

# THE FLYER



Middlesex County  
R-C Fliers, Inc.

Dec 2007



Chris Parent's Electric Yak-55. Photo by Jim Orsborn

## President's Message - Run!

**Hi all!** Well, there's no denying it now - it's almost Winter! I had to go out and stick my driveway markers through semi-frozen ground this morning, just in time for the plow-guy. Sigh...

→ **Please attend this month's meeting!** It's coming up rapidly - December 12th. We'll be voting on the *proposed changes to the by-laws*, and that requires a quorum.

In case doing your memberly duty isn't enough to drag you out on a Wednesday night,

for this meeting I'll be providing some *Christmas Cheer* (snacks and beverages, non-alcoholic of course.)

Are you happy Dave? I said "Christmas!"

→ **Another important item** coming up at our December meeting will be presentation of a slate of candidates for club office. The nominating committee (Chairman Frank Sullivan and members Greg Sullivan and Bob Forgione) are actively seeking nominees for office, especially in light of the news that two of

our current officers won't be on the ballot for next year.

If you've been wondering to yourself, "*How can I help the club in 2008?*" (and I know you have...) please consider *running* for office! You can contact any of the nominating committee members, and nominations are accepted right up until the election is held at the January meeting.

→ **The 17th Annual R/C Auction** notice made it into the most recent

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**MCRCF**

## After-New Year's Party!

**Saturday January 5th  
7:00 p.m.**

Chun King/Rick's Café  
(O'Connor's Hardware Plaza,  
Billerica)

Buffet, Door Prizes  
Pay at the door (usually  
around \$20/person for  
food, taxes and tip - does  
not include beverages)

Model Aviation magazine,  
which means it will be in  
the event advertisements

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## News From the Field by Jim Orsborn

Okay, so have you ever looked at something and asked, "What is that and how does it work?" Well take a closer look at the leading edge on Chris Parent's Yak-55 shown on the cover. I've got a close up here, but you can see something on the other LE on the cover photo. What are they?



Well, first off, let me describe the plane. Chris tells me that it is a Hyperion Yak-55 that he has modified over the past two years. The model was not designed for a glow engine, rather the manufacturer specified a brushless electric motor that was needlessly heavy, drew too much current, and provided far more power than needed. For these reasons he changed to the Hacker A20-20L brushless motor with a 3 cell, 1300 MAH, 15C battery. It also has a Berg 4 receiver and a Castle Creations, Phoenix 25 speed control. There is an APC 10x4.7 Slow Fly prop on the engine and a short Azarr antenna on the radio. Standard park flyer servos.

Chris said the problem was he crashed the plane several times in its early days. He said it would snap roll at just about any flight speed and was very difficult to control both going into and recovering from spin maneuvers.

Chris told me that he remembered something from early aerodynamics that talked about using a "turbulator" to intentionally create turbulent air flow that stays closer to the wing and does not separate quite as quickly as laminar, boundary layer airflow. So, starting with a device on the bottom of the wing, Chris found that he could fly the plane inverted without any more sudden snaps!

With the knowledge that the plane had much better flight characteristics during inverted flight, Chris was able to add another set of turbulators on the top of the wing. Watching Chris fly this model Sunday afternoon, I can confirm that he has the plane under complete control 100% of the time; whether upright, inverted, spinning, rolling or snapping!

Chris repeatedly told me that he really does not claim any particular expertise in any of this stuff, but is just fooling around with toy airplanes like everyone

else.

So, I thought it would be neat to check out the Internet and see if there was any more information on the theory behind turbula-

**Did you notice that Chris Parent's name is spelled out in the Cyrillic alphabet of the Russian language on the side of his "Yak"? Take another look at that front-page photo - now that's cool!**

tors. According to Wikipedia, a free encyclopedia on the Internet;

*"A turbulator is a device for improving the flow of air over a wing."*

The Wikipedia site <http://en.wikipedia.org/wiki/Turbulator> goes on to explain turbulence.

When air flows over the wing of an aircraft, there is a layer of air called the

boundary layer between the wing's surface and where the air is undisturbed. Depending on the profile of the wing, the air will often flow smoothly in a thin boundary layer across much of the wing's surface. However there comes a point, the transition point, in which the boundary layer breaks away from the surface of the wing. Beneath the separated layer, bubbles of stagnant air form, creating additional drag because the boundary layer becomes thicker as more air gets caught up in it.

