the Ampeer

October 2001 Page 1

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Ampeer subscriptions are $10 a year US & Canada and $17 a year world wide.

The Next Meeting:
Date: Saturday, October 13 **Time**: 10:00 A.M.
Place: Midwest R/C 5 Mile Road Flying Field, Northville Twp.

What's In This Issue:

Charlie Spear Award

From: Jim Bourke jbourke@ezonemag.com

Ken,

Thanks very much for you and Keith presenting me with the Charlie Spear Award. It's a real pleasure to be honored. It means a great deal to me and comes as quite a shock.

Please pass on my thanks to everyone involved. I shall display it proudly.

Jim

Speedy Bee & Smoothy Ratings

From: Bob Roels BKROE912@aol.com

Rating 5 stars

Clancy Aviation Speedy Bee - Astro Flight 035 with Superbox, 10 -1250 mAh cells, APC 13x6.5 prop, Jeti 35 Speed control with BEC, Futaba and cirrus micro servos. All up weight 48 ounces.

Construction changes - Spruce used for main wing spar, and top longeron on fuse. Covered in clear Monokote

Flies Great! 4 1/2 minute duration with aggressive flying. Inverted, rolls, Cuban eights, vertical hover, outside spins, knife edge spin

Tips - down thrust must be adjusted to avoid high speed stalls especially small glow version. I prefer electric version over glow.

Rating 4 stars

Balsa USA Smoothy (sport 40 size 54 inch wingspan model) - Astro 25 Geared 11.5 x 9 Zinger 16 2000 cells, Astro 217 D, 270 mAh receiver pack, Hitec 81 servos, weight 88 ounces.

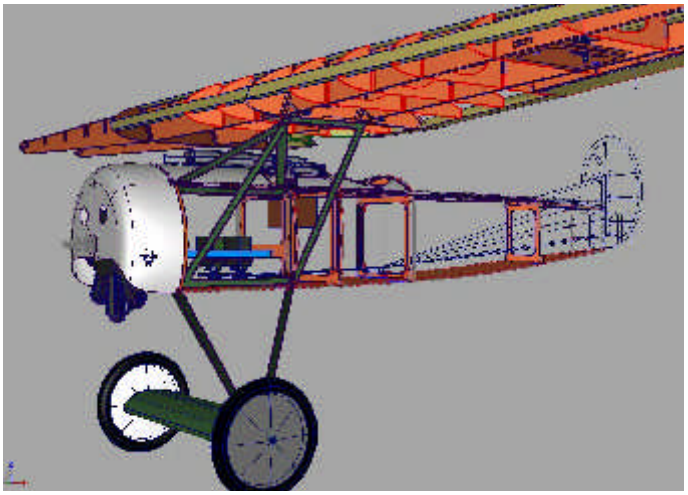
Construction changes include lightening holes, built up empennage in place of sheet surfaces, hollow all balsa block. Flight duration six minutes.

Next EFO Meeting

The next EFO meeting will be a "flying" meeting on Saturday, Oct. 13. It will be held at the Midwest R/C Society flying field on 5 Mile Rd., Northville Township, MI. Gathering time will be 10:00 A.M. Bring your latest projects to share and fly.

Should the weather prove "unflyable" on Saturday, the meeting will be held on Sunday, Oct. 14 at the same time. Check with Ken, 248.669.8124, if the weather is

"iffy" on Saturday. Any efliers in the area with an AMA card may join us, whether they are EFO members or not.



Fokker EV

From: Al Flowers AFlowers@ndii.com

Ken,

For some time I have enjoyed your website and it is on my "favorites" list. Please keep up the great work.

I have been designing and building a model which you might like to show on the site. Like Keith Shaw's, it is a Fokker D.VIII (actually my model is of the earlier version, the E.V). I am producing kits of this model and the launch will be the last week of July.

At 1/8th scale it is half as big as Keith's, but it is still very accurate, due to much research and effort. It won 1st place in its scale category (under 50" wing span) at the San Diego Mid Winter Electrics. It was subsequently shown in the regional coverage for that District in Model Aviation Magazine.

The model is almost entirely laser cut (by Bob Holman, wood and Ameristar Laser, aluminum) and is extremely fast and easy to build. Flying is a bit of a different matter due to the proportion of the landing gear, etc. In fact, I have installed (and will provide in the kit) a tailwheel which makes it possible to manage a takeoff. Now, an intermediate flyer can manage it. Of course, once in the air, it is fine.

