the Ampeer

July Special Edition 1997 Page 1

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The Next Meeting:
Date: Thursday, July 3 Time: 7:30 or ASAP
The Rushton Road Flying field, South Lyon, MI
Located between 9 Mi. & 8 Mi. , east side of Rushton Rd.

Getting Up to Speed - 400 That Is Part 2 - Building Light & Strong

by Chris Boultinghouse
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This article is from the
March 1997 DEAF NOTES
newsletter of the Dallas Electric Aircraft Fliers
edited by: Frank Korman
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In Part 1 of this series of articles we discussed the basic requirements for a successful Speed 400 powered design. Part 2 will give you some ideas for building a light and sufficiently strong airframe for your own Speed 400 design.

It will come as no surprise to anyone who knows me that I prefer to work in composite materials. Even though I cut my teeth on balsa, and still have a fond place for it in my heart, almost all of my recent designs consist mainly of foam, fiberglass, carbon fiber, Kevlar and epoxy. That's not to say that balsa is inferior! In fact, I will spend a fair bit of this article discussing balsa and how to use it in conjunction with 'high tech' materials to build a very light structure. I will also discuss all-composite airframes.

Balsa: Nature's Wonder Wood

Anyone who has been around modeling for more than a few days will have worked with balsa. They will probably also be aware that balsa varies wildly in weight and strength from sheet to sheet (and even within the same sheet). It goes without saying that you should choose your wood carefully for any electric powered project, but especially for a Speed 400 project. Every gram counts here! The tendency for most modelers and designers is to over build the structure. There is always that temptation to add "just a little more" wood or epoxy "just in case". Well, I'm here to tell you that it just isn't necessary to do that with Speed 400 planes. If you are building a simple "slab-sided" sport plane, use 1/16" sheet for the fuselage sides. 3/32" sheet is sufficient for tail

What's in this issue?

surfaces, or even 1/16" will work if you put a layer of 1.5 oz. fiberglass over it to prevent flexing. Of course, tail surfaces can also be built from sticks and covered with film or tissue, but on planes this size I find that the weight savings over sheet surfaces is negligible (especially compared to the work involved!).

Fuselages: Evil, but Necessary

For me, the fuselage is the most tiresome part of the project. I'm a wing man, and fuselages are just a convenient place to put the radio, and a handy way to keep the horizontal stabilizer in the right place in relation to the wing. Oh, I guess it also gives you a place to put the motor and battery. Details.. details.

Now, more about my recommendation for using 1/16" balsa for the fuselage sides. Too flimsy? Nope. The trick is to laminate some 1.5 oz. fiberglass to the insides of the fuselage pieces before assembly. This is very easy to do! Simply mist some 3M #77 spray glue onto the glass and smooth it in place on the balsa (before or after cutting the sides.. .it makes no difference). Now gather some 15 minute epoxy, a mixing stick, a spreader, (a scrap of balsa is fine), a wadded up paper towel and a hair dryer or heat gun.

Mix a generous batch of epoxy and glob it on the glass. Spread it around with the spreader. Don't worry about making it thin.. .just cover the glass. Now grab the paper towels and the hair dryer. Warm up the epoxy until you see it start to make waves in the wind from the dryer. Then quickly wipe the (now very thin) epoxy with the towel. You have just soaked up every gram of excess resin and firmly pressed the glass to the balsa. You have the added benefit of heat-curing the epoxy, which not only speeds the cure but also tends to make it stronger. Of course, the wood is now much stronger than it would be otherwise and will resist splitting.

The final benefit is the fact that CyA adhesives have this strange love affair with epoxy, so the bond between these pieces will be tenacious when you use CyA for assembly. This same laminating process can be used for 3/32" balsa formers and for 1/16" balsa tail surfaces (glass both sides).

Fuselage construction now proceeds normally. I use 1/16" plywood laser cut motor mounts. These nifty mounts are available from Tim McDonough (217-523-8625). For a minimal charge Tim will send you two laser cut mounts and metric mounting screws. These are an exact fit for the Speed 400 motors and are true works of art.

Velcro is great for securing battery packs in place. You already have a fiberglass interior for your Velcro to stick to.

Servos can be mounted in a variety of ways. One neat trick is to drill a 1/4" hole in the fuselage sides and use 1/4" dowel through the sides for your servo rails. This doubles as a fuselage stiffener. Personally, I remove the mounting flanges from my servos and simply glue them into the fuselage bottom with either GOOP or **RTV**.

Once your "Composite Balsa" fuselage is built, I recommend the glass treatment for the outside as well. It adds little weight, but much strength.

You can also build an all composite fuselage without fancy molds or vacuum equipment. Simply take a block of foam and carve away everything that doesn't look like a fuselage. Inset any wood pieces (wing bolt blocks, firewall, etc.) into the foam. Add one layer of 3.4 oz. glass/epoxy, sand smooth (after the epoxy cures), and add a layer of 1.5 oz. glass/epoxy. For something this small, only remove the foam where necessary for equipment space. If the walls are really thin, add 1.5 oz. glass/epoxy to the inside cavities after the foam is removed. A Dremel sanding drum works well for foam removal chores. With this method you can build very "swoopy" fuselages with minimal effort. My very first Speed 400 plane (a Hawker Hurricane) was built using this method.

