

# FAST YACHT Performance Prediction

"Flying Scot"

Here are your Performance Prediction prints and plots, and a few notes as a key to the meaning of the more obscure parts.

The column headings on the speed tables are not altogether obvious. From left to right:

TWA: true wind angle in degrees

AWS: apparent wind speed at the masthead

AWA: apparent wind angle at the masthead

VB kts: highest possible boatspeed in this wind condition

VMG kts: speed made good straight up- (or down-) wind ("velocity made good")

HL: heel in degrees

LWY: leeway in degrees

FLT 1/2->1: flatness of sail required to get this highest possible speed (1/2 [.5] as flat as a cloth sail can get and 1. as full and deep as a cloth sail can be rigged.)

RF hgt: reef height as a fraction of max possible HEIGHT (not a fraction of AREA -- so to calculate as an area fraction, square the value here, so for example RF hgt of 70% height remaining [.7] is the same as  $.7 \times .7 =$  (approx.) .5 so half of the sail area still up.

Each speed table presents two groups (of rows per wind angle) of conditions, one for each of two windspeeds. The upwind and downwind optimum angles are separately marked as OPT Tack and OPT Gybe (as they are with little boxes on the polar graph.)

I have run your prediction with a third crew member for the following reasons: in light air the added length advantage from the weight cancels out the surface area disadvantage from that same weight. In moderate air, the weight gives a small speed advantage from stability due to movable crew but its better to have a target for performance be a little fast than slow so the prediction should be useful in moderate air for both 2 and 3 crew. In heavy air you wouldn't probably sail with only two, and it is easier to make the prediction mathematically with a bit more stability in heavy air because the whole system (real and numeric) becomes unstable in heavy air (as you may have noticed on the water.)

Because of the instability in heavy air broad reaching, I did not plot the downwind polar curve for TWS 24knots on the basic True Wind polar graph. You can see that instability on the 24knot polar curve offwind on the "Apparent Wind Polar" which is a polar performance graph with respect to Apparent Wind Angle (easier to measure but not as useful as True Wind Angle in judging speed POTENTIAL) where I did plot it. All the speeds are represented in the columnar printed tables.

There are a couple of non-geometric (abstractions) specifications that may bother you if you check every parameter very carefully. For example spinnaker area is given in Projected Area (wind shadow) square feet not square feet of cloth because of the drag aerodynamics downwind, whereas upwind cloth area is given but so are Triangular (for rating purposes in some classes) and Effective (because some overlap percentages are more effective [e.g. your 110%] than others [e.g. 155%] in generating useful slot aerodynamics between genoa and main.)

One or two of the pages may be altogether obscure: for example the Wind Page which gives the relationship between true wind and apparent wind speed and angle on your particular boat. This would only be of interest ordinarily to sail makers and racing instrument developers.

The highest VMG is a purely theoretical ideal. In 8 knots and above (usually) the highest achievable VMG (called optimal tack or optimal gybe) is found (upwind) by falling off a bit. Upwind this adjustment is very reliable, downwind in heavy air it is more of a guess and not always intuitively satisfying and sometimes incorrect. Our Prediction Program, which takes sea state as steadily increasing (degrading) with wind speed, lets the boat fall off from the ideal VMG an amount determined by windspeed (sea state) but not more than a predetermined percentage limit in VMG reduction. (Actually downwind the opt gybe is often "above" the ideal VMG.) So Opt Tack and Opt Gybe are an attempt to estimate practically achievable/sustainable VMG.

Its an effect that is more important with smaller boats (e.g. Flying Scot), shallower boats (shallower effective keel/board draft), and lower aspect rig boats.

Another distinct but at first counterintuitive effect is a fall off, for most boats, in VMG above a certain True Wind Speed, so that for instance a Flying Scot has greater VMG at 20 knots than at 30 knots. Simply a case of the boat being overpowered by conditions.

[Another, less likely, event that can cause the VMG to not be equivalent to the Opt Tack or Opt Gybe, results from the fact that Optimum conditions are calculated independently as such and not derived from the shape of the curve from the fixed angle cases. That adds one independent variable to the math (True Wind Angle) which makes the result differ from the one implied by the curve because the arithmetic is more tenuous with more unknowns. This can be seen particularly offwind in heavy air with your boat where the little optimum boxes don't fall on the more or less smooth curve implied by the fixed-angle conditions.]

# "Flying Scot"

e32m03

11 Dec 2002

MASTER FILE

FILE DATE: 11 Dec 2002  
BOAT NAME: "Flying Scot"  
MODIFIER:  
DIG FILE: 02555F55  
SERVICE CODE: GDYF  
DESIGNER: Douglas  
STOCK MODEL: Flying Scot

CUSTOMER CODE: 0

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## 2. SPAR INFO

DI	DTT	DL	DLT	TL	HBIS	HBI	SFJ
.12	.12	.2	.2	0	1.7	1.68	0
DTY	DPTY	DLY	DLTY	TLY	HBIYS		
0	0	0	0	0	0		

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## 3. APPENDAGES INFO

TK	HK	CRK	CTK	TRK	TTK	SK	YTEK	CAK	LCBK
.7	.667	1.5	1.3	.11	.09	27	-2	.661	.433
TR	HR	CRR	CTR	TRR	TTR	SR	XTER	CAR	LCBR
3	3	1.3	1.25	.09	.065	4	-11	.682	.421
VOLK	WSK	CBXK	CBZK	VOLR	WSR	CBXR	CBZR	ECMA	XTEC
.062	1.868	-1.129	.347	.202	7.65	-10.176	1.41	3.333	-2.25

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## 4. PROP INSTALLATION INFO

TYPE	PSA	PSL	PSD	SHL	SHD	PHL	PHD	PRD	PIPA
4	0	0	0	0	0	0	0	0	0

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## 5. SAIL INFO

SPL	SMW	SL	I	J	LP	P	E	BAD	RGF
7	15	18.82	14.5	6.4	7.083	23.3	12.2	1.8	1.025
PY	EY	YRGF	BADY	EB	YSF	YSMG	YSD	ISPIN	
0	0	0	0	0	0	0	0	16.5	
IGENK	GENKLP	GENKPL	GENKMW	GenkSA	SpinSA	EffWdrd	ActWdrd	TriWdrd	
0	0	0	0	0	132.399	201.749	226.639	188.53	

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## 6. FLOTATION INFO

FGO	LBG	FFS	FAS	FF	FA	RMC	BDK	HEELIM	WATER
1	18	1.75	1.33	1.789	1.372	93.959	6	-18	64
DSPL	LCG	VCG	CW	XCW	ZCW	GW	XGW	YGW	ZGW
900	1	-1.25	500	-3.5	-2	25	0	0	-1.5

