the Ampeer

January | The EFO Officers | 2008

President:
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
Phone: 248.669.8124

Vice-President:
Richard Utkan
240 Cabinet
Milford, MI 48381
Phone: 248.685.1705

Secretary/Treasurer:
Rick Sawicki
5089 Ledgewood Ct. W.
Commerce Twp., MI 48382
Phone: 248.685.7056

Board of Director:
David Stacer
16575 Brookland Blvd.
Northville, MI 48167
Phone: 248.924.2324

Board of Director:
Jack Lemon
8908 Sandy Ridge Dr.
White Lake, MI 48386
Phone: 248.698.4683

Ampeer Editor:
Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
Phone: 248.669.8124

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The Next Meeting:
Date: Thursday, January 10 **Time:** 7:30 p.m.
Place: Jim Young's house, Brighton, MI (see info inside)

What's In This Issue:

Bob Aberle Receives 2007 Zaic Award

In November 2007, Bob Aberle was presented with The Frank and John Zaic Memorial Award at the 5th Annual JR Electric Indoor Festival held in Columbus, OH.

The Award Reads:

The Frank and John Zaic Memorial Award
In Honor of AMA Founder
Lt. John W. Alden
In recognition of extraordinary contributions to the
Progress, Promotion, or Preservation of Aeromodeling
In the United States of America
Presented in the year 2007 to
Robert F. Aberle

For exceptional service in maintaining, furthering, and expanding the cause of radio control aeromodeling for the benefit and enjoyment of all participants and the technical advancement of the science involved.

Congratulations Bob! Very well deserved! Thanks for all of your work and dedication to every facet of this hobby, Ken and the EFO.

How Much Better Are the "Better" Outrunners?

By Ken Myers

Recently, Jim Kroger, of New Mexico and I exchanged some emails on this topic. Here are my current thoughts on this topic.

JK: I got started on your "One Way of Selecting a Brushless Outrunner Electric Motor" article. (homepage.mac.com/kmyersefo/M1-outrunners.htm) I have a question. With the TowerPro, and the HXT, you appear to focus on relatively inexpensive motors. This is laudable, with the several planes a

JK (cont.): hobbyist may have, it's sensible.

KM: That was the point of these motors, and you got it! I spent a lot of time in 2006 and 2007 trying to come up with inexpensive planes and power systems and share that information with the members of the general RC club I belong to, Midwest RC Society. I wanted to show them that I can put a good performing sport plane in the air in the "40" size without spending an arm and a leg when using electric power. I also wanted to show the members of the EFO that they can start flying "40" size planes for about the same cost as the smaller electrics many members are currently flying. I have to say that I believe that I was reasonably successful on both counts as a few of the Midwest RC Society guys are now working on "40" and "60" size electrics and at least two of the EFO members have "40" size winter projects started already.

JK: However, in the case of the HXT, it seems like a tradeoff is inefficiency. This is a guess on my part, but it seems that if you opted for a more expensive motor, like an AXI, Hacker, even a Neu, or even a mid-priced option like an E-flite, Scorpion, or Himax, that you would gain a lot in performance and flight duration from better efficiency (again I'm guessing that the HXT is inefficient because it's cheap).

KM: Somewhat true, but… read on.

JK: Is it that these companies just don't make such a motor?

KM: That is part of the problem. For example, the TowerPro/BP Hobbies 3520-7 and -6 fall in cracks between the "big guys", and I'll come back to that in a bit.

KM: Let's look at the HXT 42-60/06 compared with some others. (***Note:*** *United Hobbies has replaced this motor with one now known as the Turnigy 42-60 500Kv 900W Outrunner for $35.95. This note appeared in a thread on RC Groups. It is from UH/HC to a member by the ID of scrapster:*
"Hello.
HXT = hextronik
Hextronik is our company. We have changed the name of the motor because the factory that make this motor have complaints from UK vendors about our pricing.
We have been forced to change both the name and the shape of the end bell to help remove complaints on our pricing from western vendors.
If you are having difficulty with this, please call our office and ask to speak with the manager in charge. He will be able to speak to you at length regarding the naming and branding issues related to these products at this price.
Regards
Samee"
The original thread about Turnigy is located here:
http://www.rcgroups.com/forums/showthread.php?t=772872
My review of the HXT 42-60/06 is located here:
http://homepage.mac.com/kmyersefo/hxt42-60-06.htm

Keep in mind that "better" efficiency can be used in two ways. It may be used to swing a larger diameter prop or larger pitched prop at the same amp draw, or the extra efficiency can be used to swing the same prop at a lower amp draw.

