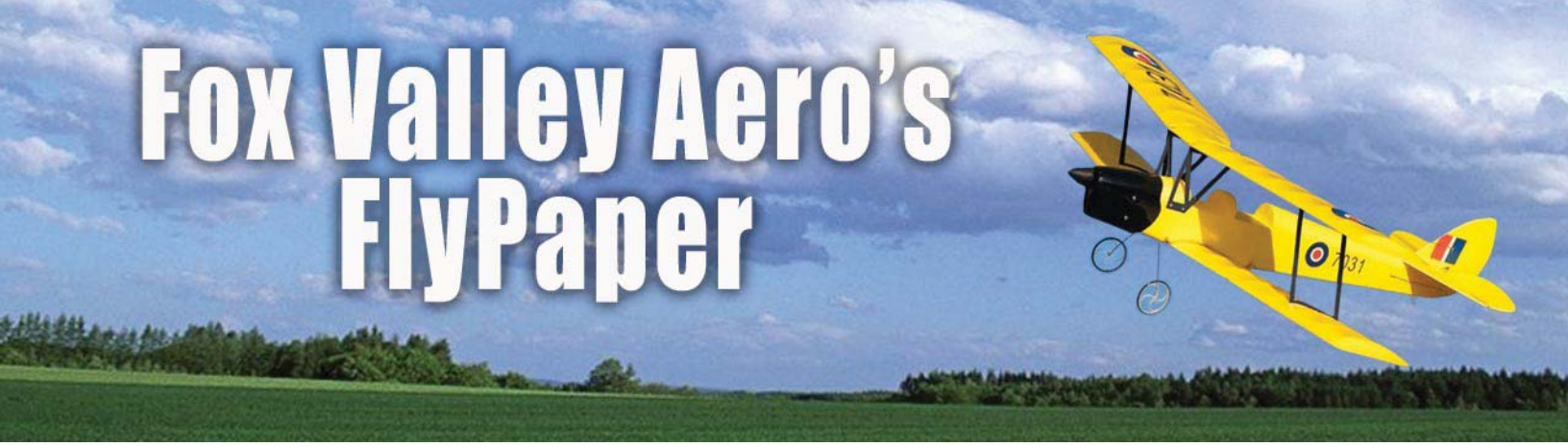


Fox Valley Aero... where friends go to fly! **September 2010**

AMA
SINCE 1936

Academy of Model Aeronautics
Charter Club # 252

AMA Gold Leader Club

P.O. Box 837
St. Charles, IL 60174-0837

An Illinois
Not-For-Profit Corporation

Important Field Notice!

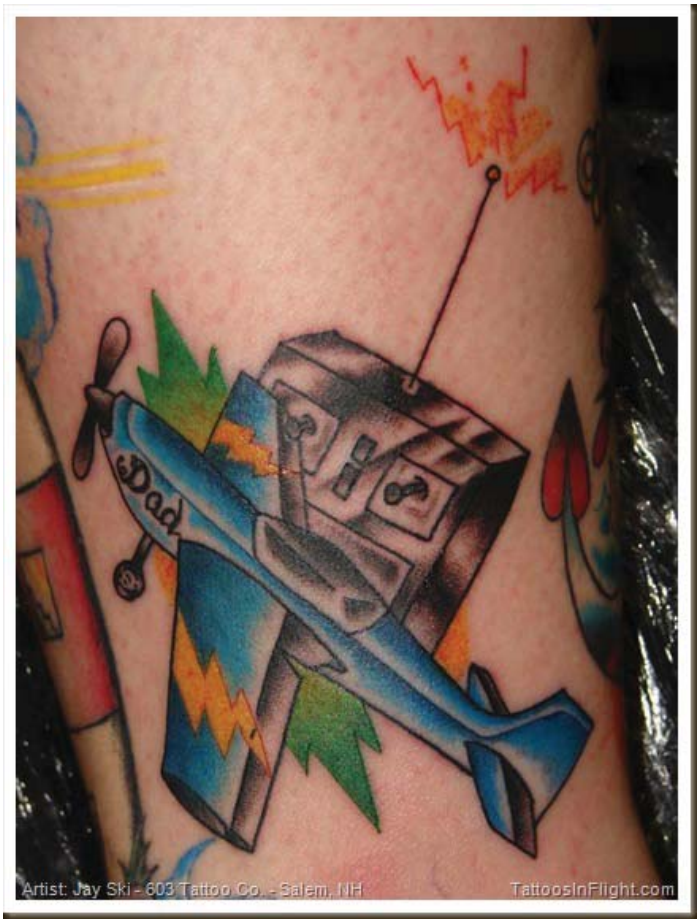
Recently officers from the St.Charles Police Department completed their rifle qualifying training and certification at the Tri-City Public Safety Facility otherwise known as the "gun range". Time was running out to complete this training as other facilities that have been available in the past to police officers from several communities have closed permanently due to the poor economy. While the activity during the past several weeks is only temporary, Geneva and Batavia police officers will also need to complete their certification as well. Plans are to finish the range this year. Equipment will be brought in shortly after the last department completes training to finish interior grading and pouring of concrete slabs. While that work is being completed, the range will be officially closed and no shooting will take place. The range is expected to open sometime late 2011. In the meantime, I was asked to remind everyone that there is an agreement in place not to fly over the range. Although communication from our neighbors has been sparse - OK non-existent - a few flyovers were noticed during the recent training so it is extremely important we start observing that airspace. I will be working to keep the channels of communication open for the mutual benefit of both parties and let our membership know of any changes.

David Todd

Fly Paper Editor note

Rich Erikson– newsletter@fvac.com

Hey everyone...
September is upon us and we better fly while we can! Soon the snow will be falling and those of us who dare not attempt to fly year round like a few of you crazies do... Cliff and Dan...you guys have a problem... I am committed to the hobby though... not as much as this guy with the tattoo.. but committed. My fleet is expanding along with my waist line and that is just the way I like it.



