

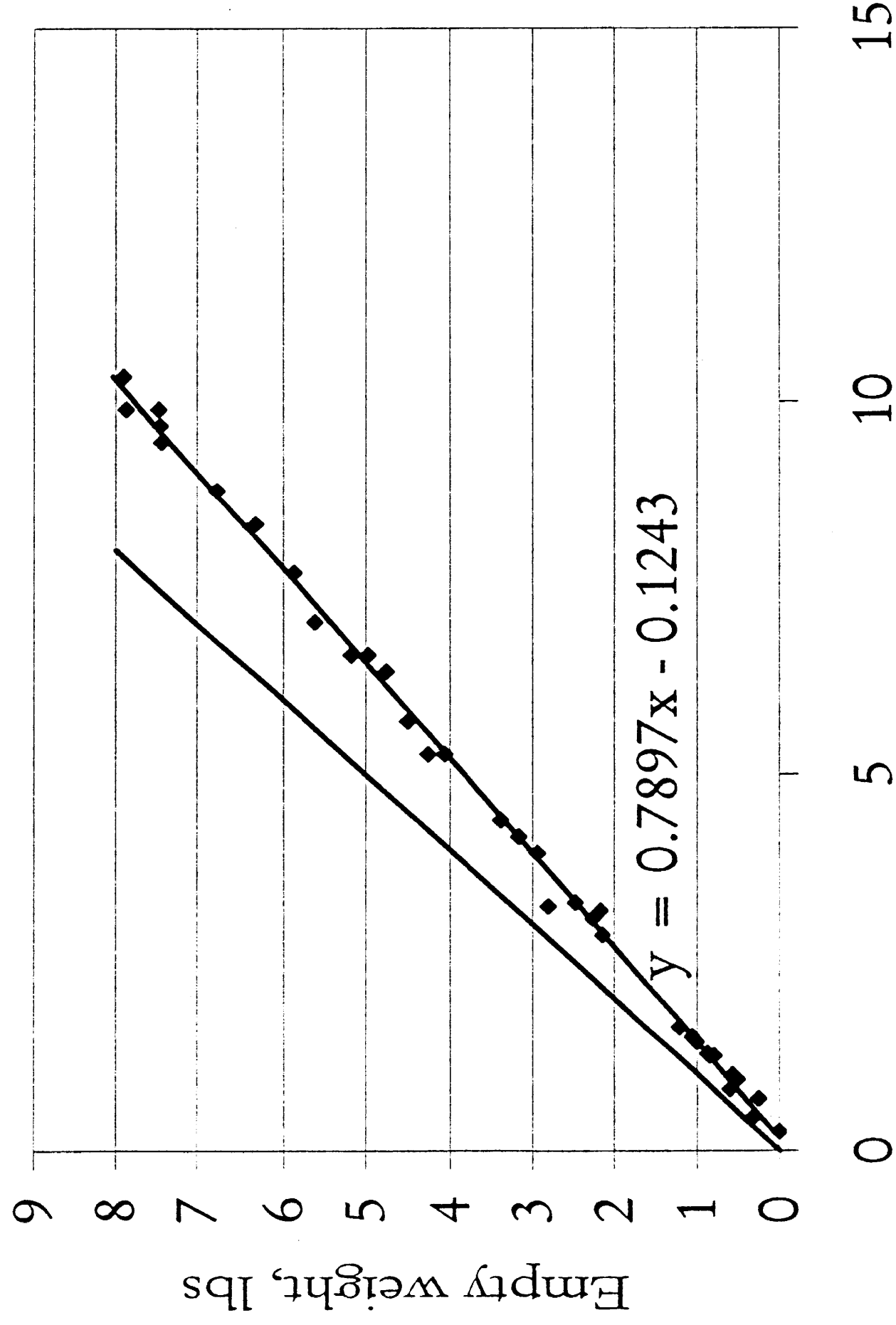
Preliminary Weight Estimation (One Way of Many)

The Database attached was made in the following way. Electric powered aircraft were categorized by take-off weight and empty weight. Take-off weight included payload and batteries. Empty weight did not include payload or batteries.

