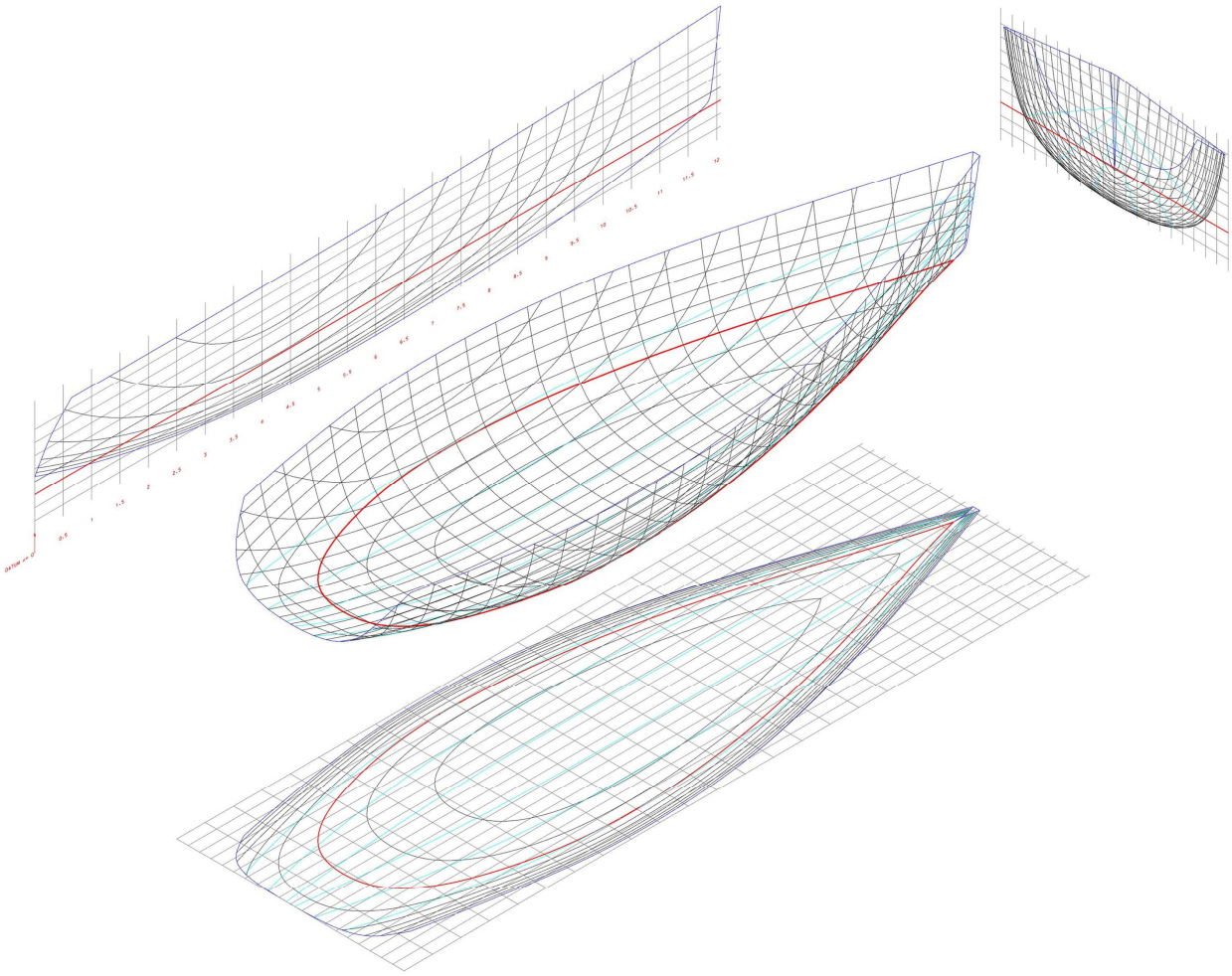
DUFOUR P40
LONG KEEL TALL RIG



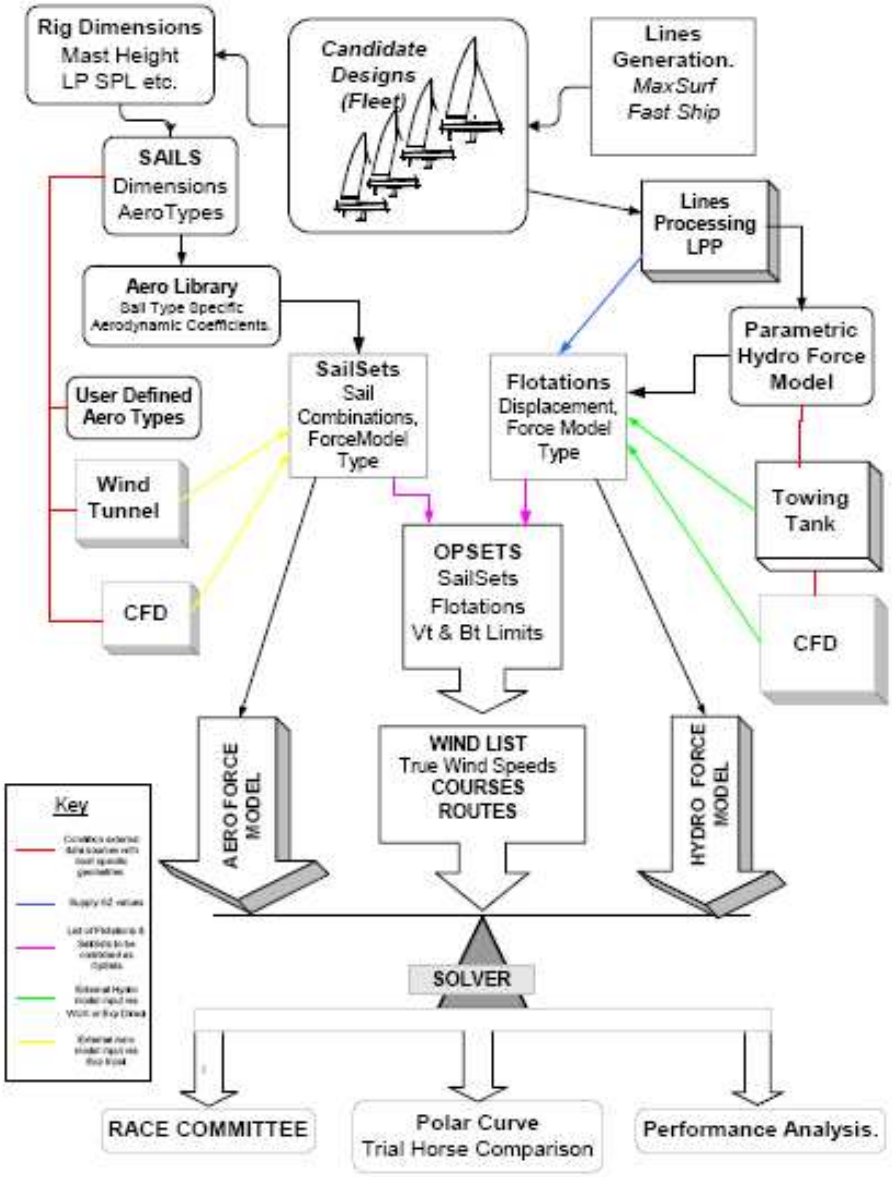
VELOCITY PREDICTION PROGRAM ANALISYS

FELCI YACHT DESIGN

VPP ANALYSIS

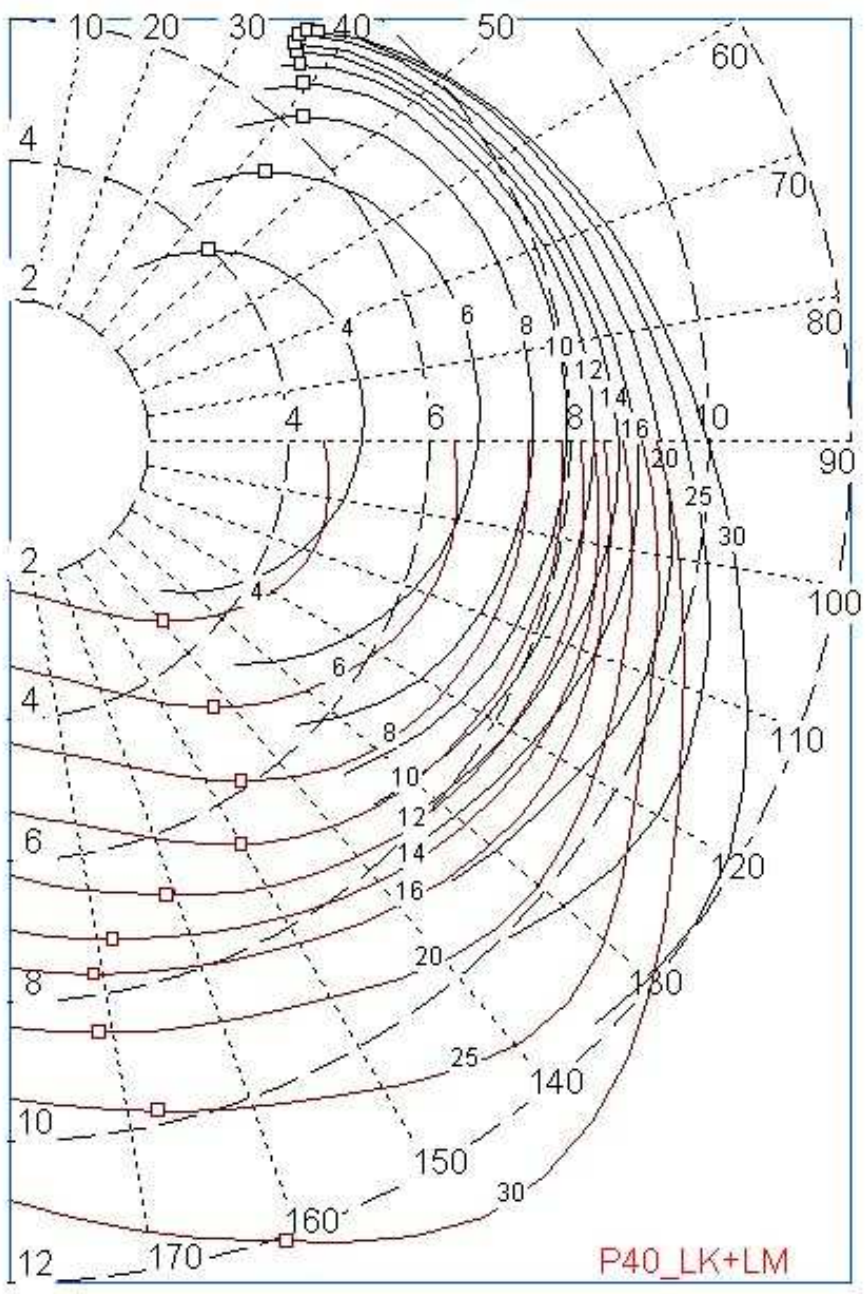
The Velocity Prediction Program are algorithms that resolve the equilibrium equations, starting from the boat model.

They offer many analysis possibilities allowing also fleet comparison and race models; they also could be used with results coming from tank model test, wind tunnel test or CFD data and regression coefficients.



VPP Polar Plot:

This is a typical polar plot which shows the boat speed for specific true wind speed and heading. The radial lines represent true wind heading and the circumferential lines represent true wind speed. Optimal upwind and downwind conditions are marked as small square on the boat speed contours for each wind speed.



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Best Boat speeds Table:

The following tables give a numerical representation of the polar diagram. Boat speeds are given for a series of true wind speed both in knots and in seconds/miles, and there is also included either upwind and downwind optimum speed-made-good solution.
The last two tables represent the best boat speed and angle related to the apparent wind.