Along with this fall weather comes the Wasps.. and someone got a little carried away with the Hornet Spray and took out my Trex 450

"Cliff and Dan... you guys have a problem"

No Helicopters were hurt in the filming of this joke...back of P.I.T.A.

"there are still many good flying days left"

Treasurer's Report

Paul Jacobs – paul_jacobs@att.net

The club treasury is in great shape as we head into the final quarter of the year. As I write this I am sitting at the scorers table in the rain waiting for our contest to start. The front is supposed to pass by 10:00 AM and we should then be under way. This is our last major flying event of the year but here are still many good flying days left. The Turkey Fry has been moved up to October 17 to take advantage of better weather and it is one of the best get together we have during the year. Karl Greisbaum and Tom Spriet each deep fry a turkey and they disappear at amazing speed.

My winter projects are piling up and I am now putting the DA 100 on the front of my 1/3 H9 Sukhoi. The spark plugs will hang outside of the cowl but it should still look OK and fly like a rocket. Cindy delivered the long awaited Phoenix 7's at the last meeting and I plan on adding an O.S. .61 with a pipe and haven't decided on the electric retracts. The DP Cub is well on its way to being repaired and all I will need to finish is a windshield and cowl. Cermak is supposed to start offering all of Dave Patrick's designs but those are really slow boats coming from China.

Sal and I will be working on a budget for the Christmas Party which is our last event of the year and is always a good time. Election season is upon us as nominations are taken at the October and November meetings and voted on at the Christmas Party. Six director at large positions and all officer positions are voted upon each year so if you are interested in one of these now is the time to raise your hand.

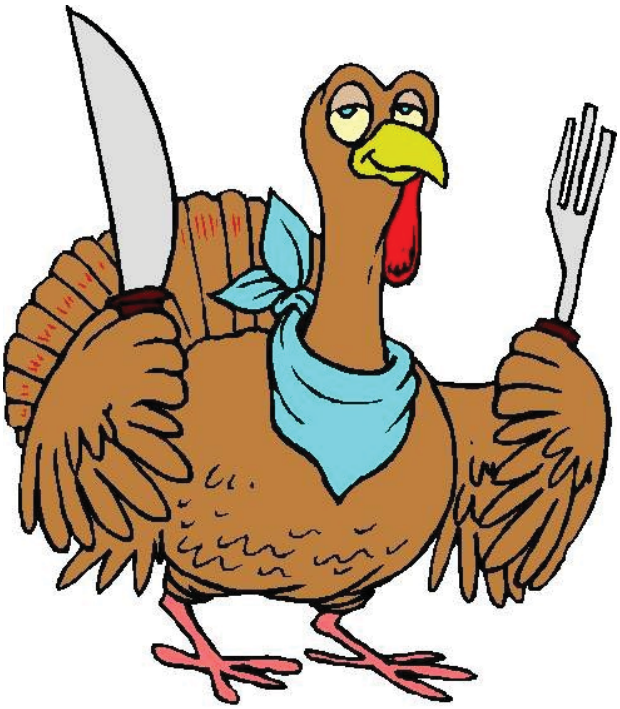
Till next month,
Paul

FVAC Annual Turkey Fry

All FVAC Members and their families:

Mark your calendar for October 17th for the FVAC annual Turkey Fry!

Time: 10:00 - 4:00 pm with lunch (Turkey) being provided by the club.
This annual event has become very popular where we begin to conclude our flying season with some fun, food, and fellowship along with the day of flying. Please bring a dish to pass and our top chiefs (Karl and Tom) will be asked to bring their turkey fryer and prepare the feast with Cliff as our carver! More information will follow over the coming weeks and Fly Paper.



Big B25 Maidens at FVAC

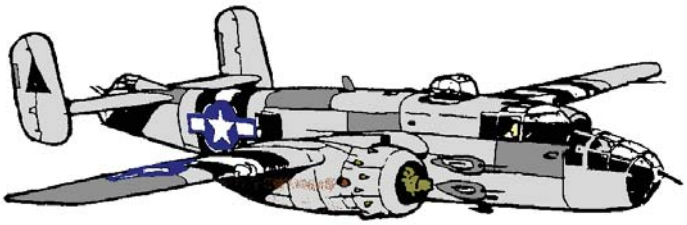
This maiden flight of a B-25 was done at the FVAC field in August. This link is a two part video. First part is the take off. Second part is the landing.

The Ziroli 122" B25 first flight video.

http://myprojectscentral.com/rich_text_16.html

B-25 owner "Frank DelGiudice"

Pilot that did most of the flying "Billy Greg".
I am not sure who took these great videos, but I think that he is a FVAC member.



Government Relations Chairman's Report

John "JT" Turner – jtgrassroots@yahoo.com

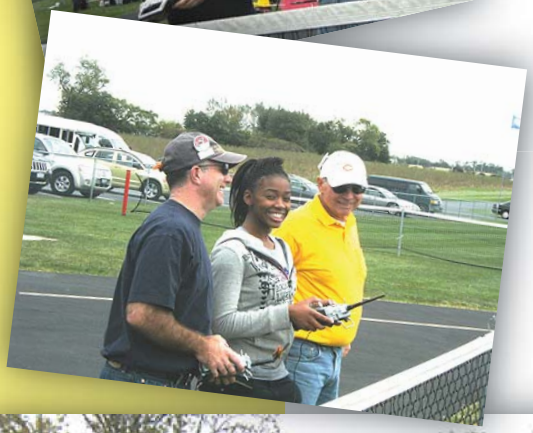
"Thanks to everyone who made a successful event"

Recently, Model Aviation illustrated our Juice Bar in their September/October magazine. This state of the art technology is a real key to team effort for making our club very current and progressive among other RC clubs within the Midwest. To recognize our effort, the mayor of St. Charles (Don DeWitte) received the October Magazine with a letter highlighting the picture and informing him about the FVAC efforts to make our club attractive for those electric RC fliers!