My kit is available for $140 plus $8 S&H and is very complete, with dummy engine, twin machine guns, pilot, full interior, vacuformed cowl and wheels (done for me by MM glider Tech/Merle Brady). The best part is the fuselage covering which is provided. I have reproduced several of the Jasta 6 (Squadron 6) airplanes with their colorful lozenge camouflage, black & white striped tail, wheels and cowl. The colors and trim schemes were thoroughly researched for accuracy

although the .JPGS are not representative.

All in all, I think it would make a great article for the website, particularly in connection with Shaw's plane. I am attaching a couple of .jpgs so you can see what I mean.

The Fokker prototype has a 3.34:1 geared Graupner speed 480, a Jeti 180 speed control and a APC 11-7 propeller (modified Zinger 12-6 for static display), Hitec 555 Rx with three Hitec HS-81 servos. It requires a four channel radio because it has aileron control. Its wing span is 42" and the projected weight is about 34 oz. (the prototype came in at 37 but I have changed things to lightened it).

Regards,
Allan Flowers, CheckerboardAir, 12857 Via Grimaldi, Del Mar, CA, 92014
http://www.checkerboardair.com
or Phone: 619.699.0818

The Hummer before John and Doug's mods. It did not fly very well. What did they do to "fix" it? Check it out.

From a Hummer to a Bummer

From: John Rossetti jyuma@axxent.ca

Hi Ken ..... Enjoyed the August Ampeer . I'm

attaching a photo of myself and my friend Doug Moore with our "Bummers," as Doug named them. Our first Venture into electrics was the building of an electric canard called the Hummer from plans in RCM. Neither of our Hummers flew worth a darn. We don't k now if it was a CG problem or what, but we stuck them in a corner. Doug thought he could convert to something that would fly, so he cut the wings in half, glued them back together with no forward sweep, put the canard on the tail end and presto, it flew like a pattern plane. Once I saw his fly I converted mine (the orange and white one) and was amazed how well it flew.

As our first venture into electrics, the canards were enough to turn us off, but thankfully we stuck with electrics and enjoy flying our "Bummers," as we call them now.

Don DeGasperi's 72" B-24
From: Dan Parsons danpars@worldnet.att.net

Hi Ken,

I figured you and the rest of the electric gang would like to see the results of Don DeGasperi's latest design and building effort, his magnificent 72" B-24. As you may remember, I sent you in-flight pictures of his A-20 Havoc, which you publish ed in the *Ampeer*. Don's passion is drawing plans (to absolute scale) of a plane that he likes and then building it and having i t flown by our local electric Guru, Gary Kyle.

Don's latest, the B-24, Gary flew July 22, 2001 on it's test flight. Things co uld not have gone better!! After using a high-start bungee system to launch it off the grass (which went perfectly), Gary put i n about a 5 minute flight that was flawless and beautiful, both power-on and power-off. Over many years, I have seen several larger, IC powered, B-24's fly and none could approach the smooth and obviously well-mannered flight characteristics of Don's B-24. And remember, it is absolute scale, giving pause to the conventional wisdom that absolute scale models "just don't fly righ t". By the way, I blew that "wisdom" away many years ago with my Martin Baker-5 and deHavilland Hornet.

Here are the statistics on Don's B-24:
Wing Span: 72"
Weight: 4.5 lb.
Power: Speed 400's, direct drive; wired in parallel
Battery: 8 Sanyo 1900's

Electric continues to grow by leaps and bounds here in Albuquerque.
Best regards,
Dan Parsons

Getting the Ampeer

From: Adrian Drayson adrayson@presto.net.au

Dear Ken,

I have been informed you are willing to advise those interested in the *Ampeer*, the date each issue is posted on the web? If this is the case, may I be so advised?

(*This is exactly the way it works. The Ampeer is NOT sent out via email. A notice is sent to those interested, when I have posted the current issue to the Web site. The current issue is available in Adobe Acrobat .PDF format and in an HTML format. The paper version, available to those without a Web connection, is printed from the .PDF version, and is identical, except that the version found on the Web can be printed in color on your own color printer.*

If you have Web access, I prefer that you get if from the Web site since it saves me a lot of time in printing, folding, stapling, labeling and the like. If you now receive the paper version and can get it on the Web, would you please let me know. Another nice feature of the Web version is that it is completely FREE!

13 months of back issues can be found on the Web site as well. There is an index of back issues available. http://members.aol.com/KMyersEFO/ampindex.htm. I will be happy to email YOU any back issue listed.

