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**The Next Meeting: Thursday, July 6,  
at the South Lyon field on Rushton Rd  
Start and flying time: ASAP  
Final Meet Plans**

**Model Electronics P-51  
from Watts Current - Dec. '94  
editor: Rich Simpson**

I just finished building a new P-51 from Model Electronics. It's an all foam model with a few wood bulkheads. The injection molding work on the foam is really good. I am not into scale paint jobs, so I just painted the wingtips red to be able to see it and left it at that. I am using the "War Emergency" motor with a 6:1 gearbox they provide, a 13x7.5 folder and 10 cells. The sound of this high-speed motor and gearbox in a powered dive is... wicked.

I flew it twice today... almost destroyed it the first time out (ailerons reversed!). The second flight was great. It will go straight up vertically almost forever and will do lots of aerobatics.

This is my first non-glider type electric and I am happy with the results. The P-51 is a bit weird to launch because there's no fuselage under the wing. You have to grab it from behind the wing and balance the weight of the battery/motor which is all forward. I didn't have to run or even walk, I just pushed it forward. The wing comes

with mounts for a landing gear, I might give in and put one on.

For the first time in my modeling life, I followed the instructions and set the control-surface throws as per the instructions.... for tomorrows flights I am changing everything! No, just the ailerons, they need twice the throw the diagrams suggest.

Pete @ Model Electronics said that the Zero is injection-molded with the wing skins already in place, so you wouldn't have bare foam like I do on the P-51. What is amazing about this model is that they put in the control linkages for the ailerons, spars, hinges and gear mount into the mold. There's basically no slop in the aileron mechanism right out of the box. This is unlike the days when I flew wet power and decided to try one of Combat Models' foam F-16's. The finish wasn't as good and it was heavy.

This foam job was made by Kyosho a long time ago, they couldn't get it to fly very well at all 'cause they were trying with six cells, direct drive (ROFL! !!). Peter @ Model Electronics apparently

## Ampeer

**What's  
in this  
issue?**

**MEP P-51 - European vs Sermos - Building the Begin-Aire -  
Parable of Beauty - Building Light - Electric Glider Tug & SR  
Max Motor - June Meeting and Midwest Demo Fly-in**

made a deal with them and is now selling these kits with a tailor made power system. - Martin Euredjian

Based on their ads, I always thought the Model-Electronics airplanes were SureFlite kits. When I saw them at KRC and asked the question, I was proved wrong. Also, they seem to be a bit smaller.

I was impressed by the static demo, basically a WEP motor with gearbox, huge prop (13x6-10 I think) and 10 cell pack mounted on a board. The owner, Peterson(?), lets you hold the board and, when he plugs in the battery, it almost pulls you around the parking lot. I saw Dave Baron fly the P-51 a couple of times. Great performance, as good or better than a glow model of about .20 size. Just what I would like to fly. The only rub is that the whole setup runs about \$300. I don't want to spend that for my next model, even though it's an ARF. I've already got the packs and charger, and some larger motors, so I'll probably just get the gearbox and put it in a built-up model. Anyway, I can't deny that the Model Electronics stuff looks like it delivers the advertised performance. Ron Farkas

To everyone who has lost his canopy from Graupner UHU, Elektro Junior Sport: (and Elektro Junior, for that matter) forget the \$27 replacement canopy. There is a better canopy from Graupner and it's cheaper. It's about 1/16 thick molded white ABS and it holds on with an internal rubber band (much better than the gimmicky UHU method). Stock no. from Hobby Lobby is GR4291/1. Price \$9.90 Jim Martin

#### European Connectors vs Sermos

Swiss Gold - 0.200 mOhm - 4 dia. x 15 mm - ??? g  
SERMOS - 0.250 mOhm- 8.5x8.5 x 41.5mm - 3.2g  
4mmGold - 0.300 mOhm - 5 dia. x 16 mm - 1.6g  
(variations exist)

2mm Gold - 0.560 mOhm - 2.5 dia. x 13 mm - 0.2 g  
(for comparison: a \*top\* ESC has about 2 mOhm in the FETs alone) Johann.

#### From the Dec. '94 *Silents Please* BEGIN-AIRE at FIRST GLANCE

by Jay Putt

A couple of days ago I received a new kit from Craig Wagner, part-owner of Aerocraft. It was a pleasant surprise when the kit arrived because I know Aerocraft is a small company and they must serve their commercial customers first. Craig had promised me one of the first kits last summer, when we compared his proto-type BEGIN-AIRE to the Future Flight Thermal-Thing I was flying at the time, but I never expected him to actually be able to send me one.

