R/C Sportflyer
July, 2002

Next Meeting at Stamm Field – Thursday, July 11 ***@ 7:00 p.m.*** **(Second Thursday of the MONTH!!)**

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Club Web Site: http://rcsf.freeservers.com/

Minutes of June 6, 2002 Meeting

The meeting was called to order at 7:00 PM by President, John Carnal. There were 28 members and 9 visitors present. The Treasurer's report and minutes of the last meeting were approved.

Safety: Cliff Miller reported that things are going well and no safety issues. Everyone is doing a good job. Bernie Drummond reminded us of wearing sunscreen and hats. Keep yourself protected from the suns harmful rays.

Training: Dennis Tschirhart said that we have a lot of students and they are all progressing well. A number of the new flyers were at the meeting.

Jackson County Parks & Rec: Bernie Drummond reported that the next meeting is the following Wednesday (over by the time you get this). Nothing new from last month. Gary Salva, Director of the Parks department, is still talking with the organizations using park facilities about having only one representative from each activity at the parks meetings, rather than representatives from each club. No decision yet.

Field Maintenance: There was some discussion about the field, primarily around getting the damaged grass replaced. Since we are near the hot part of the summer, nothing much can be done. There is the possibility the parks department can water.

Formation: Dennis Tschirhart talked about the formation team's public debut at Jefferson City. Based on the response of the crowd, they did a great job, in spite of Dennis (literally) losing his engine during the flight. I guess everyone thought that was a part of the demonstration.

Fun Fly: Larry said that everything is set. We had good responses from the hobby shops and distributors. MNC sold us some good stuff at half price. The list of the distributors/hobby shops supporting the fun fly is below.
A motion was made, seconded, and passed to increase the funding of the fun fly to a total of $500.00.

Delta Darts: We had about 28 kids in the first session and 8 in the second. This was in spite of less than perfect weather. The Mid-America Airshow Team flew for the kids. Interestingly, most of the kids were girls. Altogether it was a good event. George Wright has another group of about 8 kids interested in a Delta Darts event.

Atchison Antique Fly-In: About 7 of our club went to Atchison to help at the Antique Aircraft fly-in. We helped man the gate collecting admission and had a static display of models. The gate was located next to the approach end of the runway and was a perfect place to watch the airplanes land. Claud had his scale Stinson Voyager on display. Cam Blazer, President of the chapter, flys a full-scale Voyager. During the fly-in we got Claud and his model with Cam and his full-scale for pictures. After that Cam took Claud flying. Claud said he flew the plane from just after takeoff until just before landing.

Church: Hans has talked with Rev. Goodwin at the church. Rev. Goodwin will be retiring but we will be able to continue meeting at the church next fall.

Next Month's Meeting: Since the first Thursday of July is the fourth, a **motion** was made, seconded and passed to delay both the meeting and following club fun fly to the next week. This makes our meeting date the 11th and the fun fly the 13th.

Raffle Prize: Chick Schumaker won the Dremel cordless tool, complete with charger.

Calendar of Events – Models

Jul 11	RCSF Club Meeting - Stamm Field - **NOTE: NOT first Thursday of July!!**
Jul 13	RCSF Fun-Fly
Jul 13	Jumbo Squadron Fun-Fly (makeup) at JACOMO
Jun 15	Mid States Scale Classic - Hillsdale, KS; John Ostmeyer CD, ph: 913-451-1602
July 20	KCRC Summer Fly-in
Aug 24	Jumbo Squadron Big Bird Fly-In, JACOMO, register at 8:00, flying starts at 9:00
Sept 14	KCRC War Bird Fly-in
Sept 28	RCSF Club BBQ & Fun-Fly
Jun 14, '02	RCSF Fun-Fly (tentative)

Calendar of Events – Full Scale

July 23-29	"Oshkosh" - Annual EAA bash, Oshkosh ,Wisconsin - www.airventure.org
Aug 17-18	Air Show - KC Downtown Airport
Sept 6-8	Huff-N-Puff Balloon Rally, Topeka, KS 785-267-1156
May 24, '02	Antique Aircraft Fly-In, Atchison (tentative), RCSF invited

Thanks to the following suppliers for donations to our 2002 fun fly:

Hobby Haven	FMA Direct	Fox Manufacturing Company
FTE	Great Planes Distributors Co.	Hobby Lobby
Lone Star Models Manufacturing	Model Airplane News	Robart
Sig Manufacturing Co., Inc.	Smiley Antennal Co.	Tower Hobbies
Windsor Propeller Co., Inc.	YS Performance	

Because of all the support from these suppliers and hobby shops I think everyone went home with something from the fun fly. Thanks again to the hobby shops and suppliers that supported the fun-fly.