I'm sharing the rest of Adrian's email, as it demonstrates why so many people are "switching to electric", and also the varied backgrounds that "we" efliers come from. KM)

Some personal details:

I have had many years experience with model aircraft and their means of power...mainly rubber, then I.C. and to date electric motors! Of these few, electric is the most attractive for me. What I like best is, less noise (usually), cleanliness, no oil-grimed hands to transmit to the TX & Rx gear, and the end of wearisome "wipe down" sessions after a day's outing; not to mention begrimed clothing!

However, I'm a "tyro" when it comes to electrics, having been introduced to them recently, by a long-time personal friend. Your Ampeer downloads are invaluable and greatly appreciated, thank you for them.

At one time I produced .60 cu.in.(10cc) I.C. engines as a "cottage industry" and was very quickly put out of business by the low-priced Asian imports, but not before I'd produced some 60 of them.

But now, it is electric motors and their idiosyncrasies that face me as I pursue this very satisfying branch of our aeronautical pastime. How absorbing it is. (*Hear, hear! KM*)

Thank you for the encouragement the *Ampeer* gives the likes of me.

Regards,
Adrian Drayson, 43 Wallace Street, Sefton, NSW 2162 Australia

Details on Rick Sawicki's Lazy Tiger P-51

From: Rick Sawicki Rrrjjjsss@aol.com

(*There was a photo and a little info on EFO member Rick Sawicki's conversion of the Lazy Tiger P-51 in the July 2001 issue of the Ampeer. It generated quite a bit of interest, so here are some further details. KM*)

It is a stock Lazy Tiger 51 except for the forward top of the body. The blacked out, anti-glare section, comes off to allow easy exchange of batteries. A platform was added from the firewall to behind canopy to function as a floor for the batteries. The power system is a Cermark 2008 with stock gearing of 2.4:1. It is equivalent to somewhere between an Astro Flight 15 regular and FAI. A Jeti 50 speed control is used. Both 14 cells, at a 35 amp draw, and 12 cells, at a 30 amp draw using 1700SCR and 2000SCR have been used. I have enough total cells of each type to have 4 complete running packages; 2 with all 1700 and 2 with all 2000. I'm using a 270 mAh 4 cell battery on the receiver. For props I've used both the 12x10 and 13x10 APC electrics. The performance is fantastic. The takeoff run is 25-30 ft. and then it's easily airborne. It takes about 1/2 a lap to pick up speed then anything goes!!!! It will do consecutive 8's...vertical 8's, consecutive fast or slow rolls and more. I have my transmitter timer set for 5 minutes. When it goes off, I have time to plan a proper landing and usually a roll back to the pits. Throttle management required for 5 minutes. If you run wide open through the entire flight, it is around 4 minutes. It is by far the best ARF possible for E-flight conversion if the person wants an extremely aerobatic aircraft. I hope that answers most of your questions. If you need additional info, please send a note....best wishes....Rick Sawicki

Please Send Ampeer Subscriptions or Renewals to:
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Walled Lake, MI 48390

Recommendations for Electric Powered Flight Systems

By Ken Myers

Part 1: February Ampeer 2001
Part 2: March Ampeer 2001
Part 3: June Ampeer 2001
Part 4: July Ampeer 2001
Part 5

In the July issue, we left off looking at the Goldberg 550 motor on direct drive and found it only really, in a very limited way, useful only with 6 cells. Now we will investigate its possibilities with a belt drive.

Motor Specs: Belt Drive: Kv = 2233 Io = 2 Rm = .155
Weight = 8.6 oz. with MFA 2.222222:1 belt drive
Weight = 9.55 with Modelair-Tech 2.57:1 belt drive

motor out at 10 amps = (8 * 1.25) – (8 cells * 0.012 * 10 amps) – (10 * 0.03) = 6.378 motor volts
motor out at 11 amps = 6.378 motor volts – (0.126 * 11) = 4.99 prop volts * (11 – 1.1) = **49.42** watts RPM = 4.99 * 2233 = 11,143
prop watts = $(7/12)^4$ * (4/12) * 1.18 * $(11.143)^3$ = **63** watts

The prop output is again too high, as the output of the motor and the prop should match. To slow the RPM, the amps must go up.
motor out at 12 amps = (6 * 1.25) – (6 cells * 0.012 * 12 amps) – (12 * 0.03) = 6.276 motor volts
motor out at 12 amps = 6.276 motor volts – (0.126 * 12) = 4.764 prop volts * (12 – 1.1) = **51.93** watts RPM = 4.764 * 2233 = 10,638