I have also been experimenting with brown wrapping paper and epoxy over foam. This seems to work best on wings, as the paper resists the compound curves of a fuselage. I'll talk more about paper a little later.

Decorations on either fuselage type can be done with Magic Markers or frugal application of spray paint. Just remember to keep it light!

Wings: The Magic Parts

Okay, now the fun part. There are almost as many different ways to build a wing as there are airfoils to choose from. We'll talk a little about both.

When it comes to airfoils I've tried many, but have settled on a few favorites:

Goe432: This is a highly cambered (4.5%) but thin (8%) airfoil that is best suited for powered glider or heavy lifting applications. It is, in fact, the airfoil used on my Corn Dagger HLG kit. It has very good manners, relatively low drag, and incredible lifting ability. Coordinates are available on the UIUC/Selig web site (http://opus.aae.uiuc.edu/~selig/ads.html).

RG14: This is my all-around favorite airfoil. I use it for all my Speed 400 Warbirds and have even used it with success on a modified Corn Dagger (3rd place Expert, 1996 TNT). It is a low camber airfoil with very low drag, good stall manners and good lift ability. I highly recommend it for any electric application where you want a good speed range and low drag. Being rather thin, heavier airframes will require a spar, but it isn't necessary with Speed 400 designs.

Clark Y: An oldie but a goodie. This airfoil is fairly thick (12%), with fairly high camber, but is an incredibly good choice for virtually any electric project. I used it on the Aveox/CAB Hawker Hurricane (1/8 scale), and was more

than pleased with the results. Despite what you may be told, it is suitable for mild aerobatics, (certainly anything that a Warbird would do), and is very easy to build with conventional methods due to the flat undersurface from the spar to the trailing edge. It would also work well with Speed 400 designs if you desire a slightly more docile flight profile than you get with the RG14.

These are but three out of thousands of possible airfoils to choose from. Just because I haven't used an airfoil doesn't mean it won't work well! Don't be afraid to experiment.

Construction methods vary, but I'll touch on some of my favorite methods.

Conventional construction (in my book) means ribs, spars, leading edge stock, trailing edge stock and possibly leading edge and/or center section sheeting. This is certainly a valid choice for Speed 400 designs, and has been covered countless times in other articles. All I'll add to this is the advice to choose wood carefully and if you use leading edge sheeting it should be no thicker than 1/32".

A variation on "conventional" is to create a bottom wing skin (1/32"), glue on a spar, add a few ribs, (not as many as normal), and a leading edge piece. Once this is dry, simply add the top spar and skin. This will give you a very strong wing that only requires a light sanding to be ready for finishing. My favorite finish for balsa wing skins is tissue and dope. It is very light, fills the grain and adds strength.

Now we move to foam wings. The most common type is a white foam (expanded bead polystyrene) core that is then skinned with balsa or obeche veneer. Adhesive can be contact cement, double-sided tape or epoxy. I prefer epoxy.

From there, you move to a variation on the method above, where you cut normal foam cores, but do not use the entire core. Instead, you place the bottom wing skin in the lower core cradle, (the shell from which the core was cut), add a spar, then ribs that are cut from the core itself. This will save a little weight (since you don't leave all the foam in the wing) but of course is more time consuming. This method actually has more merit on larger projects where substantial weight can be saved by eliminating much of the foam core.

From here we progress to gray or blue foam (extruded polystyrene). This foam is a bit heavier, but substantially stronger and more resistant to crushing. This is the type of foam best suited to vacuum bagged fiberglass skins. I could write a book on this method, but here's the Reader's Digest version:

Cut .014" **Dupont Mylar** "skins" for the wings. Wax well, then paint the Mylars with **Krylon** (or similar paint). Prepare the foam cores. Attach a 1" strip of 3 oz. glass tape to the leading edge of the core with 3M #77. Cut two layers of 1.5 oz. fiberglass to cover the Mylars with some overhang all around. Mix a batch of laminating epoxy and wet out the glass (over the Mylars) using a foam roller. Blot away excess resin with paper towels. Now make a "sandwich" of this entire gooey mess (Mylar> glass> core <glass <Mylar), and put it in the vacuum bag.

The upper (or lower) cradle goes under the vacuum bag (not inside) to keep the wing flat. Once the wing is positioned in the cradle, place the upper cradle on top of the bag and add a couple of bricks to press the wing flat. Seal the bag and draw vacuum (17-24 inches). 24 hours later, peel out and trim the flashing from your nearly finished wing. It sounds simple, and it really is, but it does require a fairly high initial investment in equipment. Which leads me to the next method....