Vt	True wind speed (knots)
Bt	True wind angle (°)
Vs	Boat speed (knots)
Vmg	Boat velocity made good (knots)
Heel	Heel angle (°)
Va	Apparent wind speed (knots)
Ba	Apparent wind angle (°)

Best Boatspeeds (kt)

	4	6	8	10	12	14	16	20	25	30
36.0	3.04	4.47	5.52	6.19	6.61	6.84	6.98	7.13	7.21	7.18
40.0	3.41	4.93	5.99	6.63	6.96	7.15	7.27	7.43	7.52	7.54
45.0	3.82	5.40	6.48	7.00	7.27	7.43	7.54	7.70	7.78	7.82
52.0	4.28	5.90	6.92	7.35	7.57	7.70	7.82	7.99	8.13	8.20
60.0	4.66	6.32	7.21	7.62	7.83	7.98	8.11	8.30	8.47	8.58
70.0	4.95	6.60	7.40	7.84	8.10	8.26	8.41	8.64	8.87	9.03
75.0	5.03	6.67	7.44	7.90	8.21	8.39	8.54	8.81	9.06	9.24
80.0	5.07	6.70	7.47	7.93	8.28	8.51	8.68	8.96	9.24	9.45
90.0	5.02	6.67	7.45	7.93	8.32	8.67	8.93	9.26	9.62	9.95
110.0	4.59	6.37	7.34	7.89	8.32	8.65	8.89	9.64	10.50	11.16
120.0	4.31	6.03	7.14	7.75	8.22	8.66	9.05	9.59	10.66	11.84
135.0	3.60	5.24	6.56	7.36	7.89	8.34	8.80	9.80	11.27	12.44
150.0	2.86	4.30	5.56	6.63	7.33	7.83	8.26	9.14	10.63	12.88
165.0	2.34	3.55	4.70	5.74	6.67	7.33	7.82	8.67	9.86	11.75
180.0	2.12	3.22	4.28	5.28	6.19	6.96	7.51	8.33	9.35	10.81
Up.Vs	3.91	5.29	6.23	6.58	6.78	6.89	6.96	7.10	7.21	7.29
Up.Bt	46.3	43.7	42.2	39.5	37.7	36.4	35.8	35.6	36.1	37.0
Up.Vmg	2.71	3.82	4.61	5.08	5.36	5.54	5.65	5.77	5.83	5.82
Dn.Vs	3.37	4.78	5.86	6.62	6.83	7.25	7.69	8.51	9.76	12.04
Dn.Bt	139.4	142.5	145.7	150.1	161.0	168.2	171.0	171.3	167.5	160.9
Dn.Vmg	2.56	3.79	4.84	5.74	6.46	7.09	7.59	8.42	9.53	11.37

Times for 1 nm (secs)

	4	6	8	10	12	14	16	20	25	30
36.0	1185.3	805.3	652.4	581.2	545.0	526.0	515.7	504.6	499.5	501.2
40.0	1055.4	729.8	600.6	543.4	516.9	503.3	495.1	484.8	478.8	477.6
45.0	942.4	666.6	555.8	514.1	495.2	484.5	477.2	467.4	463.0	460.4
52.0	841.5	610.1	520.2	489.9	475.3	467.5	460.4	450.4	442.9	438.9
60.0	772.7	570.0	499.5	472.2	459.9	451.0	444.1	433.8	425.1	419.5
70.0	726.9	545.2	486.7	459.2	444.6	435.7	428.3	416.5	405.9	398.8
75.0	715.6	539.5	483.6	455.7	438.7	429.1	421.3	408.7	397.5	389.8
80.0	710.4	536.9	482.1	453.8	434.9	423.1	414.8	401.6	389.7	380.9
90.0	717.0	539.8	483.4	454.0	432.7	415.3	403.2	388.8	374.3	361.8
110.0	784.8	564.9	490.2	456.2	432.9	416.1	405.2	373.4	342.9	322.5
120.0	835.8	597.0	504.0	464.5	438.0	415.6	397.7	375.3	337.7	304.1
135.0	1000.9	686.6	549.0	489.1	456.3	431.6	408.9	367.5	319.5	289.5
150.0	1259.6	838.0	647.9	543.2	491.0	459.8	435.9	394.0	338.8	279.4
165.0	1536.7	1015.0	766.4	627.1	539.6	491.0	460.4	415.4	365.0	306.5
180.0	1696.3	1119.6	840.3	681.7	581.1	517.1	479.6	432.1	384.9	333.1
Up	1330.8	941.4	780.6	709.2	671.4	650.0	637.4	623.7	617.5	618.8
Dn	1405.2	949.4	743.6	627.0	557.3	507.5	474.3	427.8	377.8	316.6