Cells	7					Actual	Glider	Trainer	Bipe	Performance
Amps	Mtr. Volts	RPM	Watts In	Watts Out	eff.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.
10	7.61	6089	76.1	48.48	63.7%	13.50	12.19	9.48	8.53	7.76
15	7.04	4738	105.6	61.295	58.0%	17.00	15.41	11.99	10.79	9.81
20	7.072	3991	141.4	71.496	50.5%	19.10	17.98	13.98	12.58	11.44
25	6.6525	2791	166.3	63.8825	38.4%	22.60	16.06	12.49	11.24	10.22

Table 3: 7-cell Predictions, 2.222222:1 MFA Belt Drive

The Actual Power System Weight eliminates this setup for use with any type of plane.

prop watts = $(7/12)^4$ * (4/12) * 1.18 * $(10.638)^3$ = **54.83** watts

Cells	8					Actual	Glider	Trainer	Bipe	Performance
Amps	Mtr. Volts	RPM	Watts In	Watts Out	eff.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.	Pwr. Sys.
10	8.74	7225	87.4	57.52	65.8%	14.20	14.46	11.25	10.12	9.20
15	8.11	5813	121.7	75.205	61.8%	18.20	18.91	14.71	13.24	12.03
20	8.168	5093	163.4	91.224	55.8%	20.60	22.94	17.84	16.06	14.60
25	7.71	3854	192.8	88.205	45.8%	24.60	22.18	17.25	15.52	14.11

Table 4: 8-cell Predictions, 2.222222:1 MFA Belt Drive

By comparing the Actual Power System weight to the possible power system weights of the plane types, it can be seen that this setup is only useful for gliders and old timers with 10 –20 amp draws. The 25 amps draw is once again under 50%, and the other types of planes do not have enough weight allotted to the power system.

Case 1: Glider or Old Timer using 8 600AE cells having a weight of **57.52** watts / 35 = 1.64 lb. or 26.24 oz. Wing area: $(26.24 / 1.15 * 144)^{3/4}$ = 434 sq.in. Prop diameter: SQRT(26.24 * 2 / Pi) * 2 = 8.17 in. rounded to 8 Prop Pitch = 8 * 0.65 = 5.2 or round to 5. RPM at 10 amps = 7,225 (from table) 8x5 folder prop watts out at 7,225 = $(8/12)^4$ * (5/12) * 1.18 * 7.225^3 = **36.63** watts

The prop output is too low. The output of the motor and the prop outputs should match. To increase the prop output, a larger prop is necessary. To find a bigger prop: 9x6 folder: $(9/12)^4$ * (6/12) * 1.18 * 7.225^3 = **70.4** watts

This is close enough to guess that a 7x4 folder will pull just over 12 amps at about 53 watts out.

What we now know about a glider or old timer using this power system is:

Finished weight: 52.5 watts (computed using 7x4 folding prop) / 35 = 1.5 lb. or 24 oz.
Wing area about: 405 sq.in. (revised using 24 ounces as the completed weight)
Wing area range: 385 – 425 sq.in. (range is plus and minus 5% of the suggested wing area)
Power system weight: 11 oz.
Airborne Radio Weight: 3.6 oz.
Completed Airframe Weight: 9.4 oz.
Prop: 7x4 folder
Amp Draw: 12.3
RPM: 10,485

Watts Out: 52.5

While it is quite feasible to build this plane with this power system, it is not recommended, since the amp draw is too high and the airborne radio system allotment is too low to contain a reasonable receiver battery for thermal soaring of a glider or old timer.

durability of this motor, when using 10 cells is certainly in question, but since it is a FREE motor, it is worth it to use it up before replacing it.

My recommendation for the Goldberg Mirage 550, a very nice flying plane, would be to add the MFA belt drive and use 10 1250SCR or 10 Panasonic 2000 NiMH

											Modeled
				Target	Power	Finished	Airborne	Other	Required	Modeled	Prop Size
	Cell	Plane	Wing	Finished	System	Airframe	Radio	Possible	Prop	Prop	Estimated
#Cells	Type	Type	Area	Weight	Weight	Weight	Weight	Weight	Size	Size	MPH
6	1250SCR	glider	478-528	32	15.8	9.6	4.8	1.8	8x4	8x4	37
7	1250SCR	trainer	318-352	32.3	17.3	9.69	4.845	0.465	7x5	7x5	56
7	1250SCR	glider	519-574	35.7	19.1	10.71	5.355	0.535	10x5	12x8 fold	37
8	2400SCR	glider	615-680	44.8	26.2	13.44	6.72	-1.56	11x6 fold	11x8 fold	44
8	1250SCR	trainer	326-360	33.4	20.6	10.02	5.01	-2.23	8x5	10x8	48
9	2400SCR	glider	712-788	54.4	29.4	16.32	8.16	0.52	12x6 fold	12x6 fold	35
9	1250SCR	trainer	387-428	42	22.1	12.6	6.3	1	9x6	10x7	48
9	1250SCR	bipe	413-457	37.8	22.1	11.34	5.67	-1.31	9x5	10x7	48
10	2400SCR	glider	761-840	59.4	31.6	17.82	8.91	1.07	13x7 fold	13x7 fold	36
10	1250SCR	trainer	425-470	47.6	23.6	14.28	7.14	2.58	9x6	9x7	57
10	1250SCR	bipe	461-510	43.8	23.6	13.14	6.57	0.49	9x5	10x5	40
10	1250SCR	performance	316-350	40	23.6	12	6	-1.6	8x6	9x8	63