Here is a comparison using the same prop, an APC 14x8.5E, which is what I am using with this motor and 6 M1 (A123 Systems) cells in the Flite 40 sport plane. The comparison was made using Drive Calculator, as I certainly can't afford motors like the Kontronik Koras! :-) 6 M1 (A123 Systems) cells were used as the power source.
Kontronik Kora TOP 20-14W, weight 319g, 17.38v, 37.3 amps, 7856 RPM, static thrust 105 oz., 649 watts in, 556 watts out, pitch speed 63 mph, system eff. 85.7%, Kv ~503, Price - $199.00US
AXI 4120/18 (the one in the DC data base), weight 305g, 17.44v, 36.4 amps, 7750 RPM, static thrust 102 oz.635 watts in, 533 watts out, pitch speed 62 mph, system eff. 83.9%, Kv ~509, Price - $129.90US
Neumotors 1506/3D 6.7:1, weight 237g, 17.38v, 37.3 amps, 7785 RPM, static thrust 103 oz., 649 watts in, 540 watts out, pitch speed 63 mph, system eff. 83.3%, Kv ~498, Price – $185.00US plus gearbox
AXI 4120/18 (mine), weight 315g, 17.54v, 34.9 amps, 7608 RPM, static thrust 98 oz., 612 watts in, 502 watts out, pitch speed 61 mph, system eff. 82%, Kv ~509, Price – $129.90US
HXT 50-55B, weight 300g, 17.57v, 34.4 amps, 7483 RPM, static thrust 95 oz., 604 watts in, 476 watts out, pitch speed 60 mph, system eff. 78.8%, Kv ~503, Price - $42.33US Note! This is not the one that is being sold now. The current one has a Kv of about 600.

Kontronik Kora 25-12, weight 220g, 17.23v, 39.6 amps, 7735 RPM, static thrust 101 oz., 683 watts in, 529 watts out, pitch speed 62 mph, system eff. 77.4%, Kv ~555, Price - $144.00US
HXT 42-60/06 500Kv 1-deg timing, 264g, 17.33v, 38.1 amps, 7464 RPM, static thrust 94 oz., 660 watts in, 472 watts out, pitch speed 60 mph, system eff. 71.6%, Kv ~550, Price $35.95 – see note about renaming this motor above
HXT 42-60/06 500Kv 15-deg timing, 264g, 17.26v, 39.2 amps, 7487 RPM, static thrust 95 oz., 677 watts in, 478 watts out, pitch speed 60 mph, system eff. 70.4%, ~565, Price $35.95 – see note about renaming this motor above

Even though the "original" HXT 42-60/06 is not available, its replacement should be close to identical in performance, so it can be used to compare it to the Kontronik Kora TOP 20-14W. The price difference is now about $163US. For that amount of money you get ~390 more RPM or an increase in pitch speed of about 3 mph. I'm not sure that I would notice the difference. The static thrust difference is about 11 oz. That may or may not be noticeable. The wide-open throttle amp draw decreases by about 0.8 amps. I don't believe that I would notice the difference in the flight time, as both would probably average very close to the same.

Other motors in this group may be compared this way and you can see whether one is worth more to you than the other. To me, there doesn't appear to be a huge difference.

JK: This leads to a second question: you stated "The equivalent AXI designation would be a 3530/06, if it existed." Is there a formula for AXI's designations?

KM: No, AXI, Scorpion, TowerPro, Hyperion and some others use the stator diameter in mm and stator length to describe their motors.