# "Flying Scot"

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PERFORMANCE Pg 1

TWA ° AWS AWA ° VB VMG HL ° LWY ° FLT RF  
 kts kts kts kts 1/2 -> 1 hgt

----- 3.0 knots True Wind Speed -----

	36.0	4.0	4.0	1.187	.960	.2	22.31	.91	1.00
	44.0	4.3	14.2	1.706	1.227	.3	14.44	1.00	1.00
OPT Tack	48.7	4.4	18.2	1.902	1.256	.3	12.17	1.00	1.00
	52.0	4.5	20.7	2.019	1.243	.3	11.01	1.00	1.00
	60.0	4.5	26.0	2.241	1.120	.4	8.99	1.00	1.00
	70.0	4.4	32.1	2.414	.826	.3	7.28	1.00	1.00
	70.3								
	80.0	4.3	35.6	2.719	.472	.4	6.85	1.00	1.00
	90.0	4.1	40.0	2.893	0.000	.4	6.07	1.00	1.00
	105.0	3.5	50.1	2.811	-.728	.3	4.61	1.00	1.00
	120.0	2.7	65.8	2.476	-1.238	.2	3.10	1.00	1.00
	135.0	2.1	89.6	2.044	-1.445	.1	1.70	1.00	1.00
OPT Gybe	141.5	1.9	102.3	1.870	-1.464	0.0	1.19	1.00	1.00
	150.0	1.7	120.2	1.668	-1.444	0.0	.76	1.00	1.00
	165.0	1.6	150.7	1.459	-1.409	0.0	.47	1.00	1.00
	180.0	1.6	179.7	1.350	-1.350	0.0	.31	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack: 2866.3 Gybe: 2458.6 60deg: 1606.5 ~100: 1268.3 135: 1761.6  
 Linear-random: 1728.8 Circ: 1824.3 Olymp: 2502.5 W/L: 2662.5 AC92: 2385.6  
 BELL Versions: 1795.4 : 1868.2 : 2542.5 : 2717.3 GPH: 655.3

----- 4.0 knots True Wind Speed -----

	36.0	5.3	3.5	1.589	1.286	.4	22.81	.93	1.00
	44.0	5.8	14.2	2.261	1.626	.6	14.55	1.00	1.00
OPT Tack	49.3	5.9	18.7	2.561	1.671	.6	11.97	1.00	1.00
	52.0	6.0	20.7	2.697	1.660	.6	10.99	1.00	1.00
	60.0	6.0	25.9	3.022	1.511	.6	8.88	1.00	1.00
	70.0	5.9	31.9	3.280	1.122	.6	7.15	1.00	1.00
	71.1								
	80.0	5.8	35.4	3.687	.640	.8	6.60	1.00	1.00
	90.0	5.5	39.6	3.934	0.000	.8	5.90	1.00	1.00
	105.0	4.7	49.3	3.844	-.995	.6	4.54	1.00	1.00
	120.0	3.7	65.0	3.358	-1.679	.3	3.07	1.00	1.00
	135.0	2.8	89.7	2.718	-1.922	.1	1.70	1.00	1.00
OPT Gybe	140.5	2.5	100.6	2.510	-1.938	.1	1.27	1.00	1.00
	150.0	2.3	120.6	2.203	-1.907	0.0	.78	1.00	1.00
	165.0	2.1	150.8	1.929	-1.864	0.0	.48	1.00	1.00
	180.0	2.1	179.7	1.788	-1.788	0.0	.32	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack: 2154.4 Gybe: 1858.0 60deg: 1191.2 ~100: 929.3 135: 1324.5  
 Linear-random: 1294.6 Circ: 1377.8 Olymp: 1882.9 W/L: 2006.2 AC92: 1793.4  
 BELL Versions: 1368.6 : 1426.1 : 1951.6 : 2095.5 GPH: 655.3

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PERFORMANCE Pg2

TWA ° AWS AWA ° VB VMG HL ° LWY ° FLT RF  
 kts kts kts kts 1/2 -> 1 hgt

----- 6.0 knots True Wind Speed -----

	36.0	8.0	3.0	2.485	2.011	1.1	23.07	1.00	1.00
	44.0	8.8	14.4	3.548	2.552	1.4	13.77	1.00	1.00
OPT Tack	49.8	9.0	19.1	4.051	2.613	1.5	11.20	1.00	1.00
	52.0	9.1	20.6	4.186	2.577	1.5	10.57	1.00	1.00
	60.0	9.0	25.0	4.524	2.262	1.5	8.90	1.00	1.00
	69.5			^ Genoa /	Spinnaker v				
	70.0	8.7	31.8	4.760	1.628	1.6	7.88	1.00	1.00
	80.0	8.5	36.1	5.161	.896	1.8	7.59	1.00	1.00
	90.0	7.9	41.8	5.297	0.000	1.7	6.75	1.00	1.00
	105.0	6.7	53.0	5.169	-1.338	1.1	4.88	1.00	1.00
	120.0	5.4	67.3	4.796	-2.398	.6	3.15	1.00	1.00
OPT Gybe	135.0	4.2	88.7	4.149	-2.934	.2	1.68	1.00	1.00
	139.7	3.8	97.9	3.889	-2.967	.2	1.31	1.00	1.00
	150.0	3.4	120.2	3.335	-2.888	.1	.77	1.00	1.00
	165.0	3.2	150.9	2.890	-2.791	0.0	.48	1.00	1.00
	180.0	3.2	179.7	2.667	-2.667	0.0	.33	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack: 1377.7 Gybe: 1213.2 60deg: 795.8 ~100: 690.7 135: 867.6  
 Linear-random: 904.3 Circ: 956.6 Olymp: 1214.1 W/L: 1295.5 AC92: 1168.7  
 BELL Versions: 950.9 : 991.9 : 1364.2 : 1474.8 GPH: 655.3

----- 8.0 knots True Wind Speed -----

	36.0	11.0	5.0	3.640	2.945	2.2	20.28	1.00	1.00
	44.0	11.6	14.3	4.645	3.341	2.6	14.07	1.00	1.00
OPT Tack	46.3	11.7	16.2	4.803	3.321	2.6	13.26	1.00	1.00
	52.0	11.7	20.7	5.113	3.148	2.6	11.67	1.00	1.00
	60.0	11.5	26.5	5.397	2.698	2.5	10.03	1.00	1.00
	65.1			^ Genoa /	Spinnaker v				
	70.0	11.2	31.8	5.830	1.994	3.1	9.56	1.00	1.00
	80.0	10.8	37.1	6.287	1.092	3.4	8.79	1.00	1.00
	90.0	10.1	43.9	6.407	0.000	2.9	7.43	1.00	1.00
	105.0	8.6	56.5	6.174	-1.598	1.8	5.30	1.00	1.00
	120.0	7.0	72.4	5.697	-2.849	1.0	3.38	1.00	1.00
OPT Gybe	135.0	5.6	93.0	5.104	-3.609	.4	1.76	1.00	1.00
	148.4	4.6	117.2	4.495	-3.827	.1	.83	1.00	1.00
	150.0	4.6	120.5	4.418	-3.826	.1	.77	1.00	1.00
	165.0	4.2	150.6	3.896	-3.763	.1	.46	1.00	1.00
	180.0	4.2	179.7	3.592	-3.592	0.0	.32	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack: 1084.1 Gybe: 940.8 60deg: 667.1 ~100: 575.8 135: 705.4  
 Linear-random: 724.0 Circ: 751.4 Olymp: 958.7 W/L: 1012.4 AC92: 922.8  
 BELL Versions: 737.4 : 763.2 : 1009.0 : 1066.0 GPH: 655.3