Table 5: Appropriate uses for the Goldberg Turbo 550 Motor
(*Note that the wing area range is + and – 5% of the target wing area)

# Cells	Cell Type	Gear Ratio	Gear Unit Wt.	Power Sys. Wt.	Prop Size	RPM	Amps	Motor Watts In	Motor Watts Out	Motor Eff.	Waste Motor Watts	Sys. Watts In	Sys. Watts out	Sys. Eff.
6	1250SCR	1:1	0	15.8	8x4	9,000	16.7	108	63	58.33%	45	125	63	50.40%
7	1250SCR	2.28:1	1.8	19.1	12x8 fold	4,600	19	143	78	54.55%	65	166	78	46.99%
8	RC2400	2.28:1	1.8	26.2	11x8 fold	5,600	19.7	170	98	57.65%	72	197	98	49.75%
9	RC2400	2.57:1	2.75	29.4	12x6 fold	5,800	20.2	197	120	60.91%	77	227	120	52.86%
10	RC2400	3.6:2	2.75	31.6	13x7 fold	5,150	19.3	202	132	65.35%	70	220	132	60.00%
7	1250SCR	1:01	0	17.3	7x5	10,950	18.1	137	84	61.31%	53	158	84	53.16%
8	1250SCR	2.28:1	1.8	20.6	11x7	5,650	19.4	168	98	58.33%	70	194	98	50.52%
9	1250SCR	2.28:1	1.8	22.1	10x7	6,800	19.3	189	117	61.90%	72	217	117	53.92%
10	1250SCR	2.28:1	1.8	23.6	9x7	8,150	18.3	202	132	65.35%	70	229	132	57.64%
9	1250SCR	2.28:1	1.8	22.1	10x7	6,800	19.3	189	117	61.90%	72	217	117	53.92%
10	1250SCR	2.28:1	1.8	23.6	10x5	8,000	19	209	135	64.59%	74	238	135	56.72%
10	1250SCR	2.28:1	1.8	23.6	9x8	7,900	19.4	212	137	64.62%	75	243	137	56.38%

Table 6: Predicted Motor Performance with Cells and Ratios Noted
(*Note: Gear Unit Wt. = 1.8 is MFA belt drive and
Gear Unit Wt. = 2.75 is Modelair-Tech H-500 belt drive)

Looking at the **Table 6**, it can be seen that this is not a very efficient motor. If the supplied motor is to be used to power the Mirage 550, it should be used on 10 cells with the MFA 2.3:1 belt drive added. (**Note**: it is advertised as 2.3:1 but I have determined that it is 2.28:1 and they rounded it.) While the values in **Table 6** are modeled, they are reasonably close approximations. I actually set up the unit on 10 Sanyo 1250SCR cells using a 9x7 prop and at 8,150 RPM the amp draw was about 20. That was quite close to the prediction. The cells until the motor dies. For a radio system I would recommend a Hitec 555 receiver (0.75 oz.), 2 HS -81 servos (0.6 oz. ea.), 270/300mAh Rx pack (2 oz.) and an Astro Flight 217D controller (1 oz.) for an airborne radio system weight of about 5 ounces. The total weight will be about 43 – 44 ounces, and the performance quite acceptable for a trainer.

Since the 663 sq.in. Goldberg Electra glider comes with the same motor, it is easy to come up with a recommend system for it as well. The Turbo 550 with

the MFA 2.3:1 belt drive and 8 Sanyo RC-2400 turning an 11x8 folder would make up the power system. It would use the same airborne components as above and the finished airframe weight would be about 19.5 oz. That gives an all-up weight of 47 – 48 ounces.

The Formulas and Rules of Thumb

While having access to a computer and knowledge of a spreadsheet or one of the "Calc" programs does make life easier, all of the formulas for the rules of thumb are easily computed on a calculator.