It seems that others, including the ones marketed using the HXT/Turnigy designation and ElectriFly use the outside dimensions in mm using the outside diameter and total case length. For example, using the outside dimensions the TowerPro 3520, it would be designated a 4650.

I had mentioned that the TowerPro 3520-7 falls in the crack, and that is because Scorpion, AXI and similar motors jump directly from a 30mm stator diameter to a 40mm stator diameter. By doing this, they are missing some useful Kv values. If you look at Scorpion, you'll find that none of the 30mm motors have a Kv of about 500, like the examples above. The lowest Kv for a Scorpion 30mm is the S3032-12 at 687. The 40mm start with the S4020-12 at 542. The S3032-12 is approaching the Kv of the 3520-6, which is about 725/730 and the S4020-12 falls into the group we were looking at above. The "crack" is that the TP 3520-7 has a Kv of about 610, which falls between the two Scorpion motors, as well as other brands. The HXT 50-55B now has a stated Kv of about 600, the current model would fall into the same group at the TP 3520, especially when you compare the outside dimensions, 4650 for the TP to 5055 for the HXT.

Follow-up:

JK: Whew, this is complicated stuff. Increasing the Kv with ESC timing will reduce efficiency. But that stands to reason, since a lower Kv motor swinging a bigger prop is more efficient. So why use any advance at all?

KM: As I understand it, timing was/is used with brushed motors to reduce the pitting of the commutator and chipping of the brushes when running at high power levels caused by trailing edge fire. It was/is only effective when the motor is run at mostly wide-open throttle. It was/is used in limited/timed motor run events where the plane has a limited amount of motor run time to get to maximum gliding altitude and the motor is not used again. The events are mostly for gliders and old timers. It had the side benefit of increasing the power out and rpm to the detriment of efficiency, but since the motor was/is only used for 30 seconds or so, it didn't/doesn't matter.

Timing advance is used to increase the power of two types of brushless motors. There seems to be a large segment of the hobby that likes to get as much "power" from as little battery as possible, because of the cost of lithium polymer (Li-Poly/Li-Po) batteries. Obviously, a 3S (three cells in series) Li-Po is going to be cheaper than a 4S, 5S, etc. of the same quality. A 3S will also be lighter than a 4S, 5S, etc. If a person wants to fly a 4 lb. 3D plane they want the lightest airframe and power system possible. They'll need about 600 watts in (150 watts in per pound or greater) to fly their mission. They want a very light

wing loading/cubic wing loading. To get their 600 watts they'd use a motor capable of 600 watts in, a 3S Li-Po that can handle the almost 60-amp wide-open throttle current required and an appropriate ESC. They'd also fly with some form of advanced timing to get that last little bit of power. Even though the WOT amp draw is high, the flight times are good, since a lot of time is spent at part throttle. **Part throttle does not lower the amp draw**, it just leaves the ESC's "off time" on longer, so the transistors spend more time in the off state than the on state and the "average" amp draw is lower.

For my sport planes, as a rule my 600 watts in planes weigh about 6 lb. giving a wing loading/cubic wing loading that is good for flying in some wind. Since I now use the M1 (A123 Systems) cells with these planes, that means 6 cells and I prop for about 35 amps at static WOT. I also use low timing. Keeping the amp draw lower and using low timing increases power system efficiency, keeps all the power system components "happier", and increases duration. There are *ampers* and *volters*, and I tend to lean more toward the *volter* side.

One other thing about timing brushless motors, some motors just won't run well at certain timings, but all of the larger outrunners I've been using recently respond very well to low timing.

JK: How different are the HXT 42-60/06 and the TowerPro 3520-7? I guess it doesn't matter since the HXT is no longer available, but just curious. (*Yes, it is, but we weren't aware of it when exchanging our emails. KM*)

KM: The TowerPr0 3520-7 is about a 600 Kv motor and the HXT 42-60/06 is about a 550 Kv motor. That means that on the same battery the HXT can swing a larger diameter prop a little slower than the TP motor. When I used the 3520-7 with a 6S M1 pack, to keep the amp draw about 35 amps, the largest prop I could use was an APC 12x7 sport at about 9000 RPM for a pitch speed of about 60 mph. Drive Calculator estimates that with that prop the thrust is about 90 oz..