An article that might be more appropriate for a winter newsletter. But, when I find something I can use in the newsletter, I use it. Thanks to Dave Walker for his effort in committing his knowledge and experience to writing. (And for his permission to use the article in our newsletter!)

Designing Your Own R/C Aircraft
by Dave Walker*

Yes this really is a lot easier than you think, honest. I'm assuming that you have some basic knowledge about the basics of aerodynamics. Now my knowledge is at the very edge of not knowing anything, so just the basics are needed here to obtain what I consider excellent results. One "old timer" at the field told me that if it looks about right, and has the proper CG, and enough power it'll fly. So far he's been dead on.

To date I have designed 2 planes from scratch. Well actually only one from "nothing", and one that was a heavily modified design. I've also modified an existing design, and created a symbols library for use in my drawings.

You need not use CAD to design your own plane, although personally I think it is a lot easier. The important thing is to start small and work your way up. I'm not gonna take you step by step through the process, but rather give you a place to start. I know for me starting was the hardest part.

Where to start?

Good question. I would suggest for your first attempts you modify an existing design. For now this will apply to not only using CAD, but getting started in R/C design in general. It can be on the back of some old plans, or even "on top" of existing plans.

My first design, a twin tailed glider started life as a Goldberg Electra. I had the stock electric motor and it was nothing what I expected in performance. Sure I got a 20-minute motor run, but it took that much time just to get to altitude.

Well since we have a nice paved runway and I like touch and goes, why not add landing gear. I knew I had to have an engine with a throttle and at the time I got a really good deal on a Super Tiger .11, so it became the engine. I also wanted something with a little more performance than a standard polyhedral glider. Well I figured that if one tail was good, 2 must be better, so....

For the tails I kept the fixed and movable area the same as on the stock Electra, just made a different outline. I also re-designed the horizontal in order to make the necessary adjustments to attach 2 tails and their control hardware.

I was really apprehensive about taking this off for the first time, but that proved unwarranted. The flight performance far exceeded my expectations. I was able to make tight control line type circles around myself with the wing almost perpendicular to the runway. Rolls and snap rolls, although not pattern pretty, were easy and fun to do. Inverted flight was a no-no though.

Wanting more performance, I salvaged a glider fuselage with tail from the club trashcan. Wanting something snappier, I shortened the tail moments, and mounted the wing from the above design on the bottom of the fuselage. The other design was great as a trike gear, so how would a tail dragger work? To find out, I mounted the main gear in the wing, and added a tail wheel.

All the above modifications provided a snappier plane, and it was very easy to take off and land as a tail dragger. Now the snaps were very quick, and it rolled much better. Inverted flight was now possible, not easy, but possible. It did suffer some in stability, but still was very easy to fly. The other handled wind fairly well, but this design handled it much better. See where we are going with this?

Failures

Yes you can expect some failures as you improve your design skills. This is part of the learning experience. Just learn from your mistakes, and evolve from them. I take a failure as an opportunity to better some part of the design. What ever you do, don't blame a design flaw on radio problems or something like that. It is too easy to do this, and you really can't improve on a poor design this way. As Lisa Simpson once said, the Chinese have the same word for failure and opportunity.

OK, what can I do to better the low wing, powered glider design? Well a buddy was flying a Florio Stunt Wagon, one of the first Fun Fly types. The thing looped around it's CG using flaps coupled with the elevator. Now if I added flaps

to this design... So I added inboard flaps hooked to the unused rudder channel. I just cut, and hinged the trailing edge. Using the rudder channel I used left control for down flap, and right control for up flap.

Well this did absolutely NOTHING in flight. I was hoping for some tighter loops, both inside and out, using up or down flap. Well let's make those darned things bigger. I added twice as much area by adding more balsa to the flaps. Still nothing. Well I kept adding till I had about 4 times the normal area, and had about 40 degrees throw with full stick. NOTHING! Don't know why, as this should have effected flight somehow, but it didn't. Well with all that fiddling, I weakened the wing to where it folded in a really tight turn.