With the recent success of the 2010 Summer Festival of Fight, a letter was sent to John Redman (Horizon Hobby) and David Payne thanking them for their participation for flying and answering questions by both spectators and FVAC members. Thanks again to the folks at Horizon Hobby!

On Thursday September 9th, the FVAC hosted the annual Glenwood Kids day sponsored by the St. Charles Rotary Club. Dan Compton, Joe Cubalchini, JT, Tom, Berry, and Greg Wright participate at this event. Over 30 students came out to watch and take the controls of flying a model aircraft. The day concluded with a catered lunch and a jet demonstration by Greg Wright. Thanks to everyone who made this a successful event and Paul Dodds who set up the event. Speed recovery as well!

John M. Turner.



Hi Paul,

Thank you so much for arranging for all of the pilots and airplanes for the Rotary Fly-In last Thursday. The boys and girls from Glenwood School thoroughly enjoyed it as well as all of the adults. The St. Charles Noon Rotary Club truly appreciates the time you took to bring a smile to our faces!

Please pass along our thanks to all that were there from the Fox Valley Aero Club. It is much appreciated!!

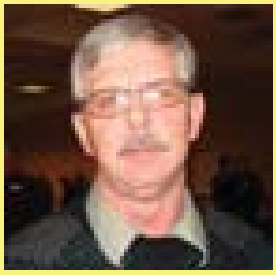
Kathy Livernois, SPHR
Director of H/R
City of St. Charles

"badges and ID's are on their way, really"

Membership Chairman's Report

Another month gone by, man where has this year gone! New members you are not going to believe this but your badges ----are-----here!!!!!!!! I would like to welcome all the new members to the Fox Valley Family!

JT range checks his latest creation... full size pilot not included in the kit



"weekends can be spent doing what we all love to do...FLY"

Field Chairman's Report

Greg Bohler – sbcglobal.net

This is the easiest field report I have ever had to write. The field is in great shape. No work has been done lately and no work is currently needed. Wow, I flew through that report.

Having such a short report has allowed me time to talk for a minute about my favorite part of the club, the friendship and interaction with other club members. Twice this month I was lucky enough to experience what our club is really about. Some of you know that I have a giant scale Mono Coupe. It has a Saito 3 cylinder 170 on it. I spent the better part of last season learning about that engine and asking advice trying to get it to run right. This year frustration took over and I attempted to sell the plane as is just to be done with it. One of our members and my friend Mark Knopke told me to pull the engine and he would play with it and see what he could do. 1 week later he called me and said he had rebuilt my engine and it was running like a dream. In that short of a time I went from a plane I wanted to sell to a plane that runs and flies perfectly. Thank you Mark.

My other high spot came when the AMA magazine came out this month. Several of us worked on creating the Juice Bar early this season. Walt Thyng was instrumental in helping create this project. He put some pictures and a short story online about it. The AMA magazine picked it up off of the internet and published it in the magazine this month. Thanks to everyone that was involved in this fantastic group effort. What a great feeling it was to have our club recognized nationally and to see something we created in print.

This was perfect timing and a great month for reminding me what great people I associate with and how fantastic our club is.

Thanks to everyone that make me feel this proud of us and what we do.

See you at the field,
Greg Bohler

"Just the facts...
as I remember them"

Secretary's Report

Tom Spriet – tom@etglass.com

Fellow members,
Considering the lack of minutes from our non-meetings, gives me an opportunity to advertise an upcoming event/meeting.
Due to the recent loss of my Aeromaster, I have gone out and tried to get the all asked questions.. "why?" and "What happened ?" answered... !!
I began questioning John Redman at our festival of flight as to what the reason may be.. The answers may be in the power consumption that is encountered in the A/C and therefore the lack of power to the receiver/computer. To this end John has offered to come up and discuss what happens in the aircraft with the users of 2.4 and multiple servos that may or may not be ganged on splitters/y harnesses. He will be sharing his thoughts, ideas, experiences and findings regarding power consumption in RC Aircraft!!
This is a non manufacture specific issue but a general problem that occurs in all aircraft using 2.4..
John had suggested that we begin at 10:00am, break for lunch and then have another 2 hr session. Considering he had asked for 4 hours lets one know that there is alot to talk about and allows ample time for Q/A.
FYI, In our first meeting last month, that was specifically for JR radio programming, we went 5 hours in a blink and was very beneficial to all in attendance.
Members, I'm positive that your time would not be wasted if you plan to come. There will be something for "ALL" to learn.
I would ask all attendees to pay $5.00 per person for lunch as we will have it catered. You don't have to pay to come just to eat..
Please forward R.S.V.P's to " tom@etglass.com ". This would be a great help to prepare for the day as we will be preordering the food on wed before the meeting.

The particulars are these:
1) Bring a chair
2)Bring your questions

10:00am Saturday September 25.
E & T Glass and Mirror
1000 Commerce drive
Geneva, Il 60134
www.etglass.com

Thanks
Tom Spriet
Secretary FVAC

Fox Valley Aero at Illini Jets

Warbirds from Muncie and Fon Du Lac

Chicagoland Fall Pattern Classic 9/11/10 & 9/12/10

Rusty Dose– boyd.dose@att.net

"Feedback from the pilots was very positive"

Report: 2010 Chicago land Fall Pattern Classic

Thank you to the Fox Valley Aero Club for allowing the use of one of the finest R/C aero-modeling facilities in the country to host the 2010 Chicago Fall Pattern Classic was held over the weekend of September 11 and 12th. A special thanks to Paul and Doreen Jacobs, Mel Ziska and Dan Compton for their time and energy which made the event possible!