The Thermal-Thing is 450 sq.in. and the BEGIN-

AIRE is 475 sq. in. Both are naturals for the Graupner 6 volt Speed 400 on 5 or 6 cells, and either direct or gear drive. The Thermal-Thing had been somewhat of a disappointment, requiring some redesign by Tom Hunt before it would fly acceptably well, so I was excited by the nice performance of Craig's new model.

To start, here are some basic statistics:

Wing span: 68 in.

Wing area: 475 sq. in.

Flying wt. : 23-26 oz.

Power: Speed 400 (6 v.) (The plans show direct drive but I plan to use a gearbox)

Battery: 5-6 cell 500 mAh SR max recommended

One nice point is that this model is designed solely for electric power. It is not an adapted glider. The plans are a delight to read, clearly laid out, and of high quality. One side is printed upside-down to the other so that you can always work with the side you want close to the edge of the table without having to roll the plans in your lap. A nice touch.

The instruction book includes a complete identification of the different stick wood sizes and includes a complete parts list. The text is amplified with excellent illustrations that enhance what is already on the plans.

Construction techniques look strong, but simple. The "snap-together" crutch assembly for the fuselage is particularly notable. Tail surfaces are built-up and I wondered why the stab looked so familiar until I realized that it's just like the one on my Aerocraft Apache. The only change I plan to make at this time is the addition of shear webs between the wing spars in the center sections. It may be overkill but it's a habit I've gotten into and I'm comfortable with it. (So do I - km)

On examining the rest of the kit, I found that the stick wood is full box size rather than cut to shorter lengths to save money. The ribs are machine cut, sanded, and absolutely beautiful, while other assorted pieces are cut and ready to use.

There is a full set of hardware, bagged, and stapled to the inside of the box. Included is fiberglass reinforcing tape and line for the pull-pull rudder control. The included steel pushrod was carefully taped to the bottom of the box where it can't do any damage. The plastic cowl for the nose is "perfect" and the lite-ply die cut parts are ready to fall out of the sheet. In fact, the balsa fuselage sides are so well cut that they did fall out of their die cut sheets while I was examining them. Nice work, Craig!

Even though my building time is limited these days, I'm excited enough by this kit that it is going to be my next project. I hope that some other SEFLI members decide to try it too so that maybe we can do some one-

design flying together. This has been done with pylon racing but I never could fly those twitchy little monstrosities. According to my sources, this kit is now available from Tom Tyler at Patchogue Hobbies (516-475-8856).

Speed 400 size sailplanes are quite common in Europe and Dave Durnford has already sent me some interesting plans for them from Britain. It's a nice size, fits in my hatchback, and can actually land on our small field.

My experiment with the Thermal-Thing this year was disappointing (the wing fractured in flight) but I think the design was rushed into production without enough testing. By contrast, Craig has done exhaustive testing through a number of prototypes with the BEGIN-AIRE and most of the bugs should be worked out.

For a small company, Aerocraft has put out a beautiful, quality kit. I thoroughly enjoyed building their Apache and I am looking forward to building the BEGIN-AIRE.

## SECOND INSTALLMENT --

### CONSTRUCTING THE BEGIN-AIRE

BY JAY PUTT - Jan. '95 *Silents Please*

My intent here is not to repeat what's in the instructions, which are very complete and nicely illustrated, but rather to add my own comments and suggestions during the building process. Therefore, if you're not actually building a Begin-Aire, this will probably bore you. But if you are a novice and have bought the kit, I hope some of what follows is helpful.

#### WING

The wing is built in 4 almost identical panels. All of the ribs are the same size, which is a nice touch in a beginner's kit, and the sheeting and capstrips are the same on all panels. However, care must be taken where the center and tip panels differ. There is only one dihedral gauge as all panel joints are made at the same angle. But, the two center panels get angled ribs on both ends, while the two tip panels have an angled rib on just one end. This means that you must be careful to make right and left tip panels. If, like me, you have two right hands and two left feet, this can lead to problems. Being momentarily distracted while I was building, I carefully glued a wingtip to the wrong end of a tip panel with fast-acting CA. I guess that's what they really make razor saws for. Seriously, just be extra careful while making the panels.

Some small suggestions are as follows:  
 Instruction #7 - don't try to trim the trailing edge flush with the bottom sheet until you remove the wing panel from the building board.  
 Instruction #8 - the notches in the top of the ribs are not

deep enough for the 3/16" sq. spar (Craig Wagner explained that this is due to an anomaly in the manufacturing process). The easiest way to deal with this is to sand the spar lightly before installing it.