If you can estimate the payload weight and battery weight you can use this chart to get an estimate of take-off weight. Referring to the attached figure. The horizontal distance from the unity line to the line fared through the data is the sum of payload and battery weight. So if you know that sum you can find the take-off and empty weights.

You can get some idea of battery weight from previous designs in AAE451. Alternately, you can use the estimate thrust and drag required for cruise flight and back out the energy stored in the battery. From this you can estimate battery weight.

Takeoff Weight vs Empty weight (Entire Database) Compiled by WTA



- ◆ Entire Database
- Unity line
- Linear (Entire Database)

Takeoff weight, lbs

Historical Database: Compiled by WTA

Type	Takeoff	Empty	W area	W span
Superlights	1.25	0.8496	341	48
	0.9375	0.5371	450	39
	0.8125	0.5969	260	36
	0.4375	0.3143	296	37.5
	0.6875	0.2475	287	33
	0.25	0.0036	310	43
	1.25	0.7924	400	43
	1.625	1.2246	396	54.3
Aerobatic Sport	1.5	1.0688	300	30
	1	0.5688	215	39
	0.9375	0.5063	98	28
	1.275	0.8746	216	36
	3.25	2.8188	464	54
	3.96	2.948		
Handout	2.86	2.1516		
	6.6	5.1832		
	3.3	2.4904		
	5.28	4.268		
	3.08	2.2704		
	4.18	3.168		
	8.36	6.336		
	5.72	4.5056		
	5.28	4.0656		
	8.8	6.776		
	1.43	1.0142		
	7.04	5.6232		
	9.9	7.4712		
	9.9	7.876		
	6.38	4.7608		
	3.19	2.178		
	4.18	3.168		
	4.4	3.388		
	10.34	7.9112		
	5.28	4.268		
	6.6	4.9808		
	9.46	7.436		
7.7	5.8784			
5.28	4.0656			
9.68	7.4536			
4.4	3.388			

Tabular Summary of Geared Motors for Electric Powered Model Aircraft

The following table list a variety of model aircraft and the geared motors which are likely to suit them. It can be used to help you select a motor and gearbox which will give a sensible combination of flight time and flight performance.

Abbreviations

Span	= Wingspan (mm)
Wt	= Weight (g)
Mot	= Motor
Gbx	= Gearbox
Cells	= No. of cells
0.7	= 700mAh;
1	= 1000mAh;
1.4	= 1400mAh;
1.7	= 1700mAh
Prop	= Propeller (inches)
Tr	= Trainer
ATr	= Aerobatic trainer
AM	= Aerobatic model
Sc	= Scale model
Bp	= biplane

Notes

The table shows geared motors (sometimes with alternative motors) for a wide variety of model aircraft. Each case represents no more than a suggestion, and I make no claim that the combinations are the best possible ones. In the context of a particular model a change of propeller and/or a different number of cells may bring about further improvements to the flight performance. There is no reason why you should not try out different motors, especially if you have a different motor to hand, and your purse-strings are tight.

As a general rule never attempt to control a geared motor with a motor switch, as the start-up surge caused by a simple switch will eventually damage parts of the power train. Use a proportional speed controller at all times.

