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Subsonic Investigation of Leading-Edge Flaps Designed for Vortex- and Attached-Flow on a High-Speed Civil Transport Configuration

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Summary

A wind tunnel investigation of two separate leading-edge flaps, designed for vortex- and attached-flow respectively, were conducted on a High Speed Civil Transport (HSCT) configuration in the Langley 14- by 22-Foot Subsonic Tunnel. Data were obtained over a Mach number range of 0.12 to 0.27, with corresponding chord Reynolds numbers of 2.50×10^6 to 5.50×10^6. Variations of the leading-edge flap deflection angle were tested with outboard leading-edge flaps deflected 0° and 26.4°. Trailing-edge flaps were deflected 0°, 10°, 12.9° and 20°. The longitudinal and lateral aerodynamic data are presented without analysis. A complete tabulated data listing is also presented herein. The data associated with each deflected leading-edge flap indicate L/D improvements over the undeflected configuration. These improvements may be instrumental in providing the necessary lift augmentation required by an actual HSCT during the climb-out and landing phases of the flight envelope. However, further tests will have to be done to assess their full potential.

Introduction

Proposed High-Speed Civil Transport (HSCT) configurations have supersonic cruise speeds above Mach 2, and hence incorporate a high degree of leading-edge sweep for supersonic cruise efficiency. However, high leading-edge sweep is not conducive to efficient performance at subsonic speeds such as encountered during take-off, climbout, approach and landing. Therefore, investigations are continuing at the NASA Langley Research Center to study ways of improving the subsonic capabilities of conceptual HSCT configurations.

One area of investigation involves the tendency for highly swept wings to develop leading-edge vortical flow at moderate to high angles of attack. It has been observed in previous wind tunnel investigations (references 1 & 2) that during the subsonic climbout phase of the flight envelope, these wings tend to produce large upper surface vortex structures. Although these vortices may provide significant lift augmentation, they often result in increased drag and a poorer L/D. Increased drag requires a corresponding increase in engine thrust, thereby adversely affecting the community noise characteristics.

Over the years, several methods have been tried to manipulate the vortex flow field on the wings of configurations similar to HSCT concepts in order to improve their low speed performance (references 3 thru 8). This test investigates the use of two leading-edge flap systems to enhance low-speed, high-lift. The first system, a vortex flap on the 71° inboard section of this model, was designed to use leading-edge flow separation advantageously by rotating the vortex-induced suction force forward, thus providing a measure of leading-edge thrust. The second system, referred to as a mission adaptive flap (MA), was designed to significantly reduce flow separation by keeping the leading-edge of the flap aligned with the local upwash field. This results in a flap with a considerable amount of twist and camber. Both flap systems were tested with a variety of trailing-edge flap deflections.

The results presented herein were acquired at the NASA Langley 14- by 22-Foot Subsonic Tunnel. Data were obtained for the cruise and high-lift configurations (without vertical tails) for an angle-of-attack range from -2° to 20° over a Mach number range of 0.12 to 0.27. The corresponding Reynolds number, based on the mean aerodynamic chord, ranged from 2.5×10^6 to 5.5×10^6, respectively.

Symbols & Abbreviations

a	speed of sound, $\frac{ft}{\text{sec}}$
b	wing span, ft
C_A	axial-force coefficient, $\frac{\text{Axial force}}{qS}$
C_D	drag coefficient, $\frac{\text{Drag}}{qS}$
C_L	lift coefficient, $\frac{\text{Lift}}{qS}$
C_l	rolling moment coefficient, $\frac{\text{Rolling moment}}{qSb}$
C_m	pitching moment coefficient, $\frac{\text{Pitching moment}}{qS\bar{c}}$
C_N	normal force coefficient, $\frac{\text{Normal force}}{qS}$
C_n	yawing moment coefficient, $\frac{\text{Yawing moment}}{qSb}$
C_Y	side force coefficient, $\frac{\text{Side-force}}{qS}$
$\bar{c}$	mean aerodynamic chord, ft
D	drag, lb

L	lift, lb
L/D	lift-to-drag ratio
M	Mach number, $\frac{V}{a}$
q	dynamic pressure, $\frac{lb}{ft^2}$
R	Reynolds number, $\frac{\rho V c}{\mu}$
S	wing reference area, ft^2
V	velocity, $\frac{ft}{\text{sec}}$
α	angle of attack, deg
β	angle of sideslip, deg
δ	flap deflection angle, normal to hinge line (positive down), deg
μ	viscosity, $\frac{lb \cdot \text{sec}}{ft^2}$
ρ	density, $\frac{\text{slugs}}{ft^3}$

Subscripts:

L	leading edge (Indicates all leading-edge flaps unless followed by the subscript 1, 2, or 3.)
T	trailing edge (Indicates all trailing-edge flaps unless followed by the subscript 1, 2, or 3.)
∞	free stream conditions
1, 2, 3	flap location as defined in Figure 2.

Abbreviations:

HSCT	high-speed civil transport
i	inboard wing
o	outboard wing

Model Description

Wind Tunnel Model

A geometric description of the model tested in this investigation is presented in figure 1. The wing has an inboard sweep of 71° and an outboard sweep of 50° with no twist or camber. The flap systems, shown in figure 2, consist of leading-edge flap segments and partial span trailing-edge flap segments spaced to accommodate engine nacelle placement. Tests were conducted for each of the leading-edge flaps along with the undeflected leading-edge configuration. Trailing-edge flaps were deflected 0°, 10°, 12.9°and 20° for each of the leading-edge flaps. Transition grit (number 60 size) was applied to both the forebody and the wing upper surface leading-edge to fix boundary-layer transition from laminar to turbulent flow. During this investigation the model had no canards, tail surfaces, or engine nacelles. The geometric characteristics are presented in Table 1.

Vortex Flap

The vortex flap, shown on the model in figure 3, was designed for the inboard 71° swept section using Frink's vortex flap design code (reference 9). The design conditions included a lift coefficient of $C_L = 0.8$, a vortex flap deflection of 40°, with an outboard leading-edge deflection of 26.4°, and all trailing-edge flaps at 20°. The resulting configuration is shown in figure 4. During the investigation, the vortex flap was also tested at 30° and 50° deflections.

Attached Flow Flap

An attached flow flap, shown on the model in figure 5, was also designed for the entire wing leading-edge. The flap was designed using Carlson's wing design code (reference 10) and is referred to as a mission adaptive flap because the local flap deflection angle increases as a function of wing span to account for the increasing upwash field. By keeping the flap aligned with the local upwash, leading-edge flow separation can be significantly reduced. The amount of local deflection shown in figure 5 represents what is required for a design lift coefficient of $C_L = 0.45$. Additionally, the flap possesses a high degree of camber to maintain a smooth hinge line radius and thus reduce the possibility of hinge line separation. To ensure a smooth transition between the inboard and the outboard sections, the inboard and outboard flap segments were manufactured such that no gap existed at the crank. Gaps at the crank would normally exist due to deflecting leading-edge flaps on hinge lines with different sweeps.

The difference in the design C_L between the two flap systems resulted from a change in program focus occuring after the design of the vortex flap was completed and fabrication was started. However, each flap system was tested over a large range of lift coefficients thereby providing overlapping data for both design conditions.

Test Conditions & Instrumentation

Tests were conducted in the Langley 14- by 22-Foot Subsonic Tunnel (reference 11). Test Mach numbers, dynamic pressures, and Reynolds numbers based on the wing mean aerodynamic chord were as follows:

Mach number, M	Dynamic pressure, q, psf	Reynolds number, $R, x\ 10^6$
0.12	20	2.50
0.18	50	3.90
0.22	70	4.50
0.27	110	5.50

Tests were conducted over an angle-of-attack range from -2° to 20°; with most configurations also tested through ±5° of sideslip. All configurations had zero roll angle.

A six-component strain-gauge balance mounted inside the fuselage measured the forces and moments. The accuracy of this strain-gauge balance is presented in Appendix A.

Angle of attack was measured by an accelerometer installed in the model; whereas, the angle of sideslip was measured via a digital encoder mounted to the turntable drive mechanism of the model support system.

The data were corrected for jet-boundary and blockage effects according to the methods of references 12 and 13. No corrections were made for flow angularity or local support system flow interference.

Presentation of Data

An index to the aerodynamic data acquired during this investigation is presented in Table 2, with a complete tabular listing of the data being presented in Table 3. Plots depicting the longitudinal and lateral aerodynamic data are presented herein, without analysis, in the following groupings:

Topic **Figure**

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Table 1.

Geometric Characteristics Of Basic Model

The wing reference area is defined by extending the inboard leading edge and the outboard trailing edge of the cruise configuration planform projection to the centerline (see Figure 1.).

Aspect ratio	2.116
Reference area, ft^2	10.664
Gross area, ft^2	11.005
Span, ft	4.750
Root chord, ft	5.288
Tip chord, ft	0.529
Reference mean aerodynamic chord, ft	3.071
Leading-edge sweep, degrees:	
At body station 1.943 ft	71.0
At body station 6.299 ft	50.0

Table 2.
Index to Data in Table 3.

Note: Alpha <u>sweep</u> is defined as $\alpha = -2°$ through 20°, $\Delta = 2°$. Runs with the vortex flap were limited to a maximum of 16° at q=110 psf due to the internal balance pitching moment limitations.

Run	q (psf)	α (deg)	β (deg)	L.E. Flap Type	δ_{L1} (deg)	δ_{L2} (deg)	$\delta_{T1,2,3}$ (deg)
10	20	sweep	0	MA	-	-	0 / 0 / 0
11	50	↓	↓	↓	↓	↓	↓
12	70	↓	↓	↓	↓	↓	↓
13	110	↓	↓	↓	↓	↓	↓
14	70	sweep	0	MA	-	-	0 / 0 / 0
15	110	↓	-5	↓	↓	↓	↓
16	110	↓	+5	↓	↓	↓	↓
17	70	sweep	0	MA	-	-	10 / 10 / 0
18	110	↓	0	↓	↓	↓	↓
19	↓	↓	+5	↓	↓	↓	↓
20	↓	↓	-5	↓	↓	↓	↓
21	70	sweep	0	MA	-	-	10 / 10 / 12.9
22	110	↓	0	↓	↓	↓	↓
23	↓	↓	+5	↓	↓	↓	↓
24	↓	↓	-5	↓	↓	↓	↓
25	70	sweep	0	MA	-	-	10 / 10 / 20
26	110	↓	0	↓	↓	↓	↓
27	↓	↓	-5	↓	↓	↓	↓
28	↓	↓	+5	↓	↓	↓	↓
29	20	sweep	0	NONE	0	0	0 / 0 / 0
30	50	↓	↓	↓	↓	↓	↓
31	70	↓	↓	↓	↓	↓	↓

Run	q (psf)	α (deg)	β (deg)	L.E. Flap Type	δ_{L1} (deg)	δ_{L2} (deg)	$\delta_{T1,2,3}$ (deg)
32	110	sweep	0	NONE	0	0	0 / 0 / 0
33	110	↓	+5	↓	↓	↓	↓
34	110	↓	-5	↓	↓	↓	↓
36	20	sweep	0	NONE	0	0	0 / 0 / 0
37	50	↓	↓	↓	↓	↓	↓
38	70	↓	↓	↓	↓	↓	↓
39	110	↓	↓	↓	↓	↓	↓
40	↓	sweep	+5	NONE	0	0	0 / 0 / 0
41	↓	sweep	-5	NONE	0	0	0 / 0 / 0
42	70	sweep	0	NONE	0	0	10 / 10 / 20
43	110	↓	0	↓	↓	↓	↓
44	↓	↓	+5	↓	↓	↓	↓
45	↓	↓	-5	↓	↓	↓	↓
46	20	sweep	0	VOR	0	0	0 / 0 / 0
47	50	↓	↓	↓	↓	↓	↓
48	70	↓	↓	↓	↓	↓	↓
49	110	↓	↓	↓	↓	↓	↓
50	↓	↓	+5	↓	↓	↓	↓
51	↓	↓	-5	↓	↓	↓	↓
52	70	sweep	0	VOR	0	0	20 / 20 / 20
53	110	↓		↓	↓	↓	↓
54	↓	↓	+5	↓	↓	↓	↓
55	↓	↓	-5	↓	↓	↓	↓
56	70	sweep	0	VOR	40	0	20 / 20 / 20
57	110	↓		↓	↓	↓	↓
58	↓	↓	+5	↓	↓	↓	↓
59	↓	↓	-5	↓	↓	↓	↓

Run	q (psf)	α (deg)	β (deg)	L.E. Flap Type	δ_{L1} (deg)	δ_{L2} (deg)	$\delta_{T1,2,3}$ (deg)
60	70	sweep	0	VOR	40	26.4	20 / 20 / 20
61	110						
62			+5				
63			-5				
64	70	sweep	0	VOR	30	26.4	20 / 20 / 20
65	110						
66			+5				
67			-5				
68	70	sweep	0	VOR	50	26.4	20 / 20 / 20
69							
70			+5				
71			-5				
72	70	sweep	0	VOR	40	26.4	10 / 10 / 12.9
73	110	sweep	0	VOR	40	26.4	10 / 10 / 12.9