Output Watts

low-wing, mid-wing or high-wing (performance types) 55+ watts output per pound

trainers and light planes (moderate performance types) 45 watts output per pound

powered thermal sailplanes and old-timers (low performance types) 35 watts output per pound

biplanes 50+ watts output per pound

multi-motor planes based on desired performance for type

Target Weights Based on Wing Area with Flight Factors:

low-wing, mid-wing or high-wing (performance types), target 2.5, maximum 3

trainers and light planes (moderate performance types), target 2, maximum 2.5

powered thermal sailplanes and old-timers (low performance types), target 1.15, maximum 1.5

biplanes, target = 1.65, maximum = 2

Finished Weight:

Wing area in square feet = wing area in square inches / 144

Wing loading = wing area in square inches raised to the 1/3 power * flight factor

(**Note**: There are two different wing loadings used. The target wing loading sets the "desired" target weight of the project, while the maximum wing loading sets the "maximum" acceptable weight for the project.)

Finished weight = wing area in square feet * wing loading

Minimum Prop Diameter and Relative Pitch

low-wing, mid-wing or high-wing (performance types)

minimum diameter = (the square root of ((weight in ounces * 1.15) / Pi)) * 2

pitch = 0.75 diameter

trainers and light planes (moderate performance types)

minimum diameter = (the square root of ((weight in ounces * 1.25) / Pi)) * 2

pitch = 0.65 diameter

powered thermal sailplanes and old-timers (low performance types)

minimum diameter = (the square root of ((weight in ounces * 2) / Pi)) * 2

pitch = 0.65 diameter

biplanes

minimum diameter = (the square root of ((weight in ounces * 1.4) / Pi)) * 2

pitch = 0.5 diameter

Component Weights

power system weight can equal up to about 55% of the total weight

onboard radio system weight equals up to about 15% of the total weight

completed airframe weight equals about 30% of the total weight

Prop Watts Out

Watts out = (Diameter in inches/12)^4*(Pitch in inches/12)*KRPM^3*Prop Multiplier

Diameter and pitch are in inches. **Prop Multipliers**: 1.31 typical wood prop, 1.18 folding carbon-fiber props, 1.11 standard APC props. KRPM is RPM in thousands.

KRPM = (Watts out/((Diameter/12)^4*(Pitch/12) *multiplier))$^{1/3}$

Back Figuring for use when one of the 3 Component Weights is known.

(weight / flight factor * 144)$^{3/4}$

Motor Formulas

volts to motor = (1.25 * number of cells) – (number of cells * cell resistance * amps) – (0.03 * amps) 1.25 is cell voltage, 0.03 is system resistance

watts out = (volts to the motor – (motor resistance Ra * amps)) * (amps – Io)

RPM = (volts to the motor – (motor resistance Ra * amps)) * RPM per volt Kv

motor efficiency = watts out / (volts to the motor * amps)

system efficiency = watts out / (1.25 * number of cells * amps)

Cell Amp Draws, Weights and Resistance for Estimation Purposes:

10 amps, 0.7 oz., cell resistance = 0.01

15 amps, 1.2 oz., cell resistance = 0.01

20 amps, 1.5 oz., cell resistance = 0.005

25 amps, 2.0 oz., cell resistance = 0.005

So ends our saga of confuse the reader. While some of you followed this dissertation, many of you have become even more bewildered. That was not my intention. I received an email that shows, while we are making progress, there is still much confusion about the best power system to use in a given plane.

Motors?

(*I received the following email. It is very typical of the type of email I get every day. I've printed the question, and my response, for your information. KM*)

From: Bill Reed breed@hal-pc.org

Is there such a thing as a list of the various motors which has their size and power comparisons? I am confused by the multitude of various motor models and their sizes and power, etc. Sure would be nice to find out all the info in essentially one place!

Bill in Houston

Hi Bill,

Unfortunately, there is not such list. There are lists of motor constants that can help you determine the properties of a motor, but no direct comparison chart. It would be almost impossible to make one. Almost any given motor can be used in a lot of different applications. It is probably better to think of cell counts for a given plane and performance than the motor. I do have a list on the EFO site, but it certainly isn't all of the motors, cell counts and applications.

I use the Astro Flight 035 direct in my Lightening 250, a performance model. In this application it uses 6 cells and puts out about 125 watts on a freshly charge pack. I use the same motor geared 2.82:1 in my TigerShark on 10 cells. In this application it puts out about 188 watts. The Lightening 250 is a 250 sq.in. performance plane. The TigerShark is a 480 sq.in. low-wing sport plane. Both fly as intended using the "same" motor.