# "Flying Scot"

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PERFORMANCE Pg3

TWA ° AWS    AWA °    VB    VMG    HL ° LWY °    FLT    RF  
           kts                kts kts                                ½ → 1 hgt  
 -----

----- 10.0 knots True Wind Speed -----

	36.0	13.8	5.2	4.610	3.730	3.9	19.91	1.00	1.00
	44.0	14.1	13.7	5.377	3.868	4.3	15.45	1.00	1.00
OPT Tack	44.7	14.1	14.3	5.424	3.857	4.3	15.20	1.00	1.00
	52.0	14.1	20.5	5.855	3.605	4.2	12.92	1.00	1.00
	60.0	14.0	26.8	6.224	3.112	4.0	10.97	1.00	1.00

----- 62.7 ----- ^ Genoa / Spinnaker v -----

	70.0	13.8	31.7	6.990	2.391	7.5	10.26	1.00	1.00
	80.0	13.2	37.5	7.401	1.285	8.3	9.43	1.00	1.00
	90.0	12.3	45.2	7.481	0.000	4.9	7.90	1.00	1.00
	105.0	10.6	58.4	7.273	-1.882	2.8	5.56	1.00	1.00
	120.0	8.7	74.8	6.725	-3.362	1.4	3.52	1.00	1.00
	135.0	7.0	96.9	5.888	-4.163	.6	1.87	1.00	1.00
	150.0	5.9	123.0	5.200	-4.503	.2	.87	1.00	1.00
OPT Gybe	162.7	5.4	146.8	4.801	-4.584	.1	.56	1.00	1.00
	165.0	5.3	151.3	4.739	-4.578	.1	.50	1.00	1.00
	180.0	5.3	179.7	4.450	-4.450	.1	.33	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----  
 Optimum Tack: 933.4    Gybe: 785.3    60deg: 578.4    ~100: 490.3    135: 611.4  
 Linear-random: 609.8    Circ: 629.3    Olymp: 822.0    W/L: 859.4    AC92: 787.2  
 BELL Versions: 612.5                : 632.2                : 820.5                : 837.1    GPH: 655.3

----- 12.0 knots True Wind Speed -----

	36.0	16.4	4.7	5.410	4.377	9.7	20.58	1.00	1.00
	44.0	16.6	12.9	6.134	4.412	11.2	16.32	1.00	1.00
OPT Tack	44.6	16.6	13.5	6.197	4.411	11.3	16.02	1.00	1.00
	52.0	16.6	20.1	6.768	4.167	11.5	13.37	1.00	1.00
	60.0	16.4	26.6	7.151	3.576	9.9	11.44	1.00	1.00

----- 65.4 ----- ^ Genoa / Spinnaker v -----

	70.0	15.7	32.5	7.545	2.581	15.2	10.59	.89	1.00
	80.0	15.0	39.1	8.041	1.396	15.2	9.31	.91	1.00
	90.0	14.3	45.0	8.771	0.000	15.2	7.75	.99	1.00
	105.0	12.6	59.0	8.522	-2.206	4.4	5.67	1.00	1.00
	120.0	10.3	77.2	7.582	-3.791	1.9	3.70	1.00	1.00
	135.0	8.4	98.5	6.816	-4.820	.8	1.93	1.00	1.00
	150.0	7.3	125.1	5.903	-5.112	.3	.99	1.00	1.00
OPT Gybe	159.3	6.8	141.7	5.585	-5.223	.1	.74	1.00	1.00
	165.0	6.6	152.2	5.424	-5.239	.1	.58	1.00	1.00
	180.0	6.6	179.6	5.135	-5.135	.1	.38	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----  
 Optimum Tack: 816.1    Gybe: 689.3    60deg: 503.4    ~100: 418.4    135: 528.1  
 Linear-random: 530.5    Circ: 547.5    Olymp: 717.5    W/L: 752.7    AC92: 686.9  
 BELL Versions: 528.6                : 547.3                : 719.6                : 725.7    GPH: 655.3

# "Flying Scot"

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PERFORMANCE Pg4

TWA °	AWS	AWA °	VB	VMG	HL °	LWY °	FLT	RF
		kts					½ -> 1	hgt

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----- 14.0 knots True Wind Speed -----

	36.0	18.4	3.6	5.838	4.723	19.4	21.03	.95	1.00
	44.0	18.6	12.6	6.584	4.736	19.7	16.39	.92	1.00
OPT Tack	44.6	18.6	13.2	6.639	4.724	19.7	16.11	.92	1.00
	52.0	18.5	19.5	7.167	4.412	19.7	13.94	.99	.98
	60.0	18.1	25.9	7.580	3.790	19.8	12.24	1.00	.99
	70.0	17.7	34.4	8.092	2.768	16.1	10.04	1.00	1.00

----- 77.5 ----- ^ Genoa / Spinnaker v -----

	80.0	17.0	41.5	8.670	1.506	15.3	8.57	.93	.91
	90.0	16.3	47.5	9.646	0.000	15.3	6.76	.98	.92
	105.0	14.7	55.6	10.867	-2.813	15.3	4.91	1.00	.98
	120.0	12.1	75.4	9.268	-4.634	3.0	3.56	1.00	1.00
	135.0	9.9	100.6	7.573	-5.355	1.0	2.02	1.00	1.00
	150.0	8.6	126.0	6.717	-5.817	.4	1.05	1.00	1.00
OPT Gybe	159.8	8.1	143.4	6.284	-5.896	.3	.79	1.00	1.00
	165.0	8.0	152.9	6.094	-5.887	.2	.66	1.00	1.00
	180.0	7.9	179.6	5.754	-5.754	.1	.45	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack:	762.1	Gybe:	610.6	60deg:	474.9	~100:	344.2	135:	475.4
Linear-random:	461.0	Circ:	481.5	Olymp:	659.2	W/L:	686.3	AC92:	623.4
BELL Versions:	462.5	:	482.7	:	644.5	:	634.5	GPH:	655.3

----- 16.0 knots True Wind Speed -----

	36.0	20.4	5.0	5.978	4.836	20.0	20.19	.79	.99
	44.0	20.6	13.7	6.764	4.865	19.7	16.26	.91	.94
OPT Tack	44.7	20.6	14.3	6.820	4.851	19.7	16.02	.92	.94
	52.0	20.4	20.7	7.333	4.515	19.8	13.99	1.00	.92
	60.0	20.0	27.4	7.789	3.894	19.8	12.15	1.00	.93
	70.0	19.5	35.3	8.643	2.956	20.0	9.58	1.00	.95
	80.0	19.0	42.2	9.757	1.694	20.2	7.25	1.00	.97
	90.0	18.2	48.6	10.742	0.000	19.0	5.64	1.00	1.00