Table 3
Tabulated Force and Moment Data

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
10.	1.	2.36	0.12	19.97	-2.05	0.00	-0.1506	0.0247	-0.1496	0.0301	-0.0150	0.0000	0.0001	0.0008	-4.97
10.	2.	2.36	0.12	19.98	0.07	0.00	-0.0435	0.0190	-0.0435	0.0189	-0.0036	0.0000	-0.0001	-0.0002	-2.30
10.	3.	2.36	0.12	19.98	2.00	0.00	0.0458	0.0131	0.0453	0.0147	0.0051	-0.0001	-0.0004	-0.0019	3.09
10.	4.	2.36	0.12	19.99	4.05	0.00	0.1301	0.0057	0.1293	0.0149	0.0130	-0.0003	-0.0005	-0.0025	8.69
10.	5.	2.36	0.12	20.05	6.05	0.00	0.2104	-0.0036	0.2096	0.0188	0.0228	-0.0003	-0.0006	-0.0035	11.17
10.	6.	2.36	0.12	20.02	8.02	0.00	0.2858	-0.0129	0.2848	0.0274	0.0361	-0.0003	-0.0009	-0.0044	10.38
10.	7.	2.36	0.12	20.01	10.03	0.00	0.3587	-0.0232	0.3572	0.0401	0.0523	-0.0003	-0.0012	-0.0049	8.91
10.	8.	2.36	0.12	19.95	12.00	0.00	0.4446	-0.0313	0.4414	0.0625	0.0716	-0.0009	-0.0020	-0.0038	7.07
10.	9.	2.35	0.12	19.92	14.02	0.00	0.5435	-0.0336	0.5355	0.1002	0.0991	-0.0003	-0.0021	-0.0067	5.35
10.	10.	2.35	0.12	19.93	16.01	0.00	0.6721	-0.0363	0.6560	0.1521	0.1271	-0.0001	-0.0019	-0.0092	4.31
10.	11.	2.35	0.12	19.95	18.06	0.00	0.7824	-0.0391	0.7560	0.2075	0.1633	-0.0002	-0.0021	-0.0099	3.64
10.	12.	2.35	0.12	19.86	20.09	0.00	0.8902	-0.0417	0.8504	0.2692	0.2022	-0.0014	0.0021	-0.0028	3.16
11.	1.	3.70	0.18	50.06	-1.99	0.00	-0.1439	0.0241	-0.1429	0.0291	-0.0146	-0.0002	0.0001	0.0010	-4.91
11.	2.	3.69	0.19	50.11	-0.04	0.00	-0.0467	0.0189	-0.0467	0.0189	-0.0038	-0.0001	0.0000	0.0003	-2.47
11.	3.	3.68	0.18	49.91	2.00	0.00	0.0468	0.0126	0.0464	0.0142	0.0055	0.0000	-0.0002	-0.0009	3.26
11.	4.	3.68	0.18	50.00	4.07	0.00	0.1328	0.0048	0.1321	0.0143	0.0135	-0.0003	-0.0003	-0.0011	9.25
11.	5.	3.68	0.18	49.94	6.07	0.00	0.2115	-0.0044	0.2108	0.0181	0.0228	-0.0003	-0.0004	-0.0016	11.63
11.	6.	3.68	0.19	50.11	8.05	0.00	0.2878	-0.0137	0.2869	0.0270	0.0361	-0.0003	-0.0006	-0.0027	10.62
11.	7.	3.67	0.18	49.88	10.04	0.00	0.3603	-0.0241	0.3589	0.0395	0.0515	-0.0003	-0.0009	-0.0036	9.09
11.	8.	3.67	0.18	49.82	12.01	0.00	0.4425	-0.0337	0.4398	0.0599	0.0700	-0.0006	-0.0011	-0.0034	7.34
11.	9.	3.66	0.18	49.67	14.00	0.00	0.5386	-0.0347	0.5310	0.0976	0.0991	-0.0006	-0.0010	-0.0063	5.44
11.	10.	3.67	0.18	50.05	16.03	0.00	0.6669	-0.0373	0.6513	0.1499	0.1261	-0.0011	-0.0016	-0.0072	4.35
11.	11.	3.66	0.18	49.77	18.01	0.00	0.7790	-0.0405	0.7533	0.2044	0.1617	-0.0004	-0.0014	-0.0072	3.68
11.	12.	3.66	0.18	49.83	20.01	0.00	0.8794	-0.0432	0.8411	0.2629	0.1980	-0.0014	0.0030	0.0003	3.20
12.	1.	4.29	0.22	69.89	-1.99	0.00	-0.1448	0.0244	-0.1438	0.0294	-0.0146	-0.0001	0.0002	0.0013	-4.88
12.	2.	4.29	0.22	69.99	0.09	0.00	-0.0414	0.0187	-0.0414	0.0187	-0.0032	-0.0002	0.0000	0.0006	-2.22
12.	3.	4.28	0.22	69.84	2.02	0.00	0.0482	0.0128	0.0477	0.0144	0.0058	-0.0002	-0.0002	-0.0005	3.30
12.	4.	4.28	0.22	70.05	4.02	0.00	0.1307	0.0052	0.1301	0.0144	0.0136	-0.0004	-0.0003	-0.0009	9.05
12.	5.	4.27	0.22	69.80	6.05	0.00	0.2088	-0.0040	0.2081	0.0181	0.0227	-0.0004	-0.0003	-0.0011	11.47
12.	6.	4.28	0.22	70.05	8.01	0.00	0.2850	-0.0134	0.2841	0.0267	0.0357	-0.0004	-0.0005	-0.0021	10.63
12.	7.	4.27	0.22	69.76	10.06	0.00	0.3597	-0.0242	0.3584	0.0394	0.0514	-0.0003	-0.0008	-0.0031	9.09
12.	8.	4.27	0.22	69.87	12.01	0.00	0.4397	-0.0342	0.4372	0.0588	0.0693	-0.0005	-0.0009	-0.0026	7.44
12.	9.	4.26	0.22	69.75	14.07	0.00	0.5376	-0.0348	0.5299	0.0980	0.0996	-0.0010	-0.0008	-0.0057	5.41
12.	10.	4.27	0.22	70.13	16.07	0.00	0.6643	-0.0376	0.6488	0.1492	0.1265	-0.0014	-0.0014	-0.0060	4.35
12.	11.	4.26	0.22	70.08	18.03	0.00	0.7729	-0.0409	0.7476	0.2023	0.1608	-0.0006	-0.0010	-0.0055	3.70
12.	12.	4.25	0.22	69.73	19.94	0.00	0.8742	-0.0439	0.8367	0.2595	0.1968	-0.0019	0.0039	0.0028	3.22
13.	1.	5.26	0.28	110.30	-2.01	0.00	-0.1458	0.0242	-0.1448	0.0294	-0.0144	0.0000	0.0002	0.0018	-4.93
13.	2.	5.24	0.28	110.04	0.02	0.00	-0.0460	0.0189	-0.0460	0.0189	-0.0039	-0.0003	0.0001	0.0011	-2.44
13.	3.	5.23	0.28	109.87	2.08	0.00	0.0484	0.0125	0.0479	0.0143	0.0059	-0.0003	-0.0001	0.0000	3.35
13.	4.	5.22	0.28	110.09	4.00	0.00	0.1264	0.0053	0.1257	0.0142	0.0131	-0.0006	-0.0002	-0.0002	8.85
13.	5.	5.22	0.28	110.15	6.04	0.00	0.2059	-0.0040	0.2052	0.0178	0.0224	-0.0005	-0.0003	-0.0007	11.50
13.	6.	5.21	0.28	110.03	8.10	0.00	0.2864	-0.0139	0.2855	0.0269	0.0361	-0.0003	-0.0005	-0.0013	10.62
13.	7.	5.20	0.28	110.17	10.07	0.00	0.3577	-0.0245	0.3564	0.0389	0.0509	-0.0002	-0.0006	-0.0023	9.16
13.	8.	5.20	0.28	110.19	12.00	0.00	0.4352	-0.0349	0.4329	0.0571	0.0680	-0.0006	-0.0009	-0.0015	7.59
13.	9.	5.18	0.28	109.88	13.98	0.00	0.5217	-0.0380	0.5155	0.0901	0.0964	-0.0025	-0.0017	-0.0008	5.72
13.	10.	5.18	0.28	110.31	16.11	0.00	0.6430	-0.0391	0.6286	0.1423	0.1266	0.0010	-0.0011	-0.0026	4.42
13.	11.	5.16	0.28	110.04	18.06	0.00	0.7646	-0.0415	0.7398	0.1995	0.1593	-0.0007	0.0005	-0.0025	3.71
13.	12.	5.16	0.28	110.21	20.08	0.00	0.8840	-0.0444	0.8455	0.2643	0.1987	-0.0006	0.0011	-0.0023	3.20
14.	4.	4.32	0.22	70.33	-2.03	0.00	-0.1396	0.0234	-0.1387	0.0284	-0.0148	0.0003	0.0001	-0.0009	-4.88

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
14.	5.	4.32	0.22	70.24	-0.08	0.00	-0.0428	0.0182	-0.0427	0.0182	-0.0042	0.0002	0.0000	-0.0018	-2.34
14.	6.	4.32	0.22	70.15	2.03	0.00	0.0557	0.0115	0.0553	0.0135	0.0058	0.0002	-0.0003	-0.0031	4.11
14.	7.	4.33	0.22	70.14	4.01	0.00	0.1366	0.0040	0.1360	0.0136	0.0132	0.0001	-0.0004	-0.0036	10.02
14.	8.	4.33	0.22	70.10	6.07	0.00	0.2165	-0.0053	0.2159	0.0178	0.0229	0.0001	-0.0003	-0.0042	12.15
14.	9.	4.34	0.22	70.37	8.00	0.00	0.2919	-0.0147	0.2911	0.0264	0.0359	0.0001	-0.0005	-0.0052	11.02
14.	10.	4.33	0.22	70.14	10.01	0.00	0.3659	-0.0252	0.3647	0.0393	0.0515	0.0001	-0.0008	-0.0063	9.28
14.	11.	4.33	0.22	70.19	12.02	0.00	0.4460	-0.0354	0.4436	0.0590	0.0697	-0.0003	-0.0012	-0.0048	7.52
14.	12.	4.33	0.22	69.97	14.09	0.00	0.5443	-0.0388	0.5373	0.0960	0.0979	-0.0020	-0.0025	-0.0035	5.60
14.	13.	4.33	0.22	70.04	16.04	0.00	0.6516	-0.0412	0.6376	0.1419	0.1263	0.0021	-0.0023	-0.0039	4.49
14.	14.	4.33	0.22	69.79	18.04	0.00	0.7679	-0.0425	0.7433	0.1993	0.1607	0.0022	-0.0004	-0.0057	3.73
14.	15.	4.33	0.22	69.97	20.06	0.00	0.8860	-0.0449	0.8477	0.2643	0.1982	-0.0025	0.0050	0.0016	3.21
15.	1.	5.55	0.28	109.90	-2.00	-5.01	-0.1324	0.0234	-0.1315	0.0281	-0.0176	-0.0009	0.0027	0.0072	-4.68
15.	2.	5.57	0.28	110.85	-0.04	-5.01	-0.0397	0.0186	-0.0397	0.0186	-0.0065	-0.0001	0.0025	0.0058	-2.13
15.	3.	5.54	0.28	110.32	2.04	-5.01	0.0545	0.0119	0.0540	0.0139	0.0030	0.0016	0.0022	0.0047	3.90
15.	4.	5.52	0.28	109.64	4.04	-5.01	0.1385	0.0040	0.1379	0.0138	0.0125	0.0031	0.0018	0.0033	9.98
15.	5.	5.52	0.28	109.68	6.02	-5.01	0.2149	-0.0056	0.2143	0.0172	0.0215	0.0055	0.0010	0.0001	12.47
15.	6.	5.53	0.28	110.26	8.00	-5.01	0.2895	-0.0166	0.2889	0.0241	0.0323	0.0100	0.0018	-0.0039	11.97
15.	7.	5.51	0.28	109.56	10.02	-5.01	0.3639	-0.0272	0.3630	0.0370	0.0475	0.0100	0.0017	-0.0036	9.80
15.	8.	5.52	0.28	110.22	12.02	-5.01	0.4425	-0.0367	0.4405	0.0570	0.0655	0.0114	0.0014	-0.0107	7.73
15.	9.	5.52	0.28	110.16	14.01	-5.01	0.5398	-0.0426	0.5341	0.0904	0.0893	0.0127	0.0029	-0.0226	5.91
15.	10.	5.51	0.28	109.87	16.14	-5.01	0.6443	-0.0443	0.6312	0.1381	0.1215	0.0157	0.0002	-0.0266	4.57
15.	11.	5.53	0.28	110.80	18.12	-5.01	0.7484	-0.0432	0.7247	0.1937	0.1581	0.0160	-0.0047	-0.0285	3.74
15.	12.	5.52	0.28	110.22	20.15	-5.01	0.8544	-0.0433	0.8171	0.2560	0.1970	0.0186	-0.0087	-0.0306	3.19
16.	1.	5.52	0.28	110.45	-2.03	5.02	-0.1491	0.0234	-0.1482	0.0287	-0.0194	0.0035	-0.0024	-0.0100	-5.16
16.	2.	5.51	0.28	110.14	-0.01	5.02	-0.0505	0.0188	-0.0505	0.0188	-0.0085	0.0019	-0.0025	-0.0096	-2.69
16.	3.	5.50	0.28	109.94	2.02	5.02	0.0444	0.0129	0.0439	0.0145	0.0007	0.0001	-0.0026	-0.0098	3.03
16.	4.	5.50	0.28	109.61	4.01	5.02	0.1309	0.0052	0.1303	0.0144	0.0101	-0.0013	-0.0026	-0.0106	9.06
16.	5.	5.50	0.28	110.01	6.09	5.02	0.2147	-0.0044	0.2139	0.0186	0.0216	-0.0037	-0.0018	-0.0093	11.51
16.	6.	5.51	0.28	110.25	8.06	5.02	0.2930	-0.0147	0.2921	0.0268	0.0335	-0.0078	-0.0020	-0.0061	10.89
16.	7.	5.50	0.28	109.88	10.02	5.02	0.3666	-0.0249	0.3654	0.0398	0.0480	-0.0087	-0.0024	-0.0069	9.19
16.	8.	5.51	0.28	110.16	12.06	5.02	0.4498	-0.0327	0.4467	0.0627	0.0680	-0.0105	-0.0031	0.0016	7.13
16.	9.	5.51	0.28	110.20	14.02	5.02	0.5436	-0.0390	0.5368	0.0949	0.0914	-0.0109	-0.0038	0.0106	5.66
16.	10.	5.51	0.28	110.10	16.08	5.02	0.6470	-0.0413	0.6331	0.1410	0.1220	-0.0138	-0.0029	0.0109	4.49
16.	11.	5.50	0.28	109.85	17.99	5.02	0.7331	-0.0407	0.7098	0.1896	0.1552	-0.0137	0.0010	0.0123	3.74
16.	12.	5.51	0.28	110.17	20.06	5.02	0.8553	-0.0392	0.8169	0.2590	0.1977	-0.0180	0.0067	0.0149	3.15
17.	2.	4.80	0.22	69.93	-2.00	0.00	-0.0699	0.0235	-0.0690	0.0259	-0.0229	-0.0002	0.0002	0.0007	-2.66
17.	3.	4.79	0.22	69.91	-0.08	0.00	0.0202	0.0185	0.0202	0.0185	-0.0115	0.0000	0.0001	0.0002	1.09
17.	4.	4.79	0.22	69.87	2.03	0.00	0.1149	0.0121	0.1144	0.0162	-0.0021	0.0000	-0.0002	-0.0007	7.07
17.	5.	4.79	0.22	70.09	4.07	0.00	0.1960	0.0040	0.1952	0.0180	0.0060	-0.0001	-0.0002	-0.0011	10.85
17.	6.	4.78	0.22	70.04	6.01	0.00	0.2713	-0.0050	0.2703	0.0237	0.0157	0.0001	-0.0001	-0.0014	11.40
17.	7.	4.77	0.22	69.85	8.04	0.00	0.3517	-0.0151	0.3503	0.0346	0.0294	0.0000	-0.0002	-0.0019	10.11
17.	8.	4.78	0.22	69.97	10.02	0.00	0.4273	-0.0261	0.4253	0.0492	0.0439	0.0000	-0.0004	-0.0025	8.64
17.	9.	4.78	0.22	70.13	12.06	0.00	0.5084	-0.0360	0.5047	0.0720	0.0640	-0.0001	-0.0006	-0.0012	7.01
17.	10.	4.77	0.22	69.76	14.02	0.00	0.6087	-0.0385	0.5999	0.1114	0.0891	-0.0009	-0.0016	0.0002	5.39
17.	11.	4.77	0.22	69.91	16.01	0.00	0.7188	-0.0400	0.7020	0.1616	0.1195	0.0027	-0.0020	0.0015	4.34
17.	12.	4.77	0.22	70.00	18.04	0.00	0.8338	-0.0412	0.8056	0.2214	0.1549	0.0041	-0.0015	-0.0007	3.64
17.	13.	4.77	0.22	69.88	19.99	0.00	0.9640	-0.0430	0.9206	0.2921	0.1893	-0.0010	0.0018	0.0020	3.15
18.	1.	5.92	0.27	110.36	-2.08	0.00	-0.0744	0.0230	-0.0735	0.0257	-0.0233	-0.0001	0.0002	0.0003	-2.86
18.	2.	5.90	0.27	109.96	0.06	0.00	0.0256	0.0175	0.0256	0.0176	-0.0110	0.0000	0.0001	-0.0001	1.46