An important limiting factor of a motor is its maximum RPM before things start to be thrown off inside the case. Another limiting factor is how much area the case has, as this directly relates to how much heat can be dissipated from the motor quickly.

MaxCim, a great brushless motor manufacturer, supplies two motors. They are essentially the same size and weight. The only difference is the way they are wound. With various gear-drive/belt-drive combinations, these motors can range from 100 watts out to well over 1000 watts out. That's the same motor!

The best thing to do is not to think about the motor required, but the power out to match the performance you have in mind.

Here is a short comparison you might find useful.

Closed can motors, Graupner and the like – you are wasting 40 – 50 percent of the power you put into them.

Other ferrites, you are wasting 30-40 percent of the power you put into them.

Astro Flight cobalts, you are wasting 25 – 30 percent of the power you put into them.

Brushless, you are wasting 20 – 25 percent of the power you put into them.

There is one way to tell if one motor is more efficient than another in a given application and that is by its apparent resistance. This is a "pseudo" resistance that is used in figure how much voltage loss is happening at a given amperage. The lower the Ra, the more efficient a motor can be. A typical ferrite Speed 600 motor might have a resistance of 0.125 ohm, while the equivalent "physical size" Astro Flight 035 has a resistance of 0.040 ohms.

What this means is that if both are run at 25 amps, not uncommon, the ferrite will drop 25 * 0.125 or 3.125 volts and waste 78 watts of power that is dissipating as heat, while at the same 25 amps the AF035 is 25 * 0.04 or dropping only 1 volt and wasting only 25 watts. Brushless are even more efficient, for several reasons, but one of the reasons is that, in general, they have even lower resistances.

Unfortunately, this still doesn't answer the question, how do you compare one motor to another. A 7.5 oz. Speed motor, a 7.5 oz. Astro Flight Cobalt motor and a 7.5 oz. brushless motor all have the same weight, but there uses are all different. One of the best ways to find out what works, is to see what has worked well for others. The EFO Web site has ratings pages, (http://members.aol.com/KMyersEFO/page38.htm) that show what Ampeer readers have found to be successful setups. Study them, and the type of plane you are trying to do, and you'll have a better idea of how to power your plane.

Rotation Rule:

The convention is that, viewed from the rear, the thumb points up the axis and the fingers define the direction of rotation for the motor. Left hand would be counter-clockwise from the rear, right hand would be clockwise. Aircraft prop rotation is from the cockpit so left hand has the prop moving left and down, reversed from "normal." Left hand on an electric motor we would be consider reversed, but when a single stage gear-drive is added, to a reversed rotation motor, the prop is now spinning clockwise, or in the normal direction. To use a single stage gear-drive with a right-hand rotation, a "reversed pitch" prop is needed, or a belt-drive, which turns in the same direction as the motor.

Sanyo CP-1700

(*There was a discussion of the CP-1300 and CP-1700 Sanyo cells on the eflight list (http://www.ezonemag.com to find out how to sign up). Ralph Weaver was asked how these cells look. His response from the list follows. KM*)

I've been very please with them. The increase in capacity from 1250 to 1700 was a result of the same technology that increased the subC capa city from 1700 to 2000 and then 2400. I've been using the 1700's at 60 - 70A and they perform better than the 1250's. The pack doesn't get any hotter than 1250's and it should actually be a little cooler since the internal resistance is a little lower.

(*You can check out more about these cells, as well as others that Ralph sells at his Web site: www.magtechinc.net While you are there you can also check on the CP-1300 which Ralph said are closer to 1150 mAh but weigh about the same as the 800AR. The CP-1300 are about the same diameter as other subC Sanyos. KM*)

Great Lakes Electric & R/C Hobby Expo
October 6, 2001
10 A.M. – 9 P.M.
5328 Highland Road
Waterford, MI 48327
Phone: 248.673.0100

About the Electric Show…
Check out the high performance of ELECTRIC!!!!

The dome at Oakland Yard is 80,000 square feet, 90 feet high in the center!

The Saturday, October 6th Show will feature over 60 'swap shop' tables, 10 retailer/manufacture exhibi t areas, a children's R/C interactive zone, adult R/C car racing series, advanced model flight demos by leading manufactures, model contest and of course food and drinks. General public tickets are $5 per adult, *$2* per child (12 and under), $4 senior citizens *(55* and over). *All types are welcome to display/sell; electric or gas; boats, cars, planes and helicopters*

General hobbyists will have access to all swap tables, model displays and retailer space. The public will be able to purchase from the vendors a ll day and will be able view all demonstrations from the flight line.

