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The Next Meeting:
Date: Thursday, March 6 Time: 7:30
Dublin Community Center, just N. of the village of Union Lake on Union Lake Rd. across from St. Patrick's Church

Boeing Hawks/PSEMF Fly-in '96 reported by Bernard Cawley

Just a brief synopsis of the Boeing Hawks/PSEMF Fly-In from the point of view of the VERY tired and sunburnt CD....

For the first time in years we had good weather both days - but of course the wind came up when we ran battery allotment, and gusted dead across the runway.

We had a record number of pilots - 42 on Saturday, and 9 new faces on Sunday. With an average of three planes apiece we had full airspace (even limiting to four at a time) and often, especially on Saturday, a queue to go fly.

There was an unusual amount of carnage, including two mid-air collisions (one of which took out a beautiful scale deHavilland Comet about the same size as Keith Shaw's, but which was done as the red "Grosvenor House" rather than the black one.). We also had a sailplane down on one of the buildings of the Boeing Space Center (no hole in the roof, fortunately).

Even so, there were lots of smiles and

good times had. We had a good representation of the Oregon contingent, as well as the Canadian contingent.

The winner of the "most impressive" and also "best scale" on Saturday was a 3/8 scale (yes, that's right) Ford Flivver, built and flown by Dan Gregory of our area and powered by an Astro 90 running through a homemade belt drive on 36 cells. Dan also had another 90 powered "could be scale" plane called "Genairic".

Randy Smithhisler had his two geared 90 powered Cubs - a straight conversion of the Sig 1/4 scale kit, and his latest pride and joy, a 1/4 scale PA-12.

At the other end of the scale were a number of Speed 400 sailplanes (including 2 Timothys) and one Mini-Viper - which turned lots of heads with its speed and aerobatic capability.

Three (at least) manufacturers were there: Dave Palumbo and Matthew Orme made the trip up from California for Aveox, and they were busy most of the day Saturday. Vic Newton, also from California, who is a new entry in the speed control and other electronic gadget business was there - he has

What's in this issue?

Elec. Meet Report - Eclipse Rating - Sailplane & Electric Modeler - Glue Hints, Tips & Safety - The Sorta PT Revisited - Ratings from S. America - KRC update - Poling Float plane - New Astro gearboxes - More ratings - Terrier - Duration Challenge - Speed 400 Primer

Ampeer

two tiny microprocessor based controls with more to come. And, of course, Pete Peterson of Model Electronics was there showing his wares and flying up a storm both days - getting most attention for his MaxCim powered Sig Venture (an un-released Four-Star variant that's 60 sized) and the big foam Spitfire he's been flying for 7 or 8 years now over the evolution of the War Emergency Power-Turbo 10 motor development. (I, unfortunately, share a frequency with Pete - I only flew Timothy in battery allotment because of that!).

Sunday was much more relaxed, with about 1/2 of Saturday's participants returning (don't know why more didn't - it was beautiful - better weather from a wind standpoint, but poorer thermals).

Sunday's most impressive winner was Rick Giasson's AT-6 (I think a Top Flight AT-6) with an Astro geared 40 and retracts. He flew it a lot and turned many heads. It was also marked in an unusual fashion - early WWII GERMAN markings. Apparently the Germans captured soon AT-6's at a Dutch airfield early in the war, and, of course, used them.

Best Scale went to Randy Smithhisler's big PA-12.

Other trends - lots of MEC systems, powering everything from little bombs (like their Zero and Mustang and the now-infamous Psycho-Max flying plank - the first electric I saw accelerate straight up years ago) up to, and including one Clancy Big Lazy Bee. A few brushless systems - there were at least a couple more than the MaxCims that Pete and I were flying and the Aveoxes that Matthew Orme brought. Almost none of the typical "oh-five" trainer types - only one each Aero-Lectric, Mirage and PT-Electric, and the latter were both heavily modified - the Mirage was a Speed 400 twin, the PT had a new wing with ailerons and flaps (the builder of that one is a flight controls supervisor at Boeing, who currently has the flaps group on the new 737 program). Lots of twins, especially on Saturday - including a deHavilland Dragon Rapide by Ivan Pettigrew (as well as his ill-fated Comet).

We also saw on Saturday the MEC powered Royal B-17 that Dave Grip has mentioned - rather un-scale like in speed and aerobatic capability, one might say - it really scooted.

There were two good flying Ace Cloud Dancers - one on a geared 25, one on a 40 (Dennis Weatherly and Terry McGill, respectively - those of you who subscribe to Eflight recognize those names).

they're easy to pull for maintenance, too.....

Good flyin', quietly,

Bernard

Eclipse Rating

from: Jim Mullen - WA1ZUH
jmullen@map.com

144 Tower Hill Road
Brimfield, MA 01010
413-245-3228

Ken,

I'm new to e-flight, but not to R/C. Here's the rating on the one e-plane I've flown so far:

Aircraft: Airtronics Eclipse
Radio: Futaba 7FGHi, FM, with 2 S130 servos.
ESC: Hitec 1003, on/off w/BEC
Motor: Stock that came with kit
Battery: 7 x 800AE
Prop: 12-8 folding

Plane was built as per instructions, monocote, weighed in at 48 oz.