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
18.	3.	5.89	0.27	109.97	1.98	0.00	0.1104	0.0117	0.1100	0.0155	-0.0024	0.0001	-0.0001	-0.0009	7.09
18.	4.	5.89	0.27	110.01	4.03	0.00	0.1926	0.0035	0.1919	0.0171	0.0057	-0.0001	-0.0002	-0.0012	11.21
18.	5.	5.89	0.27	110.01	5.98	0.00	0.2673	-0.0056	0.2664	0.0225	0.0151	-0.0001	-0.0001	-0.0016	11.82
18.	6.	5.88	0.27	109.94	8.11	0.00	0.3515	-0.0163	0.3503	0.0339	0.0293	0.0000	-0.0003	-0.0021	10.33
18.	7.	5.88	0.27	110.15	10.06	0.00	0.4248	-0.0272	0.4230	0.0481	0.0434	0.0000	-0.0004	-0.0028	8.80
18.	8.	5.88	0.27	110.20	12.06	0.00	0.5037	-0.0371	0.5004	0.0700	0.0632	0.0000	-0.0004	-0.0018	7.15
18.	9.	5.87	0.27	109.98	13.95	0.00	0.5978	-0.0401	0.5898	0.1065	0.0879	-0.0007	-0.0010	-0.0015	5.54
18.	10.	5.87	0.27	109.80	15.91	0.00	0.7021	-0.0409	0.6864	0.1548	0.1177	0.0015	-0.0015	-0.0002	4.43
18.	11.	5.86	0.27	109.69	18.04	0.00	0.8338	-0.0418	0.8058	0.2209	0.1534	0.0023	-0.0006	-0.0013	3.65
18.	12.	5.87	0.27	109.87	20.05	0.00	0.9601	-0.0438	0.9169	0.2911	0.1895	-0.0015	0.0026	0.0028	3.15
19.	1.	5.86	0.27	110.16	-2.05	5.05	-0.0832	0.0229	-0.0824	0.0259	-0.0279	0.0034	-0.0023	-0.0092	-3.18
19.	2.	5.86	0.27	110.30	-0.02	5.05	0.0125	0.0180	0.0125	0.0180	-0.0158	0.0016	-0.0023	-0.0088	0.70
19.	3.	5.85	0.27	110.02	2.05	5.05	0.1070	0.0117	0.1065	0.0155	-0.0067	-0.0005	-0.0024	-0.0090	6.86
19.	4.	5.85	0.27	109.95	4.01	5.05	0.1896	0.0035	0.1889	0.0169	0.0030	-0.0022	-0.0024	-0.0095	11.20
19.	5.	5.86	0.28	110.45	6.04	5.05	0.2701	-0.0064	0.2693	0.0223	0.0146	-0.0046	-0.0016	-0.0086	12.07
19.	6.	5.85	0.27	109.87	7.98	5.05	0.3473	-0.0174	0.3463	0.0314	0.0259	-0.0083	-0.0018	-0.0048	11.02
19.	7.	5.86	0.27	110.09	9.96	5.05	0.4232	-0.0282	0.4217	0.0460	0.0403	-0.0091	-0.0022	-0.0058	9.16
19.	8.	5.85	0.27	109.99	12.10	5.05	0.5140	-0.0366	0.5102	0.0729	0.0603	-0.0105	-0.0034	0.0051	7.00
19.	9.	5.85	0.27	110.04	14.04	5.05	0.6062	-0.0420	0.5983	0.1076	0.0850	-0.0114	-0.0036	0.0140	5.56
19.	10.	5.85	0.27	109.89	15.98	5.05	0.7017	-0.0437	0.6866	0.1528	0.1147	-0.0137	-0.0027	0.0161	4.49
19.	11.	5.84	0.27	109.56	18.05	5.05	0.8024	-0.0435	0.7764	0.2094	0.1509	-0.0156	0.0013	0.0204	3.71
19.	12.	5.85	0.27	110.09	20.02	5.05	0.9091	-0.0422	0.8686	0.2743	0.1889	-0.0183	0.0064	0.0248	3.17
20.	1.	5.85	0.27	110.10	-2.01	-5.02	-0.0697	0.0223	-0.0689	0.0247	-0.0263	-0.0014	0.0029	0.0085	-2.79
20.	2.	5.85	0.27	110.10	-0.01	-5.02	0.0208	0.0176	0.0208	0.0176	-0.0143	-0.0001	0.0026	0.0075	1.19
20.	3.	5.85	0.27	110.28	2.04	-5.02	0.1125	0.0112	0.1120	0.0153	-0.0047	0.0019	0.0025	0.0063	7.35
20.	4.	5.85	0.27	110.18	4.10	-5.02	0.1961	0.0029	0.1954	0.0171	0.0054	0.0036	0.0021	0.0052	11.45
20.	5.	5.84	0.27	109.79	6.08	-5.02	0.2720	-0.0067	0.2712	0.0224	0.0145	0.0064	0.0013	0.0024	12.10
20.	6.	5.84	0.27	110.02	8.08	-5.02	0.3472	-0.0173	0.3462	0.0322	0.0257	0.0099	0.0019	-0.0013	10.76
20.	7.	5.84	0.27	110.17	10.05	-5.02	0.4208	-0.0278	0.4192	0.0467	0.0401	0.0105	0.0021	-0.0006	8.98
20.	8.	5.84	0.27	109.87	12.07	-5.02	0.5069	-0.0373	0.5035	0.0704	0.0577	0.0118	0.0023	-0.0089	7.15
20.	9.	5.85	0.27	110.31	14.08	-5.02	0.6008	-0.0415	0.5928	0.1072	0.0830	0.0134	0.0032	-0.0195	5.53
20.	10.	5.83	0.27	109.70	15.94	-5.02	0.6978	-0.0427	0.6827	0.1523	0.1128	0.0152	0.0007	-0.0226	4.48
20.	11.	5.84	0.27	109.93	18.04	-5.02	0.8052	-0.0414	0.7784	0.2121	0.1502	0.0149	-0.0035	-0.0232	3.67
20.	12.	5.84	0.27	110.07	20.04	-5.02	0.9207	-0.0417	0.8792	0.2791	0.1882	0.0200	-0.0077	-0.0257	3.15
21.	2.	4.74	0.22	70.09	-2.00	0.00	-0.0033	0.0216	-0.0025	0.0217	-0.0412	-0.0002	0.0000	0.0002	-0.12
21.	3.	4.73	0.22	69.94	0.04	0.00	0.0941	0.0169	0.0941	0.0170	-0.0304	-0.0002	-0.0001	-0.0002	5.53
21.	4.	4.74	0.22	70.10	2.06	0.00	0.1855	0.0111	0.1850	0.0179	-0.0219	-0.0001	-0.0003	-0.0005	10.34
21.	5.	4.73	0.22	69.99	4.02	0.00	0.2634	0.0032	0.2625	0.0219	-0.0143	-0.0005	-0.0003	-0.0006	11.98
21.	6.	4.73	0.22	69.91	6.04	0.00	0.3404	-0.0063	0.3391	0.0300	-0.0037	-0.0006	-0.0002	-0.0009	11.32
21.	7.	4.73	0.22	70.01	8.05	0.00	0.4105	-0.0164	0.4087	0.0419	0.0134	-0.0005	-0.0003	-0.0011	9.76
21.	8.	4.73	0.22	70.06	10.03	0.00	0.4830	-0.0277	0.4804	0.0577	0.0279	-0.0006	-0.0005	-0.0016	8.32
21.	9.	4.74	0.22	70.18	12.04	0.00	0.5646	-0.0373	0.5600	0.0824	0.0485	-0.0006	-0.0004	-0.0003	6.79
21.	10.	4.73	0.22	70.13	14.06	0.00	0.6662	-0.0381	0.6555	0.1264	0.0756	-0.0015	-0.0012	0.0007	5.19
21.	11.	4.73	0.22	70.00	16.02	0.00	0.7811	-0.0367	0.7609	0.1824	0.1061	0.0004	-0.0004	-0.0007	4.17
21.	12.	4.72	0.22	69.88	18.03	0.00	0.8978	-0.0378	0.8655	0.2446	0.1416	-0.0010	0.0003	-0.0004	3.54
21.	13.	4.73	0.22	69.98	20.05	0.00	1.0113	-0.0398	0.9637	0.3126	0.1813	-0.0032	0.0046	0.0079	3.08
22.	1.	5.88	0.27	110.45	-2.03	0.00	-0.0071	0.0218	-0.0064	0.0220	-0.0413	-0.0002	-0.0001	-0.0002	-0.29
22.	2.	5.86	0.27	110.11	0.01	0.00	0.0889	0.0172	0.0889	0.0172	-0.0305	-0.0001	0.0000	-0.0003	5.16
22.	3.	5.85	0.27	109.61	2.03	0.00	0.1814	0.0113	0.1808	0.0179	-0.0221	-0.0001	-0.0002	-0.0009	10.11