I'm now using the same battery with the HXT motor in the same plane but using an APC 14x8.5E at a 37 amps draw. Even though the RPM is down to about 7400, it still yields a pitch speed of 60 mph due to the higher pitch, but it has more thrust due to the two-inch increase in diameter. Drive Calculator estimates 95 oz. of thrust. With the power (watts in) staying basically the same, the performance went up. Why? Obviously, if the watts in are about the same, the only thing that has changed is the propeller.

Conclusion, the APC 14x8.5E propeller is more efficient than the APC 12x7 sport prop.

A Bingo 20, Hyperion & Scorpion Motors and More

From Dan Bono DBono99@aol.com

(*For the past few weeks Dan and I have been communicating on several topics. I have rearranged some of his correspondence to create the following. KM*)

I thought you would like to know my experience with Hyperion motors. I just purchased my 3rd Hyperion motor.

I recently crashed my Sig Kobra. The crash was really bad. The plane went in pretty hard right on the plastic spinner. I had a Hyperion Z3025-08 with a Hyperion Titan 50 amp ESC in this plane. When I got home, I tried the motor and ESC and both seemed to working fine. The prop adapter was bent, yet everything still looked fine. I ran the motor without a prop, because I didn't have another prop adapter. I was surprised that I didn't see any wobble in the motor when I ran it for a few seconds.

I won't really know until the new adapter arrives, but from what I can see, things are looking good.

I had a Hyperion 3S2P 4200mAh Li-Po in the Kobra. I might have to chuck it because of the crash. The funny thing was that the firewall was still in place, but the two formers behind it were not. I think the battery hit the firewall.

The Bingo 20

I purchased a Scorpion S3020-12 for my present project, a Bingo 20. The Bingo 20 has a 49-inch wingspan with 440 sq.in. of wing area and an all up weight (AUW) of about 48 oz.

At the beginning of the maiden flight of the Bingo 20, my test pilot got the plane about five feet in the air and it started proposing, maybe three or four times before hitting the ground.

After the crash, I made the following changes.

1. Moved the CG up to 25% instead of 30%. It was 2 3/4", now it is 2 1/4".
2. Reduce the elevator throws from 3/8" to somewhere between 1/4" and 5/16"
3. Put some UP trim in the elevator

4. Have -30% expo. in the elevator, but I might go 50%

Upon examination, after the crash, the Scorpion motor looked OK. It seems like the Scorpion passed the crashed test.

Following the repair and adjustments, the plane flew just like it's supposed too. There were NO problems whatsoever, what a relief.

It looks like the main problem was the CG. I had to add about 3-4 oz. of weight to the front end, to get the CG at 25%. I also put some wing saddle tape on the wing saddle to take up for the wing movement. The final weight came out around 52 oz.

The Scorpion motor worked fine after the crash, with a Grayson 3S1P 4100mAh Li-Po.

I've been flying the Bingo 20 using the Grayson Battery.

My color scheme for the Bingo 20 looks great on the ground, but in the air, orientation can be a problem. Both my test pilot and I lost IT for few seconds the other day.

The Scorpion S3020-12

http://www.innov8tivedesigns.com/product_info.php?cPath=21_25_38&products_id=76

I bench tested the Scorpion S3020-12, and numbers were higher then those at the Scorpion web site. Here is what I got. It seems like the battery does make a difference. My numbers were close to Lucien, maybe a tad higher.

I thought you would like to know the number's I got with the Scorpion S3020-12 using the Scorpion 55 amp ESC and an APC 10x5E.
Skyshark 3S1P 4000mAh; 25 amps, 250 watts in and the voltage dropped to 9.5.
GraysonPower 3S1P 4100mAh; 28 amps, 280 watts in and the voltage held well at 10.50.