Flies OK, probably a three *** rating at least. Motor run time about 3 to 4 minutes, easily makes 10 to 15 min flights in dead air, much longer in thermal conditions. Can perform minimal aerobatics, handles a moderate breeze OK, but requires care when landing. Not really happy with the plug in wing tips, but they haven't fallen off in the air yet!

Neat list Ken, looking forward to more listings.

Finally, an American Electric Magazine! Sailplane & Electric Modeler

Formerly *Sailplane Modeler*, *Sailplane & Electric Modeler* is the new quarterly magazine for the electric and soaring enthusiast. Ninety-six pages and growing, we're big, we're bold and we are color.

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Glue, Hints, Tips, and Safety

by Gary Baker

from: The *Electric Model Flyer*

Oct./Nov. 1996

newsletter of the: Electric Model Flyers of Southern Ontario

edited by: Rod Campbell

34 Hopkins Ct.

Dundas, Ont., Canada L9H 5M5

e-mail: rcamp@interlynx.net

Fast setting, non-CA, wood glue? There really is such a thing! You need to save one empty CA bottle with the spout that has the tiny opening at the end. You then fill it with a wood glue. Now you have a container that permits a correct amount of glue to be dispensed.

Wood glue is usually sold in bottles with huge openings from which pour large quantities of glue. You use several times more wood glue than you actually need, it takes forever for the water to evaporate, and so you turn to CA to speed up your work. If you would use only the amount of wood glue that you need, then you would be quite surprised at how fast it dries.

I helped a young friend build a glider fuselage one evening: we cut, sanded, shaped and glued the wood. It took less than four hours from start to finish. This fellow took his fuselage home with him. We used Weldbond wood glue and we could have covered the fuselage ten minutes after the last piece of wood went on.

I am highly allergic to CA, and have turned to Weldbond. It now is a staple in the shop. It glues almost anything to anything. There is one other wood glue that I would recommend: Titebond II. You can glue two pieces of wood together, and after 24 hours, submerge the pieces under water for another 24 hours without the glue letting go. If you dispense the glue in the right quantity it also dries fast. Weldbond has some water resistant properties as well. Another way of looking at this is: if you were gluing 2x4's, would you put so much on that it slopped out of the joint? I would guess not.

If you think you need to fillet a joint, why don't you experiment to see if it really is necessary; most of the time it will be of little benefit, a lot of work, and more weight. Some people use so much wood glue that epoxy would have weighed less!

A few years ago, I discussed the correct way to use liquid adhesives with a technical person where I work (which happens to be a major manufacturer of adhesives). He said that most people do not understand how adhesives work. For instance, CA is often used improperly; far too much is used. The only strength in this glue is where surfaces meet.

Wood Glue (Aliphatic resins like Weldbond or Titebond):

Take a couple pieces of sheet stock - let's say 1/8". Lay a thin bead of glue part way down the centre of one sheet. Press the two pieces together with some pressure, then pull them apart, if you have placed the right amount of glue on the wood there will be glue from edge to edge. If ok, press the pieces back together again, let stand 15 minutes, and then try to pull the pieces apart. If you have used the right amount (surface covered but none squeezed out), the pieces will be hard to take apart and probably will break beyond the glue line.

CA: Pick up a small bottle, with a small tip, turn it upside down, holding the bottle a half metre above the work table. Let one drop of glue come out on it's own (free flowing) do not force the glue out. Watch how much glue this is when it lands. This one drop will glue one square inch of material! Go ahead, draw out one square inch on a piece of paper - that is the size of each surface that a drop of CA will properly glue together. The same applies to aliphatic resin wood glue; too much is used and ends up being wiped off or sanded off.

Now, do you suppose that you are using too much glue? Remember, some of these items are dangerous to use when used properly, they are even more dangerous when used improperly! Have you had a nagging cold lately, running nose, blurred vision, coughing up phlegm, difficulty breathing at times, seeing your doctor to get a cure? Sick to the point that you have to stop building? After a few days you are getting better, and a couple weeks go by and you are back building and you get another cold. Guess what, you have reached your tolerance for CA. Your body is reacting violently to the chemistry; it is trying to tell you something.

Let me tell you if you won't listen to yourself: you are pressing your luck. The next time you use CA may be your last. This happened to me; the last time I really thought I would not pull through, and it was a week later that I finally discovered it was the chemistry. It took about four hours from exposure to the reaction to begin, so you may not think it is the chemistry. I didn't. Do I use CA's now? I have one small bottle, use it outside or in the garage, and I leave the area immediately and stay away for a couple of hours after.

The Sorta PT: Revisited

by Ken Myers

Over the years, the Sorta PT has had several people comment that they'd like to have the plans, so that they could build this nice flying, "cute" plane. Today, December 31, 1996, I've finally started those plans. They might be offered to a national magazine when I finish them, and after publication will be available here in the Ampeer. To whet your appetite, here is the article on the original flight report,

published in the Ampeer in May of 1988.

The Sorta PT: A Flight Report



Tuesday April 5, 1988, Indian Springs Metro Park

After an aborted attempt, late in March, the Sort PT took gracefully to the air at about 8:10A.M. The breezes were 5 to 10 MPH from the southeast. The Sorta PT moved rapidly down the bike path and lifted, wings level, into the wind. The sun gleamed through the yellow Micafilm, as it circled lazily in the sky. Left circle, fine. Right circle, fine. Horizontal figure eight, beautiful. Control response just perfect.