Everyone has seen the heavy brown paper that is used for wrapping boxes. Commonly known as Kraft paper, it is 60# untreated brown paper. The fact that it is untreated means that it will soak up resin (which is a good thing for our purposes). This paper can be used in place of fiberglass for wing skins, and can be used on fuselages provided there aren't too many compound curves. For wings, fold a piece of paper and lay the wing core into the folded paper trailing edge first. Now mark around the core and trim the paper to fit flush with the edges. Use a foam roller to apply epoxy to the inside of the brown paper then place the core inside. Roll some epoxy on the outside (to seal the paper) then put waxed paper or coated freezer paper on the outside. Now put the whole mess back in the cradles. Place on a flat bench and stack weights on it until the epoxy cures. This will give you a wing that is similar in weight to one skinned with fiberglass, but doesn't require vacuum bagging. Of course, it's pretty dam ugly, but hey, it's cheap! If you want it to be pretty, swipe some light spackle on the wing, sand smooth. Now you can prime and paint.

I hope this gives you some ideas for lightweight construction techniques. Next time we'll present the plans for either the Brownie or Speedie (haven't decided which) so you can build a Speed 400 racer and go fast, turn left.

Year Code	Month Code
R-1987	A-January
S-1988	B-February
T-1989	C-March
U-1990	D-April
V-1991	E-May
W-1992	F-June
X-1993	G-July
Y-1994	H-August
Z-1995	I-September
A-1996	J-October
B-1997	K-November
C-1998	L-December

Sanyo Date Codes
via WATTS CURRENT
Aug. 1996
Doug Ward, editor
R.D. #1, Box 189
Irwin, PA 15642

If for example, you find a ZE code, the chart reveals that the cell was made in May 1995.

The Speedy Bee by Clancy Aviation

from Dereck Woodward
e-mail: woodwadd@erols.com
Subject: Speedy Bee for the Plane Ratings

Ken

The Speedy Bee by Clancy Aviation, I'll give it a four star rating.

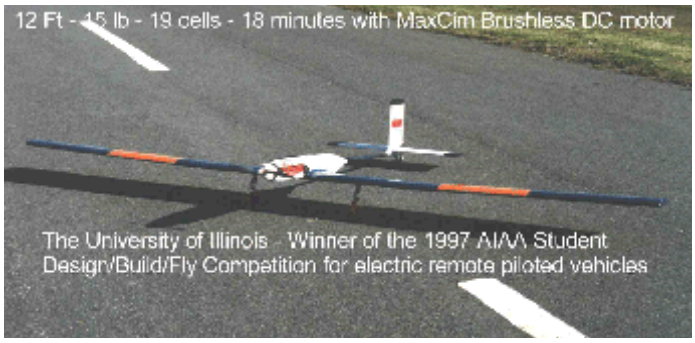
Mine has micro RC gear with an Astro 05G, eight 1700's and Master Airscrew props - either an 11 x 9 wooden Electric or 11 x 7 "S" series. Flying weight is 51 ounces - my only gripe - with more "Lazy Bee" structure instead of "convenience", it would be lighter, fly better. Mine is absolutely stock - for a kit review in EFI. The best die-cut kit I've built, cutting and parts accuracy are outstanding. Three sheet plan is the same one RCM sell as a construction plan, with all parts and even the "works" colour scheme shown for templates. Monokote covering doesn't help the weight - should have used Micafilm. Kit has many of those little details that make it outstanding - you even get a pre-cut and printed set of parts to make up the full dashboard panel for the Williams Bros. pilot shown on the plan.

I flew for a while with lower control throws, now have vast throws - ailerons 1-1/4" each way, elevator and rudder approaching one inch. Take - offs are easy to keep straight, but needs a hefty pull to lift off. Suspect suction between that 14" chord wing and the ground - but this is no problem and the subsequent steep climb out looks cool. Landings - you can put it down just where you want. I have flown mostly off hard surfaces. Slow and fast flight - well, there isn't that much difference between the two!

Aerobatics are as wild as my Lazy Bee, with real inverted capability added. She'll do presentable four point and slow rolls and needs little down stick for inverted. All the usual loops, rolls and combination manouvres are there, the stall is straight ahead and docile. The wing will not stay stalled long enough to spin or snap roll - the maximum roll rate is fast enough to imitate an Avalanche loop that few will argue about! Still shies away from outside loops, the flat bottomed wing is not going to play that game. Attracts attention like little else!

Speedy Bee is growing on me fast. Well recommended for the extrovert flier who wants something different looking. Don't bother with low power combos - I did fly her on a Graupner FG3 motor/box combo, spent all the flight on full power just to keep it fun. If you want relaxation, go for the long wing Lazy Bee, Speedy Bee is for moving, not loafing.

A Win For MaxCim



from Tom Cimatoe-mail at: MaxCim@compuserve.com
57 Hawthorne Dr., Orchard Park, NY 14127-1958
Phone/Fax 1-716-662-5651

Hi folks,

MaxCim Motors contributed to a winning effort!!

The University of Illinois chose to power their winning entry with a stock Max15-13Y Brushless motor with 3.53:1 Model Electronics gearbox and our Maxu35-25NB Digital 25 cell Speed Controller. They used a 15x12 prop. I made the 19 cell - RC2000 packs for them, each weighing 39oz.