These bubbles can be reduced or even eliminated by shaping the airfoil to move the transition point or by adding a device, a turbulator that trips the boundary layer into turbulence. The turbulent layer remains thin and close to the wing's surface and so stagnant bubbles cannot form.

Checking on another site <http://www.mh-aerotoools.de/airfoils/turbulat.htm> I discovered that there may have been a more optimal location for the turbulators on Chris's plane and there are even design concepts for Pneumatic Turbulators that might be a second solution.

The pneumatic option which uses small tubes to pass air from the bottom to the top of the wing

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(Continued from page 2) Notes from the Field

look really interesting. According to the design, they would be "automatic" (e.g. only active when actually needed) and would otherwise not change any flight characteristics.

Okay, so now it's time to get personal about some of the planes I've seen at the field.

Joe Boston; I know that you have headed off to Florida, but do you think these things might help you with some of your planes, like the Sukhoi that seem hard to land?

Bill Copp and John Parisi, how about one of your Extra's. I'm even thinking I might try them on my Venus 40. I've seen it snap pretty quick and this might just give me a little more confidence.

Good Flying



## Continuing the Discussion on Turbulence

*Ed Note: I received the following comments from Chris Parent. He sent them to me in an email review of the previous article.*

*Hi Jim,*

I looked at the links you sent. For sailplanes, I think the idea is to operate at low Reynolds numbers and high lift - and for this, the turbulator is to trade increased surface drag for decreased form drag.

The assumption of the base condition in the sailplane example is that a separation bubble forms (as it always does) at the point of transition from laminar to turbulent flow, but that the now turbulent flow re-attaches to the wing top surface. It just does it in a sub-optimal way that results in a lot of form drag

The turbulator moves this transition point in a way that results in a net decrease in drag. More surface drag via the turbulator but less form drag via a cleaner transition overall.

To land the model Sukhoi, we are looking for even lower Reynolds numbers than a sailplane, and a high coefficient of lift, all while using an airfoil that is far from optimal for this.

In this case drag caused

by a messy separation bubble is not the problem. The problem is that the separation bubble forms, then sort of bursts - and the now turbulent air never re-attaches to the top of the wing. Yes there is a lot of drag, but the catastrophic loss of lift is the cause for alarm.

In our messy, low Reynolds number toy airplanes, I believe the transition point moves very far forward at high angles of attack. This was belief #1 in my faith-based forward turbulator position.

Belief #2 was that for such to remarkable loss of lift, the air could not be flowing very far back while still attached to the top of the wing - otherwise I might observe something less dramatic than the so-called "tipstall".

And indeed there are examples of models that do not snap suddenly, but rather just sort of corkscrew if you reach a critical angle of attack.

Belief #3 was recollection of an article from ~35 years ago about the change of the Goodyear Racer "Li'l Gem" into "Ole Tiger". The paint stripe that solved the snap was very far forward.

This is what pathetically passes for analysis on my part. But the "Yak 55" (really a Technoavia SP-55M) did improve dramatically.

I started with the turbula-

tors on the bottom. I figured if they were a disaster, it would only show up inverted so I could land and take them off.

But I did a bunch of stalls inverted and saw a clear difference. Go figure.

For the wayward Sukhoi, however, drag is not an issue. I would try two things:

1. Absolutely seal the aileron hingeline. The air that must shoot up through any gap would be considerable in a landing.
2. Try taping on pretty much anything. Maybe for 1/3 of the chord, and something like 10% (or even a bit less) of the chord back from the leading edge.

I have no reason to believe that the size or position of mine is even close to optimal - but it does work in my case, and the added drag is impossible to notice.

So maybe a piece of 3/32 or 1/8 square stock might do it for a bigger model?

I'd forget bothering with the inverted tests, and start right out with them on top. Then do simulated landings at 150 feet and see what happens. *Chris Parent*

*p.s.* Oh, and the funny little plane is a model of the 1919 White Sport:

<http://www.aerofiles.com/white-sport.jpg> It is not

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## Adverse Yaw by Jim Orsborn

I had someone at the field the other day that asked me what we were talking about when we described a plane that had a severe case of adverse yaw. I'm not too sure that the field explanation came across, so here goes another try.

Actually, Chris Parent and I were talking about another very small electric plane that he had brought to the field. It was a model of a vintage 1919 kit plane that was sold as a home built project. I guess it was like many projects that never really made it too far, but make a really nice model.