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
22.	4.	5.86	0.27	110.26	4.05	0.00	0.2607	0.0030	0.2598	0.0216	-0.0143	-0.0005	-0.0003	-0.0009	12.00
22.	5.	5.85	0.27	110.22	6.02	0.00	0.3347	-0.0064	0.3336	0.0292	-0.0042	-0.0007	-0.0002	-0.0011	11.44
22.	6.	5.84	0.27	109.82	8.02	0.00	0.4052	-0.0164	0.4035	0.0408	0.0123	-0.0004	-0.0003	-0.0012	9.88
22.	7.	5.84	0.27	109.79	10.04	0.00	0.4810	-0.0282	0.4785	0.0569	0.0277	-0.0005	-0.0005	-0.0017	8.41
22.	8.	5.83	0.27	109.73	12.00	0.01	0.5572	-0.0380	0.5530	0.0798	0.0472	-0.0005	-0.0002	-0.0009	6.93
22.	9.	5.84	0.27	110.09	14.02	0.00	0.6574	-0.0401	0.6476	0.1219	0.0738	-0.0009	-0.0004	-0.0013	5.31
22.	10.	5.83	0.27	109.77	16.01	0.00	0.7610	-0.0390	0.7422	0.1744	0.1062	-0.0003	0.0000	-0.0018	4.25
22.	11.	5.83	0.27	109.86	18.01	0.00	0.8904	-0.0395	0.8590	0.2404	0.1398	-0.0009	0.0012	0.0004	3.57
22.	12.	5.83	0.27	110.09	20.03	0.00	1.0029	-0.0407	0.9562	0.3085	0.1795	-0.0023	0.0034	0.0048	3.10
23.	1.	5.82	0.27	109.77	-2.00	5.01	-0.0172	0.0218	-0.0164	0.0224	-0.0457	0.0013	-0.0027	-0.0094	-0.73
23.	2.	5.81	0.27	109.70	0.02	5.01	0.0785	0.0176	0.0785	0.0177	-0.0347	-0.0007	-0.0025	-0.0091	4.44
23.	3.	5.81	0.27	109.89	2.01	5.01	0.1719	0.0115	0.1713	0.0176	-0.0266	-0.0029	-0.0026	-0.0090	9.71
23.	4.	5.81	0.27	109.96	4.03	5.01	0.2564	0.0032	0.2556	0.0214	-0.0168	-0.0048	-0.0025	-0.0099	11.93
23.	5.	5.81	0.27	109.77	6.02	5.01	0.3343	-0.0070	0.3331	0.0286	-0.0045	-0.0083	-0.0017	-0.0089	11.66
23.	6.	5.82	0.27	110.37	7.99	5.01	0.4069	-0.0181	0.4055	0.0393	0.0084	-0.0113	-0.0018	-0.0050	10.32
23.	7.	5.81	0.27	109.95	10.01	5.01	0.4792	-0.0292	0.4769	0.0554	0.0248	-0.0103	-0.0020	-0.0056	8.61
23.	8.	5.81	0.27	110.04	12.05	5.01	0.5626	-0.0374	0.5580	0.0820	0.0450	-0.0119	-0.0032	0.0055	6.81
23.	9.	5.81	0.27	109.73	14.01	5.01	0.6566	-0.0413	0.6471	0.1204	0.0714	-0.0150	-0.0030	0.0144	5.37
23.	10.	5.81	0.27	109.76	16.00	5.01	0.7499	-0.0421	0.7325	0.1683	0.1041	-0.0165	-0.0019	0.0149	4.35
23.	11.	5.81	0.27	109.92	18.01	5.01	0.8460	-0.0395	0.8168	0.2264	0.1408	-0.0168	0.0029	0.0162	3.61
23.	12.	5.81	0.27	109.87	20.04	5.01	0.9651	-0.0388	0.9199	0.2974	0.1805	-0.0214	0.0078	0.0194	3.09
24.	1.	5.80	0.27	110.04	-2.00	-5.01	-0.0045	0.0213	-0.0037	0.0214	-0.0441	0.0004	0.0029	0.0077	-0.17
24.	2.	5.80	0.27	110.07	0.07	-5.01	0.0910	0.0170	0.0910	0.0171	-0.0329	0.0021	0.0026	0.0068	5.32
24.	3.	5.80	0.27	109.93	2.03	-5.01	0.1783	0.0110	0.1778	0.0174	-0.0244	0.0039	0.0025	0.0058	10.21
24.	4.	5.81	0.27	110.25	4.05	-5.01	0.2616	0.0026	0.2608	0.0214	-0.0145	0.0061	0.0020	0.0050	12.20
24.	5.	5.80	0.27	109.76	6.00	-5.01	0.3324	-0.0069	0.3313	0.0282	-0.0050	0.0094	0.0013	0.0022	11.73
24.	6.	5.80	0.27	110.04	8.03	-5.01	0.4031	-0.0176	0.4016	0.0394	0.0085	0.0122	0.0018	-0.0013	10.19
24.	7.	5.80	0.27	109.96	10.02	-5.01	0.4756	-0.0287	0.4733	0.0553	0.0246	0.0116	0.0021	-0.0010	8.55
24.	8.	5.80	0.27	109.98	12.02	-5.01	0.5575	-0.0378	0.5532	0.0803	0.0426	0.0123	0.0026	-0.0100	6.89
24.	9.	5.80	0.27	109.91	14.00	-5.01	0.6514	-0.0412	0.6420	0.1191	0.0692	0.0162	0.0033	-0.0197	5.39
24.	10.	5.80	0.27	109.77	16.00	-5.01	0.7471	-0.0421	0.7298	0.1674	0.1024	0.0178	0.0007	-0.0235	4.36
24.	11.	5.80	0.27	110.09	18.03	-5.01	0.8452	-0.0402	0.8162	0.2258	0.1387	0.0167	-0.0033	-0.0237	3.61
24.	12.	5.80	0.27	110.10	20.06	-5.01	0.9643	-0.0392	0.9192	0.2969	0.1782	0.0214	-0.0077	-0.0252	3.10
25.	2.	4.87	0.22	70.21	-2.06	0.00	0.0267	0.0237	0.0275	0.0228	-0.0500	0.0000	0.0001	0.0010	1.21
25.	3.	4.85	0.22	69.83	0.03	0.00	0.1268	0.0194	0.1268	0.0196	-0.0386	0.0004	0.0001	0.0004	6.48
25.	4.	4.85	0.22	69.95	2.04	0.00	0.2157	0.0140	0.2150	0.0219	-0.0298	0.0005	0.0000	-0.0001	9.83
25.	5.	4.85	0.22	70.37	4.06	0.00	0.2939	0.0059	0.2927	0.0270	-0.0211	0.0003	0.0000	-0.0006	10.85
25.	6.	4.85	0.22	70.33	6.03	0.00	0.3653	-0.0029	0.3636	0.0359	-0.0104	0.0003	0.0001	-0.0009	10.13
25.	7.	4.84	0.22	70.36	8.06	0.00	0.4344	-0.0131	0.4319	0.0486	0.0068	0.0003	-0.0002	-0.0008	8.88
25.	8.	4.83	0.22	70.07	10.10	0.00	0.5118	-0.0254	0.5084	0.0657	0.0221	0.0004	-0.0004	-0.0015	7.74
25.	9.	4.84	0.22	70.23	12.06	0.00	0.5928	-0.0349	0.5870	0.0909	0.0416	0.0002	-0.0004	0.0004	6.46
25.	10.	4.83	0.22	70.17	14.01	0.00	0.6908	-0.0366	0.6791	0.1334	0.0670	-0.0017	-0.0014	0.0029	5.09
25.	11.	4.82	0.22	69.91	16.03	0.00	0.7926	-0.0365	0.7718	0.1860	0.0997	0.0006	-0.0008	0.0073	4.15
25.	12.	4.81	0.22	69.56	18.03	0.00	0.9061	-0.0345	0.8722	0.2504	0.1353	0.0011	0.0026	0.0074	3.48
25.	13.	4.81	0.22	69.59	20.04	0.00	1.0314	-0.0353	0.9810	0.3238	0.1741	-0.0036	0.0084	0.0136	3.03
26.	1.	5.99	0.27	110.21	-2.09	0.00	0.0201	0.0238	0.0210	0.0231	-0.0498	0.0003	0.0001	0.0002	0.91
26.	2.	5.97	0.27	109.74	0.05	0.00	0.1204	0.0193	0.1204	0.0195	-0.0379	0.0006	0.0002	-0.0002	6.18
26.	3.	5.98	0.28	110.44	2.03	0.00	0.2110	0.0139	0.2103	0.0215	-0.0293	0.0009	0.0001	-0.0009	9.78
26.	4.	5.97	0.27	110.16	4.05	0.00	0.2890	0.0057	0.2879	0.0264	-0.0210	0.0007	0.0001	-0.0011	10.92

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
26.	5.	5.96	0.27	110.16	6.02	0.00	0.3602	-0.0036	0.3586	0.0347	-0.0105	0.0006	0.0001	-0.0015	10.33
26.	6.	5.97	0.28	110.51	8.07	0.00	0.4307	-0.0139	0.4284	0.0474	0.0063	0.0007	-0.0002	-0.0013	9.04
26.	7.	5.95	0.27	110.06	10.08	0.00	0.5066	-0.0262	0.5033	0.0638	0.0215	0.0008	-0.0003	-0.0017	7.89
26.	8.	5.94	0.27	109.97	12.06	0.00	0.5858	-0.0362	0.5804	0.0883	0.0409	0.0005	-0.0001	-0.0004	6.58
26.	9.	5.95	0.28	110.49	14.04	0.00	0.6836	-0.0396	0.6727	0.1291	0.0658	-0.0010	-0.0006	0.0010	5.21
26.	10.	5.94	0.27	110.06	16.09	0.00	0.7822	-0.0400	0.7626	0.1805	0.0999	-0.0009	-0.0004	0.0059	4.22
26.	11.	5.94	0.27	110.05	18.06	0.00	0.8865	-0.0372	0.8544	0.2421	0.1348	0.0030	0.0033	0.0091	3.53
26.	12.	5.94	0.27	110.04	20.02	0.00	1.0226	-0.0376	0.9737	0.3181	0.1711	-0.0030	0.0088	0.0134	3.06
27.	1.	5.92	0.27	109.93	-2.05	-5.08	0.0238	0.0232	0.0246	0.0224	-0.0525	0.0017	0.0030	0.0082	1.10
27.	2.	5.92	0.28	110.29	0.02	-5.08	0.1213	0.0194	0.1213	0.0195	-0.0409	0.0041	0.0027	0.0074	6.21
27.	3.	5.92	0.28	110.38	2.07	-5.08	0.2106	0.0134	0.2100	0.0211	-0.0315	0.0059	0.0027	0.0065	9.94
27.	4.	5.91	0.27	109.97	4.08	-5.08	0.2919	0.0053	0.2908	0.0263	-0.0216	0.0081	0.0021	0.0057	11.04
27.	5.	5.92	0.28	110.38	6.09	-5.08	0.3629	-0.0046	0.3614	0.0343	-0.0108	0.0113	0.0014	0.0027	10.53
27.	6.	5.92	0.27	110.19	8.06	-5.08	0.4296	-0.0152	0.4275	0.0458	0.0027	0.0131	0.0016	0.0001	9.33
27.	7.	5.92	0.28	110.43	10.01	-5.08	0.5018	-0.0266	0.4988	0.0619	0.0182	0.0126	0.0020	0.0006	8.05
27.	8.	5.91	0.27	110.01	12.01	-5.08	0.5853	-0.0365	0.5801	0.0873	0.0356	0.0129	0.0025	-0.0079	6.65
27.	9.	5.91	0.27	110.20	13.99	-5.08	0.6689	-0.0399	0.6587	0.1246	0.0613	0.0179	0.0035	-0.0149	5.29
27.	10.	5.92	0.27	110.30	16.00	-5.08	0.7664	-0.0392	0.7475	0.1756	0.0967	0.0191	0.0014	-0.0209	4.26
27.	11.	5.91	0.27	110.18	18.01	-5.08	0.8641	-0.0371	0.8332	0.2345	0.1325	0.0181	-0.0026	-0.0221	3.55
27.	12.	5.90	0.27	109.59	20.10	-5.08	0.9879	-0.0355	0.9399	0.3093	0.1741	0.0225	-0.0073	-0.0238	3.04
28.	1.	5.92	0.28	110.52	-2.08	5.01	0.0049	0.0239	0.0057	0.0238	-0.0536	0.0015	-0.0023	-0.0085	0.24
28.	2.	5.90	0.27	110.08	0.04	5.01	0.1053	0.0202	0.1053	0.0203	-0.0419	-0.0005	-0.0019	-0.0087	5.19
28.	3.	5.90	0.27	109.89	2.01	5.01	0.1958	0.0144	0.1951	0.0214	-0.0335	-0.0019	-0.0021	-0.0084	9.11
28.	4.	5.90	0.27	110.01	4.01	5.01	0.2772	0.0062	0.2761	0.0259	-0.0233	-0.0037	-0.0019	-0.0094	10.66
28.	5.	5.91	0.27	110.27	6.05	5.01	0.3539	-0.0038	0.3524	0.0340	-0.0103	-0.0067	-0.0012	-0.0081	10.37
28.	6.	5.92	0.28	110.49	8.05	5.01	0.4287	-0.0152	0.4266	0.0456	0.0035	-0.0089	-0.0012	-0.0049	9.35
28.	7.	5.90	0.27	110.01	10.03	5.01	0.5002	-0.0267	0.4972	0.0617	0.0185	-0.0089	-0.0017	-0.0049	8.05
28.	8.	5.89	0.27	109.71	12.10	5.01	0.5864	-0.0355	0.5808	0.0894	0.0392	-0.0112	-0.0027	0.0067	6.50
28.	9.	5.91	0.27	110.29	14.02	5.01	0.6770	-0.0395	0.6664	0.1273	0.0651	-0.0150	-0.0028	0.0162	5.24
28.	10.	5.90	0.27	109.96	16.06	5.01	0.7680	-0.0405	0.7492	0.1755	0.0989	-0.0167	-0.0012	0.0198	4.27
28.	11.	5.90	0.27	109.97	18.08	5.01	0.8690	-0.0410	0.8388	0.2333	0.1316	-0.0218	0.0026	0.0249	3.60
28.	12.	5.90	0.27	109.98	20.08	5.01	0.9682	-0.0407	0.9233	0.2974	0.1664	-0.0237	0.0068	0.0300	3.10
29.	12.	2.60	0.12	20.10	-2.00	0.03	-0.0504	0.0102	-0.0500	0.0119	-0.0054	0.0000	0.0001	0.0006	-4.19
29.	13.	2.60	0.12	20.13	0.04	0.03	0.0257	0.0108	0.0257	0.0108	0.0040	0.0004	0.0000	0.0003	2.37
29.	14.	2.60	0.12	20.11	2.01	0.03	0.0992	0.0107	0.0988	0.0143	0.0139	0.0006	-0.0003	-0.0005	6.93
29.	15.	2.60	0.12	20.10	4.02	0.03	0.1782	0.0104	0.1770	0.0229	0.0240	0.0002	-0.0004	-0.0007	7.71
29.	16.	2.59	0.12	20.05	6.04	0.03	0.2689	0.0096	0.2664	0.0381	0.0386	0.0005	-0.0004	-0.0012	7.00
29.	17.	2.59	0.12	20.06	8.03	0.03	0.3723	0.0087	0.3674	0.0611	0.0549	0.0008	-0.0007	-0.0032	6.02
29.	18.	2.59	0.12	20.05	10.06	0.03	0.4730	0.0084	0.4642	0.0916	0.0770	0.0004	-0.0008	-0.0038	5.07
29.	19.	2.60	0.12	20.09	12.05	0.03	0.5672	0.0085	0.5529	0.1278	0.1031	-0.0003	-0.0010	-0.0046	4.33
29.	20.	2.59	0.12	19.98	14.04	0.03	0.6744	0.0081	0.6523	0.1730	0.1305	-0.0006	-0.0008	-0.0051	3.77
29.	21.	2.58	0.12	19.94	16.07	0.03	0.7860	0.0078	0.7531	0.2271	0.1604	-0.0007	-0.0003	-0.0051	3.32
29.	22.	2.58	0.12	19.89	18.07	0.03	0.9001	0.0073	0.8534	0.2889	0.1916	-0.0017	0.0008	-0.0043	2.95
29.	23.	2.58	0.12	19.84	20.06	0.03	1.0130	0.0068	0.9492	0.3571	0.2249	-0.0039	0.0041	0.0001	2.66
30.	1.	4.08	0.18	50.27	-2.08	0.03	-0.0546	0.0082	-0.0543	0.0102	-0.0059	0.0001	0.0001	0.0007	-5.31
30.	2.	4.07	0.18	50.15	0.04	0.03	0.0244	0.0090	0.0244	0.0090	0.0038	0.0005	0.0000	0.0005	2.70
30.	3.	4.07	0.18	50.06	2.09	0.03	0.1005	0.0085	0.1002	0.0121	0.0138	0.0007	-0.0002	-0.0004	8.25
30.	4.	4.06	0.18	50.02	4.04	0.03	0.1760	0.0077	0.1750	0.0202	0.0230	0.0002	-0.0002	-0.0007	8.67
30.	5.	4.06	0.18	50.05	6.08	0.03	0.2665	0.0068	0.2643	0.0353	0.0380	0.0005	-0.0003	-0.0013	7.49