Friday, September 10, was the set-up day consisting of installing the (6) aerobatic box poles in the previously installed PVC tubes located along the south boundary of the grass/corn field. This task took no less than 2.5 hours finding all but one cement encased PVC tube. Paul Jacobs , Dan Compton and Mel Ziska were a huge help in this process. Friday was a very breezy day, with a handful of guest pilots and a few club members sharing the facility for the morning and afternoon practice and sport flying.

Saturday, September 11 began with light rain followed by a low ceiling delaying the first flights from beginning until about 1:00PM. Nineteen competitors traveled from Iowa , Illinois , Indiana , Minnesota and Missouri flying (4) rounds each for a total of (76) competition flights. Paul and Doreen Jacobs were the event score keeper and score runner using a scoring program supplied by the National Society of Radio Controlled Aerobatics. Mel Ziska and Paul spent time prior to the event meeting with Larry Larsen who typically is the score keeper for the Chicago area pattern events over the years but was unavailable due to his son's wedding. The field was returned to the club members by about 4:45PM on Saturday for the remainder of the evening.

Sunday's weather was superb, allowing the event to begin promptly allowing all competition flights to be completed by 11:30AM, allowing the FVAC club members the remainder of Sunday afternoon and evening for open flying. The scores were tabulated and laser engraved cherry wood plaques were awarded for Sportsman, Intermediate, Advanced, Masters and FAI classes as well as a pilot's choice for best craftsmanship/finish for Champion and Runner-up called Concours d'Elegance.

Feedback from the pilots was very positive, particularly amazed by the "Juice Bar", condition of field/runway and appreciation for hosting the event.

Future of the Chicago Land Fall Pattern Classic?

I have hosted dozens and dozens of pattern national, regional and local competitions over the last 20 years and believe that the short and long term benefits to the "host" club are significant. The event does have significant interest, due to the cumulative track record of hosting enjoyable events, although many would prefer an earlier date in June or July due to the constraints of the Sun position.

My personal commitments including family, career and flying toy airplanes will not allow me to be the 2011 Contest Director for the FVAC sponsored 'Chicago Land Fall Pattern Classic".

Rusty Dose
Contest Director

2009 FVAC Flight Instructors

Dan Compton	cell: 630-664-6426	trainu2fly@comcast.net	Chief Flight Instructor
John Fischer	cell: 312-518-0075	jeffxx@comcast.net	
Cliff Fullhart	Home: 630-397-5033		
Alan Galle	cell: 630-697-8464	ajgalle@comcast.net	
John Horvath	cell:630-440-7398	horvatsky@comcast.net	
Paul Jacobs	Home:630-778-1184	paul_jacobs@att.net	
	Work: 708-728-9000		
Mike Kostecki	cell: 630-373-2722	mkostecki503@comcast.net	
Dennis McFarlane		highpd119aol.com	Not avail. Firday or Sunday
Tom Siwek	cell: 224-542-0323.	tsiwek@sbcglobal.net	Available primarily on Weekends
Bill Sponsler	cell: 847- 323-6578	bsponsler@comcast.net	
Jason Walsh	cell: 630-291-1872	jwalsh1@ameritech.net	

Radio Control Scale Aerobatics

Mike Hurley 11542 Decatur Ct. Westminster, CO 80234 mike.hurley1@comcast.net

posted courtesy of Peter Goldsmith & Model Aviation (approved by Rod Kurek)

What if, from the very beginning, you learned to fly RC with the radio upside down? Then, two years later, someone said you needed to turn it over and fly right side up? It'd probably be pretty tough because you learned all of the habits the wrong way. Flying a plane that's not fully trimmed is just about as bad. You get into the habit of correcting for poor flying characteristics and end up chasing the plane around the sky during the whole flight. Then when you move to a new plane you have to start over and learn how to compensate for the new plane's different set of problems all over again.

In a conversation with top-rated TOC pilot Peter Goldsmith at this year's Nationals, Pete noted that it didn't look like many of the planes were trimmed well. Some of the pilots, even in the top classes, were chasing their planes around the sky rather than flying the maneuvers. Peter was excited to do something about that problem and I asked if he would write something for this SA column. He graciously agreed. I think this is one of the most important topics that you could get from this column. Peter's approach is systematic, comprehensive and complete. In this first of two installments, Peter covers subjects related to trimming the physical airframe. In the next SA column he'll review how to set up your radio to compensate for poor flight characteristics using a variety of mixing techniques. Tear these pages out of this magazine and put them in a notebook or your flight box. If you follow these steps in the proper sequence you're guaranteed to have a better flying plane than your competitors who didn't!

Peter Goldsmith was born and raised in Sydney, Australia, and began flying radio control at eleven years old. He still remembers his first radio transmitter called a "Bionic Baby", a two-channel dry cell system that his mother bought for him in Singapore. Young Pete had two weeks before his mother arrived home with the new radio so he put that time to good use and designed and built his first RC aircraft. Growing up, Peter says, he would design and build his own planes out of necessity. So, from the very beginning, he was a designer. Peter's first love in RC has been sailplanes and soaring. He loved doing aerobatics with them and through an evolution of events decided to try F3A. His first contest was in 1978. Peter competed on an Australian National level in Pattern up until he came to the U.S. in 2000, and was the Australian National champ from '95 until 2000. During that time he was also a member of the Australian National team for the World Championships making the finals in three of the five Worlds and was awarded Oceanic Champion three times. In Scale Aerobatics, Pete has multiple top-level performances at the Masters and won it in '01. He has placed second in the AMA Nationals three times and won the Freestyle National Championship in '02. Peter competed in the Tournament of Champions from 1992 until it's end in '02. He is currently the JR Team Manager and continues to compete at the very top level. One of the most telling aspects about Peter's RC career is that he has always flown and competed with his own designs, scratch built, and trimmed based on his 25+ years of experience.