Well that's sorta the truth on the Sorta PT. It is how I felt though, but the real facts are as follows. Late in March I tried to do a test flight on too windy of a day. An Electra had already pounded the ground. It should have been a warning. The PT rose from the bike path and the wind got under its wing. I decided to abort then. It flew into some heavy weeds. The damage was; ripped off landing gear and a wing that impolder. I had been leery of the wing from the time that it was built. It was just too light. I made a new, stronger wing which was also lengthened. This added 2 more ounces to the plane, which now weighs 44 oz.

The fifth was a much better day. The winds were down and no one was in the park. I changed the 112 watt Top Flite 10 x 6 to a 126 watt, Rev-Up 10 x 8W. This worked well on the first flight. I chose to land on the grass, a small mistake. The grass was moist, long and clumpy. The landing gear stopped, the plane didn't. No real damage was done and the gear was glued back into place. A Rev-Up 10 x 6EW was put on the Astro .05 cobalt to see if I could extend the flight time. A take off was made from the parking lot. A five to seven minute flight was logged and the flight ended with a perfect landing on the parking lot. I did have to carry

quite a bit of up trim so I eliminated some of the downthrust.

I was thrilled with its performance. It is docile and fun to fly, not a sky burner but a fun plane. I am drawing up the plans and will be trying to get them published. We'll keep you posted.

April 6

She flew four more four more times this morning. Good flights. I tried different props. Everything seems to work. The Kyosho 9x8 and Rev-Up10x6W seem to give the longest flights.

South American Ratings

from: Marciano Cantero
Buenos Aires-Argentina
marciano@impsat1.com.ar

Hi Ken,

Congratulations for your great WEB page and the Ampeer!!!!

Ok, my plane ratings:

Falcon 550 E, Airtronics *****- Aveox F7LMR and Aveox controller, 7 1700SCRC Airtronics Infinity, 150mAh rx pack, 52 oz. It's the most pleasurable plane I've flown. You can get rocket climbs and then glide searching for thermals without losing much altitude. 20 minutes per flight without thermals and you can go for a dive and get lots of speed. I'm delighted!!

Olympic 650, Airtronics **** Astro 05G, ACE speed control, 7 cells ,Vanguard Tx & Rx, 2 microserves, 200mAh Rx pack. This was my favorite plane for 4 years until the Falcon arrived. It flies slow but is a great flier!

Riser, SIG **** 28 turns, BB Leisure Texaco motor, 3.8:1 gear ratio, 7 cells, 2 microserves, New Creations speed control w/Bec.

Lazy Bee (40 "span), Clancy ***** Astro 035, Master Aircsrew 3:1 gearbox, 11x7 Master E prop, 7 cells, Neu speed control, 2 microserves, FUN FLY!

Seniorita, SIG **** Astro 25G, ACE speed control, 14 -16 cells, 250mAh Rx pack, 2 std servos, 80 oz .A real classic!

Yardbird (Randy Randolph design MAN plans) ****
Astro 035 direct, 7x4 APC, 6 cells, 2 microserves,
Yeti speed control, wonderful sport plane!

Comments:

I know my ratings are all 5 stars, (*note: I changed all but Falcon 550E to ****. Remeber folks, only one best plane I've ever flown. km*) but I love the way that each plane flies and I like them all. On the other side I want to tell you that I folded the wings of my Lowwatt (speed 400 6v, 7cells) in the 4th flight but flies great, I think that was overpowered! I want to give you some advice in the dihedral center to put some 8" carbon fiber reinforcement extending 4 inches in each spar would be better than only a ply brace (I built mine per plans and my wing breaks where the ply brace ends) I'm working now on my conversion of a Showmaster (049 Ken Willard design RCM plans) with a speed 400 7.2v geared 2.33:1, 8x4 or 9x6, 8 to 10 cells Sanyo 600AE. When I test fly I'll report.
My best regards!

KRC 1997 Update

from: Anthony Assetto
102723.2566@compuserve.com

I've been enjoying the Ampeer over the last year and will continue to download it - Thanks for all your efforts in putting this item together for us!

The KRC club had its first meeting with Queen City for the 97 KRC Electric Fly and the dates are set at September 20 and 21st with setup on the 19th. We are hoping to get the Friday time made earlier than last year's 3pm setup!

Jim Wolstenholme will be managing the meet again this year with some help from me. Jerry Rawson, a novice electric flyer, is the club president this year.

Keep in touch and get some flying in!

Poling Float Plane Revisited

from R.J. (Jim) Benner
405 Harpers Way
Lansing, MI 48917

In the January Ampeer, you commented on a float plane by Mitch Poling, the plans for which you published some time ago. Reading between the lines, I gathered you might be inclined to re-publish those outline planes. I would encourage you to do so because this is a super e-plane. It flies solid, does great ROWs, loops after a very short dive and it does half-fast rolls. Anyone inclined toward float planes will love it.