I made the following modifications to the wing:

1. I installed 1/16" shear webs the full length of both inner panels and one rib bay past the panel joint in the outer panels. This is just a personal preference but one that makes for a much stiffer wing.
2. After laying out and gluing the bottom sheets and strips for the outer panels, I placed shims under the waxed paper to build-in 1/4" washout at each tip. After constructing the panel, it relaxed to about 1/8" washout, which is exactly what I wanted to start with. Don't try this if the Begin-Aire is your first kit, it can get messy.

#### TAIL SURFACES

The stabilizer, fin, and rudder are very straightforward and only warrant a couple of comments. The 3/16" X 3/8" X 36" stick stock in my kit came in two very different weights and stiffness. I made sure the long pieces were made of the stiff stuff. The "optional" lightening holes in the rudder are 1 1/2" diameter. Don't leave home without them!

#### FUSELAGE

The crutch assembly is an interesting and innovative part of the fuselage design. If assembled carefully, making sure all pieces are glued square to each other, it becomes almost impossible to end up with a twisted or warped fuselage.

However, my kit had a slight discrepancy between the length of the crutch and the length of the fuselage sides forward of F4. The fuselage sides were slightly shorter than on the plans, so that when F4 was lined up forward of the marked dowel holes, F3, F2, and F1 were too far forward. This was easily corrected with some trimming, but a beginner might get too far along before noticing. The rule here is measure before you glue. When assembling the crutch, it is important to get good square joints. I use the 1" thick small Plexiglass triangles that Larry Goldstein used to sell at SAM contests.

Another suggestion is when building the fuselage sides, lay in the second set of 1/8" square strips along the edge of the sides, leaving a break for the formers, before attaching the sides to the crutch. The instructions tell you to put in the second set of strips after assembly. This is OK if you have skinny fingers and never have any CA runoff on the inside of your fuselage. Need I say more?

**One note:** I ran out of the supplied 1/8" square strip wood before finishing the fuselage. Maybe I'm just a sloppy cutter!

The recommended batteries are 5 or 6 cell SR MAX 500's for the Speed 400 motor (6 volt). After assembling the fuselage I inserted a six cell (3 in a row, side by side) pack into the battery compartment and it fit perfectly. For a 7.2 volt Speed 400, a 7 or 8 cell 500 MAX pack will also fit.

Any model of this size should use mini-size servos and a micro 4 channel receiver, but there is ample room in the fuselage for a number of receiver, receiver battery, and speed control layouts. There are sufficient openings for cooling and the passage of electrical wiring. As I said in the first article, this model has been designed from the start for electric.

### **BUILDING The BEGIN-AIR! - 3RD INSTALLMENT**

#### **Installing the hardware - by Jay Putt**

from the March 1995 issue "Silents Please"

editor: Don Mott, P.O. Box 264, Upton, NY 11973-0264

This is the third article in a series on building this new electric sailplane kit by Aerocraft.

One general piece of advice to beginners is to follow the instructions in sequence, except where I've noted changes in these articles. In a couple of instances, when I did things in my own preferred sequence, it didn't always work out. In reviewing my 2nd installment, I realized that some readers may have felt I was being too critical of this kit. Just to make sure there's no misunderstanding, I feel that the BEGIN-AIR! is a very well engineered kit. It is also a very new kit, just off the production line, and the manufacturer asked me to look for any problems during construction. Those that I have found are of very minor consequence.

#### **Installing the servos and control linkages**

When I first looked at the elevator and rudder control mechanisms, I was concerned that they might prove difficult for a beginner. However, having worked through the instructions carefully, I think the only issue is how much care the builder takes in assembling the controls, not his or her skill level.

Here is one place where I would advise departing from the sequence in the plans. Install the servos before fitting the tail surfaces to the fuselage and tack gluing them in place. I didn't and whacked the fin off against the work bench while screwing down a servo.

For a model this size, there's no need to use expensive servos. The ones I used are Tower Hobbies TS-31's. They're mini-size and weigh only .65 oz. Recently, I purchased 3 of them from Tower for \$71.97 (23.99 ea.) plus 5.99 shipping. They fit almost perfectly in the BEGIN-AIR! servo tray and hole cut-out in the crutch.

In installing the elevator servo, it is important to pay careful attention to why the Dubro Easy Connector is installed on the "bottom" (actually the side facing the center of the fuselage) of the servo arm. If you don't do it this way, the assembly will not fit in the width of the fuselage. In my case, the supplied "socket head set screw" did not fit the threads on my easy connector. A quick trip to my miscellaneous parts bin produced one that did but this might be troublesome to a beginner who hasn't collected this stuff yet. I also had to modify a small allen wrench to fit between the connector and the servo tray. My solution was to use the cut-off wheel on my Dremel tool to shorten the wrench, but you could also cut a groove in the servo tray to permit a longer wrench.