Peter Goldsmith: Competing in this year's Don Lowe Masters I was inspired by the raw talent in pilots half my age -- I was honored to place 7th! I began thinking about all the help I had received over the years and felt driven to give back to the new pilots of the aerobatic community, as had been done with me many years ago. Earlier in the same year in a discussion with Mike Hurley at this year's Nats, I shared with him how passionate I am to share my life's aerobatic knowledge, and he invited me to write something about trimming and mixing.

A properly trimmed model can reduce your workload in an aerobatic sequence by an enormous amount. I judged at the Nationals this year and thoroughly enjoyed the experience. I was impressed with the skills, especially in the lower classes, displayed by pilots but noticed most of them trying to fly around a poor trim setup. It drove me crazy to watch! I remember bouncing out of my judging chair and saying to Mike, "boy, I need to help these people!" So here are some thoughts from my own 25 years of experience and involvement with people who shared their thoughts on trimming with me.

First, an observation. There is no such thing as a perfectly trimmed model. Our goal is to reduce our workload in flight when flying sequences. Even if we could get our model perfectly trimmed, we would need perfect flying conditions to benefit from the perfect set-up!

Servo and control setup

3D trim and precision trim typically work against each other. What I mean by this is that when pilots set up their new 40% something, they go straight for the big rates; 35°, 40°, and in some cases 50° of throw. Has anybody thought how this can affect the servo resolution? And more importantly the servo power? Most scale aerobatic events allow a separate aircraft for freestyle. Why not have your free aircraft setup specifically for the free event, then have a precision setup for known and unknowns sequences? I know for me personally having a model just for freestyle will be something I aim to do in the future. That's not always a realistic option, so if you're using the same plane for precision and free, bias it toward a precision control setup.

For precision flying I would expect you to be running between 12° and 15° of elevator throw. If you feel you need more than this, check your exponential as it may be too high. Just as a starting point, 35% expo is what I call a linear feel. What I like to have with my expo is when at half stick, I get about 50% of the reaction of full stick, around 35% – 40% expo gives you this with modest control deflections. If I have my stick at full travel, my aircraft will roll around 360° per second; about right for precision. Now when I only move my stick half way, I should be looking for 180° per second. Make sense?

If freestyle/3D flying is your bag, then you're stuck with the downside of long servo arms and will have to pay attention to the servo power delivered in this environment. With my 46% Cap 232, I use 1" servo arms on all surfaces with the exception of rudder which is 1¼". I have 28° on aileron, 32° on elevator and 35° of throw on rudder. For me, this is a good compromise for precision and free flying, but it's biased towards free. With 1" servo arms, and 1½" distance from control horn attachment point to center of hinge line, I'm getting a 1 to 1.5 ratio. More importantly I am maximizing servo power and control geometry. With 1" servo arms my resolution is better, control slop is reduced, and servo wear is greatly reduced. Another bonus is that I don't need as many servos per surface. Give it a try next time you set up your aircraft. You may be surprised. In fact in some cases you may see no difference in control responsiveness by going to 1" servo arms, as with the better geometry you may be reducing any control surface blow back.

One of the biggest challenges I see pilots dealing with is surface blowback. Blow back is when the servos are overpowered by the amount of pressure on a given control surface during full deflection causing the surface to lose holding power and start to push back towards the neutral position. It can also happen when in neutral trying to hold the plane stable or stop it when exiting a maneuver. With blowback, your snaps will be all over the place, both entry and exits. Getting consistent flying is almost impossible. Every time your speed changes your control response will change. Hmm…. I suspect a few lights just went on. Yep, could it be the fact that you're consistently missing your snap exits is due not to your skills, but control blowback?

When setting up your servos, make sure you run the numbers, do the math and figure out just how much power you are delivering to the surface. All servos are rated at inch ounces -- that is, at one inch from the center of the servo. An 8611 is 266 inch oz. on 6 volts. With a 2” servo arm the applied force is reduced to only 133 inch oz., and around 200 inch oz. with a 1½” servo arm. Years ago I was able to measure the forces on my Cap. Believe it or not, the ailerons required well over 30 lbs of force to deflect at 100 mph! Today there are a lot bigger ailerons out there than mine. Please pay attention to this -- it is crucial to consistent flying. If you have to use 1½” servo arms, or 2” servo arms, you will need more servos.

Sequencing.

My concept of sequencing the trimming process is simple. I can’t make this point more loud and clear: It is very important to trim your model in the *correct sequence* to make sure each adjustment has no affect on the previous adjustment. There is an intentional order in which I recommend trimming a model; Model balance, Center of Gravity (CG) is number one. You can’t move ahead until you have a CG you’re happy with. If you change your CG at a later point you will need to start over and check your entire trim setup. Differential, knife edge flight, down line tracking will all be affected by the CG.

Next is dynamic balancing, or “wing tip weight”. Then comes thrust angles, then aileron differential, and finally P mixing, knife edge tracking, roll coupling, down line track and so on. Oh, and if you change your propeller, your whole trim setup will change. ‘Duh’. Been there? I know I have. Make sure you’re trimming with the same propeller you plan to compete with. When I went from a 2 blade to a 3 blade prop on my 46% Hangar 9 Ultimate, I needed 2° more up thrust and 1° more right thrust, plus everything else changed as well -- knife edge tracking, differential, etc… I had to start all over again. The lesson here is to determine what propeller you’ll want to use before you start this trim process.

Balance

OK, how do I know the correct CG for my model? If in doubt, read your model’s instructions; that’s usually a good place to start. For precision flying, forward is better, but… too far forward can be a problem. I can’t put in writing what is the best feel for each pilot, other than it is a feel thing. I can, however, give you some symptoms of too far back and too far forward, plus some simple tests I use to check.