----- 92.4 ----- ^ Genoa / Spinnaker v -----

	105.0	16.4	58.0	11.789	-3.051	15.4	4.35	1.00	.91
	120.0	14.1	69.0	12.269	-6.135	8.4	3.17	1.00	1.00
OPT Gybe	125.7	12.8	80.3	10.795	-6.300	3.2	2.74	1.00	1.00
	135.0	11.3	100.0	8.780	-6.208	1.4	1.99	1.00	1.00
	150.0	9.9	127.1	7.418	-6.424	.6	1.14	1.00	1.00
	165.0	9.2	153.2	6.849	-6.616	.3	.69	1.00	1.00
	180.0	9.2	179.5	6.431	-6.431	.2	.48	1.00	1.00

----- Handicaps: ----- (seconds/mile) -----

Optimum Tack:	742.1	Gybe:	571.4	60deg:	462.2	~100:	314.7	135:	410.0
Linear-random:	421.7	Circ:	450.2	Olymp:	623.9	W/L:	656.8	AC92:	589.5
BELL Versions:	429.7	:	455.1	:	635.5	:	688.7	GPH:	655.3



# "Flying Scot"

11 Dec 2002

PERFORMANCE Pg5

TWA°	AWS	AWA°	VB	VMG	HL°	LWY°	FLT	RF
kts			kts	kts			$\frac{1}{2}$ ->1	hgt

----- 18.0 knots True Wind Speed -----

	36.0	22.4	5.3	6.070	4.911	19.9	20.61	.80	.93
	44.0	22.6	14.3	6.903	4.965	19.7	16.43	.93	.88
OPT Tack	44.6	22.5	14.9	6.952	4.950	19.7	16.22	.94	.87
	52.0	22.3	21.7	7.473	4.601	19.8	14.05	1.00	.86
	60.0	22.0	28.7	8.020	4.010	20.0	11.96	1.00	.88
	70.0	21.6	37.0	9.168	3.136	20.2	8.89	1.00	.88
	80.0	21.0	44.0	10.360	1.799	20.1	6.68	1.00	.90
	90.0	20.0	50.2	11.464	0.000	20.2	5.19	1.00	.94

----- 103.0 ----- ^ Genoa / Spinnaker v -----

	105.0	18.2	60.1	12.635	-3.270	15.4	3.93	1.00	.85
[NG: .114]	120.0	15.3	70.2	13.337	-6.669	15.4	2.93	1.00	.97
OPT Gybe	126.8	14.3	77.1	13.238	-7.931	6.0	2.46	1.00	1.00
	135.0	12.5	95.6	10.893	-7.702	2.1	1.83	1.00	1.00
	150.0	11.3	127.6	8.208	-7.108	.7	1.18	1.00	1.00
	165.0	10.6	153.7	7.484	-7.229	.4	.75	1.00	1.00
	180.0	10.5	179.5	7.106	-7.106	.2	.52	1.00	1.00

----- Handicaps: -----

(seconds/mile) -----  
 Optimum Tack: 727.2 Gybe: 453.9 60deg: 448.9 ~100: 294.0 135: 330.5  
 Linear-random: 385.6 Circ: 417.1 Olymp: 573.1 W/L: 590.6 AC92: 533.2  
 BELL Versions: 394.5 : 422.6 : 592.8 : 626.7 GPH: 655.3

----- 20.0 knots True Wind Speed -----

	36.0	24.3	5.4	6.143	4.970	19.9	21.08	.82	.87
	44.0	24.5	14.8	7.010	5.042	19.7	16.68	.96	.82
OPT Tack	44.5	24.5	15.4	7.067	5.041	19.8	16.44	.96	.82
	52.0	24.2	22.5	7.594	4.676	19.9	14.14	1.00	.82
	60.0	23.9	30.1	8.221	4.111	20.0	11.57	1.00	.81
	70.0	23.6	38.4	9.618	3.289	20.1	8.37	1.00	.83
	80.0	22.9	45.6	10.901	1.893	20.2	6.24	1.00	.85
	90.0	21.8	51.9	12.093	0.000	20.3	4.81	1.00	.88

----- 101.3 ----- ^ Genoa / Spinnaker v -----

	105.0	19.9	61.9	13.344	-3.454	15.4	3.90	1.00	.82
[NG: .307]	120.0	16.6	75.1	13.342	-6.671	15.4	2.79	1.00	.91
OPT Gybe	130.9	14.8	80.7	14.797	-9.689	6.8	2.01	1.00	1.00
	135.0	13.8	91.1	13.238	-9.361	4.0	1.72	1.00	1.00
	150.0	12.2	125.9	9.619	-8.330	.9	1.04	1.00	1.00
	165.0	11.8	153.9	8.225	-7.944	.5	.78	1.00	1.00
	180.0	11.9	179.4	7.692	-7.692	.3	.57	1.00	1.00

----- Handicaps: -----

(seconds/mile) -----  
 Optimum Tack: 714.2 Gybe: 371.6 60deg: 437.9 ~100: 278.5 135: 271.9  
 Linear-random: 362.7 Circ: 395.8 Olymp: 535.4 W/L: 542.9 AC92: 492.0  
 BELL Versions: 372.5 : 401.9 : 564.8 : 579.2 GPH: 655.3

# "Flying Scot"

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PERFORMANCE Pg6

TWA ° AWS AWA ° VB VMG HL ° LWY ° FLT RF  
 kts kts kts kts 1/2 -> 1 hgt

----- 22.0 knots True Wind Speed -----

	36.0	26.3	5.5	6.216	5.029	20.0	21.49	.84	.82
	44.0	26.4	15.2	7.108	5.113	19.9	16.91	.98	.77
OPT Tack	44.9	26.4	16.1	7.178	5.088	19.9	16.61	.99	.77
	52.0	26.1	23.2	7.701	4.741	20.0	14.24	1.00	.77
	60.0	25.9	31.1	8.525	4.263	20.0	11.37	1.00	.78
	70.0	25.5	39.7	10.013	3.424	20.2	7.97	1.00	.78
	80.0	24.8	46.9	11.384	1.977	20.3	5.90	1.00	.80
	90.0	23.6	53.4	12.660	0.000	20.4	4.51	1.00	.83

----- 101.2 ----- ^ Genoa / Spinnaker v -----

[NG: .170]	105.0	21.4	65.4	13.350	-3.455	15.5	3.50	1.00	.75
[NG: .477]	120.0	18.1	79.2	13.347	-6.674	15.5	2.71	1.00	.86
[NG: .461]	135.0	15.3	95.9	13.238	-9.361	4.4	1.83	1.00	1.00
OPT Gybe	143.6	13.6	109.0	12.734	-10.255	1.7	1.10	1.00	1.00
	150.0	13.1	124.0	11.168	-9.672	1.1	.92	1.00	1.00
	165.0	12.7	153.2	9.405	-9.084	.6	.69	1.00	1.00
	180.0	13.0	179.4	8.499	-8.499	.4	.56	1.00	1.00