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
30.	6.	4.06	0.18	50.05	8.02	0.03	0.3680	0.0059	0.3635	0.0577	0.0542	0.0008	-0.0004	-0.0018	6.30
30.	7.	4.06	0.18	50.08	10.02	0.03	0.4656	0.0056	0.4575	0.0873	0.0754	0.0004	-0.0005	-0.0026	5.24
30.	8.	4.05	0.18	49.99	12.01	0.03	0.5596	0.0057	0.5461	0.1231	0.1015	-0.0001	-0.0006	-0.0030	4.43
30.	9.	4.05	0.18	49.84	14.02	0.03	0.6663	0.0052	0.6452	0.1680	0.1291	-0.0006	-0.0004	-0.0034	3.84
30.	10.	4.05	0.18	50.11	16.07	0.03	0.7792	0.0038	0.7477	0.2213	0.1590	-0.0009	0.0001	-0.0036	3.38
30.	11.	4.05	0.18	50.17	18.02	0.03	0.8877	0.0035	0.8430	0.2806	0.1890	-0.0020	0.0018	-0.0014	3.00
30.	12.	4.04	0.18	49.89	20.02	0.03	1.0010	0.0030	0.9395	0.3487	0.2222	-0.0044	0.0056	0.0036	2.69
31.	1.	4.77	0.22	70.13	-2.04	0.03	-0.0536	0.0068	-0.0533	0.0087	-0.0056	0.0001	0.0000	0.0002	-6.15
31.	2.	4.76	0.22	70.04	0.05	0.03	0.0241	0.0075	0.0241	0.0075	0.0038	0.0005	0.0000	0.0000	3.21
31.	3.	4.75	0.22	69.85	2.01	0.03	0.0967	0.0071	0.0964	0.0105	0.0134	0.0006	-0.0002	-0.0006	9.17
31.	4.	4.75	0.22	69.75	4.00	0.03	0.1730	0.0062	0.1722	0.0184	0.0226	0.0001	-0.0002	-0.0008	9.35
31.	5.	4.74	0.22	69.68	6.07	0.03	0.2629	0.0055	0.2608	0.0335	0.0373	0.0003	-0.0002	-0.0014	7.79
31.	6.	4.74	0.22	69.83	8.05	0.03	0.3652	0.0045	0.3610	0.0561	0.0538	0.0007	-0.0004	-0.0019	6.44
31.	7.	4.75	0.22	70.13	10.03	0.03	0.4627	0.0040	0.4550	0.0853	0.0751	0.0004	-0.0005	-0.0028	5.33
31.	8.	4.74	0.22	69.90	12.07	0.03	0.5593	0.0039	0.5462	0.1218	0.1019	-0.0001	-0.0006	-0.0032	4.48
31.	9.	4.74	0.22	69.82	14.04	0.03	0.6619	0.0036	0.6413	0.1656	0.1284	-0.0006	-0.0004	-0.0036	3.87
31.	10.	4.73	0.22	69.64	16.04	0.03	0.7713	0.0032	0.7404	0.2182	0.1577	-0.0011	0.0002	-0.0033	3.39
31.	11.	4.73	0.22	69.47	18.03	0.03	0.8826	0.0027	0.8384	0.2784	0.1881	-0.0020	0.0019	-0.0012	3.01
31.	12.	4.72	0.22	69.28	20.05	0.03	0.9946	0.0022	0.9336	0.3462	0.2216	-0.0046	0.0061	0.0041	2.70
32.	1.	5.90	0.28	110.21	-2.08	0.03	-0.0561	0.0069	-0.0558	0.0089	-0.0059	0.0000	0.0000	-0.0002	-6.24
32.	2.	5.88	0.28	109.78	0.05	0.03	0.0227	0.0074	0.0227	0.0075	0.0037	0.0004	0.0000	-0.0004	3.04
32.	3.	5.86	0.28	109.62	2.02	0.03	0.0951	0.0069	0.0948	0.0102	0.0133	0.0006	-0.0002	-0.0011	9.27
32.	4.	5.87	0.28	110.09	4.02	0.03	0.1701	0.0058	0.1692	0.0179	0.0222	0.0002	-0.0002	-0.0012	9.48
32.	5.	5.87	0.28	110.17	6.05	0.03	0.2562	0.0049	0.2543	0.0322	0.0361	0.0001	-0.0003	-0.0017	7.91
32.	6.	5.87	0.28	110.38	8.04	0.03	0.3587	0.0040	0.3546	0.0546	0.0533	0.0006	-0.0005	-0.0021	6.50
32.	7.	5.86	0.28	110.41	10.08	0.03	0.4581	0.0032	0.4505	0.0841	0.0749	0.0005	-0.0006	-0.0030	5.36
32.	8.	5.86	0.28	110.16	12.02	0.03	0.5495	0.0030	0.5368	0.1185	0.1002	-0.0001	-0.0006	-0.0033	4.53
32.	9.	5.85	0.28	110.07	14.09	0.03	0.6555	0.0025	0.6352	0.1634	0.1279	-0.0007	-0.0004	-0.0035	3.89
32.	10.	5.85	0.28	110.02	16.06	0.03	0.7617	0.0018	0.7315	0.2145	0.1564	-0.0013	0.0002	-0.0032	3.41
32.	11.	5.84	0.28	109.83	18.03	0.03	0.8699	0.0014	0.8268	0.2730	0.1855	-0.0019	0.0019	-0.0010	3.03
32.	12.	5.85	0.28	109.99	20.08	0.03	0.9825	0.0008	0.9225	0.3412	0.2196	-0.0044	0.0064	0.0051	2.70
33.	1.	5.84	0.28	110.32	-2.06	5.01	-0.0672	0.0063	-0.0669	0.0088	-0.0097	0.0022	-0.0014	-0.0026	-7.63
33.	2.	5.83	0.28	110.05	0.07	5.01	0.0115	0.0074	0.0115	0.0075	-0.0003	-0.0002	-0.0017	-0.0037	1.55
33.	3.	5.82	0.28	109.92	2.10	5.01	0.0882	0.0071	0.0879	0.0103	0.0088	-0.0021	-0.0020	-0.0045	8.50
33.	4.	5.83	0.28	110.21	4.08	5.01	0.1687	0.0063	0.1679	0.0184	0.0201	-0.0033	-0.0022	-0.0054	9.12
33.	5.	5.83	0.28	110.30	6.09	5.01	0.2608	0.0052	0.2588	0.0331	0.0336	-0.0038	-0.0018	-0.0052	7.83
33.	6.	5.84	0.28	110.72	8.08	5.01	0.3575	0.0046	0.3533	0.0552	0.0500	-0.0069	-0.0016	-0.0049	6.39
33.	7.	5.83	0.28	110.34	10.00	5.01	0.4491	0.0041	0.4415	0.0828	0.0700	-0.0103	-0.0015	-0.0053	5.34
33.	8.	5.83	0.28	110.29	12.05	5.01	0.5465	0.0039	0.5336	0.1189	0.0962	-0.0114	-0.0015	-0.0057	4.49
33.	9.	5.82	0.28	110.08	14.07	5.01	0.6440	0.0034	0.6238	0.1613	0.1240	-0.0125	-0.0007	-0.0048	3.87
33.	10.	5.82	0.28	110.13	16.10	5.01	0.7279	0.0031	0.6985	0.2066	0.1534	-0.0119	0.0004	-0.0036	3.38
33.	11.	5.82	0.28	109.93	18.01	5.01	0.8180	0.0032	0.7769	0.2582	0.1818	-0.0137	0.0032	-0.0002	3.01
33.	12.	5.82	0.28	109.99	20.07	5.01	0.9209	0.0030	0.8640	0.3215	0.2136	-0.0160	0.0071	0.0046	2.69
34.	1.	5.81	0.28	110.01	-2.00	-5.01	-0.0540	0.0065	-0.0537	0.0084	-0.0081	0.0006	0.0017	0.0030	-6.41
34.	2.	5.81	0.28	110.16	0.00	-5.01	0.0175	0.0070	0.0175	0.0070	0.0011	0.0022	0.0017	0.0023	2.52
34.	3.	5.81	0.28	110.40	2.05	-5.01	0.0924	0.0061	0.0922	0.0095	0.0107	0.0040	0.0016	0.0017	9.75
34.	4.	5.80	0.28	110.31	4.00	-5.01	0.1707	0.0051	0.1700	0.0171	0.0218	0.0050	0.0014	0.0011	9.96
34.	5.	5.81	0.28	110.38	6.05	-5.01	0.2597	0.0039	0.2579	0.0315	0.0342	0.0059	0.0009	0.0001	8.19
34.	6.	5.81	0.28	110.50	8.01	-5.01	0.3517	0.0028	0.3479	0.0523	0.0495	0.0087	0.0008	-0.0007	6.66