One of my favorite ways to determine the correct CG is spin entries. If, when entering a spin, your model mushes, and kind of slides into the spin with no real stall visible, you may be too far forward. Another sign of forward is excessive down elevator needed for inverted flight. This is not always the reason but is a sign. Rear CG is probably easier to see for most pilots. Some obvious clues are the model is sensitive in pitch, unpredictable around the stall, or climbs when on an inverted 45° line. Again, CG is mainly about feel. The important thing is to determine your CG before you work on any other aspect of trimming your aircraft. I would recommend at least 10 – 15 flights before making the commitment to where the CG needs to be if it’s a new model.

Dynamic Balance

Ok, we’re happy with our CG. The next trim step is dynamic balance. This is really only relevant with wing tip weight. Most other axes on a model aircraft are not affected too much by the dynamic effects of high g loads. But the wings are. Just because they both weigh the same and don’t carry any aileron trim doesn’t mean you can’t have a wing weight problem. I have seen a myriad of ways to test for wing weight trim. Loops, pulling to vertical, and so on. My suggestion is to think about the sequencing argument. If you do loops, or pull to a vertical upline, the engine thrust can have an effect. But we

haven't trimmed our thrust angles yet, so how do we check this? Think about it, what could you do to check your wing tip weight in flight that will not be affected by thrust?

Some of you may have figured this out already but what I do is put the model into a vertical dive with the throttle back (minimum of 3 – 4 seconds) and pull a hard corner at the bottom. No matter where your wings are in roll, when you pull to level, the wings must be level. Check this concept with your stick plane. It really doesn't matter where your wings are. As you pull to horizontal flight your wings must be level. If you attempt to pull a hard vertical from horizontal, you must be absolutely sure your wings are perfectly level. I don't know about you guys but I am not that good! If you go from vertical to horizontal, not only will the engine thrust have no effect, but your wings can be anywhere as you're on a vertical down line.

When you pull the corner, the aircraft may be pointing in a different direction than you planned, but that is okay, as long as the wings are level. Now I know when some of you try this experiment you will notice one wing will consistently drop. You may have to add some weight to the opposite wing tip. I was never really sure if my tip weight was correct until I went to this method. Make sure you only use elevator through the corner. Perhaps, just for the trimming process, you can increase the aileron stick tension to ensure that you don't accidentally input a little aileron with the elevator and the elevators track correctly when you pull the stick back. Don't be quick to make a decision! Have patience and have a friend observe the proceedings. Do many pull outs and make absolutely sure before you move on to the next step of trimming.

Thrust angles

OK, guys, it's time to put aside esthetics and get that thrust correct. I sure see a lot of spinners perfectly lining up to the cowl these days. One of the biggest deterrents to adjusting for the correct thrust angles is once the plane is built and you make an adjustment, the spinner won't line up any more. Once again, when building your model, pay attention to the instructions. Chances are somebody has figured it out pretty close. I like to test fly the model before I paint the cowl. Once I am happy with thrust, I can make the appropriate cosmetic changes to complete the model before painting. For all the money you guys spend traveling and time you spend practicing, do put good model trim ahead of esthetics!

Setting up the correct thrust angles is fairly simple. Well, it's simple to identify, harder to adjust. Now that we know our wing tip weight is correct, we should be able to, with confidence, pull to some accurate vertical up lines. Number one issue with this is making sure your wings are level. Don't guess. Be absolutely sure your wings are level before pulling to a vertical. I have seen people add unnecessary right thrust as they were not level when pulling corners, leaving an inside wing down (normal human behavior) and the model would lean to the left. What I like to do is to fly directly overhead, into the wind, where I can clearly see my wings, then pull to a vertical up line. OK, up we go, first 100' is good, next 100' is good, moving through 500', still tracking well, up over 1000' now, still straight. If you working at it, the best you can hope for is around 1000 or so feet – plenty for most figures.

Speed will have a huge affect on your thrust angle on a vertical up line. Entry speed, compared to speed under load after climbing to 100', will be as much as 30 – 40mph slower. My goal is to trim as best I can for the first 1000'. If I go for 2000' then I typically end up with too much right thrust at the start of the climb and not enough at the finish. Play the numbers, look at the figures we fly and set your model up accordingly.

Here's a great little tip for making the adjustments. Let's say, after many pull ups you really need more right thrust. As you pass through 500' you can clearly see your model drifting to the left. Here is the

cool tip; apply some right rudder trim, and continue to apply it until it tracks straight. Bring the plane in to land and check your rudder deflection. Use a protractor to see how many degrees of rudder you required for a straight vertical. What ever it is, divide it by 2 and that will be what you need to add to your right thrust. For example, if you have 2° of right rudder, you will need to add 1° more of right thrust. It works both ways. If you need left rudder (too much right thrust) you can use the same equation.

Part 2,
Differential

Aileron differential is one of the most important aspects of model trim. With the multiple point rolls on both up and down lines in today's modern patterns, poor differential can be a real headache. The good news is it's pretty easy to detect and adjust for axial rolls. You'll remember from last time that at this stage of the game, knowing that our CG, thrust, and wing weight is correct, we can proceed with our differential setup.

Aileron differential is required when the drag of the down-going aileron does not mach the up-going aileron. If your ailerons are not working in unison, then your vertical rolls will look like a mess. A quick diversion….Make absolutely sure you are not getting surface blowback. You will never get your differential correct if you are. It's easy to check for blowback. Push to a vertical downline and roll to the right, stop rolling for a second, then roll again. The roll rate should be the same. If it is slowing then your surfaces are not reaching their intended throws. Another way to check is if your up line roll rate is faster than your down. Do what needs to be done. Either increase your servo power, or improve your geometry, by reducing the servo arm radius, and/or increasing the distance the control horn pickup is from the hinge line. Or, if you have lots of cash, add more servos. Whatever path you take, you can't afford to have surface blowback as your flying will never be consistent.