The other possibly difficult task for a beginner could be soldering the clevis to the elevator pushrod. Again, careful work could be a substitute for experience, and after all, this joint just has to work, not be pretty.

The pull-pull rudder linkage may look difficult at first but it really isn't. Just follow the instructions carefully and there should be no problem. I resisted my first inclination to just put in a Sullivan GoldenRod and be done with it, and actually had some fun building this part. For me, it was like a model ship rigging enterprise since I had already sheeted the fuselage bottom and sanded the complete fuselage before I got to this step. The reason for this departure from the instructions is that I wanted to do most of the sanding before installing any radio equipment.

Control linkage step #18 in final assembly is very important. You must make sure the temporary pull strings have ample clearance through F4 to the servo arm. I had to do substantial trimming of the two out-board cooling holes before the strings would clear without touching F4.

The instructions tell you to tack glue the tail surfaces in place while making and installing the control linkages. I would suggest masking tape and pins as an alternative. If you must use glue, try white glue rather than CA. If, like me, you often go "oops" with the glue bottle, tack gluing can quickly become a permanent installation.

#### **Final Wing Assembly**

I waited until this point to complete the assembly of the four wing panels because I wanted some pictures of the component parts. This is easier to do with the wing in four pieces.

Since all of the joints are attached at the same angle, one block, 2 1/8" high, is all that is needed. I made up one out of those famous Goldstein triangles. The poly-

hedral joint for both wing halves is completed first. I used 12 minute epoxy after holding down the panels with masking tape. A piece of waxed paper is placed under the joint.

Once both halves are set, the center dihedral joint is fastened the same way. Both of my outer joints went together exactly as measured with the supplied dihedral gauge. However, my center angle was a bit off. I must have screwed up the end rib angles during construction.

Before assembling the panels, I weighed each panel in an attempt to choose inner/outer panel combinations that would balance each half of the wing. It came out pretty well because after all four panels were attached, only a tiny amount of lead shot was needed to balance the wing. It is my opinion that balancing the wing on one of these small gliders makes for better flight characteristics.

The entire uncovered wing weighs 5 oz., and all of the completed parts (fuselage with 2 servos, tail pieces, wing, pushrod, hatch, and cowling) weighs 11.5 oz., so far.

I must say that while my work schedule makes this a slow building project, I am having a lot of fun with it. The instructions are great because they are broken down into easy to follow steps that make it possible to sit down for a few minutes in the evening and accomplish something meaningful. Some of the purists in the club may scoff at this, but for me it's a big plus.

Please, I would like some feedback (516-689-6420).

#### **4TH INSTALLMENT-FINISHING UP AND FLYING - by Jay Putt**

As I begin writing this, the BEGIN-AIR! is complete, just waiting for dressing up with some A.M.P. Graphics (516/253-2702), followed, hopefully, by some nice flying weather.

#### **Covering**

There's really not too much to say about covering the model. I used yellow Super-Monokote but any similar material should work fine. The only difficult parts were the wing tips. The wing is covered in four pieces on each side and I extended the top outer panel covering pieces to include the tips. The bottom of the wing is flat at the tip and poses no problem. However, the top piece was a challenge that required a lot of stretching and heating. It could be covered separately, in two or three pieces, but I was too stubborn. The only advice I can give the beginner is don't get upset by a few inevitable wrinkles.

#### **MOTOR INSTALLATION**

As mentioned in the 1st article, I installed a 6 volt Speed 400 with a 2.3:1 Olympus gearbox. To

attach this unit to the Sonic-Tronics motor mount required major surgery on the gearbox. Since the gearbox sits forward of the motor, the supplied plastic cowling also required a lot of cutting. In fact, when I was finished, the cowling fit better upside down. Obviously, I was determined to use a geared motor, but I do not recommend this installation for a beginner. For starters, I'm going to use the same 10 X 7 AeroNaut folding propeller that I've used with this combination before. Initially, I planned to use an SR 6-cell 500max pack, but as the project developed, it seemed as if the increased voltage from a 7-cell 500 max pack would be more appropriate. The 6 volt Speed 400 runs just fine on 7 cells. Eventually, I'll fly it with both 6 and 7 cells.