----- Handicaps: -----

Optimum Tack:	707.6	Gybe:	351.1	60deg:	422.3	~100:	274.4	135:	271.9
Linear-random:	348.8	Circ:	381.9	Olymp:	528.0	W/L:	529.3	AC92:	482.7
BELL Versions:	359.6	:	389.5	:	549.6	:	533.2	GPH:	655.3

----- 24.0 knots True Wind Speed -----

	36.0	28.2	5.3	6.252	5.058	20.0	22.06	.85	.77
	44.0	28.3	15.5	7.170	5.158	19.9	17.23	.99	.73
OPT Tack	44.9	28.3	16.4	7.241	5.133	19.9	16.90	1.00	.73
	52.0	28.0	23.8	7.795	4.799	20.0	14.35	1.00	.73
	60.0	27.8	32.1	8.790	4.395	20.1	11.02	1.00	.74
	70.0	27.5	40.8	10.357	3.542	20.3	7.66	1.00	.74
	80.0	26.7	48.2	11.815	2.052	20.4	5.62	1.00	.76
	90.0	25.4	54.8	13.169	0.000	20.6	4.27	1.00	.79

----- 101.0 ----- ^ Genoa / Spinnaker v -----

[NG: .304]	105.0	22.9	68.2	13.364	-3.459	15.6	3.43	1.00	.71
[NG: .581]	120.0	19.5	89.2	11.070	-5.535	15.7	2.90	1.00	.86
[NG: .769]	135.0	17.6	109.6	10.163	-7.186	7.6	1.94	1.00	1.00
OPT Gybe	150.0	13.9	122.0	12.797	-11.082	1.3	.83	1.00	1.00
	165.0	13.5	152.6	10.662	-10.298	.6	.62	1.00	1.00
	180.0	13.9	179.5	9.615	-9.615	.4	.49	1.00	1.00

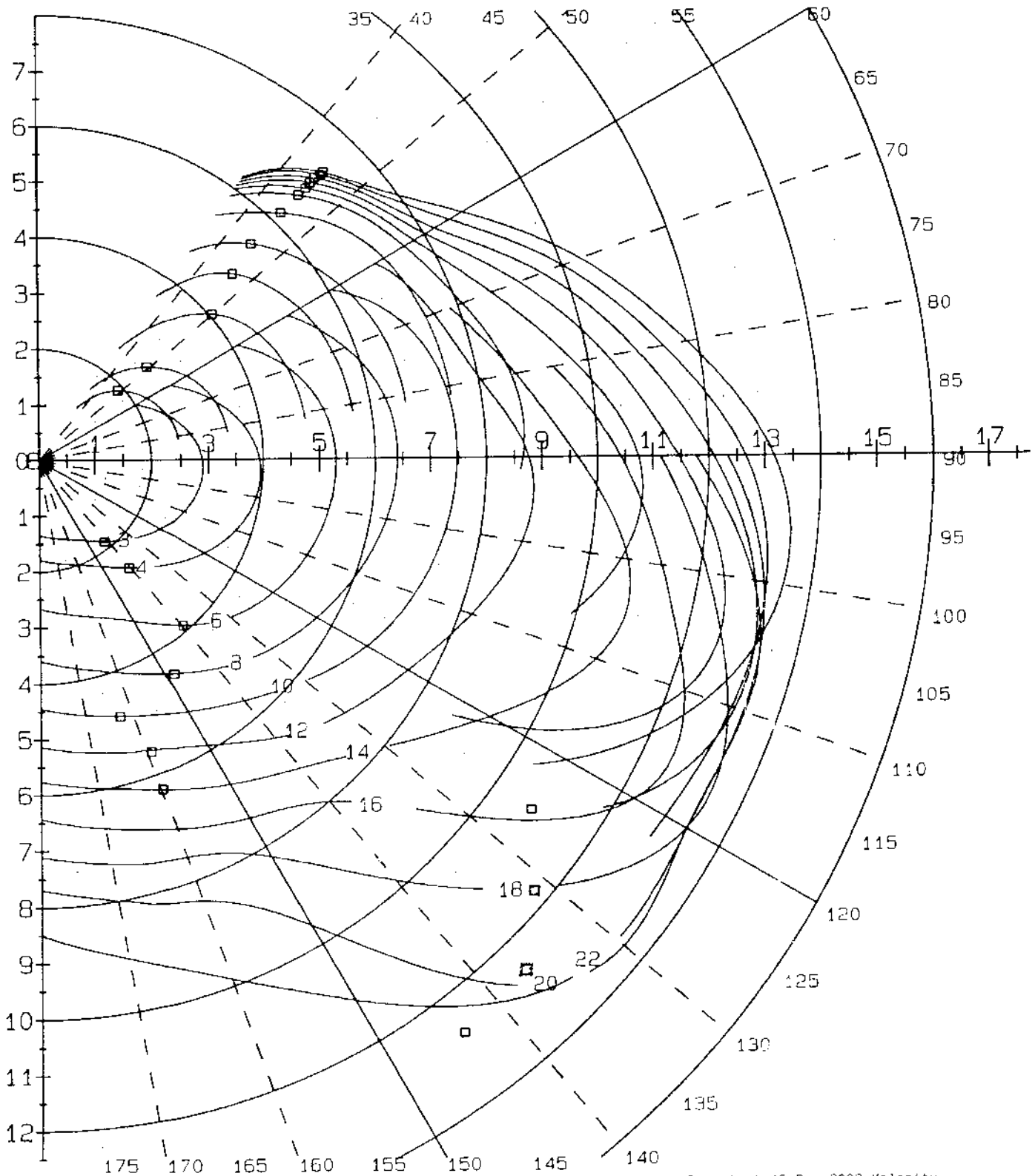
----- Handicaps: -----

Optimum Tack:	701.3	Gybe:	334.6	60deg:	409.5	~100:	270.7	135:	354.2
Linear-random:	355.6	Circ:	385.0	Olymp:	543.0	W/L:	518.0	AC92:	487.8
BELL Versions:	360.6	:	390.1	:	556.0	:	514.0	GPH:	655.3