MODEL	WINGSPAN	WEIGHT	NO OF CELLS	MOTOR	GEARBOX	PROPELLER
Acrobat, Robbe, (KT)	1.000	1.800	10 (1,4)	Ke 22/5	Power Gear 2,5	9x6
Amateur II, Graupner, (Tr)	1.200	1.300	7 (1,7)	Speed 500 Race	Power Gear 2,5	10x6
Antares, Simprop, (KM)	1.470	3.000	14-16	Ke 40-8, Ultra 1200	Intro Gear 400 (2/1), Eta-Max (2,08/1)	11x8
Baronnet, Jamara, (Tr)	1.300	1.500	8 (1,7)	Permax 700 BB turbo	Permax 2,16/1	11x7
Beaver, Volz, (Sc)	1.550	2.400	10-12 (1,7)	Ultra 900	Power gear 2,5	12x9
Blue Stick, Höllein, (Tr)	1.400	1.400	8 (1,7)	Speed 500 Race	Power Gear 2,5	10x6
Box Fly 20S, Simprop, (KT)	1.330	1.900	10 (1,7)	Speed 600, BB 8,4 V	Power gear 2,5	9x7
Cap 21, Volz, (KM, Sc)	1.720	3.800	20-22 (1,4)	Ke 50/8, Ultra 1200	Syncro Gear 800 (2,0/1)	13x9
Capriolo, Multiplex, (KT)	1.390	2.600	12-14 (1,7)	Ke 22/9, Ultra 900	Power Gear 2,5	11x10
Charter, Robbe, (Tr)	1.500	2.400	12-14 (1,7)	Ke 22/9, Ultra 900	Power Gear 2,5	12x9
Chipmunk, Volz, (KM, Sc)	1.720	4.000	20-22 (1,7)	Ke 50/7, Ultra 1600	Syncro Gear 800 (2,4/1), Eta-Max (2,25/1)	13x8
Citabria, Graupner, (Tr)	830	650	7 (0,7)	Speed 400 6 V	Graupner 1,85/1	7x4
Erich-Faube, Jamara, (Sc)	2.030	3.200	14-18 (1,7)	Ke 40/8, Ultra 1200	Syncro Gear 2,0/1	13x8
Extra 230, Volz, (KM)	1.910	4.500	24-30 (1,4)	Ke 70/5, Ultra 1600	Syncro Gear 800 (2,0/1), Ultra Gear 2/1, Eta-Max (2,08/1)	14x8
Fokker D 7, Jamara, (DD, Sc)	1.550	4.500	20-24 (1,4)	Ke 50/7, Ultra 1200	Syncro Gear 800 (2,0/1), Eta-Max M (2,08/1)	13x8
Javelin, Graupner, (KM)	1.470	2.900	16-18 (1,7)	Ke 40/8, Ultra 1000	Syncro Gear 800 (2,0/1)	12x10
Mini Champ, Topp, (KT)	1.080	1.450	10 (1,4)	Ke 22/5, Speed 500 Race	Power Gear	9x7
Piper J3, Multiplex, (Sc)	1.400	1.900	10-12 (1,7)	Ke 22/9, Speed 600	Power Gear 2,5	11x9
Pitts Special, Robbe, (DD, Sc)	1.000	2.000	10-12 (1,7)	Ke 22/9, Ultra 900	Power Gear 2,5	12x8
Su 26, Volz, (KM, Sc)	1.730	4.700	24-28 (1,4)	80/7, Ultra 2000	Ultra Gear 2/1	15x8
Taxi II, Graupner, (Tr)	1.500	2.400	10-12 (1,7)	Ke 22/9, Ultra 900	Syncro Gear 2500 (1,8/1), Eta-Max M (2,08/1)	15x7
Taxi Cup, Graupner, (Tr)	1.600	3.000	16-18 (1,7)	Ke 40/8, Ultra 1000	Power Gear 2,5	12x9
Taxi 2000, Graupner, (Tr)	1.900	4.300	20-24 (1,4)	Speed 700, BB Turbo Ke 50/7, Ultra 1600	Power Gear 800 (2,0/1)	13x8
Tommy, Multiplex (DD, Tr)	1.360	3.500	18-20 (1,4)	Ke 50/7	Eta Max (2,08/1)	13x8
Tiger-Moth, Jamara, (DD, Sc)	1.270	2.400	12 (1,7)	Ke 22/9, Ultra 900	Eta Max (2,25/1)	12x9
Ultimate, Topp, (DD, Sc)	1.360	4.400	22-26 (1,4)	Ke 50/8, Ke 70/5 Ultra 1600-8	Syncro Gear 800 (2,0/1) Ultra Gear 2/1	14x8
Vicomte 1915, Jamara, (Tr)	1.600	2.000	10 (1,7)	Speed 600 BB 9,6 V	Power Gear 2,5	15x8
						11x8