More Motor/Battery Info

Skyshark 3S1P 4000mAh battery
APC 10x5E 25amps-253watts-10.59 volts
APC 10x7E 31amps-316watts-9.95 volts

GraysonPower 3S1P 4100mAh Battery
APC 10x5E 29Amps-319watts-volts 10.97
APC 10x7E 35Amps-385watts-volts 10.70
Scorpion data can be found here:
http://innov8tivedesigns.com/Scorpion/Scorpion%203020-12%20Specs.htm

(*Your numbers are pretty close to what Lucien has posted. I believe that part of the difference is that, unfortunately, Lucien used an "old" APC 10x7E when he was doing is motor tests and therefore got lower amp draws and higher RPM than the current version of the APC 10x7E. KM*)

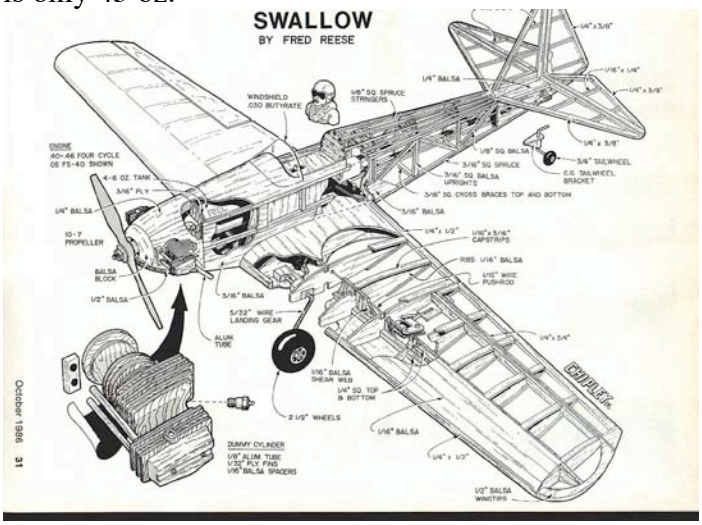
Thoughts on GraysonPower Li-Po Batteries

I'm thinking of getting two more of the Grayson Power 3S1P 4100mAh Li-Pos, one for the Kobra and one for the Bingo 20.
http://www.graysonhobby.com/catalog/product_info.php?cPath=8_41&products_id=452&osCsid=de9f15258d5796911743a7d4c8641b01

The GraysonPower battery seems to be a bargain so far. It was purchased for $59.00. Most 3s4000 cost over $100.00.

I needed a very narrow battery to fit into the fuselage of my Cloud Dancer also.

Speaking of the Cloud Dancer, I'm getting these numbers with the Hyperion Z3019-10 using an APC 10x5E; 35 amps-365 watts. The Cloud Dancer AUW is only 45 oz.



I also have plans from the AMA plans service for a plane called the Swallow. It's a 1986 Fred Reese design. This plane is the predecessor to the Cloud Dancer line. It has a wingspan of 58" and flying weight with a glow 40 of about 3 lb. 7oz. I just might keep this one full size.

(*AMA members, to find this article and plane on the AMA site http://www.modleaircraft.org, click on Publications and select Model Aviation. Visit the Digital Archives and search for Swallow, Title, 1986 and you'll find the article and plans. You must be signed in to use the digital archives. KM*)

I'm now building a down sized version of a plane called the Miss Texas. My friend picked one up off of E-bay. The original has a wingspan of 84" and mine will 42". This is and oldie. The plans came out in 1978.

Phase 3 Models EF16 EDF

From Michael Southwood
michael.southwood@ntlworld.com

With its lightweight foam construction and simple taileron control (all-flying tail plane halves), you get a highly manoeuvrable model that's docile and controllable at low speeds too.
Wingspan: 660mm (26")
Weight: 570g (20 oz)

All that is needed are micro radio, a transmitter with elevon mixing to suit the taileron controls and a 3 cell 2100mAh Li-Po. (RCM Direct 2200 used)

Assembly is super-quick due to the lightweight all foam and ABS moulded parts. Performance is nothing short of breathtaking!

SHOPPING:

The kit came from Motors & Rotors, Kings Langley, UK, a new emporium, stuffed out with goodies. Price £85.

Extras needed are two 12-inch servo extensions and a pair of 9-gram micro servos.