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
34.	7.	5.80	0.28	110.00	10.03	-5.01	0.4491	0.0018	0.4419	0.0807	0.0702	0.0114	0.0007	-0.0009	5.48
34.	8.	5.80	0.28	110.25	12.06	-5.01	0.5442	0.0013	0.5320	0.1160	0.0959	0.0117	0.0005	-0.0017	4.59
34.	9.	5.80	0.28	110.21	14.07	-5.01	0.6489	0.0004	0.6293	0.1595	0.1218	0.0137	0.0002	-0.0025	3.95
34.	10.	5.80	0.28	110.26	16.05	-5.01	0.7564	-0.0005	0.7271	0.2105	0.1499	0.0167	-0.0013	-0.0048	3.45
34.	11.	5.80	0.28	110.14	18.01	-5.01	0.8612	-0.0014	0.8195	0.2673	0.1794	0.0196	-0.0026	-0.0071	3.07
34.	12.	5.79	0.27	109.81	20.03	-5.01	0.9718	-0.0022	0.9137	0.3339	0.2125	0.0232	-0.0059	-0.0111	2.74
36.	2.	2.49	0.12	19.96	-2.04	0.00	-0.0549	0.0092	-0.0546	0.0111	-0.0057	0.0000	0.0000	0.0005	-4.91
36.	3.	2.49	0.12	19.95	0.04	0.00	0.0221	0.0099	0.0221	0.0099	0.0038	0.0004	0.0000	0.0006	2.22
36.	4.	2.49	0.12	19.96	2.03	0.00	0.0940	0.0096	0.0936	0.0129	0.0134	0.0006	-0.0002	-0.0002	7.24
36.	5.	2.49	0.12	19.93	4.02	0.00	0.1711	0.0090	0.1701	0.0211	0.0235	0.0002	-0.0003	-0.0009	8.07
36.	6.	2.49	0.12	19.91	6.01	0.00	0.2611	0.0086	0.2587	0.0361	0.0382	0.0004	-0.0003	-0.0012	7.17
36.	7.	2.51	0.12	20.26	8.08	0.00	0.3788	0.0075	0.3740	0.0612	0.0569	0.0006	-0.0005	-0.0014	6.11
36.	8.	2.51	0.12	20.30	10.05	0.00	0.4665	0.0069	0.4582	0.0890	0.0763	0.0004	-0.0006	-0.0024	5.15
36.	9.	2.51	0.12	20.29	12.05	0.00	0.5611	0.0066	0.5473	0.1246	0.1023	-0.0005	-0.0006	-0.0023	4.39
36.	10.	2.51	0.12	20.25	14.00	0.00	0.6664	0.0062	0.6451	0.1687	0.1289	-0.0009	-0.0003	-0.0025	3.82
36.	11.	2.51	0.12	20.19	16.00	0.00	0.7742	0.0057	0.7427	0.2210	0.1579	-0.0015	0.0004	-0.0021	3.36
36.	12.	2.51	0.12	20.21	18.02	0.00	0.8886	0.0053	0.8433	0.2826	0.1897	-0.0025	0.0021	-0.0003	2.98
36.	13.	2.51	0.12	20.18	20.02	0.00	1.0014	0.0048	0.9393	0.3505	0.2233	-0.0058	0.0062	0.0057	2.68
37.	1.	3.93	0.18	50.08	-2.07	0.00	-0.0563	0.0080	-0.0560	0.0100	-0.0058	0.0002	0.0000	-0.0001	-5.58
37.	2.	3.93	0.18	50.04	0.06	0.00	0.0219	0.0087	0.0219	0.0087	0.0037	0.0005	0.0000	0.0001	2.50
37.	3.	3.93	0.18	50.06	2.02	0.00	0.0942	0.0082	0.0939	0.0116	0.0134	0.0006	-0.0002	-0.0002	8.10
37.	4.	3.92	0.18	50.02	4.06	0.00	0.1724	0.0074	0.1714	0.0197	0.0231	0.0002	-0.0002	-0.0004	8.71
37.	5.	3.92	0.18	50.06	6.02	0.00	0.2592	0.0067	0.2571	0.0341	0.0374	0.0001	-0.0002	-0.0002	7.54
37.	6.	3.92	0.18	50.06	8.02	0.00	0.3616	0.0057	0.3573	0.0566	0.0537	0.0004	-0.0003	-0.0007	6.32
37.	7.	3.92	0.18	50.06	10.05	0.00	0.4620	0.0051	0.4540	0.0864	0.0747	0.0002	-0.0003	-0.0009	5.25
37.	8.	3.92	0.18	50.08	12.02	0.00	0.5556	0.0049	0.5424	0.1215	0.1008	-0.0004	-0.0003	-0.0007	4.46
37.	9.	3.92	0.18	50.09	14.01	0.00	0.6599	0.0045	0.6392	0.1656	0.1276	-0.0008	-0.0002	-0.0012	3.86
37.	10.	3.91	0.18	49.88	16.09	0.00	0.7728	0.0040	0.7415	0.2200	0.1584	-0.0014	0.0005	-0.0005	3.37
37.	11.	3.91	0.18	49.87	18.06	0.00	0.8849	0.0032	0.8404	0.2799	0.1883	-0.0020	0.0016	0.0009	3.00
37.	12.	3.91	0.18	49.74	20.09	0.00	0.9987	0.0024	0.9371	0.3485	0.2215	-0.0041	0.0049	0.0057	2.69
38.	1.	4.62	0.22	70.07	-2.03	0.00	-0.0555	0.0078	-0.0552	0.0097	-0.0058	0.0001	-0.0001	-0.0004	-5.67
38.	2.	4.61	0.22	69.98	0.08	0.00	0.0220	0.0084	0.0220	0.0084	0.0037	0.0004	-0.0001	-0.0005	2.61
38.	3.	4.61	0.22	70.10	2.08	0.00	0.0955	0.0078	0.0951	0.0113	0.0136	0.0006	-0.0002	-0.0007	8.39
38.	4.	4.60	0.22	69.88	4.02	0.00	0.1692	0.0069	0.1683	0.0188	0.0226	0.0002	-0.0002	-0.0005	8.94
38.	5.	4.60	0.22	69.94	6.04	0.00	0.2581	0.0061	0.2560	0.0335	0.0371	0.0001	-0.0002	-0.0005	7.65
38.	6.	4.61	0.22	70.03	8.09	0.00	0.3632	0.0051	0.3589	0.0566	0.0539	0.0004	-0.0002	-0.0008	6.34
38.	7.	4.61	0.22	70.01	10.06	0.00	0.4598	0.0045	0.4519	0.0855	0.0745	0.0001	-0.0003	-0.0009	5.29
38.	8.	4.61	0.22	70.20	12.00	0.00	0.5505	0.0042	0.5376	0.1196	0.0999	-0.0002	-0.0003	-0.0010	4.50
38.	9.	4.60	0.22	69.94	14.00	0.00	0.6543	0.0035	0.6341	0.1632	0.1263	-0.0007	-0.0002	-0.0008	3.89
38.	10.	4.60	0.22	69.90	16.09	0.00	0.7676	0.0028	0.7368	0.2174	0.1572	-0.0013	0.0005	-0.0001	3.39
38.	11.	4.60	0.22	69.85	18.05	0.00	0.8752	0.0020	0.8315	0.2756	0.1867	-0.0017	0.0015	0.0013	3.02
38.	12.	4.59	0.22	69.58	20.07	0.00	0.9861	0.0013	0.9257	0.3428	0.2200	-0.0037	0.0055	0.0072	2.70
39.	1.	5.73	0.28	110.29	-2.09	0.00	-0.0586	0.0075	-0.0583	0.0096	-0.0061	0.0000	-0.0001	-0.0005	-6.06
39.	2.	5.71	0.28	110.01	0.03	0.00	0.0195	0.0081	0.0195	0.0081	0.0034	0.0005	0.0000	-0.0004	2.40
39.	3.	5.70	0.28	110.05	2.04	0.00	0.0932	0.0075	0.0929	0.0109	0.0132	0.0006	-0.0002	-0.0006	8.53
39.	4.	5.70	0.28	110.21	4.08	0.00	0.1695	0.0065	0.1686	0.0186	0.0227	0.0002	-0.0001	-0.0005	9.06
39.	5.	5.69	0.28	110.00	6.04	0.00	0.2542	0.0055	0.2522	0.0324	0.0361	0.0001	-0.0001	-0.0004	7.78
39.	6.	5.69	0.28	110.10	8.05	0.00	0.3562	0.0044	0.3520	0.0547	0.0531	0.0003	-0.0002	-0.0005	6.43
39.	7.	5.69	0.28	110.16	10.09	0.00	0.4537	0.0037	0.4460	0.0839	0.0740	0.0006	-0.0003	-0.0006	5.32

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
39.	8.	5.69	0.28	110.11	12.08	0.00	0.5470	0.0033	0.5342	0.1187	0.0996	-0.0001	-0.0003	-0.0008	4.50
39.	9.	5.68	0.28	110.00	14.03	0.00	0.6484	0.0026	0.6284	0.1612	0.1260	-0.0008	-0.0001	-0.0006	3.90
39.	10.	5.69	0.28	110.35	16.02	0.00	0.7547	0.0017	0.7250	0.2118	0.1546	-0.0014	0.0005	0.0002	3.42
39.	11.	5.68	0.28	110.09	18.09	0.00	0.8691	0.0011	0.8258	0.2735	0.1856	-0.0016	0.0018	0.0021	3.02
39.	12.	5.68	0.28	110.01	20.07	0.00	0.9786	0.0005	0.9190	0.3394	0.2175	-0.0030	0.0047	0.0064	2.71
40.	1.	5.67	0.28	110.04	-2.01	4.99	-0.0664	0.0075	-0.0661	0.0099	-0.0097	0.0021	-0.0014	-0.0026	-6.70
40.	2.	5.67	0.28	110.04	-0.01	4.99	0.0078	0.0083	0.0078	0.0082	-0.0008	-0.0002	-0.0016	-0.0034	0.95
40.	3.	5.67	0.28	110.17	2.06	4.99	0.0849	0.0077	0.0846	0.0108	0.0082	-0.0021	-0.0019	-0.0038	7.84
40.	4.	5.67	0.28	110.36	4.06	4.99	0.1653	0.0068	0.1644	0.0186	0.0193	-0.0032	-0.0020	-0.0042	8.86
40.	5.	5.67	0.28	110.31	6.08	4.99	0.2570	0.0055	0.2550	0.0329	0.0324	-0.0040	-0.0015	-0.0035	7.75
40.	6.	5.66	0.28	110.14	8.00	4.99	0.3504	0.0043	0.3464	0.0534	0.0485	-0.0067	-0.0014	-0.0031	6.48
40.	7.	5.67	0.28	110.38	10.00	4.99	0.4440	0.0034	0.4367	0.0812	0.0693	-0.0099	-0.0013	-0.0030	5.38
40.	8.	5.67	0.28	110.44	12.05	4.99	0.5396	0.0027	0.5271	0.1164	0.0956	-0.0105	-0.0011	-0.0026	4.53
40.	9.	5.67	0.28	110.51	14.05	4.99	0.6308	0.0023	0.6113	0.1567	0.1230	-0.0110	-0.0006	-0.0020	3.90
40.	10.	5.66	0.28	110.11	16.07	4.99	0.7207	0.0019	0.6920	0.2031	0.1520	-0.0115	0.0007	-0.0005	3.41
40.	11.	5.66	0.28	110.07	18.05	4.99	0.8156	0.0015	0.7750	0.2563	0.1813	-0.0135	0.0031	0.0023	3.02
40.	12.	5.66	0.28	110.08	20.07	4.99	0.9168	0.0013	0.8607	0.3185	0.2125	-0.0156	0.0067	0.0071	2.70
41.	1.	5.64	0.28	109.83	-2.04	-5.00	-0.0592	0.0076	-0.0589	0.0097	-0.0090	0.0007	0.0017	0.0034	-6.09
41.	2.	5.65	0.28	110.14	0.02	-5.00	0.0157	0.0082	0.0157	0.0082	0.0005	0.0025	0.0017	0.0028	1.90
41.	3.	5.66	0.28	110.30	2.06	-5.00	0.0905	0.0077	0.0902	0.0110	0.0101	0.0044	0.0017	0.0026	8.23
41.	4.	5.65	0.28	110.31	4.09	-5.00	0.1712	0.0067	0.1703	0.0190	0.0212	0.0054	0.0017	0.0024	8.95
41.	5.	5.66	0.28	110.47	6.03	-5.00	0.2569	0.0056	0.2549	0.0328	0.0329	0.0058	0.0011	0.0017	7.77
41.	6.	5.66	0.28	110.47	8.02	-5.00	0.3511	0.0047	0.3470	0.0541	0.0502	0.0088	0.0010	0.0009	6.42
41.	7.	5.66	0.28	110.38	10.03	-5.01	0.4479	0.0040	0.4403	0.0826	0.0713	0.0115	0.0009	0.0011	5.33
41.	8.	5.64	0.28	109.80	12.09	-5.01	0.5433	0.0034	0.5305	0.1181	0.0972	0.0119	0.0009	0.0009	4.49
41.	9.	5.65	0.28	109.99	13.99	-5.00	0.6405	0.0027	0.6209	0.1589	0.1226	0.0135	0.0004	0.0002	3.91
41.	10.	5.65	0.28	110.05	16.06	-5.01	0.7550	0.0021	0.7250	0.2128	0.1518	0.0171	-0.0008	-0.0012	3.41
41.	11.	5.64	0.27	109.66	18.07	-5.01	0.8630	0.0013	0.8200	0.2715	0.1822	0.0204	-0.0028	-0.0038	3.02
41.	12.	5.65	0.28	110.13	20.03	-5.01	0.9682	0.0007	0.9094	0.3353	0.2138	0.0240	-0.0059	-0.0073	2.71
42.	3.	4.62	0.22	70.19	-2.03	0.04	0.1087	0.0171	0.1092	0.0133	-0.0432	-0.0006	0.0000	0.0002	8.23
42.	4.	4.61	0.22	70.04	0.05	0.04	0.1842	0.0171	0.1842	0.0174	-0.0342	-0.0003	0.0000	0.0005	10.57
42.	5.	4.61	0.22	69.94	2.07	0.04	0.2577	0.0164	0.2570	0.0259	-0.0234	-0.0005	-0.0001	0.0001	9.93
42.	6.	4.61	0.22	69.86	4.07	0.04	0.3306	0.0150	0.3287	0.0388	-0.0111	-0.0010	0.0000	0.0002	8.47
42.	7.	4.62	0.22	70.08	6.08	0.04	0.4152	0.0143	0.4114	0.0588	0.0050	-0.0008	-0.0001	0.0000	7.00
42.	8.	4.61	0.22	69.99	8.02	0.04	0.5033	0.0136	0.4964	0.0845	0.0248	-0.0002	-0.0002	-0.0001	5.87
42.	9.	4.62	0.22	70.04	10.02	0.04	0.5909	0.0135	0.5796	0.1174	0.0494	-0.0004	-0.0003	-0.0003	4.94
42.	10.	4.62	0.22	70.11	12.05	0.04	0.6835	0.0147	0.6654	0.1586	0.0777	-0.0007	-0.0003	-0.0005	4.19
42.	11.	4.61	0.22	69.70	14.09	0.04	0.7911	0.0156	0.7635	0.2098	0.1052	-0.0014	-0.0001	-0.0009	3.64
42.	12.	4.60	0.22	69.61	16.01	0.04	0.8942	0.0162	0.8551	0.2649	0.1335	-0.0017	0.0005	-0.0003	3.23
42.	13.	4.60	0.22	69.38	18.08	0.04	1.0112	0.0167	0.9561	0.3329	0.1648	-0.0026	0.0018	0.0011	2.87
42.	14.	4.60	0.22	69.48	20.04	0.04	1.1199	0.0168	1.0463	0.4034	0.1973	-0.0046	0.0056	0.0061	2.59
43.	1.	5.74	0.28	109.77	-2.08	0.04	0.1020	0.0162	0.1025	0.0126	-0.0430	-0.0003	0.0000	-0.0003	8.16
43.	2.	5.74	0.28	110.46	0.03	0.04	0.1792	0.0163	0.1792	0.0165	-0.0337	0.0001	0.0000	-0.0001	10.85
43.	3.	5.71	0.28	109.78	2.08	0.04	0.2529	0.0153	0.2522	0.0247	-0.0229	0.0001	-0.0002	-0.0006	10.21
43.	4.	5.71	0.28	109.80	4.07	0.04	0.3254	0.0139	0.3236	0.0373	-0.0110	-0.0005	-0.0001	-0.0004	8.67
43.	5.	5.72	0.28	110.12	6.02	0.04	0.4038	0.0129	0.4002	0.0558	0.0041	-0.0009	0.0000	-0.0005	7.18
43.	6.	5.71	0.28	110.14	8.04	0.04	0.4978	0.0120	0.4912	0.0823	0.0245	0.0002	-0.0002	-0.0004	5.96
43.	7.	5.71	0.28	110.08	10.06	0.04	0.5863	0.0118	0.5752	0.1152	0.0493	0.0003	-0.0003	-0.0006	4.99
43.	8.	5.71	0.28	110.08	12.04	0.04	0.6745	0.0127	0.6571	0.1547	0.0764	-0.0004	-0.0004	-0.0005	4.25