I built mine when you published the plans and it is as follows:

Span: 45", Airfoil: Clark Y, Weight: with 6 1400 cells (including floats) 41 oz., motor: Leisure LT-50, Amps: 18 with APC 7x4

Flight times are about 5 minutes at full power and about 12 minutes a cruise.

All in all, this is a great airplane for someone who wants to just fool around over the water.

New Astro Flight Gearboxes Coming!

We never rest and are always cooking up new stuff. Now that I have finally got my windows95 working and my Web site up and running I can get back to model planes.

We have a new super box.

1. Size 25/40/60/90 has a gear ratio of 60/17 or about 3.5:1. The cobalt 25 spins an 18x10 at 5000 rpm on 18 volts and 27 amps. The cobalt 40 spins the same prop at 5000 on 24 volts and 20 amps.

We will have three boxes soon, one for the 035 to 15 and a very tiny one for our 020. They will be in the 3.5:1 to 4:1 range

All my best,
Bob Boucher

Plane Ratings from The Electra Kid

from Brad Evenson
bevanson@sprintmail.com

Allow me to introduce myself. My name is Brad Evenson, and I live in Kirkland, IL (near Rockford). I am an electronics technician. Since getting on-line, I have been a faithful reader of the Ampeer newsletter.

I have been flying E-power for about 4 years now, and really enjoy the challenge (learned how to fly with glow). I am interested in attending the Mid-America Electric Flies this summer, please send info on this event to my E-mail address: electrakid@aol.com.

Here are some kit reviews to add to the Ampeer:
Brad Evenson electrakid@aol.com

Electra, Goldberg **** Speed 600 7.2, Graupner 7x3 folder, 6x1400 SCR, AF215 ESC. This was my first electric and its a joy to fly. It will probably outlast all my other planes!

Hots, Midwest, ***** AF05, 7x6 nylon prop, 7x1400 SCR, ACE Smart Throttle. A very aerobatic flier that will definitely get your heart going! Not that hard to land considering how fast it flies, I left the gear off. Fuse difficult to assemble because of odd angles. Kit materials were

excellent. I found it at a swap meet, there may still be some out there.

Chip, Graupner, Speed 600BB 8.4, Graupner 8x4.5 folder, 7x1400 SCR, AI Robotics FX-35D. Another discontinued kit. Recently completed, I have not flown it yet. Looks great when finished as shown on the box. Kit materials were very good, but wing turned out rather heavy. Aileron linkage through tubes in wing takes some time to set up, mounting servo in the center was difficult. No rating yet.

On page 6 of the December 96 newsletter, Orville Shields asked about an electric cutoff system. Please see attached schematic on *.BMP file.

I have used this circuit to build battery dischargers for all my transmitter and receiver packs (replace motor with appropriate resistor), but I have drawn it here to be used as a motor control. This circuit would be suitable for motors in the Speed 400 category. The relay is a SPST miniature relay with a 5VDC coil and high-current contacts. There are several manufacturers making relays like this nowadays, it should be available at any electronics supply company.

The start switch is a normally-open momentary push-button available from Radio Shack. To make the circuit work, the user must select resistor RX to open the contacts at the required voltage (100 ohms is a good starting point). This is most easily done with an adjustable DC power supply. Unless you have access to a high-current DC supply, disconnect a wire from the motor temporarily. The power supply is turned up to the anticipated fully-charged voltage of the battery pack, the push-button is pressed, and then the voltage is slowly turned down until the relay clicks off. This process is repeated with different values for RX

until the desired cutoff voltage is reached (approx 0.9V/cell).

Lower value resistors will lower the cutoff voltage, and higher values will increase it. **One word of caution about using this circuit: when the switch is pushed the circuit will not shut off until the motor runs the battery down to the cutoff voltage. Do not get bit using this idea for a motor controller!!** If anybody has questions about this circuit they can contact me at electrakid@aol.com.

Keep up the good work on the newsletter, hope to see you in July in Michigan.