So how did the twin tail meet its demise you ask. Well after a lot of abuse, including folding one outer panel at the outer polyhedral break (I think it was the control of the twin tails that allowed me to land it), I lost the tails when flying in a very strong wind. They just flew off, but since I was right into the wind I landed without incident. Well if those 2 tails made it turn so well, why don't I make bigger rudders with the entire surface moving. That is I centered the movement over the centerline of the control surface, and the entire vertical was moving. Well the first take off was the last for this guy. Soon after take off I knew I was in trouble. I was moving the rudder stick, but nothing was happening!!! I could see the surfaces moving, but the plane was not responding. My guess was that I had equal amounts of movable control BOTH ahead and behind the center of rotation. Since this was the ONLY control I had for turning, nothing happened. It crashed into a tree straight ahead, and totaled the fuselage. Live and learn. I did throttle back, and had elevator control, so I know the radio was working just fine.

Next Step

OK so where do you go from here? Well my next step was CAD, and heavily modifying an existing design. Up to this point I was roughing out a design on continuous feed computer paper, and making the parts to fit. Nothing too complicated. Well I've had the usual "Where did you get that plane?" and "Can I get the plans from you?" with the 2 powered glider designs I flew. So on to CAD it was. Well I tried the DOS version of ModelCAD with very poor results. I am a computer geek by trade, but I never used CAD, and had a heck of a time with it.

I also knew I wanted to have a Sig Kadet Senior with ailerons and flaps, and a bomb door, and a glider tow release, and an external payload release, and a... Well I finally ended up building the thing making the changes as I went without much success with CAD. Now don't get me wrong here. I liked the way my modified Kadet flew, but it lacked aileron authority at slow speeds, as I just made simple strip ailerons & flaps.

My big break came when I had a huge mid air with my buddy's modified Kadet Senior. He flew right through the center of my wing, although he will adamantly deny that :-). OK, so how can this be good? Well it was about this time that I picked up one of the Windows version of ModelCad at a swap shop and, since the midair totaled my Kadet, I needed a new one.

It took a while, but after making a few symbols to get warmed up with the CAD package, I was ready to design a "real" wing for my modified Kadet. Now a Kadet wing panel is basically a rectangle with a few extra goodies added. First I drew the basic wing as it existed in its normal design. This simple design was rather clumsy for me using ModelCAD, but I got it done in a few evenings. Next I added the ailerons & flaps & hardware. I printed a set of plans & built the wing from it, making a few modifications to the plan as I built.

Now why modify one of the best flying planes (IMO) around to begin with? Well see my section on my modified Kadet for that story. Later I converted the plans (well almost completed the task) to DrawingBoard format as I have found this to be a far superior CAD package over ModelCAD as far as a non-CAD user goes. I even tried the Win 95 version of ModelCAD as the guy at the Toledo booth said it would cure my woes with the other version. Not the case.

So the next step is taking a design that you know flies well, and change it to suit your flying style. This would make the perfect introduction to CAD, and designing at the same time. Some examples I can think of are making a low-wing stick, adding bigger ailerons and flaps to the ACE Wizard .40 trainer, or make a low wing Kadet Senior. Remember, even the best CAD package will allow you to very easily design a poor flying plane. The key when starting out, weather you use CAD or not, is to start with something simple. Just as you learned to fly on a trainer, not a fully decked out warbird, you must learn design at the "trainer" stage.

Your Own Design

Ok now that you have made some modifications of an existing design, time to take the plunge, and start from scratch. You could go for the complete scale approach here, and if you do, I can't help. I personally don't go for scale as I like to fly the heck out of a plane, and not worry about babying it. If you want to go sport, here we go. For my first design I used a known platform for a basic reference. By this I mean I took the proportions of a design that had the qualities I was looking for. After all, how many really original designs do you see? For this design, it was my friend the Sig Kadet Senior. Yes this plane again. As you can tell I like it whole heck of a lot. And so does a company that is selling plans for the cadet (note spelling) as their own design. A picture on their web site looks exactly like the Sig Kadet pictured on the box, right up to the trim. I am not including their address, as I do not support this plagiarism in anyway.

Now I wanted a twin that was easy to fly, and had great yaw characteristics. I wanted it to be gentle to fly, yet would do some aerobatics. I wanted it to be large, but use my trusty K&B .40s I had in an existing twin that was a real dog. To start off I took some basic measurements for where the tail is in relation to the wing. I used the stab and elevator design pretty much as was, and modified the fin & rudder a bit; mainly to add area as this is a twin. Now I don't think that anyone out there would confuse my fuse design as a Kadet, but the tail moments are the same.

