing plans for the 1st Annual Poker Run, sponsored by 602. This will be fun and probably take place in June, depending on where we can fit it in the schedule. We will need significant member participation to successfully pull it off and hopefully make it an enjoyable event. Also, at the meeting, there will be a complete Treasurer's report which will provide the membership with 602's current financial status, which, at this point, is pretty good. We will talk about the Travel Club and hopefully resolve any issues in regards to how it operates so that it can continue to be successful, and, a benefit to 602 members. I have proposed that we upgrade our Educational Scholarship to make it a memorial award to honor a past 602 member, and this needs to be discussed and approved. There will also be discussions on the following: EAA Tech Counselor, EAA Flight Advisor, group projects, having fly-in (optional) meetings, fly-outs including perhaps an overnight trip, EAA National membership, EAA 602 hats and shirts, and anything else we can think of to make 2006 a great year for 602. This is going to be the Year of Fun for 602, but it needs to be a group effort. I need to know what the members of 602 want to do.

Most of you know Jack Schleich from Galway. If you don't know him, fly to his airport, NY37 (as soon as the X's are removed!), and introduce yourself. Jack is a long time pilot, builder, and aviation enthusiast extraordinaire, and one of the nicest guys you'll ever meet. His wife was recently in Albany Med and received a

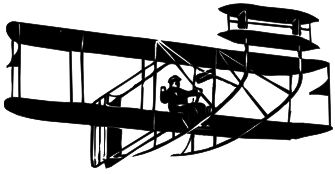
kidney transplant. She is recovering, but keep them in your thoughts and prayers. Anyway, Jack puts on some kind of event in April involving airplanes and the Boy Scouts, and I volunteered 602 to help him with it. I'm pretty sure several of our members have helped him in the past. Hopefully, this year we can provide all the help he needs, and then some. Also in April, on the 17th, we will have the instructional welding class given by Ken Sherwood. For those interested, this will take place at the 195 Factory, at 7PM. In May there will be a fly-in Chapter Mixer Clam Bake at Hiserts Air Park, 3NY7, where we will meet the guys from Cooperstown EAA Chapter 1070. June will be our Poker Run. July 24th through the 30th is, of course, Airventure 2006! In August we will be having a fun fly-in at Edinburg with the people from UL 90 in Argyle, and September is our Rhinebeck Trip. This year is going to be good, but only if the members are there to participate and enjoy it.

This month's meeting will be at Chris Brown's shop on Rte. 29 in Galway at 7:00PM, **PLEASE BRING YOUR OWN CHAIR**. His driveway is on the left as you are traveling east about 1/4 mile inside Saratoga County from the Fulton County line, **see the map on the back page**. There is a non-official green road sign "Brown Drive" at the entrance to his driveway. Please try to attend so that your voice will be heard. I'd like to have refreshments at the meeting so if anybody can provide same please contact Chris at 883-8428 or seabee-flyer@yahoo.com to make arrangements. Also, there will be a 50/50 raffle! See you there!

## Up-Coming Events

- |                      |                          |                |
|----------------------|--------------------------|----------------|
| <b>April 4-10</b>    | EAA Sun-N-Fun            | Lakeland, FL   |
| <b>May 31-June 4</b> | 2nd Annual Can-Am Fly-In | Speculator, NY |
| <b>June 21-24</b>    | Sentimental Journey      | Lock Haven, PA |
| <b>July 8-9</b>      | Geneseo Air Show         | Geneseo, NY    |
| <b>July 24-30</b>    | AirVenture               | Oshkosh, WI    |





## Effects of Frost on a Wing by Larry Saupe

Back when I was an aircraft mechanic for the military (C-130 Crew Chief), I used to really question the need to de-ice a huge aircraft when all it had on its wings was frost from the night before. From my point of view, I really saw no change in the airfoil effective shape (as is quite evident during traditional ice accumulation) and it also looked so thin, how much could it weigh? "Is riding around in a bucket at 4:00 AM spraying hot glycol all over the aircraft (and myself) really gaining anything... or was it just a cheap ploy by the pilots and flight engineer to get a bit more time to hang out in the warm lounge, drink coffee and finish breakfast?"

A few years later, as a fledgling Flight Engineer, I found myself on the other side of the fence. I still had the same questions, but fortunately the answers were readily available during training. It turns out this thin layer of frost on an airplane IS a player on aircraft performance. It effects the small scales of the flow, which ultimately effect the larger ones. Tough to get a grasp on at first, but once you feel comfortable with boundary layer theory, the story begins to unfold.