You will also need a radio system, which has elevon mixing, and a lightweight receiver. In my case I used the Spectrum AR6 100 DSM2 6 Channel 3.5 gram receiver. While this unit is said to be for Park Fliers, the range is adequate for this one. A good Li-Poly, 2200mAh 25C will give the best performance and longest endurance.

WHAT YOU GET:

The smallish box contains all the parts, neatly bagged and packed to prevent shipping damage. The construction is of polystyrene foam, smoothly moulded and in a minimum of parts. There is a bag of fittings, including some special little horns for the stabilator operation and a few ABS parts, mainly to reinforce the foam at the nose and intake leading edge. Also included is a very large sheet of decals / trim will eventually cover most of the white foam, adding strength and colour.

The Ducted Fan is fully assembled and connected to a 30 amp ESC. A small, but very powerful, brushless motor drives a well balanced fan. The EDF is attached to the thrust tube, making assembly into the foam fuselage easy and adjustable for balance according to the Li-Poly weight.

Instructions are mainly coloured photographs. While they are quite clear, I do advise reading right through before you begin. There is nothing complicated, but some assembly is best done in sequence. For instance, it is worth applying the decals before assembly of the tail fin and stabilators.

ADHESIVES:

5-minute epoxy is required for a few parts. One can use White Glue such as Resin "W" but for the amount of glue required it is probably best to stick to epoxy. A cleaner such as wood alcohol is advisable so that excess can be removed.

ASSEMBLY:

Just follow the picture instructions. My RCM 9-gram servo's fitted perfectly in the mould-outs provided. A little work with a sharp scalpel allowed the wires, fitted with 12-inch EXTENSIONS to pass the fan.

The fan comes fitted to its thrust tube and can be laid in position. The position changes with different weights of batteries. Weigh your Li-Poly and set the fan as illustrated in the manual. A little epoxy holds it in place. Set the thrust tube central at the tail until the glue dries. The clear tube will poke out of the back and will later be cut off to match the tail cone.

The ESC sits in a recess, held with the supplied Velcro.

Don't forget to epoxy the lower fuselage reinforcing front edge moulding, before gluing on the lower fuselage. Wires have to be passed through to the cockpit area where Velcro holds the receiver and battery.

The wing panels are epoxy glued to the fuselage. They are a good fit and easy to align. I used a pair of spring clamps and a couple of bits of balsa and plastic sheet to align and hold the training edge to fuselage joint.

The stabilator parts are easily assembled, using the ball jointed cranks supplied. Operating rods have to be bent and cut, but are easy if you have some Z benders.

There is not a lot more to do. Glue on the tail fin after sticking on the transfers.

The transfers are self-adhesive and quite large to handle. This is probably the hardest part of the assembly. Air bubbles can be worked out or pricked with a pin to let the air out while rubbing down. These transfers do add strength to the foam as well as looking good. You need them to be able to see this plane in the air.

FLYING:

After setting up my Spectrum 2.4 GHz transmitter and binding it to this F16, the throws and directions were set as described in the book. One inch each way looked like a lot to me, but that is what the book said! The Li-Poly was moved until the balance was in the centre of that specified. The motor runs the right way! (You should have checked that before putting the lower fuselage on.)

A friend launched the model into the wind. Full power was enough to climb away at about 30 degrees. There were no problems except that she needed a lot of trim, mostly down, with a little right. I found it difficult to hold the sticks while finding those silly beep-beep computer trims. How I long for the old type smooth levers.

Fortunately this model is very stable and I managed to keep it up until the trims were set to give hands off flying, nice and level.

Once trimmed out, flying was fun. Fast or slow, loops, rolls, beat-up's at very high speed, superb.

What more can one say. It is quite responsive and could soon hit the ground if you lose orientation. It is best flown in a clear blue sky. I was surprised at the power once up to speed. There is plenty for large loops and verticals.

CONCLUSION:

This plane is not for a beginner, but anyone with experience flying fast aerobatic models should cope. It is a pleasure to build (assemble) and a good value for money. The first flight was the tricky one. After that, with the trims set, flying has been smooth and fun. There is almost no noise and it flies best at about 1/2 throttle. Flights are at least 10 minutes using a 2200 Li-Poly.