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
43.	9.	5.71	0.28	110.35	14.07	0.04	0.7801	0.0133	0.7534	0.2046	0.1037	-0.0012	-0.0001	-0.0004	3.68
43.	10.	5.71	0.28	110.28	16.07	0.04	0.8870	0.0139	0.8485	0.2614	0.1329	-0.0014	0.0004	-0.0001	3.25
43.	11.	5.70	0.28	109.85	18.03	0.04	0.9946	0.0140	0.9415	0.3243	0.1625	-0.0024	0.0023	0.0022	2.90
43.	12.	5.70	0.27	109.91	20.03	0.04	1.1035	0.0143	1.0318	0.3953	0.1937	-0.0035	0.0042	0.0048	2.61
44.	1.	5.70	0.28	109.99	-2.02	5.00	0.0925	0.0162	0.0930	0.0130	-0.0456	-0.0023	-0.0008	-0.0047	7.15
44.	2.	5.79	0.28	114.06	-0.05	5.00	0.1602	0.0160	0.1602	0.0159	-0.0366	-0.0045	-0.0011	-0.0052	10.05
44.	3.	5.70	0.28	110.39	2.09	5.00	0.2440	0.0152	0.2432	0.0243	-0.0274	-0.0067	-0.0015	-0.0060	10.02
44.	4.	5.69	0.28	109.67	4.02	5.00	0.3192	0.0138	0.3174	0.0366	-0.0144	-0.0077	-0.0016	-0.0065	8.68
44.	5.	5.69	0.28	109.86	6.02	5.00	0.4039	0.0125	0.4003	0.0554	0.0004	-0.0069	-0.0012	-0.0054	7.23
44.	6.	5.70	0.28	110.22	8.02	5.00	0.4919	0.0120	0.4855	0.0813	0.0211	-0.0098	-0.0012	-0.0044	5.97
44.	7.	5.72	0.28	110.82	10.03	5.00	0.5780	0.0119	0.5670	0.1135	0.0452	-0.0124	-0.0014	-0.0040	5.00
44.	8.	5.70	0.28	110.15	12.06	5.00	0.6668	0.0123	0.6495	0.1528	0.0730	-0.0138	-0.0012	-0.0037	4.25
44.	9.	5.69	0.28	109.80	14.08	5.00	0.7612	0.0128	0.7352	0.1996	0.1019	-0.0142	-0.0004	-0.0030	3.68
44.	10.	5.71	0.28	110.23	16.01	5.00	0.8444	0.0131	0.8080	0.2478	0.1296	-0.0145	0.0008	-0.0019	3.26
44.	11.	5.70	0.28	110.02	18.04	5.00	0.9376	0.0131	0.8875	0.3056	0.1601	-0.0161	0.0032	0.0005	2.90
44.	12.	5.71	0.28	110.04	20.07	5.00	1.0411	0.0139	0.9731	0.3737	0.1925	-0.0174	0.0069	0.0047	2.60
45.	1.	5.70	0.28	110.15	-2.03	-5.02	0.0981	0.0162	0.0986	0.0128	-0.0454	0.0048	0.0015	0.0034	7.71
45.	2.	5.70	0.28	110.26	0.03	-5.02	0.1718	0.0163	0.1718	0.0165	-0.0362	0.0068	0.0014	0.0032	10.40
45.	3.	5.70	0.28	110.27	2.05	-5.02	0.2478	0.0154	0.2471	0.0244	-0.0258	0.0085	0.0013	0.0032	10.11
45.	4.	5.70	0.28	110.13	4.09	-5.02	0.3255	0.0140	0.3236	0.0376	-0.0125	0.0093	0.0012	0.0030	8.62
45.	5.	5.70	0.28	110.28	5.99	-5.02	0.4040	0.0129	0.4005	0.0556	0.0018	0.0082	0.0008	0.0019	7.20
45.	6.	5.70	0.28	110.27	8.09	-5.02	0.4958	0.0125	0.4891	0.0830	0.0232	0.0113	0.0006	0.0011	5.90
45.	7.	5.70	0.28	110.19	10.05	-5.02	0.5806	0.0128	0.5694	0.1151	0.0474	0.0131	0.0007	0.0007	4.95
45.	8.	5.71	0.28	110.52	12.03	-5.02	0.6690	0.0132	0.6515	0.1539	0.0744	0.0140	0.0005	0.0006	4.23
45.	9.	5.71	0.28	110.22	14.02	-5.02	0.7640	0.0134	0.7380	0.2001	0.1020	0.0150	0.0000	0.0005	3.69
45.	10.	5.70	0.28	109.99	16.08	-5.02	0.8562	0.0136	0.8190	0.2527	0.1324	0.0150	-0.0014	-0.0014	3.24
45.	11.	5.70	0.27	109.84	18.06	-5.02	0.9492	0.0140	0.8981	0.3105	0.1618	0.0158	-0.0030	-0.0034	2.89
45.	12.	5.71	0.28	110.48	20.08	-5.02	1.0477	0.0144	0.9791	0.3766	0.1937	0.0175	-0.0065	-0.0078	2.60
46.	2.	2.48	0.12	19.98	-2.04	0.03	-0.0589	0.0099	-0.0585	0.0120	-0.0121	0.0001	0.0001	0.0001	-4.89
46.	3.	2.48	0.12	20.05	0.02	0.03	0.0194	0.0111	0.0194	0.0111	0.0053	0.0006	0.0000	-0.0003	1.74
46.	4.	2.48	0.12	20.06	2.00	0.03	0.0964	0.0114	0.0959	0.0147	0.0240	0.0008	-0.0003	-0.0012	6.50
46.	5.	2.48	0.12	20.03	4.02	0.03	0.1787	0.0114	0.1774	0.0240	0.0437	0.0003	-0.0003	-0.0016	7.38
46.	6.	2.48	0.12	20.14	6.09	0.03	0.2790	0.0113	0.2763	0.0411	0.0716	0.0003	-0.0005	-0.0014	6.72
46.	7.	2.48	0.12	20.00	8.04	0.03	0.3825	0.0105	0.3772	0.0644	0.1018	0.0010	-0.0007	-0.0029	5.86
46.	8.	2.48	0.12	20.07	10.07	0.03	0.4890	0.0105	0.4797	0.0967	0.1361	0.0008	-0.0009	-0.0036	4.96
46.	9.	2.48	0.12	20.08	12.03	0.03	0.5968	0.0100	0.5816	0.1354	0.1734	0.0003	-0.0009	-0.0041	4.30
46.	10.	2.48	0.12	20.10	14.02	0.03	0.7108	0.0099	0.6872	0.1835	0.2153	0.0002	-0.0007	-0.0042	3.74
46.	11.	2.48	0.12	20.03	16.00	0.03	0.8321	0.0098	0.7972	0.2411	0.2605	-0.0009	0.0001	-0.0030	3.31
46.	12.	2.48	0.12	20.03	18.06	0.03	0.9604	0.0091	0.9103	0.3095	0.3075	-0.0012	0.0015	-0.0015	2.94
46.	13.	2.47	0.12	19.99	20.03	0.03	1.0794	0.0082	1.0113	0.3811	0.3558	-0.0020	0.0050	0.0029	2.65
47.	1.	3.89	0.18	49.99	-2.02	0.03	-0.0579	0.0085	-0.0576	0.0105	-0.0121	0.0002	0.0000	0.0002	-5.46
47.	2.	3.88	0.18	50.02	0.00	0.03	0.0197	0.0094	0.0197	0.0094	0.0052	0.0006	0.0000	0.0001	2.10
47.	3.	3.88	0.18	50.01	2.03	0.03	0.0975	0.0095	0.0971	0.0130	0.0242	0.0008	-0.0002	-0.0002	7.48
47.	4.	3.88	0.18	50.02	4.06	0.03	0.1789	0.0093	0.1778	0.0221	0.0439	0.0003	-0.0002	-0.0004	8.05
47.	5.	3.88	0.18	50.02	6.08	0.03	0.2750	0.0091	0.2724	0.0385	0.0704	0.0002	-0.0003	-0.0008	7.08
47.	6.	3.88	0.18	50.06	8.01	0.03	0.3770	0.0089	0.3721	0.0618	0.1007	0.0008	-0.0005	-0.0014	6.02
47.	7.	3.88	0.18	50.11	10.07	0.03	0.4846	0.0085	0.4757	0.0939	0.1356	0.0007	-0.0005	-0.0018	5.06
47.	8.	3.88	0.18	50.24	12.07	0.03	0.5934	0.0082	0.5785	0.1333	0.1733	0.0002	-0.0005	-0.0016	4.34
47.	9.	3.87	0.18	49.94	14.01	0.03	0.7044	0.0081	0.6815	0.1800	0.2142	-0.0001	-0.0003	-0.0010	3.79

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
47.	10.	3.88	0.18	50.26	16.02	0.03	0.8216	0.0078	0.7875	0.2366	0.2577	-0.0006	0.0003	-0.0001	3.33
47.	11.	3.87	0.18	50.06	18.20	0.03	0.9622	0.0069	0.9119	0.3101	0.3087	-0.0009	0.0018	0.0015	2.94
47.	12.	3.87	0.18	50.06	20.10	0.03	1.0856	0.0067	1.0172	0.3832	0.3553	-0.0026	0.0053	0.0058	2.65
48.	1.	4.55	0.22	70.09	-2.04	0.03	-0.0589	0.0086	-0.0585	0.0107	-0.0123	0.0002	0.0000	0.0001	-5.46
48.	2.	4.54	0.22	69.96	0.08	0.03	0.0227	0.0094	0.0227	0.0095	0.0060	0.0005	0.0000	0.0000	2.39
48.	3.	4.55	0.22	70.44	2.03	0.03	0.0970	0.0094	0.0967	0.0128	0.0245	0.0007	-0.0001	-0.0004	7.54
48.	4.	4.55	0.22	70.34	4.03	0.03	0.1789	0.0092	0.1779	0.0218	0.0446	0.0004	-0.0001	-0.0004	8.15
48.	5.	4.55	0.22	70.46	6.08	0.03	0.2738	0.0088	0.2713	0.0380	0.0702	0.0001	-0.0003	-0.0008	7.13
48.	6.	4.56	0.22	70.55	8.02	0.03	0.3738	0.0084	0.3690	0.0610	0.1008	0.0007	-0.0004	-0.0012	6.05
48.	7.	4.53	0.22	69.77	10.06	0.03	0.4820	0.0080	0.4732	0.0929	0.1356	0.0006	-0.0004	-0.0012	5.09
48.	8.	4.53	0.22	69.68	12.07	0.03	0.5921	0.0077	0.5774	0.1326	0.1733	0.0003	-0.0004	-0.0008	4.35
48.	9.	4.52	0.22	69.50	14.03	0.03	0.7024	0.0077	0.6795	0.1794	0.2140	0.0000	-0.0002	-0.0005	3.79
48.	10.	4.52	0.22	69.38	16.04	0.03	0.8221	0.0073	0.7881	0.2364	0.2581	-0.0005	0.0004	-0.0001	3.33
48.	11.	4.51	0.22	69.22	18.05	0.03	0.9491	0.0066	0.9003	0.3033	0.3038	-0.0005	0.0015	0.0011	2.97
48.	12.	4.50	0.22	68.97	20.08	0.03	1.0785	0.0061	1.0109	0.3796	0.3526	-0.0023	0.0051	0.0056	2.66
49.	1.	5.62	0.28	109.93	-2.03	0.03	-0.0591	0.0084	-0.0588	0.0105	-0.0122	0.0001	0.0000	0.0002	-5.58
49.	2.	5.60	0.28	109.55	-0.03	0.03	0.0171	0.0091	0.0171	0.0091	0.0048	0.0005	0.0001	0.0002	1.88
49.	3.	5.60	0.28	109.56	2.07	0.03	0.0984	0.0090	0.0980	0.0126	0.0251	0.0007	-0.0001	-0.0003	7.78
49.	4.	5.58	0.28	109.19	4.08	0.03	0.1789	0.0086	0.1779	0.0214	0.0450	0.0004	-0.0001	-0.0003	8.32
49.	5.	5.58	0.28	109.19	6.04	0.03	0.2678	0.0082	0.2654	0.0366	0.0685	0.0000	-0.0002	-0.0009	7.26
49.	6.	5.58	0.28	109.26	8.01	0.03	0.3698	0.0079	0.3651	0.0598	0.1002	0.0006	-0.0003	-0.0008	6.11
49.	7.	5.60	0.28	110.53	10.06	0.03	0.4757	0.0075	0.4671	0.0913	0.1346	0.0007	-0.0004	-0.0006	5.12
49.	8.	5.59	0.28	109.83	12.04	0.03	0.5844	0.0069	0.5701	0.1298	0.1717	0.0005	-0.0003	-0.0007	4.39
49.	9.	5.59	0.28	110.16	14.10	0.03	0.6986	0.0068	0.6759	0.1784	0.2135	0.0003	-0.0001	-0.0005	3.79
49.	10.	5.58	0.28	109.90	16.07	0.03	0.8173	0.0061	0.7837	0.2343	0.2572	-0.0003	0.0004	-0.0004	3.34
50.	1.	5.60	0.28	110.90	-2.04	5.03	-0.0715	0.0088	-0.0712	0.0113	-0.0185	0.0028	-0.0014	-0.0024	-6.29
50.	2.	5.59	0.28	111.01	-0.07	5.02	0.0042	0.0093	0.0043	0.0093	-0.0011	0.0001	-0.0016	-0.0032	0.46
50.	3.	5.58	0.28	110.47	2.06	5.02	0.0885	0.0094	0.0881	0.0126	0.0180	-0.0024	-0.0019	-0.0037	7.01
50.	4.	5.56	0.28	109.85	4.03	5.02	0.1734	0.0089	0.1723	0.0211	0.0400	-0.0043	-0.0022	-0.0045	8.15
50.	5.	5.56	0.28	109.66	6.02	5.02	0.2692	0.0084	0.2669	0.0368	0.0657	-0.0055	-0.0020	-0.0048	7.25
50.	6.	5.57	0.28	110.03	8.08	5.02	0.3724	0.0079	0.3676	0.0606	0.0965	-0.0093	-0.0018	-0.0041	6.07
50.	7.	5.57	0.28	110.23	10.08	5.02	0.4741	0.0074	0.4655	0.0910	0.1301	-0.0121	-0.0019	-0.0039	5.11
50.	8.	5.58	0.28	110.55	12.07	5.02	0.5829	0.0068	0.5686	0.1298	0.1672	-0.0148	-0.0018	-0.0038	4.38
50.	9.	5.57	0.28	110.28	14.02	5.02	0.6930	0.0061	0.6709	0.1754	0.2059	-0.0172	-0.0012	-0.0030	3.83
50.	10.	5.57	0.28	110.35	15.07	5.02	0.7535	0.0060	0.7260	0.2036	0.2283	-0.0182	-0.0006	-0.0023	3.57
51.	1.	5.57	0.28	110.53	-2.04	-5.02	-0.0592	0.0088	-0.0588	0.0109	-0.0156	0.0005	0.0018	0.0036	-5.37
51.	2.	5.56	0.28	110.35	0.06	-5.02	0.0195	0.0095	0.0195	0.0095	0.0025	0.0028	0.0017	0.0034	2.05
51.	3.	5.56	0.28	110.29	2.09	-5.02	0.0985	0.0095	0.0981	0.0131	0.0216	0.0053	0.0017	0.0031	7.50
51.	4.	5.56	0.28	110.44	4.03	-5.02	0.1796	0.0090	0.1785	0.0217	0.0427	0.0067	0.0017	0.0031	8.21
51.	5.	5.56	0.28	110.46	6.01	-5.02	0.2696	0.0086	0.2672	0.0371	0.0664	0.0079	0.0014	0.0029	7.21
51.	6.	5.54	0.28	109.86	8.07	-5.02	0.3712	0.0083	0.3664	0.0608	0.0972	0.0117	0.0014	0.0032	6.03
51.	7.	5.56	0.28	110.35	10.06	-5.02	0.4751	0.0078	0.4664	0.0915	0.1303	0.0145	0.0016	0.0037	5.10
51.	8.	5.56	0.28	110.31	12.05	-5.02	0.5838	0.0075	0.5694	0.1304	0.1675	0.0166	0.0015	0.0034	4.37
51.	9.	5.55	0.28	110.31	14.11	-5.02	0.7015	0.0070	0.6786	0.1796	0.2086	0.0188	0.0012	0.0028	3.78
51.	10.	5.55	0.28	110.07	15.04	-5.02	0.7572	0.0065	0.7295	0.2047	0.2287	0.0197	0.0008	0.0022	3.56
52.	2.	4.57	0.22	69.95	-1.96	-0.06	0.1623	0.0232	0.1630	0.0177	-0.0527	-0.0002	0.0002	-0.0004	9.20
52.	3.	4.56	0.22	69.88	0.08	-0.06	0.2412	0.0235	0.2412	0.0240	-0.0361	0.0001	0.0000	-0.0003	10.05