As a quick review, the boundary layer of an airflow is that slowly moving portion of air right next to the surface it is sliding against. A fluid (in this case air) does not really slide across a surface. The velocity of the air at the wing


surface (relative to the wing surface) is actually zero. This is called the no-slip boundary condition. Not far from the surface (maybe a few millimeters) the air is moving very close to the speed of the free stream (relative to the wing). This very thin layer of slow moving fluid is called the boundary layer. This boundary layer will grow in thickness the further it flows down the wing surface. So... the larger the wing chord, the thicker the boundary layer becomes (and so forth). This slow moving boundary layer also has lower kinetic energy and momentum than the free stream. When a wing stalls, it is this relatively low energy in the boundary layer that causes the wing to stall (as the slow moving air in the boundary layer

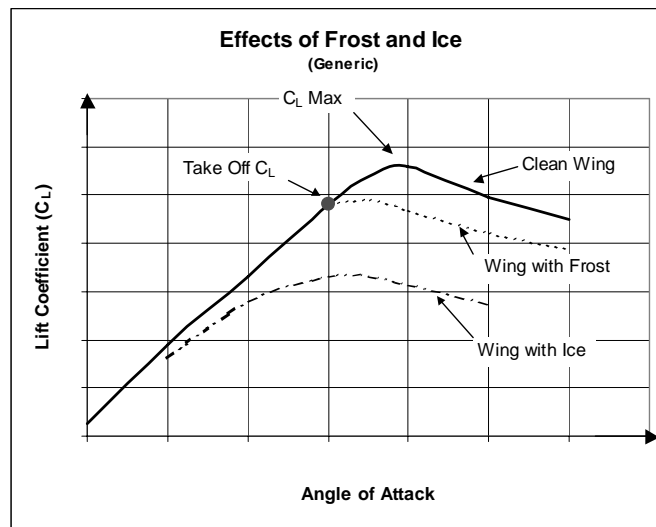
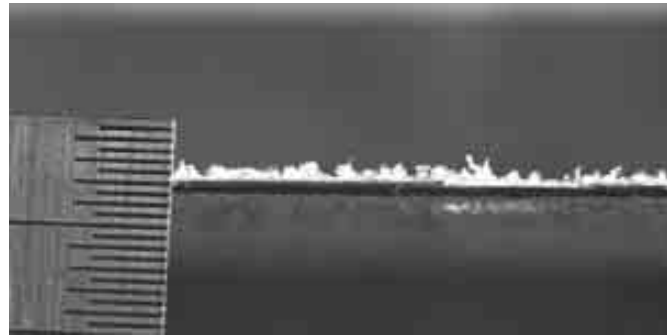
cannot force its way into the increasing pressure regions of the wing flow as easily as the faster moving air). The take-away here is that the thicker and slower the boundary layer is, the sooner the wing will stall (i.e. stall at a lower angle of attack). This is one reason such items

as vortex generators are used to add energy to the boundary layer and decrease its effective thickness (give it some energy to push into the high pressure regions).

In the case of frost, the size and structure of this type of ice actually extends into the flow (at small scales), slows the boundary layer and increases its effective thickness (think of anti vortex generators here).

The roughness of the frost

actually increases aircraft drag and also increases the speed at which the airplane will stall. Figure 1 depicts typical frost thickness as measured on a metal surface. It should be noted that the maximum height is approximately 1.5 





mm and the mean is 0.8 mm (as provided in Frost Formation Evaluation TP12897E by the Safety and Security Transport Canada 1996).

0.8 mm!, can this really bring down an airplane? The answer is yes, but not like you would think with traditional icing. This small amount of thickness actually does slow the boundary layer enough to significantly alter the flow (increasing drag and slowing the air next to the wing). Figure 2 is a generic depiction of what is involved.

The dark line indicates a typical clean wing response to angle of attack. With frost on the wing, we see the response curve is almost identical to the Clean Wing at lower angles of attack, however  $C_L$  max has been shifted to lower values and stall is happening at lower angles of attack (higher airspeeds).

The biggest concern here is the relationship between take-off  $C_L$  and this new shifted  $C_L$  max. Take off speeds vary by manufacturer, but in general are 5% to 20% greater than stall speed. Frost formation may now have the aircraft trying to take flight at or slightly less than stall speed.

How does this impact the pilot? Due to the relatively slow speeds of sport planes and minimal increase in weight due to frost, the slightly decreased acceleration and increased ground run (due to increased drag) may go unnoticed by the pilot. Attempts to rotate at normal take off speed may also occur normally. Once airborne however, a real danger now exists in that a gust of wind or sudden power change could inadvertently stall the aircraft. The same also applies at landing.

Similar factors may also exist in non-wing portions of the aircraft (such as the fuselage, struts, etc.). It is possible that these items may now exhibit separated flow (with increased drag as buffeting), when in fact they may not have been separated before. All due to the thicker boundary layers caused by frost formation.

The main take away is that even though frost does not visually alter the shape of the airfoil or add significant weight (as with normal heavy icing), it can significantly alter the flow field around it resulting in unwanted aircraft control problems.