Terrier

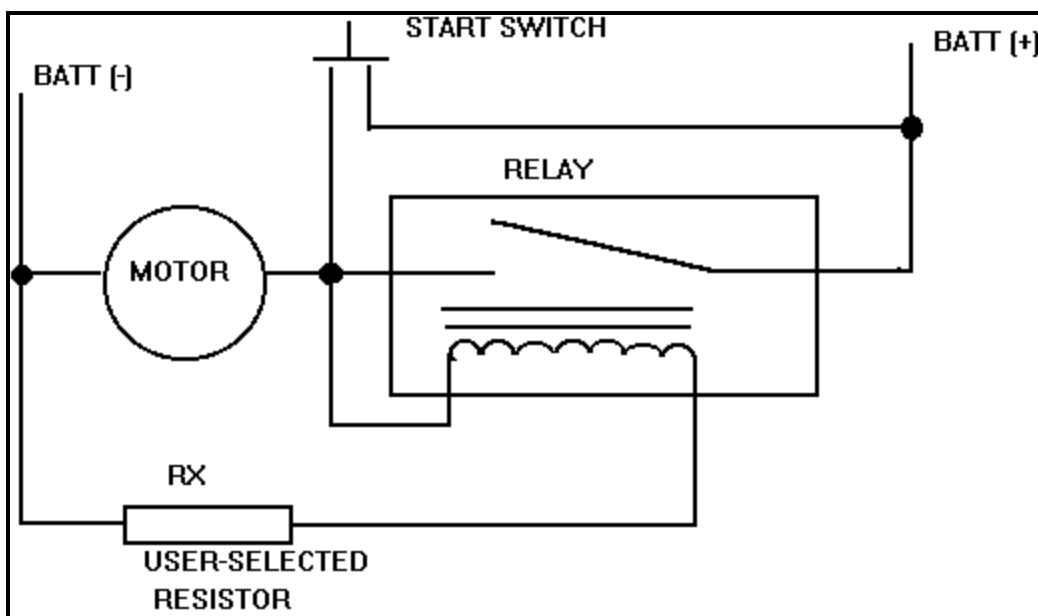
from Dale Wilde

74723.2170@compuserve.com

The attached is a photo of that plane I converted from wet to electric. I finished it before Christmas but didn't get the photo work done until today.

No it hasn't flown yet, that's computer magic.

It was built as a scaled down version from an RCM plan published around 1983, the wet version had a Cox .09. The electric has the speed 600. I built a new fuselage and recovered everything. The original fuse was too oil soaked to modify. The electric has 43.5" span, weighs 36 oz., area 304, so wing load is 17 oz./sq.ft. Should fly, the motor turns a 7 x 4 prop at 13000.



**The 4th Annual Electric Duration Challenge
June 15th - July 15th, 1997 (Inclusive)**

object: Using ELECTRIC motor power only, sustain a model aircraft in flight for as long as possible without the aid of slope, ridge, wave or continuous thermal lift. Any type or number of electric motor permitted e.g. ferrite, cobalt, neodym, brushless, etc.

(Note; This is not a thermal soarer/glider endurance contest. The prime object is the development and advancement of ELECTRIC propulsion systems, models, cells and associated equipment.)

There are three (3) categories. One flight per category. Enter as many categories as you wish. Team entries/multiple pilots permitted. ALL participants to sign official entry form.

Category (1) One = Continuous Motor Run using Nickel Cadmium (NiCad) cells only.

Category (2) Two = Continuous Motor Run using Alkaline cells only.

Category (3) Three = Continuous Motor Run using anything other than NiCad or Alkaline cells.*

*(i.e. Any combination of cells such as lithium ion, lithium, solar, nickel metalhydride. Non-rechargeable or rechargeable types arranged in parallel and/or series connection).

For flight safety reasons the absolute maximum altitude to be flown is approximately 400 feet above the flying field surface. (Subject to FAA/CAA Regulations and/or Local Regulations/Laws and/or Bylaws). So if you need binoculars or a telescope to track your model, you are flying way too high!

Flight is to be within the confines of the flying field. Models may be handlaunched (helper/assistant allowed), or R.O.G.'ed, but not towed, winched, or air launched by another airplane.

All model flying is to be carried out in accordance with the flight safety recommendations of the AMA (USA) & BMFA (Britain).

The organizers, sponsors and/or their agents shall not be liable for loss or damage to persons and/or property including models and/or equipment however caused or arising while participating in this event.

Where: Any flat field in the USA and/or territories, and the British Isles.

When: June 15th to July 15th 1997 inclusive. This is a 31 day window. Fly as often as you wish during this time. Record your longest witnessed flight time (pilot(s) & witnesses to sign entry form).

Awards: A perpetual Trophy goes to the longest flight in each country i.e. USA & Britain plus certificates of participation to all challengers. Full reports of the event will appear in publications.

General Information: Send FULL details about your model and equipment used... e.g. Model Specification, Size, Weight, Wing Area, Loading, Wing Section, Motor, Gearbox Ratio (if used), Prop (size & pitch), Battery cells (type & capacity), Radio equipment and controls used. Time of day and weather conditions during flight etc. etc. In other words as much

information as possible.

We need to show fellow modellers "How It's done". Also please submit a good quality selection of model photos (use a plain/clear background e.g. asphalt surface or white/grey sheet). For clear photo-reproduction, pictures featuring people should be taken without their wearing hats and/or sunglasses. Use flash to fill-in shadows. (Return of photos cannot be guaranteed).

Entry Fee (toward costs, postage, admin etc.): \$10.00 per Category, or \$25.00 for all three (USA); Three pounds (UK) per category. Checks (USA) payable to "Duration Challenge". Send completed entry forms to appropriate country coordinator by August 1st, 1997.

All participants agree to accept the rules and conditions of the 4th Annual Electric Challenge 1997 sent out here, and the organizers decision(s) - final.

For further enquiries, latest information etc., and Address to **SEND COMPLETED, SIGNED & WITNESSED ENTRY FORMS TO:**

Jerry Smartt (USA Coordinator),
Rt.3 Box 300, Warsaw, MO 65355-9588, USA
Tel: (816) - 438 - 5682 Fax: (816) - 438 - 9573

Dave Durnford (UK Coordinator)
2 Meadow View Road, Hayes, Middlesex
UB4 8EZ, Britain

Getting Up to Speed --400 That Is

Chris Boultinghouse
from DEAF NOTES Jan. 1997
editor: Frank Korman
9354 Forest Hills
Dallas, TX 75218-3633

When Frank asked me to write a series of articles about Speed 400 powered planes, I first wondered "why me?" [Couldn't have anything to do with the fabulous fee could it? Ed.] I don't consider myself to be a particularly gifted designer, but I guess I must admit that the electric-powered planes I've designed thus far do seem to fly as well as, or better than most. So, I've decided to share what I've learned about flying Speed 400 electrics. This first article will touch briefly on the airframe requirements, and will talk about the motors, props, batteries and speed controllers and the fun things you can do with a Speed 400-powered model. The second article will go into more detail about airframe design and composite construction. The final article will be a continuation of the construction methods and will contain the plans and instructions to build a simple but good-flying Speed 400-powered racer named Brownie. At least, that's the plan right now, so stay tuned.