'SWAP SHOP' Tables (gas or electric)

Individuals will he able to purchase a 3' x 6' table, two chairs (without power) to display and sell their wears, gas or electric, it doesn't matter.

'Expo Space'

20 x 20 expo sites, centrally located on the flight line, allocated demo time

Competitions:

Car Racing

Six adult race heats throughout the day to qualify for the championship race at 8:00 P.M.

Race times: 11am, 12pm, 2pm, 3pm, 4pm, 6pm
Semi Finals @ 6:30
Finals @ 7:00 pm
Classes: Off Road 2W & 4W 10th scale open

Flying Combat

Zaqi combat! Full contact, 40 miles per hour heart stopping fun. Zagi combat will take place on Oakland Yard's soccer field. (Weather Permitt ing)

Combat Flights: 1pm, 5pm

Model Competition (Gas or Electric)
Judqing awards at 6:00 pm

Special Demonstrations:

1 . Advanced helicopter maneuvers (gas outdoors, electric indoors)
2. High performance electric cars
3. Precision aerobatics

Oakland Yard Aviation Club - Winter Schedule 2001 /2002

Saturday, November 3rd - 8:00 P.M. to 12:00
Saturday, November 1 7th - 8:00 P.M. to 12:00
Saturday, December 8th - 8:00 P.M. to 12:00
Wednesday, December 26th - 7:00 P.M. to 11:00 P. M. 'Reindeer Fun Fly II'
Saturday, December 29th - 8:00 P.M. to 12:00
Saturday, January 1 2th - 8:00 P.M. to 12:00
Saturday, January 26th - 8:00 P.M. to 12:00
Saturday, February 9th - 8:00 P.M. to 12:00
Saturday, February 23rd - 8:00 P.M. to 12:00
Saturday, March 9th - 8:00 P.M. to 12:00
Saturday, March 23rd - 8:00 P.M. to 12:00
Saturday, April 6th - 8:00 P.M. to 12:00
Saturday April 20th - 8:00 P.M. to 12:00

For more information, an application or to sign -up for the winter flying session, contact Dave Dobrin at the dome, Oakland Yard, 248.673.0100.

Up Coming Events

August 25, Propstoppers Philadelphia Electric Fun Fly - Delaware County, Pennsylvania, Contact: Dave Harding davejean1@home.com Fun day in the beautiful Pennsylvania countryside. Check www.geocities.com/propstoppers_rc to see which field will be used

September 8 - 9, Upcoming Efliowa 2001, **Place:** Seven Cities Sod Farm - Junction of I-80 and Iowa 130.
For details: www.rc-dymond.com/efliowa/
Further information: Jon McVay (AMA 6004)
319-895-6527 email: Togflier@AOL.com

September 15 EFO "flying" meeting at Midwest R/C Society 5 Mile Rd. flying field. 10 A.M. All local efliers with AMA invited to join us.

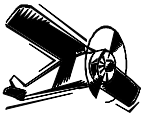
September 14, 15, 16 Neat Fair 2001 - Peaceful Valley Campsite in Shinhopple (Downsville), NY Info: www.nyblimp.com/NEAT.htm or email neatfair@aol.com

September 29 & 30 Bay Area Duo (BAD) Electric Weekend: Two meets, one Saturday, one Sunday, sponsored by two different clubs, at two different fields, both within an easy drive of San Francisco, only about 50 miles apart.
Sept 29th--7th annual Electra Fly at Half Moon Bay. Contact Courtney Bryant at (650) 325-1491 or ckbryant@ynn.com
Sept 30th--6th annual Devil Mountain Electric Fun Fly at Antioch. Contact Chuck Hill at (925) 685-1546 or ChuckHHill@aol.com

October 6 Great Lakes Electric & R/C Hobby Expo, 10 A.M. - 9 P.M., Oakland Yard, 5328 Highland Road, Waterford, MI 48327, For info and application to participate Phone: 248.673.0100 and ask for Dave.

October 26-28 First Electric Soaring World Challenge, Phoenix, AZ, Schnepf Farms, Queen Creek, Arizona (45 min. southeast of Phoenix Int'l Airport)
For more information, entry forms, rules, contact information and schedules visit: www.f5jelectric.com or Dave Wenzlick dave@techlite.net

November 4 Midwest R/C Society Annual Swap Shop, Northville Community Center, Main Street in Northville, MI. 9-3, for info contact Ken Myers KMyersEFO@aol.com



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

The Next Meeting:
Date: Saturday, Oct. 13, 2001 Time: 10:00 A.M.
Midwest R/C Society 5 Mile Rd. Flying Field
ALL eplane fliers with AMA card welcome to join us