Here is the statement from the team leader describing the winning effort:

"I am pleased to report that we have won the Cessna/ONR Design/Build/Fly contest. The flight of record was 12 laps (about 12 minutes), which was good enough to win by a large margin. We attempted more flights later to see what we could do. We completed a 16 lap flight, but did not land legally, so it didn't count. Finally, we flew the aircraft until the batteries were exhausted and completed 20 laps (about 16-18 minutes), again we had some landing difficulty. One reason why we were not careful about landings was because, we knew that we had already won and our first concern was the safety of the aircraft.

The entire propulsion system performed flawlessly."

This is a perfect example of the wide range of performance and the part throttle efficiency that we offer the average E-Flyer.

BTW, Virginia Tech was second, powered by an Astro 15G, and Texas A&M was third with power by Aveox, West Virginia Univ. was 5th with a Max15 setup also.

The Univ of Ill. plane has a 12 ft. wingspan with a 12" chord and a Clark Y !! airfoil. Final weight is about 15lb. and they flew at an average of 35 fps.(24 mph - I think!).

Regards,
Tom Cimato - MaxCim Motors, Inc.

The contest description follows:

The AIAA, through the Applied Aerodynamics, Aircraft Design and Flight Test Technical Committees, is pleased to announce the First Annual Student Design/Build/Fly

Competition. The contest will provide engineering students with an opportunity to apply the knowledge gained from their analytical course work to a UAV class aircraft design. Student teams will design, fabricate, and demonstrate the flight capabilities of an unmanned electric powered radio controlled aircraft with the maximum range on a limited battery weight. The effort must produce a well balanced aircraft with good flight handling qualities and practical and affordable manufacturing requirements along with high vehicle performance. To maintain a fresh design problem for each years student team the performance objective will be updated for each new contest year. Trophies will be presented to the 1st, 2nd and 3rd place teams, and the winning team will be invited to present their design at a future AIAA technical conference.

Objectives:

Aircraft will be designed to provide the maximum range for a given battery weight. Range will be determined from the maximum number of complete laps made over a specified flight course.

Each aircraft must:

Complete a take-off over a 10 ft obstacle within a marked 300 ft runway area. Complete as many laps of the flight course as possible with the available energy. Land within the marked 300 ft runway area.

VIII. Aircraft Requirements

The aircraft may be of any size and configuration except rotary wing or lighter-than air.

Must be propeller driven and electric powered with an unmodified, over the counter model aircraft electric motor. May use multiple motors and/or propellers. May be direct drive or with gear or belt reduction. For safety, each aircraft will use a commercially produced propeller.

Teams may modify the propeller diameter by clipping the tip.

Must use over the counter NiCad batteries. Battery pack weight must not exceed 2.5 lbs.

PHASE

Each aircraft will carry a removable 7.5 pound steel payload. The payload may be segmented into no more than 3 pieces, each of which must be rectangular in shape. (Wedges, cylinders, or other "sculpted" shapes are not allowed).

Aircraft and pilot must be AMA legal. This means that the aircraft TOGW (take-off gross weight with payload) must be less than 55 lb.

IX. Flight Demonstration

Aircraft will be judged on the maximum number of complete laps over the specified flight course.

The course consists of:

An un-assisted takeoff over a ten foot obstacle (ribbon) within a marked 300 ft zone.

Aircraft will then fly as many complete laps as possible over the specified course. The course will consist of two 180 degree turns at least 700 feet apart. (Turn spotters will be located 200 ft from either end of the take-off/landing zone.) On the downwind leg of the first lap the aircraft will make a level 360 degree turn to the right and a level 360 degree turn to the left. Both turns must be initiated after passing the upwind spotter, and be completed before passing the downwind spotter.

Flight altitude must be sufficient for safe terrain clearance and low enough to maintain good visual contact with the aircraft. Decisions on safe flight altitude will be at the discretion of the flight line judges and all rulings will be final.

After completing as many laps as the team calculates is possible with the available energy the aircraft must return and land within the original marked 300 ft zone.