Speed 400 has become a generic term meaning any Mabuchi 380 series motor, much like Kleenex has come to mean facial tissue, regardless of actual brand name. Of course, Speed 400 is the name that Graupner applies to its motors. There are also

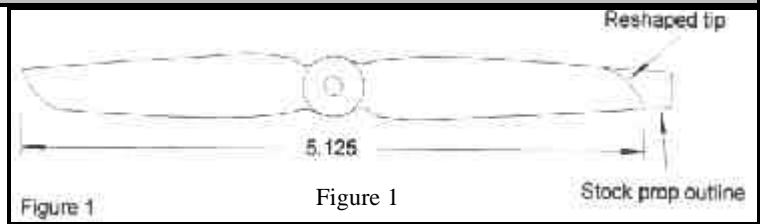
Johnsons, Robbe and others. All are essentially the same motor, but with various windings. The Graupner seems to be the most popular, with the 6v and the 7.2v versions being most appropriate for sport flying and/or racing. The 4.8v motor seems to work best with gear reduction, but to date I've not tried any geared Speed 400 motors.

AIRFRAME REQUIREMENTS: I'll cut right to the heart of the matter. The key to good performance with a 400 motor is weight. Or more correctly, lack of weight. For racers or 'fighters' you want the weight to be 19 ounces or less. Wing area should be between 130 and 200 square inches. For more docile sport planes or powered gliders the weight can approach 21 to 23 ounces. However, you will need wing area to keep all that weight flying, so figure on 250-350 square inches for good handling. Keeping a plane this light means careful selection of wood (for conventional construction) and minimal epoxy for composite construction. The airframe can be remarkably "fragile" and still survive flight and landing loads. You can't make a plane crash-proof, so don't even try. Build it to fly, don't build it to crash! I will provide more details about lightweight construction techniques in a later article.

A secondary consideration for design performance is drag. Jim Ryan designed and built the cutest model of an F6F Hellcat that you've ever seen. It only weighs 1/2 ounce more than my P-51 Mustang, but my Mustang is much faster because of the much lower drag compared to that big flat nose on the 'Cat. Just something else to consider before starting your next scale speed 400-powered project. If your subject had a radial engine, be prepared to "fudge" the cowl diameter somewhat to get a good flying model.

THE POWER SYSTEM: The Graupner **Speed 400** motor is very inexpensive (\$15 or less) and will provide many good flights as long as you remember one thing: It doesn't like amps! Keep the current draw to 10 amps or less and the motor will live a long and happy life. If you prop it to draw 12 to 15 amps, be prepared to replace the motor after about forty flights. I've found that the 6v motor on 7 (or even 8) cells provides maximum velocity in my Mustang, but doesn't have the duration of a 7.2v wind. Dale O'Donnell uses two 7.2v motors on 16 KR600AE cells (wired in series) in his P-38. With Master Airscrew 5.5x4.5 props (unmodified) his static current draw is only 8 amps. As a result, his flight times are in the 6 minute range, and consist mostly of aerobatics and fast passes. My Mustang (with the 6v motor on 7 cells, 5.125x4.5 prop) draws 10.5 amps static. Flight times average 3 minutes. Those who have seen me fly know how aggressively I fly the poor little thing! Reduced throttle cruising will give me 6 minute flights, but heck, that's not the way I like to fly.

MORE ON PROPS: The Graupner CAM 5x5 prop is very good, but also fragile and expensive. The Master AirScrew 5.5x4.5 trimmed to 5.125 diameter is a very inexpensive substitute that still provides very good performance. Modifying the tip shape as shown in Figure 1 seems to provide even more performance. I'm also experimenting with thinning the blade slightly, but results are inconclusive. [Chris has added a note that his latest prop mod is to "cup" the back side of the blade



from the root to within about 1/2" of the tip using a Dremel sanding drum. [This both thins the blade and increases the undercamber of the airfoil. Ed.] **The standard warning applies here: Be very careful when modifying propellers! Always use a good quality prop balancer to balance your props before use.** An out of balance prop robs power. You don't have extra power to waste with a 400 motor.

As for mounting props to a Speed 400 motor, I've not found a better way than the Graupner 30mm (1-3/16") hub/spinner assembly. It has a grub screw to retain it on the motor shaft (2.3 mm diameter shaft) and is absolutely true, with no wobble or runout. They are not cheap (\$15), but considering that a well-tuned 6v Speed 400 will turn 14,500 RPM, you can see the importance of a good quality hub and spinner.