Okay, where was I? Yes, how do we know when to add differential? First of all, make sure you have a way to electronically adjust your aileron travel individually. Most modern radios have a differential program. I have used both the ATV function or the differential function and both work well. Checking for differential problems is pretty simple. I have used this method for years and it works. I want you to use the same technique as before when checking for the thrust. Fly directly overhead and away from you. This time only pull to a 45° upline, making sure you are either directly into the wind, or directly down wind. Now, using full aileron deflection, roll to the right. If the aircraft, "walks to the right", then you have too much down travel on your ailerons. If, when you roll to the right, the model "walks" to the left you have too much up travel in your ailerons. Repeat this process to the left as well until you are satisfied that your model is tracking true in the roll axis.

As with the thrust angles, don't expect your model to continue to roll for 5000' on a string. It just can't be done. As per previous recommendations, go for the majority situation. There are not that many 5000' up and down lines. Fortunately. With the correct differential on your model, you will be amazed how easy it is to do hesitations on lines. Another benefit is in point rolls on a horizontal line. Your rudder will now have an even feel on both sides, as your model will not be barreling in the rolls.

Mixing

You will notice this topic is the last in the sequence but for many people it's where they go first! I get phone calls all the time from excited pilots. "Pete, I just test flew my new Edge; it only has 8% aileron mix and 4% knife edge mixing." Boy, I think, they sure got to the details of trimming their model faster than I can. If you stick to the correct trim sequence you may be ready only after 10 – 20 flights to work on the mixing to fine tune your model.

I've broken down the Program Mix (P-mix) topic into 2 sections. The first is the downline torque offset or throttle offset mixing. Second is the traditional rudder elevator/aileron mixing. Most pilots have a fairly good understanding of the latter, rudder to elevator/aileron, but not many are using throttle offset mixing. I have seen some, but only in the pitch compensation. Pay attention to what your model is doing on a down line, or at reduced throttle (idle) in the roll or yaw axis. One of the side benefits of judging our events is that you see a lot of strange trim situations. I can clearly remember models at the Nationals rolling on down lines, and yawing off axis causing some strange looking down line rolls. It's almost impossible to have perfect trim in roll at all speeds. All you can hope for is to mix in some compensation to help reduce your workload.

Both the yaw and roll axis, in most cases, have a bigger affect on your model tracking on down lines than any other situation. Imagine what the effects of a 5° error on every down line would mean. Over the height of the box you can drift in or out by as much as 150'. The same applies to the roll axis. Ever noticed how hard it is to get your wings level when approaching a pull corner with little time? With your model rolling and yawing at different speeds you will never be consistent. It is hard enough to be absolutely sure if your wings are level, let alone chase an out of trim situation. Good news is that it's fairly easy to compensate for.

Throttle to Aileron Mixing

Let's do the roll axis first. You can do this either of two ways and both work well. In fact, I would suggest you try both to get the best input. Version 1 is to climb to a high altitude, simulating a typical top of the box altitude, and fly directly over your head and into the wind. About 50' - 100' out from yourself, push down. Watch carefully to see if the model is rolling on the down line. Most models will roll slightly to the right as the aileron trim set for full throttle will be too much at low throttle as the torque effects will be greatly reduced.

Okay, I know many of you fly with no aileron trim. That's great but I bet you are carrying trim at reduced throttle. Personally, I have never had a model that hasn't needed a little left aileron mix on low throttle. The second way to check for throttle aileron mix is to fly along at level flight, medium height, and reduce the throttle. Watch carefully and see if your model is rolling; chances are it is. Ever wondered why you always have to lean a little left aileron entering spins, or why your model always falls one way? Perhaps it's because your low power trim is not correct.

Throttle to Rudder Mixing

The second P-mix is the throttle to rudder mix. Again, it's hard to get your model to track correctly in the yaw axis at all speeds. Your only hope is to apply a small amount of "left" rudder on low throttle. To check for this, use the same technique as the throttle to aileron (above). Fly above yourself, directly into the wind and push down in front of yourself and watch carefully. You will be amazed, especially at the start of the down line. If you haven't got any throttle offset to rudder, you are most likely flying around the problem and where I find it most challenging is in figure 9's and vertical and horizontal 8's. Any time you are using elevator and are off on the yaw axis, it's a bad day. I can hear all you guys thinking, yes it's true, your model perhaps could need a little rudder mix on low throttle. Give it a try and you will be amazed.

I know of some fairly experienced modelers that use the same theory but reverse where the mix is. They use little to no right thrust on the engine but have right rudder mixed on full throttle. That works well too, I've been told, but haven't tried it myself. One thing you may want to experiment with in both these scenarios is where the mix is activated. For a low throttle left rudder mix, I like to have the stick offset

start at least above half and let it progress from there as you reduce the throttle. It seems to be the best balance, plus I am not getting a sudden mix input -- it progresses more or less with the speed of the model. This will vary from model to model but try to keep the mix activation well above an idle setting.

Rudder Aileron Mixing

Earlier I made reference to pilots applying programmable mixes in their trim program. Notice that this is the last thing you do. Looking through the sequence, each trim adjustment has complemented the next stage. In most cases, for rudder aileron mix, a linear P-mix is all that is required. What I mean by linear P-mix is that you don't need a progressive value to the mix, i.e. less at the start, more at the ends. The mix will be linear. What causes adverse roll or proverse roll coupled to the rudder is the incorrect dihedral. Most modern designs, with the exception of biplanes, are real close and only require a small amount of rudder aileron mix. Some like to put their model on knife-edge, but I like to just do flat turns, simulating rolling turn inputs.