Mike Southwood
Hemel Hempstead Model Flying Club

Note for USA modelers:
This model is sold by Hobby People
http://www.hobbypeople.net/gallery/107312.asp
The price on November 15, 2007 was $139.99US.
KM

Upcoming Event of Interest

Skymasters R/C of Michigan would like to welcome your club to join us for: Spread "Spektrum"
Wednesday January 9, 2008 – 7PM
Featuring a discussion with John Adams the Technical Director Spektrum at Horizon Hobby.

Come learn everything you wanted to know about: Spread Spectrum Technology with a Presentation, Hands On, and Q&A.

The Location is Larson Middle School, 2222 E. Long Lake (18 Mile), Troy, MI 48085

Free Admission!
All Welcome!!!

It is sure to be an interesting evening!
For additional information visit the website at www.skymasters.org or call Joe Hass at 248-321-7934!

The December 2007 EFO Meeting

The first "winter" meeting of the EFO was held at Ken Myers' house on Thursday December 6. The meeting was very well attended and everyone had a good time sharing plane information and just talking about models and full-scale planes.

Bill Brown brought his brand-new, still in the box E-flite Taylorcraft 450 ARF. Bill passed around the parts and the members agreed that it looked well made and to be of good quality. Some of the specifications are:
Can be flight-ready in as little as 3 hours
Detailed cockpit with fabric-covered seats
Balsa and ply construction
Adjustable motor mount—Park 450 or Park 480 motor
Wing Span: 46 in (1170mm)
Wing Area: 370 sq.in. (23.8 sq dm)
Flying Weight: 29 oz. – 31 oz (820–880 g)
Recommended Battery: 3S 11.1V 2100mAh Li-Po

Thanks for sharing that plane with us Bill, and then repacking it! ☺

Rick Sawicki shared his Addiction 3D ARF, which he purchased from Atlanta Hobby. The kit is produced by Precision Aerobatics in Australia. He purchased the recommended power system, which is a Thrust 20 outrunner and 30A ESC, directly from Precision Aerobatics in Australia. (http://www.precisionaerobatics.com/product_item.aspx?prodID=1211)

The outrunner features a built in fan to keep it running cool. Power comes from a 3S 2100mAh or 2200mAh Li-Po pack. Ready to fly it weighs about 26 oz. or 27 oz. It has a wing area of 485 sq.in., which yields an approximate 7.9 oz./sq.ft. wing loading or a cubic wing loading of approximately 4.4 oz./cu.ft.

James Maughan brought along is almost completed Mountain Models Dandy GT. This is James' second Dandy GT. He gave his first one to a deserving young flier who didn't have a plane. He liked the plane so much he just had to have another! Jim plans to overpower this one a bit. Mountain Models recommends a 70-watt power system. Jim is going to install a 150-watt system!

The Dandy GT specifications are
Wingspan: 31.5"
Wing Area: 265 sq in
Length: 28 in
Weight: ~12 oz. All Up Weight
Wing Loading: ~6.5 oz/sq ft

Ken Myers demonstrated the CellMeter-8 from Hobby Lobby. This electronic unit measures each cell's voltage and displays the voltage. It also shows "how full" the pack is and how well balanced the cells are. He demonstrated it using a "good" pack and one that was known to be "out of balance." When a pack's voltage is too low or the cell's are too far out of balance, and alarm sounds on the unit. There are full reviews of this unit in the February 2008 *FlyRC* and on RC Groups at http://www.rcgroups.com/forums/showthread.php?t=765289&highlight=CellMeter.

The CellMeter unit is fairly expensive, but if it saves just one large Li-Po, it is worth it. There is also a 4S version, which is a bit less expensive.

Innov8tive Designs has a 3-cell and 6-cell meter that will just read the voltage of each cell. The meters have an accuracy of + or - 0.02 volts per cell, and are good for checking the general condition of a battery, and whether the battery is charged or not. You'll find them here – http://www.innov8tivedesigns.com/product_info.php?cPath=59&products_id=252. At $11.95 for the 3-cell unit and $15.95 for the 6-cell unit, they should be a good bargain.