MOTOR BREAK-IN AND TIMING: Speaking of well-tuned, proper break-in of the motor will give you more usable power. There are several different methods, but perhaps the easiest is to take two D size dry cell batteries, hook them up to the motor (making sure it turns in the correct direction) and let it run until the batteries are dead. Of course, no prop is used on the motor during the break-in period. It will get rather warm, so either place it where a fan can blow across it or put it in the refrigerator. Be sure to preserve domestic harmony by warning your significant other about the strange buzzing thing in the fridge.

After break-in, you may want to advance the timing. The motor ships with neutral timing, which is not optimal for best power output. There are tools commercially available that make this easier, but you can use a pair of snap-ring pliers or needle-nose pliers, a scrap piece of ply drilled to accept the motor shaft and mounting screws, and a little muscle to get the job done. Bolt a scrap of ply to the front of the motor to provide a better grip. Make a mark on the end bell and the housing to use as a point of reference. Insert the snap ring or needle nose pliers into the two small holes in the end bell. Now rotate the end bell opposite the direction of prop rotation approximately 5mm (about 1/8"). When looking at the back of the motor, you will turn the end bell counter-clockwise. This will take a good bit of force to accomplish. If you can't get it to turn, use a Dremel and grind the little crimps off of the case that hold the end bell. Once the motor is timed 5mm advanced, a couple of spots of solder will hold it in place.

BATTERIES: Okay, so now we've got a motor that is broken-in, timed and ready for use. We've got a handful of balanced (and maybe modified) propellers. Now you need a fuel tank! The Sanyo KR600AE cells are inexpensive (around \$2.50 each, maybe less depending upon the source), and are fine for the low power required of a 400 motor. The Sanyo N-500AR cells are more expensive, but have lower internal resistance. These might

be a better choice if you plan on pushing the motor to 12 or more amps. Plan on purchasing enough cells for three battery packs. This will allow you to fly one, charge a second and have a third cooling down. By rotating the packs you won't have a long down time" between flights. These cells are happiest when charged at 1 or 2 amps. I usually split the difference and charge at 1.5 amps. Don't charge them at 5 amps like your larger cells. They won't like it very much.

SPEED CONTROLLERS: A high rate controller is defiantly recommended, as you can greatly extend your flight times by throttling back on the "downhill" sides of maneuvers. Frame rate controllers aren't as efficient during part throttle operation and can cause the motor to run very hot. Also recommended is a BEC (Battery Eliminator Circuit). I will state right now, that I only use BEC on 400 size airplanes, and only then for racers or sport planes. A glider has flight times and flight profiles that I just will not risk with a BEC, nor will I risk larger (more expensive) airplanes. If the BEC fails in a Speed 400 size sport plane, it will just crash. It probably won't even hurt it that bad. If it fails in a glider, you'll probably loose it all when it vanishes in the thermal. And of course, a BEC failure in a larger more expensive plane just costs you more money and heartache. That said, a BEC will save you at least 1.5 ounces by eliminating the receiver pack. That is a substantial percentage of the total weight of a Speed 400 powered plane, and can mean the difference between a great flying plane and a wallowing sow. I hesitate to recommend a particular brand, but there are two I will mention: The JETI 10 and 20, and the Tarling Micro Star. Both are available from New Creations RC and both work well.

WIRING: System wiring is another area where you can save some weight. With the relatively low current used by the Speed 400 motor there is no need to use heavy (and expensive) 12 or 14 gauge wire. 18 gauge is quite sufficient. Keep the length to a minimum to save every gram possible. Sermos connectors are my personal choice for hooking it all up. The housing can be trimmed back (on the end where the wire enters) to make them slightly smaller and a tiny bit lighter. I don't use connectors between the speed controller and the motor. I just solder it directly.

FUN DOINGS: So what fun things can you do with these inexpensive Speed 400 motors? How about a 31" wingspan P-51 Mustang that flies fast, is very aerobatic, but lands slow enough that you can catch it? (Yes, I've done it more than once. I know, that's really showing off, but it sure is fun) That's not your cup of tea? Okay, how about a 2 meter wingspan C-130 Hercules made entirely of foam and Econokote (with a few bits of balsa thrown in) that will fly for 6 minutes on a single 16 cell pack of 1700SCRC cells and four 7.2v Speed 400 motors? Still don't see anything you like? Too mundane? Okay, how about a 15 ounce speed demon that tears around a pylon course at 60mph, wing-tip to wing-tip with 3 other planes in a fight to cross the finish line first? Can you say adrenaline rush? Oh, you say you're not an adrenaline junkie? Okay, how about a 1.5 meter span polyhedral glider that you can fly anywhere; will climb to high-start altitude at least 3 times on a single charge; and thermals like a hand launch glider? Just flick on the throttle, give it a

gentle toss and sit down in your lawn chair with your favorite beverage and enjoy a lazy afternoon of chasing thermals. No high start to stretch, and no sore arms later.

Now that I've got your attention, you're just going to have to wait and see what other fun things are in store....

[I asked Chris to include info on his P-51 Mustang kit. He sent the following. (The P-51 is a superb flyer and very attractive.) Ed.]

SPECS: Wingspan/Area/Airfoil =31"/165sqs./RG14--- Length = 23"--- Weight with 7, 500 or 600 mAh cells = 17ozs.

Elevator/Aileron/Throttle controls.