Rolling turns require more precise mixing than sustained knife-edge flight. In fact, in a contest you don't do much flying on your side at all, but you sure do a lot of rolling turns. So, I like to do the flat turn thing. Doing a simple inside rudder turn to the left, using left rudder, the model should just yaw, with no roll affect. If the roll rolls to the left, then you need to mix 2-5% right aileron to left rudder. My Cap is a little unique as it has adverse roll. When I apply left rudder the model rolls right, so I need left aileron mixed with left rudder. Repeat the process with right rudder. Now what I want you to do is vary the speed in which you do you flat turns. If you find, as you increase your speed, the mix becomes too much, you could be getting surface blowback. Sorry to keep harping about this but it is important. With insufficient rudder power, when you apply a P-mix for roll, or pitch for that matter, the mix value will become too much as the rudder throw reduces due to aerodynamic pressure. I see a few lights going on again. Could this be why you have your mix perfect for knife-edge, but you chase your aircraft all over doing rolling circles?

Rudder elevator mixing

I think about three times in my entire life I had a model that didn't need rudder elevator compensation. As with the previous rudder aileron, start by doing a flat turn to the left and see what happens. If your model pitches down when rudder is applied then mix a small amount of up elevator, or if it pitches up, apply a small amount of down elevator. In some cases, even without blowback, the mix value will not be exactly correct for all throttle settings. Don't panic as with most modern radios suitable for aerobatics you can use what is called a curve mix. This mix allows you to have multiple points along your mix curve to increase or decrease your mix value at different rudder inputs. My Cap is a good example of this. At low rudder throws, I only need 1-2% mix, but as the throw increases I need up to 10%. If I just have a 10% mix it will be too much at small rudder inputs. The curve mix is designed to solve this problem.

Tricks of the Trade

I would like to share a few tricks of the trade to help you with your competition efforts. You probably now have a concept of how much work there is trimming a model. Considering all things equal, you will have a hard time beating a person with the same skills as you with a better trimmed model. It took me 20 years to figure most of this out. Be patient, be observant, and be objective. If your model is not flying right, investigate why. Chances are it's just not trimmed. Even if your models are not perfectly straight, you can trim them. I can almost guarantee my models are at the lower half of building accuracy. They all carry aileron trim and elevator trim. I don't have a nuclear powered building bench, with warp speed laser meters. Nor do I have a 12' x 12', 8" thick granite table to build on.

Don’t feel you have a disadvantage if your model is not perfect. You can trim it pretty well. What makes me laugh is hearing people talk about how straight their wings are, how perfectly their model is trimmed, yet even with a perfectly trimmed model they fly with their inside wing down 5°-10°. If you’re not level in all orientations, vertical and horizontal, both at the top and the bottom of the box, you will have a lot of work on your hands. Probably the biggest progression I’ve made in my flying career was when I learned to fly level. The truth was I didn’t know I wasn’t level!

I started watching other pilots and noticed that everybody flew with their inside wing down, nobody flew level. From that point I went home, made up three flags – red, white, and blue -- and asked my helper to go out and stand under the flight path and keep me level. I think red was for inside wing down, white was for level and blue was for outside wing down. The next month of so was one of the most dramatic learning times of my life. My workload doing maneuvers was reduced immensely. I found myself just waiting for the next input, not my normal 54 inputs all the way up the vertical! I could now pay more attention to corner radius, centering rolls within legs and so on. It was a truly amazing breakthrough. I encourage all of you to investigate flying level.

Finally, many people ask me this question, what’s the best thing they can spend their money and or time on to improve their result at events etc. Should I get a more powerful engine, a better aircraft, what style should I fly, and so on. The simple truth is, all of these things are important but the best thing you can spend your money on is gasoline and oil. Practice. Try to avoid letting your ego be your only motivation. Be objective, be humble, listen, watch, and experiment. That’s what all the TOC and Masters pilots do. Sure, we all have egos, but at some stage of our lives our egos have let us down, we were humbled and forced to listen and be objective. Stay cool and hopefully we can catch up at the next aerobatic event!

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The ultimate goal of the hobby stores staff and owner is to keep you involved in the hobby for life and keep you informed with every thing you need to know to get the most out of what ever direction you choose."

2010 Fox Valley Aero Club Calendar of Events

January 1	**First to Fly Fun Fly**	10:00 AM FVAC Field
January 11	FVAC Board Meeting	7:30 Board Meeting at Jeff's House
January 14	FVAC Regular Meeting	7:30 Regular at Township Hall
February 11	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
February 27	**FVAC Annual SWAP**	Kane County Fair Grounds
March 11	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
April 8	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
April 17	**Member Work Day**	FVAC Field
May 13	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
May 28, 29	**Classic Pattern Contest**	FVAC Field
June 10	FVAC Member Meeting	6:30 Board 7:30 Regular at FVAC Field
June 12	**Kid's Day Event**	FVAC Field
June 18, 19	**Al's Helicopter**	FVAC Field
July 8	FVAC Member Meeting	6:30 Board 7:30 Regular at FVAC Field
July 15, 16, 17, 18	**Festival of (ALL)Flight**	FVAC Field
Aug 7, 8	**Chicago IMAC Contest**	FVAC Field
Aug 12	FVAC Member Meeting	6:30 Board 7:30 Regular at FVAC Field
Aug 20, 21, 22	**Festival of Flight (Rain Date)**	FVAC Field
Sept 9	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
Sept 11, 12	**Chicago Pattern Contest**	FVAC Field
October 14	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
November 11	FVAC Member Meeting	6:30 Board 7:30 Regular at Township Hall
November 14	**Annual Turkey Fry**	10:00 AM FVAC Field
December 3	**Annual Christmas Party @ Hilton Garden Inn**	