## From The Fire Front

by Tom Kravis

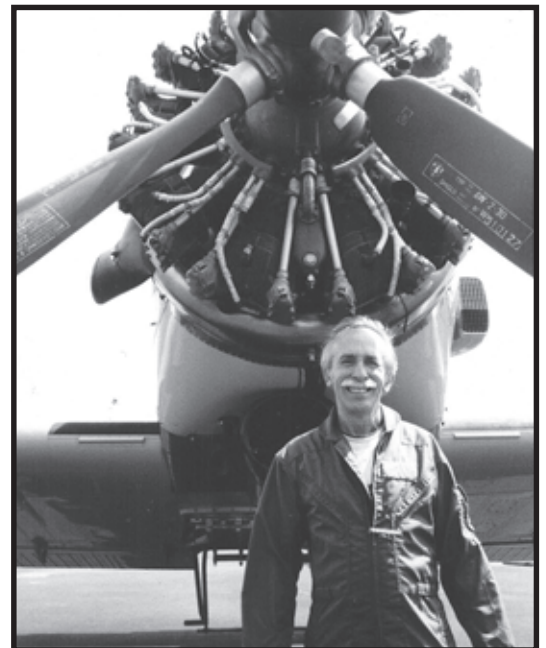
This is my 9th season with the North Carolina forest service. I started in 98 as a patrol pilot flying the L-19 Bird Dog. Patrol pilots are like forward air controllers, finding fires and directing the tanker aircraft and ground personnel in fighting the fire.

After two seasons as patrol pilot, I started flying the water bombers. The mission is to respond to fires anywhere in the region. We load with retardant, fly out to the fire, and meet up with the T-34 lead plane. The lead directs drop run on the fire, we try to drop at 100ft or less to get max effect. Fly back to a tanker base, reload and do it again. North Carolina operates a fleet of 38 aircraft, including water bombers, helicopters and utility aircraft.

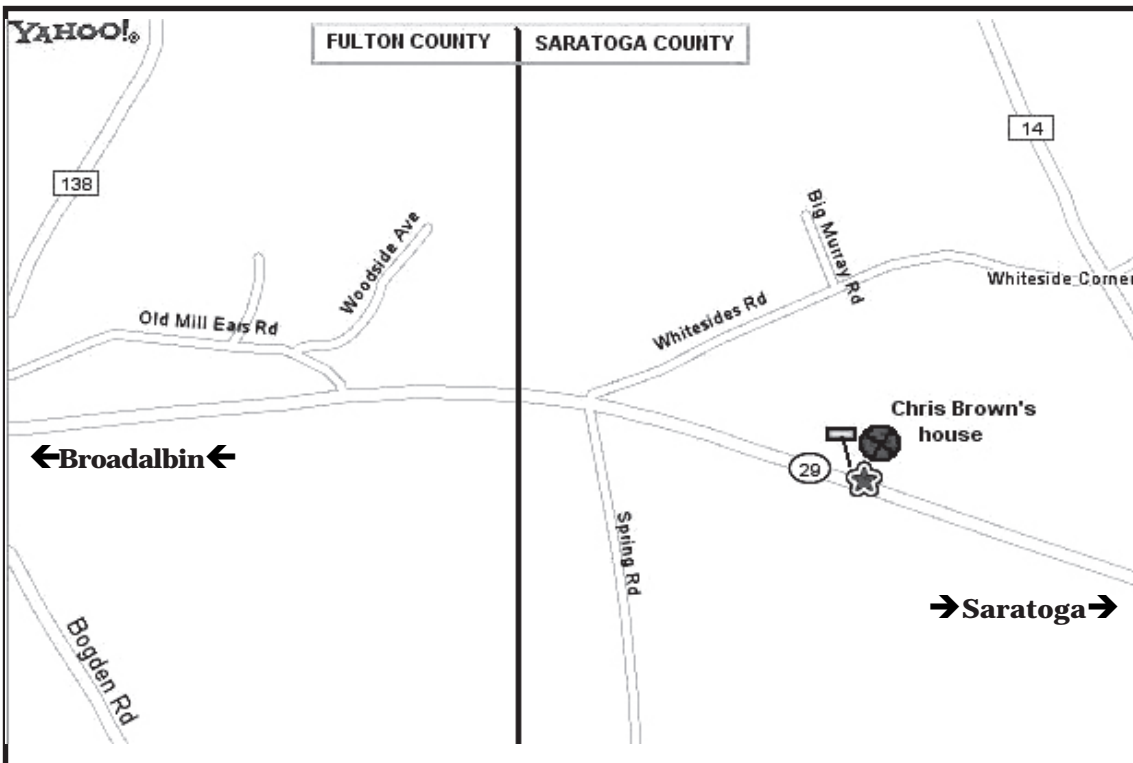

Currently, I fly the Thrush S2R, with a 600hp radial and a retardant load of 300 gal. Or the Dromader M-18, 1000hp radial, with a load cap of 500gal. The Dromader is a BIG plane, 55ft wingspan, 12,500 lbs gross weight, flies just like a Corsair or Thunderbolt, Big and heavy. All this happens when the spring winds are strong, as I write this, the wind here at Kinston is 18kts, gusting to 24kts, direct X-wind. Quite typical this time of year. Good crosswind skills are mandatory!

My overall impression is that fire bombing is about as close to flying combat as you can get in the civilian world.


**TK**





**Any questions  
about how to  
get there,  
give me a call.  
Doug 863-2409**



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(You Can Also Send In Your Dues With This Form)***

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E-Mail \_\_\_\_\_ Ratings \_\_\_\_\_

Experience Years \_\_\_\_\_ Hours \_\_\_\_\_ Aircraft Owned \_\_\_\_\_

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