The plane that Chris had was laser cut balsa and looked like a very nice project. In fact, it looked so nice that the original thought was that it might make a nice project for a new, youngster to fly as an

introduction. Chris's answer was that it would be totally inappropriate because it was much more difficult to fly that it looks. — The reason of course was that it was difficult to control because of a "severe case of adverse yaw!"

We all know that airplanes move around three different axis of rotation; Rolls are rotation about the plane's longitudinal axis. The elevator effects rotation around the pitch axis. And finally, the rudder will cause some horizontal movement around the yaw axis that goes vertical through the plane.

So we have roll, pitch and yaw rotations. If we only had perfect control surfaces that caused the plane to move about each one of these axis, one at a time. Reality of course is all of our controls usually have an effect that makes the plane rotate around more than one

axis.

Don't believe me? Well the next time you go out, try using the rudder. Move the rudder to the left and see what happens. The plane will also roll to the left and start to make almost a normal left turn with a bit of roll to the left as it turns. Okay, I'm sorry; yes you need to take off first to see the induced roll caused by the rudder.

So what happens when you use the ailerons to roll the plane. Left aileron on your stick will cause the left aileron on the plane to raise up and the right aileron to drop down. We've been told that the left aileron up creates less lift and the right aileron down causes more lift — less lift on one side and more on the other causes the plane to roll; left in this case.

Well on some planes, the left wing will also have less drag, while the right aileron which has

dropped will have much more drag. You can almost think of the ailerons as a great big air brake when they drop down.

So what would happen if the right front brake on your car started to grab as you turned the steering wheel to the left? Well that is basically what happens with the ailerons on a plane, usually with a flat bottom or semi-symmetrical wing.

The usual method for reducing adverse yaw is to set the ailerons so that they move up much more than they move down. Chris's plane had ailerons that move down only 1/4 as much as they move up! And the plane still had noticeable right yaw when rolling to the left.



(Continued from page 3) Turbulence

clear that any were ever really flown. Stevensaero has a kit and I modified the kit (highly in this case) to make mine.

The Stevens Diddlebug series would make great models for a kid. All his designs build and fly great. The stock White Sport flies well. Mine is really a handful, so more capable, but also very tricky.

## President's Message

(Continued from page 1)

twice before the auction.

Auction Flyers are going to the hobby stores, and will be in the mail to the region's other clubs soon.

There's also a new *Auction Info* web page up, so stop by [www.mrcf.org](http://www.mrcf.org) and take a look!

→ **Speaking of web pages**, somethings that I've enjoyed about the Burlington R/C Flyer's web site is that for quite a while now, they've had an active Discussion Forum (for members only.) This capability has always been provided by a club member with the know-how and bandwidth to host it using commonly available forum software. It's a great way to share information, report on local R/C events, post things for sale, and just keep in touch with each other.

Also cool is access to a photo gallery site (like Flickr) where folks from the club can post their own photos and share them with the rest of the group.

If anybody out there is able and willing to set up either or both of these capabilities for use by the club, I'd like to hear from you!

Be safe, and have fun!

*Jeff*

### Burlington RC Flyers Bulletin Board





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Forum	Topics	Posts	Last Post
<b>RC Flyer Discussions</b>			
 <b>General RC Flyer Talk</b> The main place for all of our RC Flying discussions	124	395	Mon Dec 03, 2007 6:24 pm 
 <b>For Sale/Wanted</b> Post any RC related for sale/wanted messages here	9	10	Sat Dec 01, 2007 6:53 pm 



**Happy Revelers - December 2005**

*Photo by Jeff*

## News From the November Meeting by Jim Orsborn

We received a last minute notice that the November meeting was going to be held at the Billerica Town Hall instead of the Lewis building. Fifteen members found us there, and Jeff called the meeting to order a little after 7:30 PM.

I can never get the numbers straight, but John says we have a balance of slightly over \$4,400 in the checking account. I guess we are starting to collect dues for 2008, only paid for one grass cutting and had minimal income and expenses for the last raffle.

Jeff reported that we are all set for the 2008 Auction. It will be held on January 27th at the Marshall Middle School cafeteria in Billerica. Watch for the flyer and a notice in the next AMA magazine.

Jeff led a planning discussion for when and where to hold the Christmas party. The consensus was that we return to the same location (Chung King Chinese Restaurant in the O'Connor Plaza, Billerica Center) on January 5th. Don't miss this exciting opportunity to

celebrate the holidays and get together with friends.