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Best Apparent Wind Speed

	4	6	8	10	12	14	16	20	25	30
36.0	6.7	10.0	12.8	15.3	17.6	19.7	21.7	25.6	30.5	35.2
40.0	7.0	10.3	13.1	15.5	17.7	19.7	21.7	25.6	30.4	35.1
45.0	7.2	10.5	13.3	15.6	17.6	19.5	21.5	25.4	30.1	34.9
52.0	7.4	10.7	13.3	15.4	17.3	19.2	21.1	25.0	29.7	34.3
60.0	7.5	10.6	13.1	15.0	16.8	18.7	20.6	24.3	28.9	33.5
70.0	7.4	10.3	12.5	14.4	16.0	17.9	19.7	23.3	27.8	32.3
75.0	7.2	10.0	12.2	14.1	15.7	17.4	19.1	22.7	27.2	31.6
80.0	7.0	9.7	11.8	13.6	15.3	16.8	18.6	22.1	26.5	30.9
90.0	6.4	9.0	10.9	12.7	14.4	16.0	17.4	20.7	25.1	29.5
110.0	4.9	7.1	8.8	10.3	11.7	13.0	14.4	18.4	21.9	26.1
120.0	4.2	6.0	7.6	9.0	10.5	11.9	13.3	16.1	21.0	24.2
135.0	2.9	4.4	5.7	7.1	8.5	10.0	11.5	14.5	17.7	21.4
150.0	2.1	3.1	4.2	5.4	6.7	8.2	9.8	12.9	16.5	19.6
165.0	1.8	2.7	3.7	4.7	5.8	7.2	8.7	11.8	15.7	18.9
180.0	1.9	2.8	3.7	4.7	5.8	7.0	8.5	11.7	15.6	19.2
Up	7.3	10.5	13.2	15.5	17.6	19.7	21.7	25.6	30.5	35.2
Dn	2.6	3.7	4.6	5.4	6.0	7.1	8.5	11.7	15.6	19.0

Best Apparent Wind Angle

	4	6	8	10	12	14	16	20	25	30
36.0	20.5	20.6	21.0	21.6	22.3	23.0	23.7	25.1	26.4	27.4
40.0	21.7	21.9	22.5	23.3	24.2	25.1	26.1	27.7	29.2	30.3
45.0	23.0	23.6	24.4	25.5	26.8	28.0	29.2	31.0	32.8	34.1
52.0	25.1	26.0	27.3	28.8	30.5	32.2	33.6	35.9	37.9	39.4
60.0	27.5	28.9	31.1	32.9	35.0	37.0	38.7	41.4	43.8	45.6
70.0	30.7	32.9	36.1	38.8	40.6	43.2	45.2	48.5	51.4	53.5
75.0	32.5	35.0	38.7	41.8	44.0	46.3	48.6	52.1	55.3	57.6
80.0	34.4	37.2	41.3	44.9	47.5	49.4	52.0	55.8	59.3	61.8
90.0	38.5	41.9	46.8	51.2	54.6	57.2	59.2	63.5	67.5	70.3
110.0	49.4	52.5	58.3	64.2	68.8	72.5	76.1	81.2	84.7	87.9
120.0	56.3	59.8	65.5	72.2	77.7	81.9	85.3	91.2	94.9	97.3
135.0	74.8	76.7	81.0	87.7	94.0	99.0	102.6	107.3	110.9	113.8
150.0	106.9	106.7	108.9	112.1	117.0	121.5	125.0	129.4	131.7	131.7
165.0	145.8	145.4	145.7	146.6	147.7	149.7	151.5	154.1	155.6	155.8
180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0
Up	23.4	23.1	23.3	23.1	23.1	23.2	23.6	24.9	26.4	28.1
Dn	82.6	89.7	99.4	112.3	139.0	156.2	162.8	165.0	159.7	149.1

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