#### **FINAL ASSEMBLY**

In putting all the pieces together, the only modification I had to make was to cut a shallow 'V' in the top of bulkhead F3 to allow the wing to seat properly. Adjusting the pull-pull strings for the rudder was tedious, but not difficult. Rather than attach the bottom battery compartment hatch using the rubber band method shown on the plans, I made a simple slide hook out of a piece of nylon landing gear strap that catches on a small screw. Much to my surprise, when I put everything together, the balance point came out slightly forward of what's marked on the plans. This is the way I like a model to be for the first flight.

#### **FIRST FLIGHTS**

Sunday, March 12 was the first time the BEGIN-AIR! was flown. It was a cold, blustery morning out at the Calverton field with the wind gusting all over the place. Since pictures were to be taken for a possible magazine article, Tom Hunt (as pilot) and Clyde Geist (as photographer) had graciously offered to help. We had planned the time to fit our busy schedules so we took the weather as we found it. Surprisingly, the two flights on this morning were a big success. It was difficult flying too because Tom had to hold the BEGIN-AIR! just a few feet off the ground and circle it around Clyde for the pictures. At some moments the wind was so strong that the model was completely stopped in the air, hovering like a helicopter, while under power. It's unfortunate that this is all the flying I have to report but I wanted to make the newsletter deadline. However, if early indications are a guide, the BEGIN-AIR! promises to be an excellent, stable flyer. Aerocraft has done an excellent job in designing it and producing the kit.

#### **REVIEW OF EQUIPMENT USED**

I know I've mentioned some of this in previous articles, but for those of you who might be interested,

here's a list of what I used in building the BEGIN-AIRE!:

**Motor:** 6 volt Graupner Speed 400

**Batteries:** 6-cell & 7-cell SR Max 500 packs

**Transmitter:** Airtronics Vanguard 4-channel

**Receiver:** RCD 535 micro 5-ch

**Servos:** 2 Tower Hobbies TS-31's

**Prop:** AeroNaut 10 X 7 fiberglass folding

**Gearbox:** Olympus 2.3:1

**Speed Control:** Airtronics MA-3 with BEC - I can hear some of you howling about this now. Yes, I plan to install a small on/off controller with brake as soon as

I can find one I like. I had the MA-3 and it works fine so I used it and saved the weight of a receiver battery.

#### FINAL NOTES

I want to thank Clyde Geist (A.M.P. Graphics) for finishing the trim exactly like the picture on the kit box. It's beautiful! And thanks to Tom Hunt for flying the BEGIN-AIR! superbly on its initial test flights.

#### The Parable of Beauty

Once upon a time long, long ago in a far away place, there lived a lad who wished to learn how to fly. He had a burning desire to try his wings, but as a youth, he loved beauty. His first model was a scale plane, a thing of beauty with wings that glistened in the sun. Alas, on his first attempt to fly, he crashed. His plane of beauty and graceful lines had become vicious and spiteful in the air.

After the crash, his enthusiasm waned, he vowed never again to try flying. He would become a monk and build plastic display models. He sank lower and lower into despair. As he was about to build his first plastic model, a wise old sage interceded and spoke words of wisdom to the lad.

"My son," spoke the sage, "your obsession with beauty has led you astray. Consider the young woman who is fair of face and body. She, you say is beauty."

"But," continued the sage, "place her on the athletic field and she is as the pig when it is chased by the terrier, slow afoot and ungainly. Now consider the amazon who runs like the wind and glides over the hurdles. Does she not possess beauty and grace?"

"That is true," answered the lad, "but how does this apply to flying?"

The sage then explained his parable to the slow thinking lad. "Your plane with scale detail and wings that glisten in the sun is like the girl that is fair of face and shapely of body. It possesses physical beauty but is slow and ungainly in the air. You must strive for functional beauty, for grace and agility."

"I begin to understand, old one," stated the lad. "I

shall build a plane of great functional beauty."

The youth turned to leave, then reflected on the sage's advice, and turned back to him asking, "Wise one, do you have any other words for me?"

The sage spoke again, "As the maiden of great beauty is soft and fragile, so is the scale plane. The stout and sturdy woman may be considered ugly but she is strong and will serve you well throughout a long life. So, too, is the strong and functional airplane."

The lad looked as if he would speak, but the sage held him to silence with a raise of the hand.

"Finally," continued the wise one, "one does not learn the art of love from the virgin. One learns from a woman of experience. Likewise, one should learn to fly from an experienced flyer."

"I have learned much today," spoke the lad. The wise one smiled, content that he had shared some small measure of his wisdom.

And the youth departed, thinking not of flying, but where he could find a woman of experience.