The WRAM Show is scheduled for 22—24 February and several folks indicated plans to attend again this year.

Jeff told us that there are several proposed By-Law changes that have been posted on the MCRCF Website. Plans are to discuss these items again at the December meeting and vote them in as approved changes at that meeting. So we need a quorum at the December meeting. If you can plan on attending, your support would be appreciated.

As the last official business item, Jeff asked for volunteers to work on the 2008 Nominating Committee. Frank Sullivan offered his services as well as his brother Greg. With them, Bob Forgione also volunteered to help poll the membership. The job of this committee is to pull together a proposed slate of Officers and Directors for 2008. We ask that all members consider service to the club and support the efforts of this committee in their work.

To close out the meeting, Jeff reported on a visit by our own District

1 Vice-President, Andy Argenio to the Burlington RC club earlier in the week. The club had apparently invited Andy to visit their club and describe some of his activities with the AMA.

Andy has been our District 1 VP for the past two or three years, since his election to replace Bob Kraft who was the former VP. As our representative to the AMA, Andy travels to AMA meetings in Muncie, IN as well as to visit AMA sanctioned clubs across the district. He reminded everyone that we, the membership, are the AMA and that all of the Administrative Staff in Muncie are there to support our needs.

One of the most significant issues facing AMA is our declining membership numbers. Since the membership peaked some years ago, reductions in AMA membership have cost the academy almost \$1 million dollars in dues revenue, or almost 10% of the typical annual budget. Reasons for the drop are not entirely known, and the market for R/C equipment is actually growing. Much of the growth is attributed to Park Flyer aircraft and R/C toys.

Andy and the rest of the

Executive Council are trying to do what they can to understand the reasons for this as well as find ways to reverse the trend. Expect to see new membership programs and club incentives coming from the AMA.

Andy reports that he, as District 1 VP has an annual budget of about \$12 thousand dollars, which he has been using to sponsor AMA sanctioned events in the district. He also has some limited additional funds to cover other initiatives within the district, including his travels to visit clubs. We should all continue to watch the District 1 News section in the AMA magazine and see some of activities around the district.

Finally, Andy offered his services to help any club address hobby related issues they may be facing. After the discussion, there were proposals to invite Andy to our Construction Derby next year.

**Upcoming Event Dates**  
by Jim Orsborn

**December Meeting**

Wed., Dec. 12th at the Lewis Bld. on Boston Road.  
Refreshments (Food?)  
By-Law Changes  
New Dues for 2008

**Winter Solstice**

Sat., Dec. 22nd;  
Basically the shortest day of the year. From here on, the days start getting longer and we get closer to Spring and Summer Daylight Savings Time.

**Holiday Party**

Sat., Jan. 5th at Chung King's Chinese Rest. In Billerica Center.  
Great Buffet choices  
Door prizes / Raffle

**January Meeting**

Wed., Jan. 9th at the Lewis Bld. on Boston Road.  
Election of new Officers and Directors

**MCRCF Auction**

Sun., Jan. 27th at the Marshall Middle School Cafeteria in Billerica  
Models, kits, anything RC

**WRAM Show**

Fri., Sat., Sun.; 22-24 Feb in White Plains, NY

**December 2007**

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5 ●	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22 ●
23	24	25	26	27	28	29
30	31					

**January 2008**

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5 ●
6	7	8	9 ●	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27 ●	28	29	30	31		

**February 2008**

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22 ●	23 ●
24 ●	25	26	27	28	29	

**Official Publication of the Middlesex County R-C Fliers, Inc.**

**The FLYER** is the official publication of the Middlesex County R-C Fliers, Inc., a non-profit organization chartered for the promotion of radio controlled model aircraft building and flying. The club operates a flying field located on Treble Cove Road, Billerica, MA. The club offers free flight instruction to any member provided they have a current membership with the Academy of Model Aeronautics. Contact any club member for details. Meetings are held on the second Wednesday of every month between September and June in the Billerica Recreation Dept building at 248 Boston Road in Billerica, starting at 7:30 PM.

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**First Class Mail**

**We're on the Web!**  
<http://www.mcracf.org>

**Dec. 12<sup>th</sup>, 2007**

**7:30 PM**

**Lewis Building**

**248 Boston Road (Rt. 3A)**

**Billerica, MA**