# "Flying Scot"

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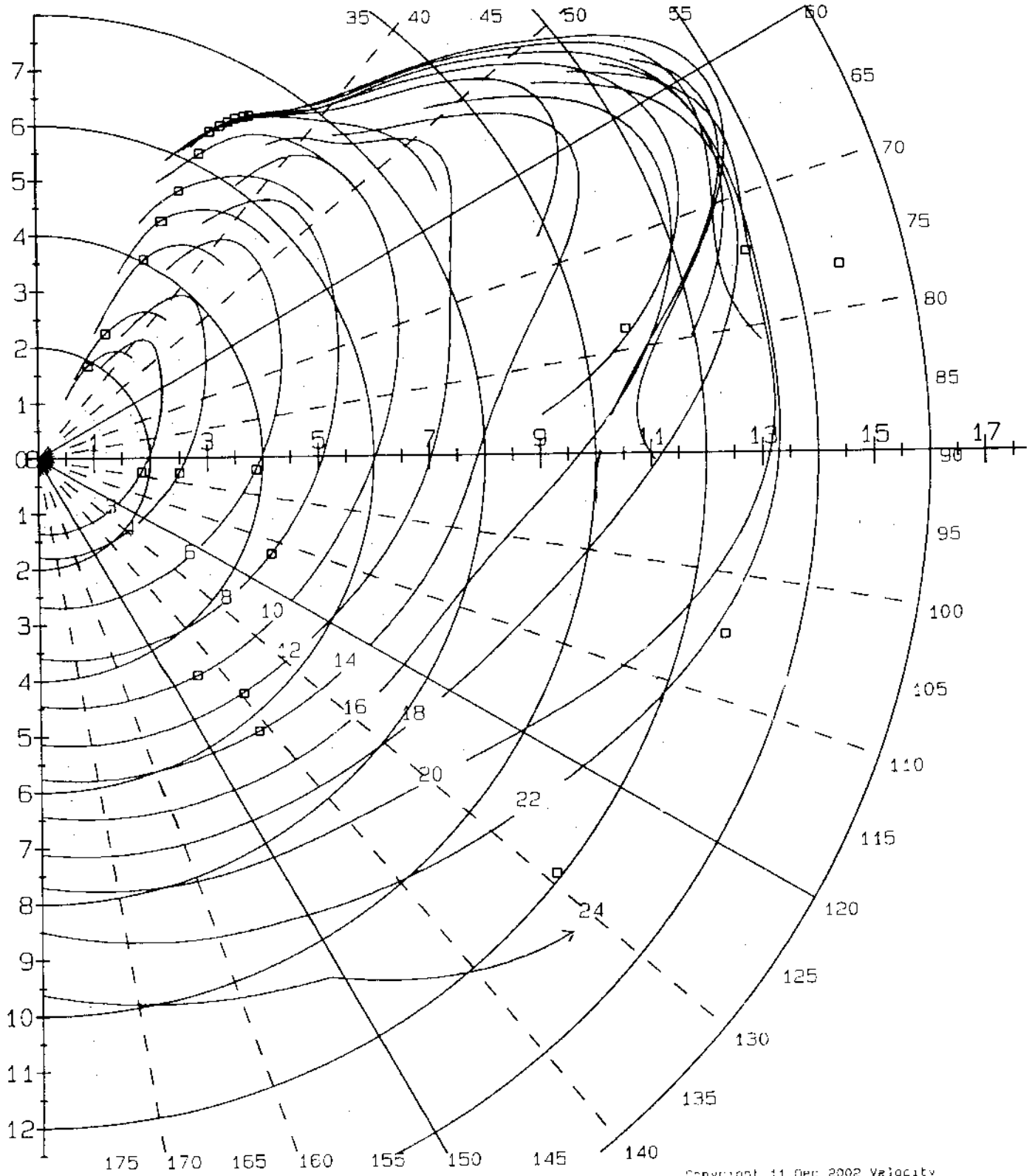
POLAR PLOT



# "Flying Scot"

11 Dec 2002

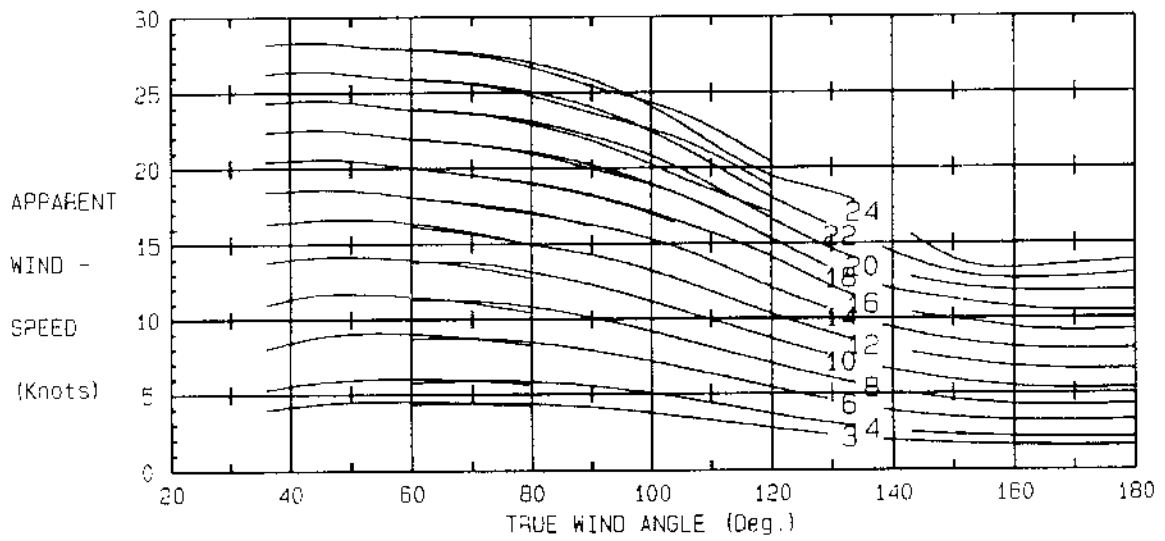
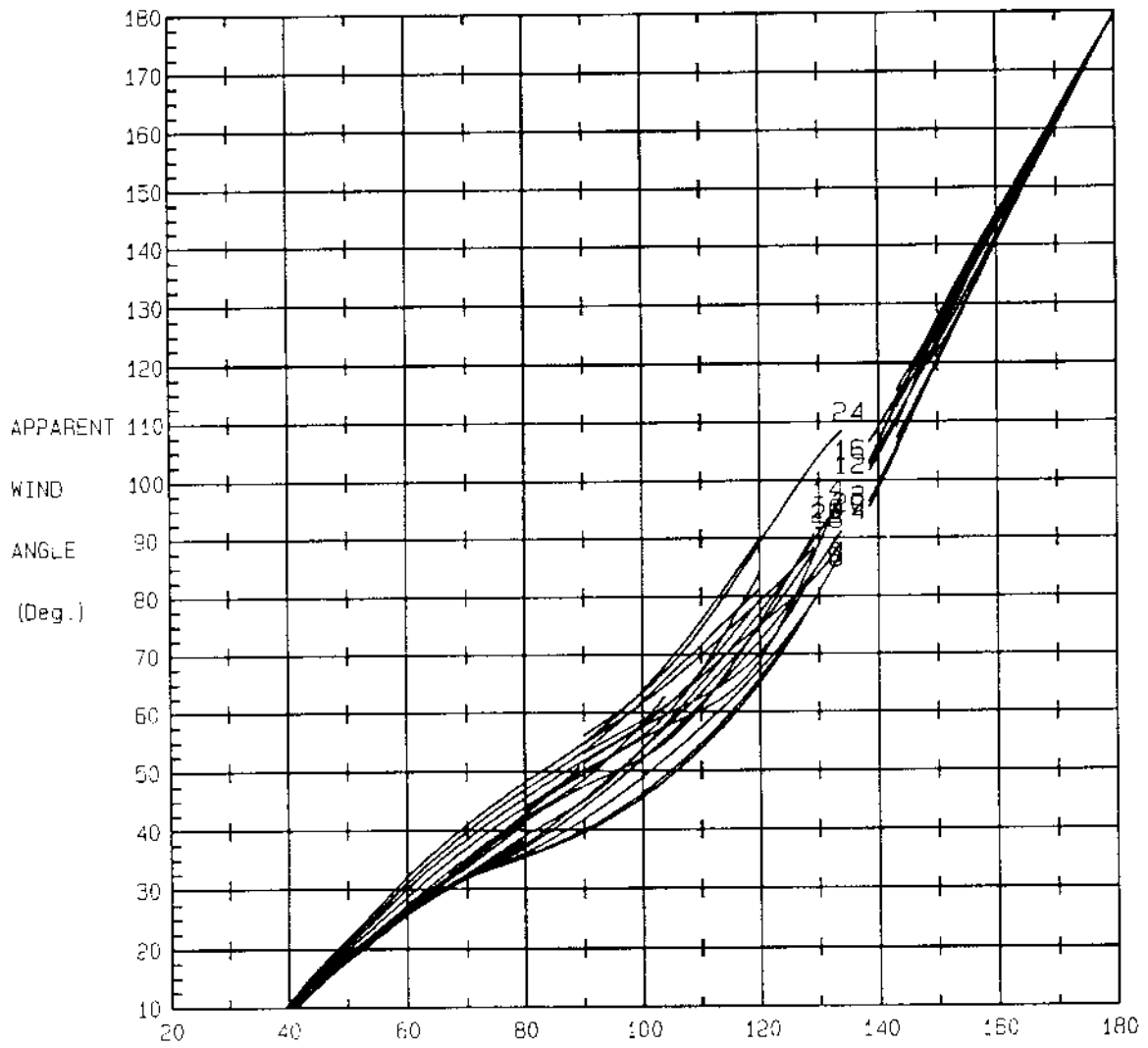
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# "Flying Scot"