For the wing I choose an 18% symmetrical airfoil (as suggested in a poll I conducted on the rec.models.rc.air newsgroup), an 80 inch span (in case I ever want to fly in an IMAA event), and a slightly different aspect ratio than a Kadet. I did use the same basic aileron design that I used on my modified Kadet. For wingtips I borrowed a design from an old timer I am flying now. I have flown it, and it sure exceeded my expectations. So far all those who have seen it do not recognize it as a Kadet (well almost), but it was designed very closely to a Kadet "underneath".

So pick a favorite design and give it a new twist. You still don't have to go the CAD route, but at this point things will get a whole lot easier if you do. I know guys who still plot ribs by hand (and rather quickly too), but it is hard to beat CAD for speed, accuracy, and flexibility. With CAD you can make changes very easily and quickly. You can save a design, and if your changes didn't come out just right you can revert back to the old "version". As an added bonus, you can send off your CAD file to have the ribs, formers, etc laser cut.

Into to CAD

I forget exactly what year it was when I tried using CAD to design a model airplane, but it was during the DOS version of ModelCAD era. Being a computer professional by trade, and I did have some drafting in high school, I figured how hard can it be? Well for me it was very difficult. I gave up a few times, and it wasn't until the Win 95 version of ModelCAD that I actually produced a useful drawing of a model airplane, well at least a wing anyway. Some of the problems I had with the Windows 3.x version were that screen draws were painfully slow, I was only able to add 5 layers, changes to tool bars were not easily saved (I edited the *.ini file to save the settings), and only one drawing at a time could be opened. The Win95 version was a slight improvement in screen re-draws, but that was about it. And I was running a Pentium 60 with 24MEG of RAM. At the time this was a top machine as the 486 was still king in sales.

Well to cut to the chase, I ordered a copy of DrawingBoard when I first saw their ads. I figured what the heck do I have to loose, it had a 30 day money back guarantee. Well with in the first 5 minutes of opening the program for the first time I was very productive. The Modified Kadet wing, which took days to draw in ModelCAD, took about 2 hours with DrawingBoard. Without going into much detail, this CAD package made using CAD for designing models a reality for me.

When starting with CAD I suggest not just diving into a project. Way too much room for error. I started making symbols that I would use when designing my planes. In a very short time I have built a rather extensive library that many have said have a professional quality. They were even chosen to be included with a book on teaching CAD. Anyway, by starting with something simple like symbols, you will learn the little tips and tricks that will work for your style. Also by doing this you will be able to learn the basic functions of your CAD package, and get used to the user interface. By building your symbol library you will also be making something that you can use when you actually design your first plane. And while you're at it, you can share with your new friends in the Cyber Sea.

In addition to the symbols I also designed an auxiliary workbench for my shop, and flight box for my LMH 100+ Helicopter. By working on these small projects I was able to work on solving some problems I had with the CAD package. Not problems, per say, just figuring out how to do something like lining up the tangent of a circle to a point some distance from the circle, etc.

Well here is a low resolution picture of the my Modified Kadet wing (check the web site or let me know if you really want a picture - Walt). As you can (kinda) see it has ailerons and flaps. All kit supplied wing components are used. Very little additional wood is actually needed. I also included 18% fully symmetrical ribs as a reference if you want to go this route. I built mine flat bottomed as supplied and have not regretted it.

So far this has been the wing for the Kadet. It is about 5 generations old. With the large barn door ailerons you can slip it the whole way in and still have aileron authority. I have the flaps set up for mechanical differential. That is, it is on a 3 position switch. Position 1 is full up, position 2 is about 30 degrees, and position 3 is about 80 degrees. Position 2 gives you some nice lift without much pitch change. Position 3 gives a lot of drag with a severe pitch change at flight speed, but makes diving at the field a real pleasure. Full flap also makes it loop real tight (with full elevator of course). Looping in landing is a whole lot easier than it looks.

Even though this is a Kadet, with the large barn door ailerons you can knife edge, 4 point roll, do rolling circles, and even roll on take off. The only thing the plane really won't do is a spin or snap, but hey, what do you want from a Kadet.

On engine selection. The only engine I recommend for it is a K&B .65 sportster. I have well over 400 hours on it (Yes I keep a log) and it is still going strong. The secret here is swing a 14x6 prop. Most .60s just scream with a 12x6, and this is not enough prop for this plane. The huge prop disk, when at idle, really slows the plane down nicely. As an added bonus I have flown almost 1 hour on 12 oz of fuel, and this was not just putting around at idle, but doing touch and goes, and other stuff.