Author Unknown

#### Building Light

by Russell Bennett

from the AMA National Newsletter - Aug. '94

There is nothing quite like the feeling of watching the glider that you just tossed into the air get sucked up by a small energetic thermal. This is, for me, one of the real joys of handlaunch glider flying. So, in an effort to have more fun, I try to build planes that thermal easier. Now, when it comes to indicating lift and staying up in light lift, lighter is better. But how do you build a light airplane? Two areas I have often wondered about are wing skinning adhesives and covering materials. In the past I had read things like "Micafilm is the lightest covering" and "diluted yellow glue is lighter than epoxy," but I had never seen any numbers. So I decided to do a little research.

I cut squares of balsa wood and covering materials, each approximately 20 square inches. The dimensions of each piece were measured and the area calculated. Using a balance which has a resolution of 0.0001 g, I started weighing. For the liquids. I would weigh a piece of balsa wood, apply the adhesive or paint, allow it to dry, then weigh the wood again.

The weight of the applied liquids will vary depending on who does the applying, however the relative weights of the different materials should remain the same. The results were interesting. Take Micafilm as an example. When used on an open structure, Micafilm is very light, however, when used on a sheeted surface

where it is necessary to have a continuous coat of Balsarite, it is actually on the heavy side. You would be better off using transparent Monokote. For all of the materials tested, the transparent colors were significantly lighter than the opaque colors. This is due to the transparent colors being tinted with a dye while the opaque colors require a layer of relatively dense pigment sufficiently thick to block most of the light. The 3M 77 spray adhesive is an example of how much the weight of coatings can vary between "just enough to do the job" and "that should never come unglued." The following are the weights I came up with:

Material Weight	(oz/sq.ft)
EZ-LAM epoxy on balsa	0.127
Diluted aliphatic resin glue on balsa (3:1 with water, applied with a sponge roller)	0.086
3M77 spray adhesive (2 surfaces, light coats)	0.037
3M77 spray adhesive (2 surfaces, heavy coats)	0.143
Monokote (opaque: white and orange)	0.250
Monokote (transparent: red and green)	0.185
Oracover (opaque white)	0.267
Supercote (opaque yellow)	0.177
Micafilm (pearly white)	0.136
Micafilm (clear)	0.073
Ultracote (purple)	0.228
Lightspan (blue)	0.086
Clear Mylar w/adhesive (Model Research Laboratories)	0.134
Water based polyurathane (one coat applied with a sponge brush)	0.122
Balsarite (one coat needed for applying Micafilm and Lightspan)	0.094

from Baltimore Area Soaring Society News Baltimore, MD

### The Wing's Too Big!

by Carl F. Brandenburg

from the AMA National Newsletter - Aug. '94

Big airplanes are fun! It's just a pain in the south side, hauling them around in your average car. My car can manage a five foot wing of 10 to 12 inch chord, but beyond that, it gets sticky. It hurts to slam the door with your aileron hanging out!

What to do? For a seven to ten foot wing, it is possible to part it in the middle and make two "handleable" wing panels to haul. However, the center of the wing has the greatest bending moment, and it usually contains the aileron and flap/spoiler servos, plus the fittings to attach the wing and fuselage.

On my 2 times size Super Stick and the 83 inch span Kadet Senior that I am presently building, I chose to separate the wing into three sections; a five foot center section plus two shorter outer panels. This allows a solid center section spar and wing structure, a fixed in place aileron structure and a straight forward wing/fuselage mounting system. In each case it is necessary to build a spar slip joint to carry the loads of the outer panel into the center wing section and to split the ailerons just outboard of the aileron drive horn and key or pin these outboard sections to the driven portion of the ailerons on the center wing. Neither of these two tasks is too daunting or excessively heavy. It is somewhat of a design challenge to make the parts fit easily and to be simple and positive to fasten in the field, but these tasks are not difficult. It is essential to insure that outer panel deflections do not cause a separation of aileron drive pins, but this is not difficult. So, if you have a problem getting your big wings into your car, buy a station wagon or try building a three piece wing. I believe that the economics suggest a three piece wing I could be wrong of course!

from Carrier Wave - Phil Moore, Editor - McDonnell Douglas RC Club - St. Peters, MO

### ON A BET OR A DARE - An Electric First

Steve Anthony - Feb. '95 *Silents Please*

It was about 4 years back, while out at the Long Island Falcon's flying site, that I got an idea. I was watching "Tony's Towing Service" in action; a big 1/4 scale Curtis Robin hauling off the grass via towline a 130" sailplane. The Robin had a releasable tow point somewhere near the C.G.; and the sailplane was towed from the nose, also with its own release. It was a wonderful show; the Robin, with the hammer down and the tail up, "breaking loose" the huge sailplane, the sailplane rising while the tug gathered speed, and finally, the tug is off, climbing, slowly gaining altitude.... ah, 'twas a wonderful thing to watch. When Tony had a free moment, (a rare thing; that tug was in the air dragging sailplanes almost non-stop!) I wandered on over to pick his brains. I believe his reaction to an "electric tug" was "WHAT?!?!... not even on a bet!"; and so another electric challenge was born.