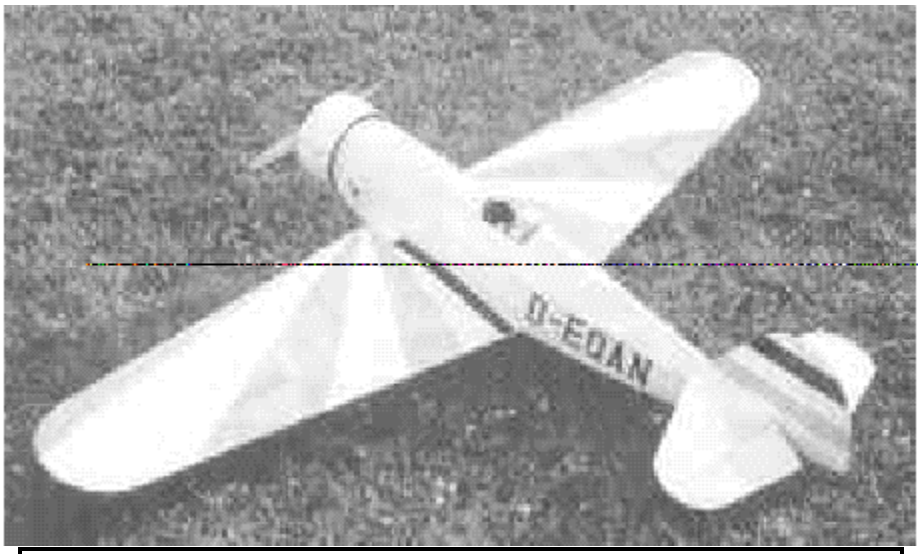
Total flight time must be at least 3 minutes. No components may be dropped from the aircraft at any time during the flight. Upon landing, the aircraft must be capable of a second flight with no repairs or service other than recharging the batteries, and possible replacement of the propeller(s).

Partial laps do not count.

A one lap penalty will be added for any aircraft which lands on the runway, but not within the marked 300 ft. landing zone. Aircraft which land off of the runway will receive no score for that flight.

Each aircraft will be presented for judging prior to the first flight with the payload installed. The team will then demonstrate removal of the payload in no more than 10

(cont. on page 9)



Note that this is the M35a Model that Keith refers. The "round" front end has now been replace by the more streamlined in-line version, making it the M35b.

Keith Shaw's Repowered M35b

from Keith Shaw
2756 Elmwood, Ann Arbor, MI 48104

Hi Ken,

It was good that the weather held off long enough that we could fly together on Sunday, and that you could see and believe the performance of the Messerschmitt. Here are the requested specs, and a little history.

History: Europe had fierce pecision aerobatic contests in the 20s and 30s. Germany entered some of the contests by the late 20s. At end close of WW1, the Treaty of Versailles restricted German aviation by imposing a 25hp engine limit. Because of this restriction, Germany developed gliders and sailplanes to a fine art to keep the interest in aviation alive. Also several civilian manufacturers (Klemm, Beucker, Messerschmitt) produced some very efficient powered aircraft (more like powered gliders) for club flying and training; some of these were even capable of decent aerobatics. By 1930, the restrictions on powered flight were relaxing, so somewhat larger engines began to showing up in these planes, sufficient to let them enter European aerobatic contests.

The original M-35 was a two-seat low wing aerobatic trainer with a high aspect ratio wing (about 8:1), powered by a 100hp Siemens radial. It did quite well, but not in the money. A modified, "souped up" version, the M-35A emerged, with a strengthened wing spar, wheel pants, coverable front cockpit, and the larger 150 hp Siemens radial. Willi Stor suceeded in winning the German National Aerobatic championship in 1935 & 1936 with this plane, and placed 2nd in the European Championships.

To try to win all the cookies, a single further variant (M-35B) was produced with a reduced aspect ratio wing, single seat, and an aircooled in-line 250hp Argus engine. It was reported to be dramatically better, but competition had also stiffened, and it could not compete with the advanced Beucker designs.

My original model was the M-35A of Willi Stor's, built in 1990, badly damaged in a freak accident with a thermal (!) a few years later.

Recently, I rebuilt it as the M-35B, to test out the MaxCim "Y" motor on various gear ratios and a fairly high cell count (up to 20 SCRC)

The specs are:

span: 63", area: 630sqin. weight: 6.2lbs., airfoil: NACA 1414, wing loading 23 oz./sq.ft., max input power loading: 78 watt per pound

The present power setup is the "Y" motor with a new Astro 05/15 super gearbox (ratio 3.6:1), MaxCim controller, and 20 older SCRC cells. You have to bore out the pinion to 3/16", or have Tom Cimato (Mr. MaxCim) do the modification for you. Tom recommends using Loctite #680 to mount the pinion, rather than just a press fit, as the shaft is stainless steel.

This combination turns a cleaned-up modified Zinger 13/6-10 at 7.2K, while pulling only 23 Amps!

Performance is invigorating; it can do easy vertical rolls, vertical eights, rolling circles, outside turns, lomcevaks, discus tumbles, along with all the "normal" loops, eights, rolls, point rolls, snaps and spins. What is unique is that I am **averaging 10+ minutes of these continuous, rigorous aerobatics!** The only time I am at full power is for the heavy vertical stuff or high drag maneuvers, the rest of the time is at half throttle or less.

Definitely a worthwhile rebuild, and a big "Thank You" to MaxCim for a great power system.

Keith

World's Smallest R/C Heli?

Alexander Van de Rostyne
e-mail at: Alex@staf.planetinternet.be
http://www.planetinternet.be/pixel

(*I had asked to use some pictures and text from his site. km*)

Thanks Ken, (most recent e-mail)

No problem taking pictures and some text (I only want you to mention that copyright stays on my side).