The plans are not completely finished yet, but I printed a copy for a fellow modeler who has only been in the hobby for about a year now, and he had no problems building from them as is. I'll also add some instruction soon. You can down load the plans in your choice of formats. If you do snatch a copy, be sure to let me know how they worked out for you. Also, I can then E-mail you the updated plans & instructions.

*By Dave Walker (e-mail: daverc102@attbi.com)
Home page: http://home.attbi.com/~daverc102/index.htm - Dave's R/C 102
Document Source: http://home.attbi.com/~daverc102/rcdesign.htm

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Here is one of the really old airplane jokes. Until you have heard this one, you really can't be counted as "one of the old hands." It's " the moose joke."

A bush pilot in Canada had the job of flying into a lake and picking up a hunter. He locates the lake, lands, taxies up to the edge of the lake and ties the plane to a tree. When he looks over to the hunter and his equipment, he sees the biggest moose he has ever seen. "Look" he says to the hunter, "I told you when I flew you in, I can't take you, your equipment and a moose back. The plane can't carry that much weight. I can make two trips if you want, but you'll have to pay for the extra trip." Then the hunter says the magic phrase that challenges every bush pilot, "The pilot last year did." So they load up all the equipment and tie the moose to a pontoon. The pilot taxis to the very far end of the lake, turns into the wind and gives it all the power the engine can possibly produce. At the very last minute he pulls it off and, to his amazement, the airplane flys. Then the pilot looks up and, just ahead, is a ridge he can't possibly get over. He stalls it into the trees at the last minute. There's a moment where everything is a confusion of green, aluminum, blue sky. When everything comes to a stop, the pilot climbs up out of the trees and wreckage. When he get out of the trees he sees the hunter. Without thinking he says, "where are we?" The hunter replies, "Oh, about 100
feet higher than last year."

And now all of you are "one of the old hands" in aviation.

I wouldn't want anyone to think I waste a lot of time at work in unproductive meetings, etc., but I did start on my original creation of "Real Airports" while sitting in a meeting. Hope you like it. Walt

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Real Airports
by Walt Calkins

1. Real Airports do NOT have control towers.
2. When a Real Airport Person (1) walks into a Real Airport, he's greeted by first name (HI-ya Jake!)
3. Real Airports have "offices" and "lounges," not "terminals" or "jetways."
4. You can land on grass at Real Airports.
5. Real Airports have picnic benches where you can sit and watch the airplanes.
6. Real Airports have at least one airplane with a round (piston) engine.
7. Real Crop Dusters (as in contrast to "aerial applicators") fly from Real Airports.
8. Real Airports are busiest on weekends.
9. IFR to/from a Real Airport means, "I Follow Roads."
10. Visual meteorological conditions at a Real Airport means you can see the end of the runway.
11. Pattern altitude at a Real Airport is anything above the trees.
12. Real Airports have trees.
13. At Real Airports you can drive to your hangar.
14. At Real Airports security is the other flyers and Smith & Wesson.
15. At Real Airports pilots and passengers use the same lounge.
16. At Real Airports you do not need "progressive taxi instructions" to get from the runway to the ramp (See #1, above).
17. Real Airports have airplanes with tail wheels.
18. Every day at a Real Airport is a good day (or, a bad day at a Real Airport is better than a good day at work).
19. Real Airports do not have things like displaced thresholds, high intensity approach lights or precision instrument approaches.
20. To get to the airplane at a Real Airport you walk across the ramp.
21. At a Real Airport, the pilot and passengers walk to the airplane together.
22. After you park your car at a Real Airport, you do not have to take a bus to get to where you're going.
23. Real Airports have airplanes with names like Stinson, Aeronca, Taylorcraft, Cessna, Stearman, Waco, Piper and Beechcraft.
24. Real Airports do not have little televisions hanging from the ceiling listing flights.
25. There are no numbered flights that arrive at or leave from a Real Airport.
26. Pilots at Real Airports do not wear uniforms.
27. If a pilot at a Real Airport is wearing a uniform, it's blue jeans and a sport shirt.
28. At Real Airports, people wear clothes with things like EAA, IAC, AAA and the like on them.
29. People at Real Airports know what things like EAA, IAC and AAA mean.
30. The lounge at a Real Airport has a VFR planning chart of the US as wallpaper on one wall.
31. There'll be a compass rose on top of the airport and a string hanging from it.
32. It'll be well used.

(1): A **R**eal **A**irplane **P**erson is a pilot, mechanic or propeller head, not a "Captain," "First Officer" or "Maintenance Technician."