That afternoon, while on the long trek home, I started to give some serious thought to the project; and some of the difficulties seemed to be a lot bigger than initially anticipated. The airframe would need to be of unique design, the weight to power

considerations would be of particular importance. The motor and motor control would be very expensive, and endurance of the battery system would at best be marginal considering the amperage requirements to produce enough power to both "break loose" the sailplane AND haul it to 1000 feet... I shuddered to think what all of this was going to do to my cat; anything big enough to haul a sailplane up was gonna do double duty as a cat taxi. That year, for Christmas, the cat got a leather flying jacket, goggles and a helmet; I got some SR packs.

As time worn on, the "Tug" project was shelved in lieu of an electric pattern ship, a couple of new electric sailplane designs, a biplane, a scale project, a bunch of OPP's (Other People's Projects) and a growing daughter. Who, incidentally, made it clear that her cat was NOT gonna go flying without a parachute. (Hmmm; I wonder how much the chute's gonna weigh?) Ah, well; time wore on, a bunch of new products appeared, I got a new job, and the tug gradually became a distinct possibility with an "off the shelf" group of components. Electric Flight technology has steadily marched ahead; the pieces necessary to accomplish the task are now readily available! Finally, over this past Thanksgiving weekend, the whole thing came together in about 10 hours!

The Tug airframe is a Hanger 9 "EZ-Fly 40" Trainer A.R.F., with absolutely no attempts made to lighten the airframe. In the interests of ease of assembly, I chose install the tailgroup servos out in the breeze right on the tail. To help facilitate the tow situation, I set her up as a tail-dragger, and added a non-steerable, castored tail wheel. The tow point was positioned 1/2" behind the C.G., operated by a mini-servo mounted on the bottom of the wing.

The sailplane is a Great Planes "Spirit" 2-meter; with 3 standard sized servos (1 ea rudder, elevator, tow release) and also has no concessions to lighten the load. The tow point was from the nose, the choice being up front or from the belly. A belly tow means you will have to hand launch, nose towing allows me a scale-like rise off grass launch. The preferred sailplane roll control system for the nose tow would be ailerons to keep the wing level, the rudder/elevator/poly-wing combo on the "Spirit" would make the sailplane pilots job rather exciting;

the sailplane wants to go one way, the nose tow point is pulling it in another direction, and the rudder input to correct the situation develops adverse yaw... as I said; the "glider guider" has his hands full!

Would you believe the power for all this combined weight 10 lbs! was a pair of 05 size motors? Would you believe only 16 cells? Would you by chance be willing to place a bet? Its true! The motors are the just-released SR Max<sup>7</sup>'s; neodym magnets, light weight, high power output and low current draw! To get the power to the prop, the final missing link was a gearbox, and Clyde at AMP provided the project with one of his just-released "AMP-Air" twin motor gearbox's. This marvelous jewel mounts two matched motors side-by-side to drive the same shaft. The SR Max<sup>7</sup> motors, The AMP-Air GBox, and one SR Max 1500 Series 16 cell pack turned the 13x8 Master Airscrew Electric Series prop at 5500 RPM, drawing just 25 amps! On Clyde's first static thrust test the test rig hopped clean off the bench! We measured over 75 ounces of thrust from this combo AFTER the thing had run for a couple of moments. Hot stuff!

Later that same evening I plucked out the Astro 40 geared motor we used to flight test the tug and tow geometry, and installed the SR/AMP-Air power assembly. The Tug lost better than a half pound between the motor weight and reduced battery pack size, and further allowed us to utilize an FX35D motor controller - also considerably lighter than the Astro 205 we tested with. More power and less weight again! I just LOVE the new stuff we got; every ounce of weight I can remove by proper equipment selection results in a net gain in performance and endurance - VERY important in electric flight!