RECOMMENDED EQUIPMENT: 2 micro servos -- speed control with BEC - standard receiver (remove case to save weight) --- Graupner Speed 400 6v motor, Graupner 6x3 folding prop/spinner (fun), or CAM 5x5 prop (wild!) ---6 or 7 cell 500-600mAh pack (7 cells recommended).

CONSTRUCTION: Epoxy-glass fuselage with Kevlar and carbon fiber reinforcement, pre painted with white Krylon giving a pinhole-free base coat for the finish of your choice. Sheet balsa tail surfaces with epoxy-glass skins. Wings of extruded polystyrene (Dow Greyboard) with vacuum bagged epoxy-glass skins and no spars. Wing and tail surfaces pre-painted during bagging process resulting in high gloss, pin-hole free surfaces. Wings are bagged in one piece with correct dihedral and washout built in.

KITS UNDER DEVELOPMENT: FW-190 for speed 400 (same size as P-51). Zapper for 05-15, 7-10 cells (very similar in size to the ElectroStreak). Brownie for speed 400 pylon racer/sport plane, (construction article and plans only), to be available in future issue of DEAF Notes!

My address, etc. CAB Designs, 2007 Brook Hollow, Cedar Park, TX 78613. Ph = (512) 259-4748. Email =cabdesigns@aol.com. Web site = <http://www.netads.com/com/cabdesigns/>

ModelAir-Tech's New Address & Phone Number

MODELAIR-TECH

P.O. BOX 1467

Lake Grove, NY 11755-0898

Phone & FAX (516) 981-0372

E-mail: THunt95147@aol.com

MODELAIR-TECH Announcement

Modelair-Tech has moved, downsized and taken on a new partner recently. Bob Aberle has decided to retire (again, the first time from 33 years at Grumman Aerospace) to pursue more time with his family and his writing. Bob will still be seen helping out Tom (Hunt) at trade shows and fly-ins around the country. (We just can't let him off that easy!) Tom's wife, Eileen will now be taking over the day-to-day business of running Modelair-Tech, while Tom still works at Northrop Grumman as a Senior Engineering Specialist during the day. Although Eileen is not as "knowledgeable" about this hobby as Bob is, she is a bit more attractive (although that's hard to tell over the phone, unless, of course you know Bob!!!). Business hours are from 10AM-2PM, and then again from 7-9PM M-F with occasional service on Saturdays (hey.. we got to go out test

flying sometime!!!). As of January 1997 we still do not have credit card service, but we are working on getting it sometime later this winter. Until then, checks and money orders are still acceptable. We should also, soon have our own web site. Those who are "computer" connected will get that update when it's available.

Please use the new phone number and mail box shown here, but if you forget, don't worry, the phone company will tell you the new #, and the old mailing address will be forwarded.

Thanks, Tom and Eileen Hunt

MODELAIR-TECH is running the following specials thru March 15th, 1997 for those who cannot make it to the WRAM model aircraft trade show in New York in late February:

\$2.00 off all plan sets listed at \$17.00 or less.

\$4.00 off all plan sets listed at \$18-\$40.

\$5.00 off an H-500 (list \$49.95).

\$6.00 off H-1000 belt drive. (list \$59.95)

\$7.00 off an H-1000/Dewalt 14.4V motor combo (\$112.95 list).

\$5.00 off a Lowwatt or Dimwatt kit (list \$24.95).

To Reach Ken Myers, you can land mail to the address on the front page. My **E-mail address** is:

102575.3410@compuserve.com

EFO WEBSITE: <http://members.aol.com/KMyersEFO/>

\$5.00 off the MOB-SO gearbox/motor combo (list \$24.95).

Note: H-500's and H-1000's need the PA-100 (1/4" prop adapter) at \$5.00ea Please add \$4.00 S+H for plans shipped rolled. No S+H needed for plans shipped folded. Please add \$6.00 S+H for H-500/H-1000 Please add \$3.00 S+H for MGB-50's (up to four, five or more add \$6.00 S+H)

Upcoming Events:

April 13, 1997 Capital Area Soaring Association's Annual SPRING SIZZLER ELECTRIC FUN FLY, Gude Drive Field, Rockville, Maryland, Call Roy Smith at 301-279-2966 for more information.

June 7 & 8 Tenth Annual Lehigh Valley Radio Control Society E-Fly, Mike Stewart, 107 Taft Terrace, Washington, NJ 07882 as CD. For more info E-mail Mike at Mike721@worldnet.att.net or Phone: (908) 689-6981

June 28/29 - Knights of the Air R/C Club, Springfield, Illinois, Tim McDonough, 127 S. Oaklane Road, Springfield, Illinois 62707 (Email: tpm@inw.net)

July 12/13 - Mid-America Electric Flies, Ann Arbor Falcons/EFO, location, Midwest R/C Society Field, 5 Mi. Rd, Northville Twp, MI Ken Myers/Keith Shaw

Aug. 2 - 5 - AMA Headquarters, Muncie, IN Doug Ward, R.D. #1, Box 189. Irwin, PA 15642 (412) 446-5891 DWard79207@aol.com



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

**Next Meeting: Thursday, March 6, 1997,
7:30 PM Dublin Community Center
Just N. of Union Lake on Union Lake Rd.**