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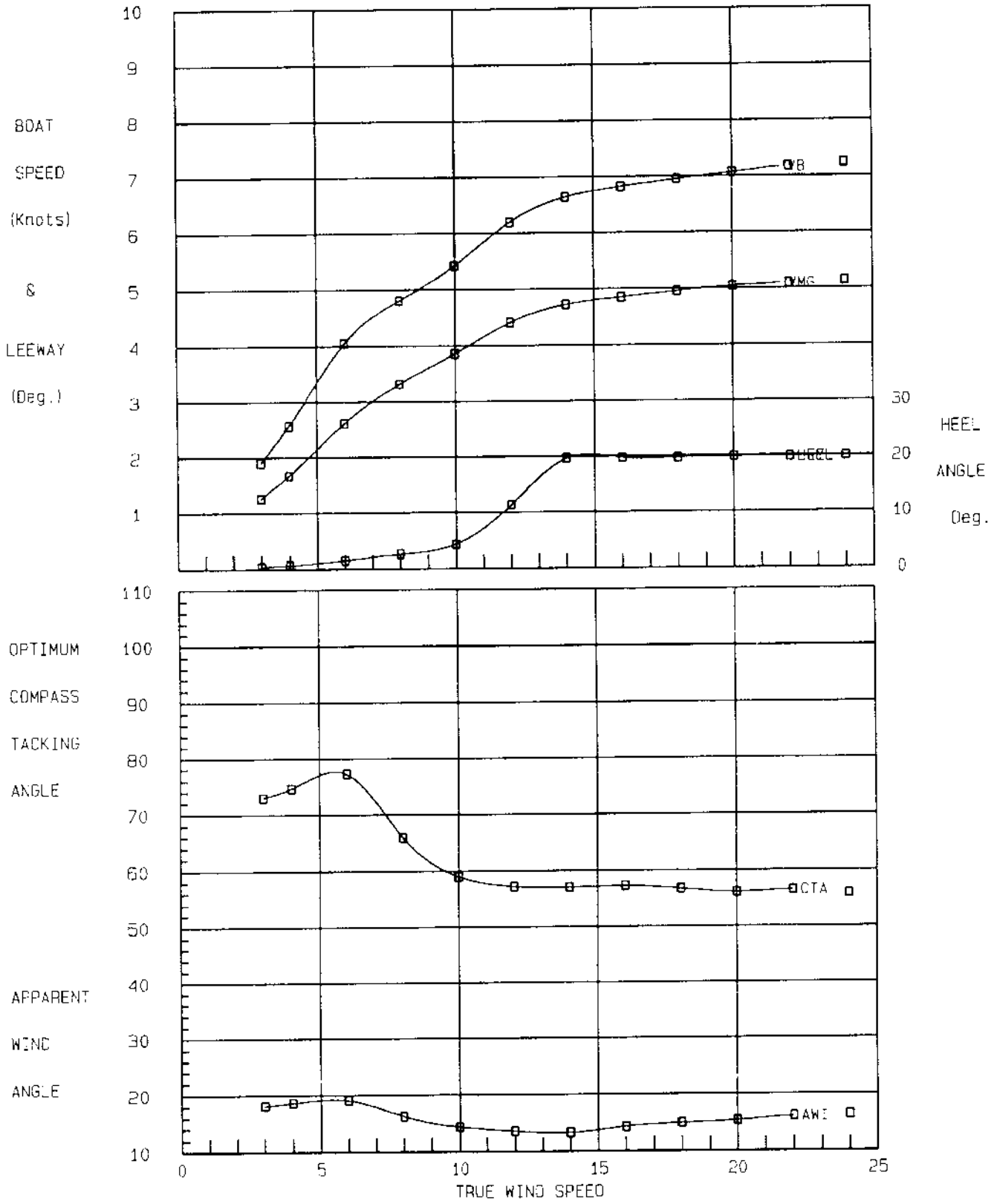
WIND PLOT