It is about any modellers dream to get his project shared with collegues. I am no different, and I am proud of what I have done...You even could help me. I am now trying to optimize all elements. One of the areas of research is batteries (off course!).I am currently flying on 8 50 mAh Sanyo Cells (NiCad). This gives me about 1 minute flying. The 75 mAh gives me 1 minute and 30 sec. If you could help me find better batteries (lower internal resistance, higher capacity at lower weight, or even non rechargeable ones, etc), that would be great.

I am sitting on the edge of different technologies, and have to go for the best, almost at any cost.

For you info, current draw is 1.3 amps in hover.

(earlier e-mail)

I have just finished the development (April '97) of what I believe to be the lightest full RC heli in the world. It is electric powered, has conventional control mechanics (swashplate, Stabiliser bar, tailrotor, 3 gram servo's, etc). The model flies perfectly in my livingroom. I will soon put sugar in my coffee with the heli...Stability is like the much bigger traditional RC helicopters. Total weight including 50 mAh batteries is 126 gram! I will take off some more weight to go under 120 gram. It may please you that I use the ICARUS piezo (without the case and the long and heavy servo leads it weights in at 5.3 grams!) for the tailrotor. Maximum flightime reached today is 1min 30seconds in hover with Sanyo 75mAh NiCad batteries (8 cells, total power requirements are about 1.5 Amps for hover, lift off weight at 138 gram). Going to higher capacity (110mAh) does not seem to add flightime. I am now looking at optimizing the flightime. Can someone give me a hint where to find other batteries (rechargeable or not).? Internal resistance seems to be a problem for the small size NiCads.

Weight is 4.4 ounces batteries included.You can check it on my homepage http://www.planetinternet.be/pixel

Alexander Van de Rostyne
Belgium

Have You Had Your E-Zone Today?

As many of you know **Jim Bourke** runs a fantastic E-site on the World Wide Web at http:www.ezonemag.com He puts out a monthly, on-line newsletter, runs the eflight mailing list and provides great e-flight services. What prompted this notice is that I had noted a construction article for a really nice AF40G PT-19 Sport Scale in the articles, designed by **Bill Bowne**. Plans are available through the E-zone. Please add $3 for domestic US or Canadian shipping and handling. Overseas shipping and handling charges are $8. Provide the plan #, mailing address, phone number, and a check with your order.

The plan number for the PT-19 is 003 and is $20.

Photo & Model data courtesy of Jim Bourke and Bill Bowne

Model Data

•Wing area: 750 sq. in. •Span: 72 in. •Airfoil: Clark YH •Weight: 120 oz. •Wing Loading: 23 oz/ft. sq. •Motor used: Astro Flight Cobalt 40 Geared •Number of cells: 20 •Propellor: 13 X 10 •Watts/pound: 53

Mail your order to:
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Richardson, TX 75081

New Airfoil Plotting Software

from Dr. Patrick E. Hanley
e-mail at: hanley@hanleyinnovations.com
http://www.hanleyinnovations.com

Dear Mr. Myers,

I produce a Windows 95 software for plotting templates NACA 4- and 5-Digit airfoils. Would you be interested in adding a link to my site on your WWW page? (*I did. km*)For more information, please visit my site at: http://www.hanleyinnovations.com/air_16.html
(*For those of you without an InterNet Connection, the following info comes directly from his site. If you have a connection, access his site to learn even more. km*)

Hanley Innovations' Visual Foil

VisualFoil, a NACA Airfoil Analysis & Plotter, is a MS Windows 95 based numerical tool that computes the lift and moment coefficients for NACA 4- and 5-digit airfoils. The airfoil analysis is based on a vortex panel method for an incompressible ideal flow. VisualFoil can be used to compute the theoretical behavior of NACA 4- and 5- digit airfoils for various flap and angle of attack settings. The program is an excellent tool for investigating the characteristics of NACA 4- and 5-digit airfoils for your next airplane design, plotting of rib sections or theoretical evaluation of an airfoil response to angle of attack and flap location and deflection changes.

Perform Online Analysis and Airfoil Plotting

•Immediate analysis of NACA 4- and 5-Digits sections 1.Lift coefficient 2.Moment coefficients 3.Angle of attack for zero lift 4.Center of pressure location 5.Effect of plain flap deflection

•Templates for ribs can be produced in a matter of seconds 1.Plots allow for skin thickness 2.Large airfoils (72"+ depending on airfoil thickness) 3.Tapered airfoils can be plotted.

•Effects of plain flaps can be analysed •Excellent tool for exploring airfoils concepts for model airplane construction

•Excellent teaching tool for undergraduate aerodynamics

•Informative manual is available

Ordering

VisualFoil can be purchased by mailing a check or money order for $25.00 U.S plus $3.00 for shipping and handling to:

Hanley Innovations, P.O Box 870, Storrs, CT 06268

Computer Requirements

VisualFoil Requires a PC running MS Windows 95/NT.

More Information?

For more information, please contact: sales@hanleyinnovations.com. or call (860) 423-4060.