It was a good night of sharing and comradeship!

IMPORTANT!

The Upcoming January 2008 EFO Meeting

The January meeting will be held at Jim Young's house. It will be on the SECOND Thursday of the month, January 10, 2008! Jim lives at 9356 Wendover Ct., Brighton, MI 48116.

Here are the directions going west on I-96. If you live quite a ways south of I-96, you might want to use MapQuest to get there.

A. Merge onto US-23 S via EXIT 148A toward ANN ARBOR. 4.1 miles

B. Take the SILVER LAKE RD exit- EXIT 55. 0.2 miles

C. Turn RIGHT onto SILVER LAKE RD., <0.1 miles

D. Turn LEFT onto WHITMORE LAKE RD. 0.1 miles

E. Turn RIGHT onto WINANS LAKE RD., 0.5 miles

F. Turn RIGHT onto RICKETT RD. 0.2 miles

G. Turn LEFT onto BONAVENTURE DR. 0.1 miles

H. Turn LEFT onto WENDOVER CT. <0.1 miles

I. End at 9356 Wendover Ct

E-flight calculators (compilation)

Found on RC Groups
By Ron van Sommeren
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1. D-calc, Christian Persson (English & German) www.yahoogroups.com/group/D-calc
2. MM_calc, English, Louis Fourdan (freeware) electrofly.free.fr
-> téléchargements (link at top of page)
-> moteurs
-> MM_calc
-> English or French version
Criticism and suggestions: www.rcgroups.com/forums/showthread.php?t=583327
3. Motocalc (€/$) www.motocalc.com
4. Elektro-Antrieb (German only, (€/$) www.geck-elektroantrieb.de
5. P-calc (freeware) brantuas.com/ezcalc/dma1.asp
6. E-Calc www.slkelectronics.com/ecalc/index.htm
7. Mumtats (freeware), RCGroups user 'vintage1' www.rcgroups.com/forums/showthread.php?t=233250
8. Rod Badcock's calculators (freeware) www.badcock.net
9. Peak efficiency (freeware) www.peakeff.com
10. WebOcalc and PowerCalc (freeware) flbeagle.rchomepage.com
-> software
11. Adam One Motor/Prop calculator (freeware www.adamone.rchomepage.com/calc_motor.htm
12. Thrust calculator (freeware) www.lcrcc.net/thrust_calc.htm
13. Thrust calculator (freeware) http://www.gobrushless.com/testing/..._calculator.php

And from Louis Fourdan

MM_Calc (see post #2) has brand specific cousins
1) Scorpion Calc www.scorpionsystem.com
2) MotrolFly Calc http://www.motrolfly.com
3) Dualsky Calc http://www.dualsky.com
4) Aero-nuts Calc http://www.aero-nuts.com
5) Himax Calc http://www.maxxprod.com/

Also from Jim Blanner

PropCalc spreadsheet http://www.rcgroups.com/forums/showpost.php?p=8761360&postcount=9

Ampeer Paper Subscriber Reminder

When subscribing to or renewing the paper version of the *Ampeer*, please make the check payable to Ken Myers. We do not have a DBA for the *Ampeer* or EFO. Thanks, Ken

Upcoming E-vents:

Wednesday, January 9, Skymaster's "Spektrum Forum" Larson Middle School, 2222 E. Long Lake (18 Mile), Troy, MI 48085

Thursday, January 10 EFO meeting at Jim Young's house, 9356 Wendover Ct., Brighton, MI 48116 7:30 p.m. Bring your latest projects and questions and be ready to talk airplanes. Everyone interested is welcome.

Happy New Year!

Have a Great 2008

With lots of new "stuff!"

Charge into a Great

Year!

The Ampeer/Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
http://members.aol.com/kmyersefo

The Next Flying Meeting:
Date: Thursday, January 10 **Time:** 7:30 p.m.
Place: Jim Young's house
See info in this issue
Please NOTE the DATE & PLACE!