# "Flying Scot"

11 Dec 2002

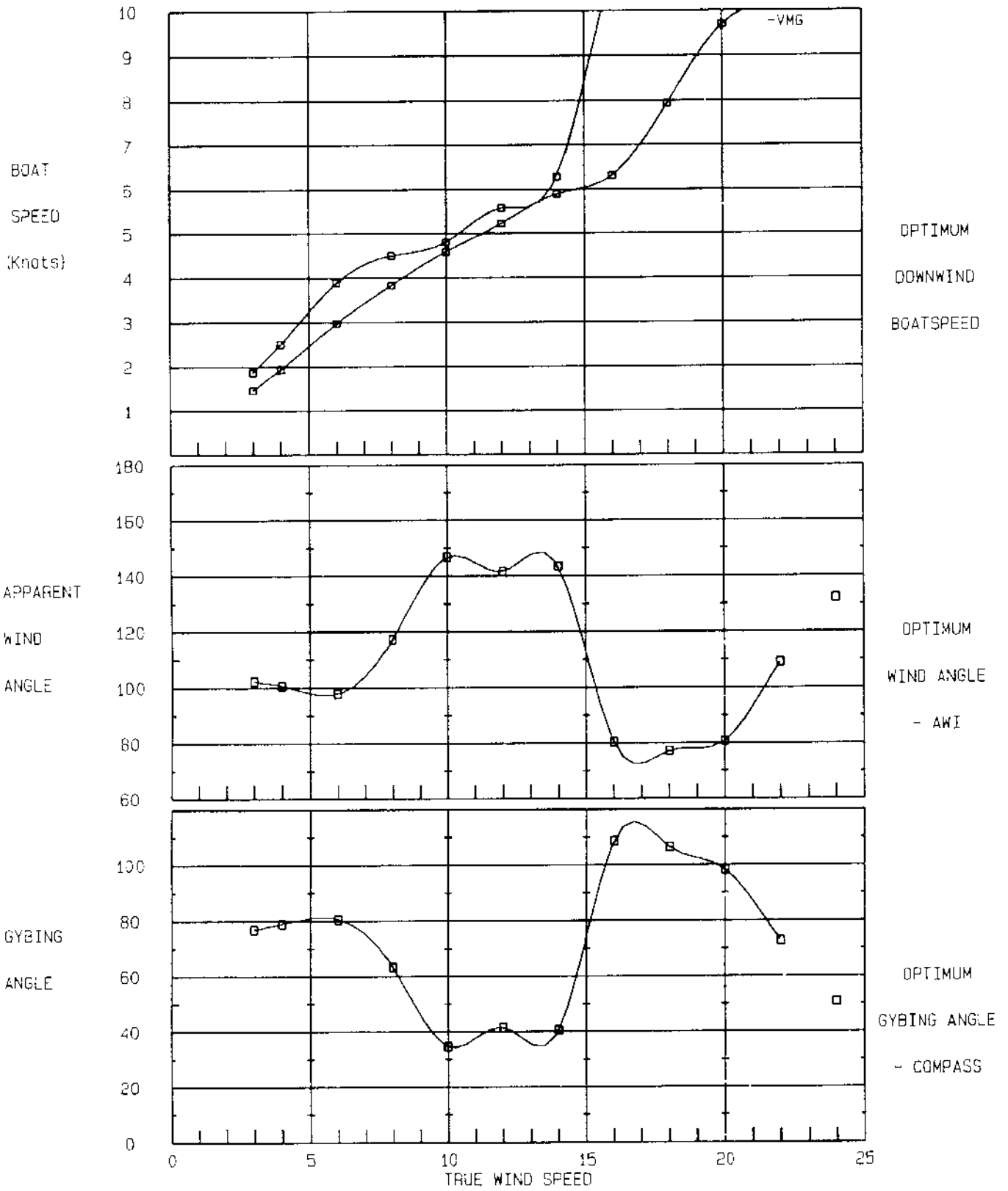
UPWIND



# "Flying Scot"

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DOWNWIND



# "Flying Scot"

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HYDROSTATICS 1

## UPRIGHT MEASUREMENT TRIM

-----					
DISPLACEMENT..	900.0	WATER DENSITY..	64.00	FGO.....	1.000
LONG. CG.....	1.000	LWL.....	16.423	FF.....	1.789
VERT. CG.....	-.250	MTI.....	243.426	FA.....	1.372
VERT. CB.....	.206	PPI.....	310.805	LBG.....	18.000
METACENTER....	-6.334	WETTED SURF...	68.964	HULL SURF AREA	141.699
LONG. CF.....		.623 RM/DEG...		94.942 LCG TOT. SURF.	
VERT. CF.....	.040	MAX. DRAFT....	.660	VCG TOT. SURF.	-.202

## UPRIGHT SAILING TRIM

-----					
DISPLACEMENT..	1425.0	WATER DENSITY..	64.00	FF.....	1.854
LONG. CG.....	-.596	LWL.....	18.292	FA.....	1.021
VERT. CG.....	-.868	MTI.....	429.665	CREW WT.....	500.000
VERT. CB.....	.091	PPI.....	399.733	GEAR WT.....	25.000
METACENTER....	-6.055	WETTED SURF...	86.446	SAILING LEN...	19.399
LONG. CF.....		-.829 RM/DEG...		131.323 RATED BEAM...	
VERT. CF.....	-.099	MAX. DRAFT....	.825	EFF. B/Tc.....	9.676
AMAX.....	1.978	EFF. DRAFT....	3.671	SUNK LENGTH...	22.176
SA / (DSPL)^2/3	25.491	SA / WS .....	2.334	DSPL/LSM .....	86.179
RATED LENGTH..	19.471	AWP / (DSPL)^2/3	9.470	100* VOL/LSM^3	.302

## SAILING TRIM WITH HEEL

-----													
HEEL	DWL	DWL	RTNG	LONG.	CB	WET	SAILING	EFF	PRIS	FORnAFT		AWP	LWL
ANGLE	@FF	@FA	ARM	%	X	SURF	LEN.	BTc	COEF	Prsmtes			
-----													
0	-.10	.31	0.00	46.1	-.62	86.45	19.40	9.68	608	735	482	74.95	18.292
2	-.11	.31	.18	46.2	-.62	86.06	19.39	9.60	608	733	483	74.51	18.288
5.0			.438			84.40	19.320	9.23	609	722	496	72.62	18.266
7.5			.629			82.71	19.220	8.77	608	714	502	70.68	18.231
10	-.16	.22	.80	47.9	-.63	80.68	19.07	8.23	606	713	499	68.28	18.182
12.5			.938			78.80	18.883	7.66	603	716	491	66.04	18.118
15.0			1.061			76.54	18.780	7.09	601	718	483	63.39	18.040
17.5			1.164			74.63	18.679	6.55	598	722	473	61.25	17.947
20.0			1.251			72.72	18.553	6.04	595	722	465	59.15	17.852
22.5			1.315			70.61	18.435	5.58	594	723	458	57.06	17.701
25	-.41	-.13	1.38	46.2	-.64	68.51	18.32	5.12	592	725	450	54.97	17.549
27.5			1.418			66.62	18.234	4.71	591	728	442	52.75	17.412
30.0			1.459			64.74	18.151	4.30	590	731	433	50.53	17.274
32.5			1.467			63.50	18.128	4.01	590	732	429	47.74	17.201
35.0			1.475			62.26	18.105	3.72	589	733	424	44.96	17.127
40	-.81	-.60	1.44	43.6	-.63	60.81	18.17	3.52	589	733	424	44.96	17.127
60	-1.374	-1.155	.982	43.4	-.623	56.14							
90	-1.978	-1.703	-.088	47.1	-.633	54.72							
120	-2.097	-1.814	-1.169	51.1	-.628	55.96							
150	-1.744	-1.462	-1.839	52.3	-.621	60.98							
170	-1.401	-1.087	-1.607	52.3	-.618	82.20							



# "Flying Scot"

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HYDROSTATICS 2

## RIGHTING ARM vs. HEEL ANGLE