Thank you,
Patrick

Good Info and Words from Jim Yuzwalk

e-mail at: jjy@eaglequest.com

Hi Ken,

I thought I'd share a few helpful hints with you:

1. To fasten my 7-cell-battery pack in my Electro-Streak I am using Radio Shack's cat no. 64-2360, Superlock Fasteners, for $2.99. They have a much stronger locking action, (about 5 times better), than normal hook & loop (Velcro) fasteners. I used them last year, and they worked quite well.

2. The other item I just found is Radio Shack's cat no. 278-1555, 10 ft. Ground Strap, for $2.49. This is great for interconnecting your homebrew battery packs. The ground strap is about 5/32 in. wide and should provide a very low impedance current path.

Maybe this information can help some other flyers. If so feel free to use it.

Thanks again,
Jim

P.S. I purchased the Astro 112D today from Tower (I prefer to buy stuff made in the USA). I also bought 14 2000SCRC Sanyo cells from B&T racing for about $6.70 each. It was great talking to Billy at B&T. They are very RC car oriented, but appreciate us E-Flyers as well. Hopefully I'll have the packs done soon!

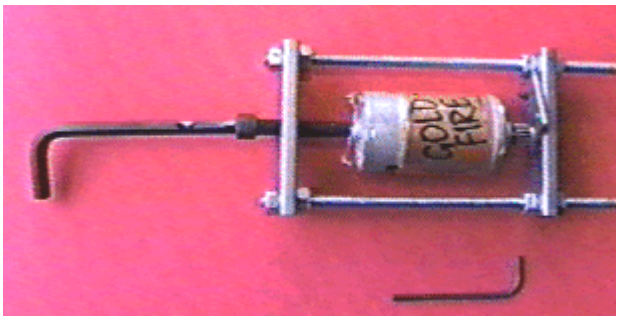
And More from another E-mail

I recently subscribed to Sailplane & Electric Modeler magazine. All I can say is WOW! I heard about it from the E-zone mailing list, and I think you mentioned it as well in a past issue of the Ampeer. At any rate, its nice to see a real magazine with an electric focus. Hopefully they will get more subscriptions from other E-Flyers.

On another note, I just finished building two seven cell Sanyo RC2000 packs. I bought an 80 Watt Weller soldering iron, intended for stained glass work, to solder the NiCd's together. It worked beautifully! Its large 1/4 inch tip has quite a bit of thermal mass and the 80 Watt element gives you about a 950 degree tip temp! The iron also comes with a massive 3/8 inch tip which is just a bit too large. The 1/4 tip makes very quick and clean solder joints between the NiCd and the braid. Very short thermal contact time required to make the connections which means little, if any, cell damage. I noticed that Radio Shack's largest iron was 40 Watts with a pencil tip. My older iron was a 60 Watt Weller with a pencil tip (tip didn't have enough thermal mass, and I had to use excessive contact time to heat the NiCd). The 80 Watt iron probably requires a bit of soldering skill to avoid damaging the NiCd's; I've been soldering for a bit over 20 years. But, maybe its not a bad recommendation for others (It's definitely better than those underpowered pencil tip irons for this kind of job). Its actually a Weller model SPG80.

(*Thanks Jim. Lots of good tips. I've used the Radio Shack Superlock Fasteners myself. I also use a stained glass iron for making up packs. Have for years. I think you are less likely to harm the cells, since you are on them for such a short time. Sailplane & Electric Modeler can be reached at: Sailplane & Electric Modeler, P.O. Box 4267, W. Richland, WA 99353 — (509) 627-0456 WEBsite is: http://www.Sailplanemodeler.com/ km)*

Pinion Gear Press



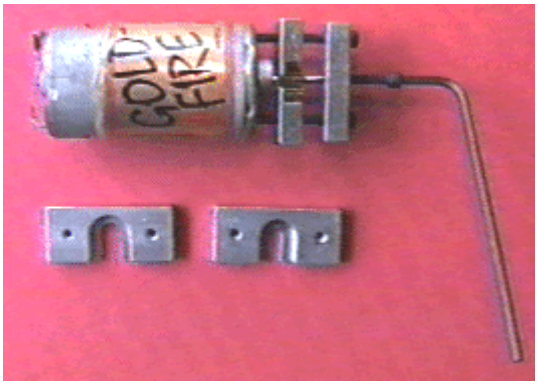
from John E. McCullough
by Ken

Years ago I purchased a full blown drill press, mainly to press on pinion gears. John has come up with this very handy tool (pictured on the next page), at a MUCH lower price than a drill press.