The next Saturday morning we met at the Calverton flying facility; a site not unused to historical flights both for modeling and full-scale; for this is place that saw the first flights of Grumman's Tomcat Fighter, the Intruder, the X-29 and Tom Hunt's first successful VTOL R/C model. Sadly; the model field isn't the 4 star facility the Full-Scale site is, we only have a 100x60 foot grass (and stubble) landing strip. No trouble for Tom's VTOL; and



great for model "Aircraft-Carrier" type practice; but for cripes sakes, fellas, this is a GLIDER TOW! I kinda like; you know, need a bit more room....? We set up initially with an upwind takeoff across the field. After two attempts, it was very apparent that 60 feet of field wasn't going to be enough. The tow line was 26 feet long, we just couldn't get enough roll to get the tug up before we ran out of field. So; we did the only thing we didn't think the rig would do, and that's a crosswind takeoff. Without a steerable tailwheel on the tug, and without positive roll control on the glider, we were asking for a disaster. We needn't have worried, for Larry Sribnick (umpteen billion hours on full-scale gliders) tamed the bucking "Spirit" and I horsed the tug into the air with about 2 (nah, coulda been 3) feet to spare- no problem 'atall, y'all! And folks, it looked just grand! We got the sailplane to 1000 feet in jig time, Larry got a 15 minute flight, and I landed the tug with my knees knocking and the biggest grin you ever saw. After a quick check-over on the tug we proceeded to put up 3 10-12 minute flights, shooting touch-and-goes, doing lazy rolls, loops, inverted flight, stall turns, and just generally messing around. The E-Z Fly 40 is in fact a very nice "Trainer", the control authority and honest flying characteristics this ship demonstrates will no doubt usher in a new era in the credibility of "ARF" type models. Hats off to Hanger 9 for this fine flyer.

**The real hero's** of this story are Larry Sribnick of SR Batteries, and Clyde Geist of AMP Products. Larry has been working on the development of NEODYM magnet motors here in the U.S. for several years. Endless fussing with prototypes, developmental headaches and difficulties have finally borne fruit! SR's Max 7 and Max 10 neodym motors offer far more power, at lower current levels and less weight than anything else flying today. Factor in Clyde Geist's AMP-Air side-by-side dual motor gearbox and suddenly the net power increase becomes more than that of the two motors taken individually! What appears to be happening is that ONE prop on ONE shaft has the base power of the TWO motors, PLUS the added efficiency gains of TWICE the brush area, and TWICE the commutator surface area. Simply put: 1+1=3. No kidding! The efficiency gains provided by spinning one prop and

shaft by 2 motors produces MORE power than 2 motors and 2 props! When the ease of assembly, minimum modifications to the airframe, lighter weight, smaller battery packs were all added up, we discover that an old electric adage no longer holds true. It used to be that we could fly the 40-sized ships with electric power, but to get "Wet" performance, we would sacrifice flight endurance; 3-5 minute motor runs would be the norm for an decently powered 40 sized trainer. The words "Electric Trainer"; like "Military Intelligence" simply did not belong together! The first because Electrics don't provide flying authority AND endurance; the second for the obvious (at least, to any ex-serviceman) reasons. With the SR MAX/AMP-Air power system, I get 10-12 minute solid flights on the 40-ARF, doing all the things a fledgling pilot would need to do. Guys, that is easily an 10 oz. fuel tank's worth of flight training on every flight! With a purpose-designed electric aircraft flight times increase even more- Clyde's Porterfield easily pulls down 20 MINUTES OF POWER-ON flying! There is only one thing left to do... Here Kitty, kitty... kitty.. Nice kitty.

### June Meeting

#### June Demo at Midwest R/C Field

The June meeting was held at the Rushton Road Field of Midwest R/C. Yes, it's back. Unfortunately, only a few of you attended, but we did have a nice time flying. The July meeting will be held at the Rushton Road Field and is very important, since it is just before the July Fun-Fly. Please try to make it.

On June 20 the EFO and friends put on an electric Demo for the Midwest R/C club. It was a wonderful evening of flying, almost a mini-fly in with lots of different types of planes. The EFO members in attendance were; Ken Myers, Jeff Hauser, Ernie LaBelle, Tom & Ernie Bacsanyi, Richard Utkan and Dave Weatherup. Guests of the EFO included Keith Shaw, Ray and Chad, Art and Bob and Midwest member Bill Brown.

**Highlights** included: Keith Shaw flying Ernie Bacsanyi's Goldberg Ultimate biplane - 60 powered; Keith flying Dave's Graupner Partnavia with twin speed 400's - THIS PLANE NEEDS AILERONS!; Kieth's Aveox powered biplane - the Flashback; Jeff's landing gear staying on the bottom of the wing; Ken's really warped tailed flying of his Senior Skyvolt.