The Pinion Gear Press can be ordered from New Creations R/C or direct from John. You can reach John E. McCullough at 5020 Stockton Drive, Raleigh, NC 27600, phone: (919) 851-3538 or e-mail at: jem11@mindspring.com

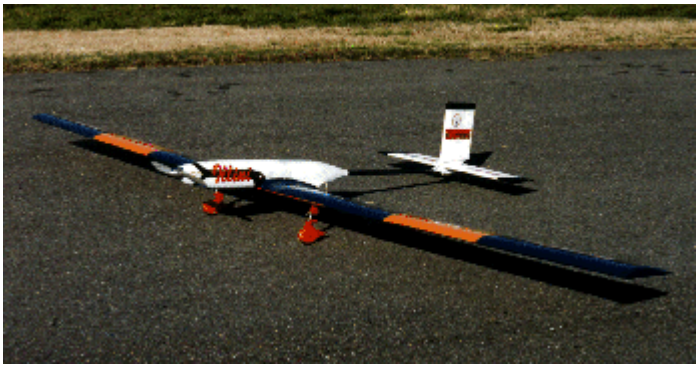
If you need a pinion puller too, Kirk Massey, of New Creations R/C, has an excellent one, also designed by John. It is shown here with the optional lower jaws for the AF 05-15 & AF 25-90. New Creations R/C can be reached at: P.O. Box 496, Willis, TX 77378 , or phone: (409) 856-4630. The New Creations R/C WEBsite is located at: http://www.newcreations-rc.com/

(Sponsor of the Mid-America Fun Flies)



MaxCim Win Cont.

minutes. Each aircraft will make one qualifying flight of two laps of the course with the payload removed (to demonstrate acceptable handling and cg location without a payload) prior to being allowed to make any scored flights with the payload. Multiple scoring flights may be made as desired and within the available contest time. *(Thanks, Tom, for the information. It is nice to see future engineers using e-powered flight. Congrats to ALL on the win too! km)*



Tiger Shark Prototype Flies
by Ken Myers

May 10, 1997 - Northville Township, MI

The proto type of the *Tiger Shark* flew at about 7:00 P.M. Weather was clear, about 50 ^{0}F and winds just under 10mph from the northwest.

The first flight was approximately 5 - 6 minutes of "feeling out the plane." The takeoff was easy and power was reduced immediately after breaking ground. There was a short period of time where a little left aileron trim and a touch of down trim were adjusted in. After takeoff, the plane was never again flown at full throttle. Both the aileron throw and elevator throw were more than I liked, so the plane was brought in for an easy landing. No surprises. The Sanyo 1700SCRC 10 cell pack was recharged in just over 12 minutes at 5 amps, which indicated that it was just over half depleted, which is what I anticipated. The elevator throw was adjusted and a second flight was made. There were no problems, except the elevator throw and elevator throw were still too great for my poor vision and growing darkness. The second landing was as easy as the first. The plane slows down nicely and it's easy to put onto the field.

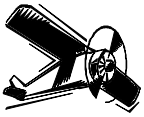
It was a very successful evening. The plane is light in the air, easy to control and thus far has shown no bad tendencies. The ground handling is positive and easy, although the takeoff run is very short.

It appears to meet the design criteria of a ten minute flight with good aerobatic potential.

Upcoming Events:

Aug. 2 - 5 - AMA Headquarters, Muncie, IN Doug Ward, R.D. #1, Box 189. Irwin, PA 15642 (412) 446-5891 DWard79207@aol.com
Aug. 16/17 Halton Hills, George Ball Memorial Electric Fun Fly, Ont. Geoff Miller (905) 454-5198
September 20 & 21 Queen City Airport, Allentown, PA: KRC - setup on the 19th. For more info e-mail Anthony Assetto at 102723.2566@compuserve.com
October 4 & 5 11th Annual DEAF Fly-In, Dallas R/C Club Field in Seagoville Greg Judy (817) 468-0962 email 75267.224@compuserve.com

Vital Stats:
Model: Tiger Shark
Type: low-wing sport electric
Designer: Ken Myers
Finished Weight: 58.6 oz. - 3lbs. 10.6 oz.
Airfoil: NACA 2412
Wing Span: 55 in.
Wing Area: 486 sq.in. - 3.375 sq.ft.
Wing Loading: 17.36 oz./sq.ft.
Fuselage length: 37 in.
Fuselage height at l.e. of wing: 4 in.
Fuselage width at l.e. of wing: 2.875 in.
Controls: rudder, elevator, ailerons, throttle
Radio: Hitec Focus 4 FM Tx & 535 Micro receiver, Rx battery 270mah Sanyo, 2 Hitec HS-101 & 1 Futaba S-30
Electronic Speed Controller (ESC): Jomar SC-4
Connectors: Sermos
Fuse: auto spade type - 25 amp
Motor: Astro Flight 05 geared
Battery: 10 Sanyo 1700SCRC
Prop: Zinger 10x6
Prop Loading: 107.44 oz./sq.ft. of prop area
Prop shaft to ground clearance: 6.25 in.
Initial Static RPM: 8,700
Initial Static Motor Volts: 10.6
Initial Static Amps: 26.8
Initial motor input power: 284 watts
Initial input watts per pound: 77.56 watt/lb.
Initial output power: 219 watts (approx.)
Initial output watts per pound: 59.8 watts/lb.



The Ampeer
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390

Next Meeting: Thursday, July 3, 1997,
Time: 7:30 or ASAP
The Rushton Road Flying field, South Lyon, MI
Located between 9 Mi. & 8 Mi. , east side of Rushton Rd.