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
52.	4.	4.55	0.22	69.81	2.04	-0.07	0.3175	0.0232	0.3165	0.0349	-0.0151	-0.0001	-0.0001	-0.0008	9.07
52.	5.	4.55	0.22	69.90	4.01	-0.07	0.3952	0.0231	0.3927	0.0512	0.0066	-0.0007	-0.0001	-0.0008	7.67
52.	6.	4.55	0.22	69.99	5.96	-0.07	0.4822	0.0231	0.4772	0.0739	0.0335	-0.0002	-0.0002	-0.0014	6.46
52.	7.	4.55	0.22	70.09	8.08	-0.07	0.5870	0.0234	0.5779	0.1068	0.0719	0.0001	-0.0004	-0.0016	5.41
52.	8.	4.55	0.22	70.17	10.01	-0.07	0.6875	0.0240	0.6728	0.1447	0.1069	0.0001	-0.0004	-0.0018	4.65
52.	9.	4.54	0.22	70.04	12.06	-0.07	0.7982	0.0254	0.7753	0.1938	0.1474	0.0000	-0.0003	-0.0016	4.00
52.	10.	4.54	0.22	69.87	14.05	-0.07	0.9124	0.0269	0.8785	0.2504	0.1894	-0.0004	0.0000	-0.0014	3.51
52.	11.	4.53	0.22	69.89	16.00	-0.07	1.0265	0.0278	0.9790	0.3132	0.2333	-0.0011	0.0009	-0.0004	3.13
52.	12.	4.53	0.22	69.97	17.98	-0.07	1.1467	0.0292	1.0817	0.3860	0.2794	-0.0016	0.0025	0.0021	2.80
52.	13.	4.53	0.22	69.78	19.98	-0.07	1.2762	0.0299	1.1892	0.4693	0.3292	-0.0032	0.0063	0.0069	2.53
53.	1.	5.60	0.28	109.82	-2.01	-0.06	0.1557	0.0224	0.1563	0.0170	-0.0528	-0.0003	0.0001	-0.0005	9.21
53.	2.	5.59	0.28	109.40	-0.01	-0.07	0.2330	0.0225	0.2330	0.0227	-0.0365	-0.0001	0.0001	-0.0004	10.28
53.	3.	5.57	0.28	109.07	1.98	-0.07	0.3089	0.0220	0.3080	0.0330	-0.0156	-0.0002	-0.0001	-0.0007	9.33
53.	4.	5.58	0.28	109.70	4.05	-0.07	0.3910	0.0215	0.3885	0.0496	0.0077	-0.0008	0.0000	-0.0008	7.83
53.	5.	5.58	0.28	109.67	6.02	-0.07	0.4768	0.0212	0.4719	0.0719	0.0339	-0.0003	-0.0002	-0.0013	6.56
53.	6.	5.59	0.28	110.55	8.04	-0.07	0.5743	0.0214	0.5656	0.1027	0.0698	0.0001	-0.0002	-0.0015	5.51
53.	7.	5.58	0.28	110.00	10.07	-0.07	0.6817	0.0217	0.6674	0.1423	0.1073	0.0004	-0.0002	-0.0018	4.69
53.	8.	5.57	0.28	110.07	11.98	-0.07	0.7839	0.0227	0.7621	0.1870	0.1443	0.0003	0.0000	-0.0021	4.08
53.	9.	5.56	0.28	109.84	14.03	-0.07	0.8999	0.0242	0.8672	0.2443	0.1872	-0.0001	0.0004	-0.0018	3.55
53.	10.	5.56	0.28	110.02	16.02	-0.07	1.0132	0.0255	0.9668	0.3074	0.2310	-0.0011	0.0012	-0.0006	3.14
54.	1.	5.55	0.28	110.00	-2.03	5.00	0.1414	0.0219	0.1421	0.0170	-0.0584	-0.0030	-0.0009	-0.0047	8.36
54.	2.	5.54	0.28	109.80	-0.03	5.00	0.2183	0.0222	0.2183	0.0223	-0.0420	-0.0060	-0.0012	-0.0055	9.79
54.	3.	5.55	0.28	110.22	2.05	5.00	0.3016	0.0220	0.3006	0.0331	-0.0213	-0.0085	-0.0013	-0.0061	9.09
54.	4.	5.54	0.28	109.78	3.97	5.00	0.3831	0.0215	0.3807	0.0485	0.0022	-0.0090	-0.0017	-0.0067	7.85
54.	5.	5.55	0.28	110.36	6.06	5.00	0.4751	0.0210	0.4702	0.0719	0.0328	-0.0100	-0.0014	-0.0071	6.54
54.	6.	5.55	0.28	110.36	8.05	5.00	0.5710	0.0214	0.5623	0.1024	0.0661	-0.0126	-0.0013	-0.0061	5.49
54.	7.	5.53	0.28	109.94	10.00	5.00	0.6671	0.0219	0.6532	0.1390	0.1018	-0.0144	-0.0015	-0.0062	4.70
54.	8.	5.53	0.28	110.09	12.05	5.00	0.7698	0.0222	0.7482	0.1844	0.1410	-0.0168	-0.0015	-0.0074	4.06
54.	9.	5.53	0.28	109.96	14.06	5.00	0.8700	0.0237	0.8382	0.2369	0.1818	-0.0180	-0.0007	-0.0068	3.54
54.	10.	5.53	0.28	109.99	15.97	5.00	0.9686	0.0244	0.9245	0.2929	0.2218	-0.0189	0.0002	-0.0061	3.16
54.	11.	5.52	0.28	109.89	17.02	5.00	1.0269	0.0246	0.9747	0.3276	0.2453	-0.0195	0.0014	-0.0051	2.98
55.	1.	5.50	0.28	109.70	-1.97	-5.00	0.1523	0.0221	0.1529	0.0170	-0.0553	0.0049	0.0012	0.0038	9.02
55.	2.	5.51	0.28	110.29	0.08	-5.00	0.2294	0.0224	0.2294	0.0229	-0.0381	0.0073	0.0012	0.0036	10.03
55.	3.	5.51	0.28	110.26	1.94	-5.00	0.3033	0.0222	0.3024	0.0328	-0.0187	0.0089	0.0012	0.0034	9.23
55.	4.	5.50	0.28	109.83	3.99	-5.00	0.3871	0.0217	0.3846	0.0491	0.0069	0.0096	0.0013	0.0032	7.83
55.	5.	5.51	0.28	110.07	6.04	-5.00	0.4769	0.0214	0.4720	0.0723	0.0346	0.0108	0.0009	0.0031	6.53
55.	6.	5.50	0.28	109.69	8.06	-5.00	0.5718	0.0217	0.5631	0.1028	0.0665	0.0139	0.0010	0.0029	5.48
55.	7.	5.51	0.28	110.36	10.02	-5.00	0.6664	0.0221	0.6524	0.1393	0.1024	0.0151	0.0013	0.0035	4.68
55.	8.	5.50	0.28	110.08	12.04	-5.00	0.7675	0.0227	0.7459	0.1842	0.1414	0.0168	0.0015	0.0040	4.05
55.	9.	5.50	0.28	110.02	14.07	-5.00	0.8726	0.0237	0.8406	0.2377	0.1822	0.0178	0.0011	0.0039	3.54
55.	10.	5.50	0.28	109.91	16.03	-5.00	0.9759	0.0250	0.9311	0.2966	0.2230	0.0185	0.0005	0.0037	3.14
56.	2.	4.38	0.22	69.95	-2.02	0.00	0.1137	0.0341	0.1148	0.0301	-0.0838	0.0002	0.0005	0.0008	3.82
56.	3.	4.37	0.22	69.96	0.05	0.00	0.2064	0.0293	0.2063	0.0296	-0.0623	0.0007	0.0004	0.0001	6.97
56.	4.	4.37	0.22	69.89	2.07	0.00	0.2952	0.0243	0.2941	0.0353	-0.0439	0.0003	0.0001	-0.0013	8.34
56.	5.	4.37	0.22	70.21	4.01	0.00	0.3736	0.0197	0.3713	0.0463	-0.0312	-0.0003	0.0003	-0.0012	8.03
56.	6.	4.37	0.22	70.09	6.03	0.00	0.4444	0.0152	0.4404	0.0626	-0.0138	-0.0001	0.0001	-0.0012	7.04
56.	7.	4.36	0.22	69.88	8.03	0.00	0.5109	0.0093	0.5046	0.0815	0.0098	0.0001	-0.0002	-0.0010	6.19
56.	8.	4.36	0.22	70.18	10.04	0.00	0.5828	0.0027	0.5734	0.1055	0.0317	0.0001	-0.0002	-0.0009	5.44
56.	9.	4.36	0.22	70.11	12.06	0.00	0.6426	-0.0031	0.6291	0.1327	0.0566	0.0001	0.0002	-0.0015	4.74

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
56.	10.	4.36	0.22	70.20	14.05	0.00	0.7101	-0.0102	0.6913	0.1643	0.0816	0.0003	0.0010	-0.0010	4.21
56.	11.	4.35	0.22	69.93	16.00	0.00	0.7956	-0.0192	0.7701	0.2030	0.1086	0.0012	0.0031	0.0006	3.79
56.	12.	4.35	0.22	70.04	18.07	0.00	0.8775	-0.0289	0.8432	0.2474	0.1459	0.0027	0.0063	0.0073	3.41
56.	13.	4.34	0.22	69.87	20.00	0.00	0.9605	-0.0360	0.9149	0.2977	0.1817	0.0020	0.0117	0.0161	3.07
57.	1.	5.37	0.28	109.81	-2.00	0.00	0.1105	0.0345	0.1116	0.0307	-0.0835	0.0000	0.0003	0.0003	3.63
57.	2.	5.37	0.28	109.97	0.03	0.00	0.2008	0.0295	0.2008	0.0298	-0.0624	0.0007	0.0003	-0.0002	6.74
57.	3.	5.36	0.28	109.64	1.99	0.00	0.2859	0.0244	0.2848	0.0346	-0.0443	0.0005	0.0002	-0.0011	8.24
57.	4.	5.36	0.28	109.74	4.07	0.00	0.3701	0.0190	0.3678	0.0457	-0.0304	-0.0003	0.0003	-0.0010	8.05
57.	5.	5.36	0.28	110.18	6.10	0.00	0.4407	0.0144	0.4367	0.0618	-0.0135	0.0001	0.0002	-0.0009	7.07
57.	6.	5.36	0.28	110.03	8.06	0.00	0.5064	0.0084	0.5003	0.0801	0.0098	0.0002	-0.0001	-0.0004	6.24
57.	7.	5.36	0.28	110.32	10.08	0.00	0.5772	0.0015	0.5681	0.1036	0.0322	0.0003	-0.0001	-0.0007	5.48
57.	8.	5.36	0.28	110.30	12.05	0.00	0.6345	-0.0043	0.6214	0.1297	0.0568	0.0002	0.0002	-0.0012	4.79
57.	9.	5.35	0.28	110.00	14.02	0.00	0.7020	-0.0114	0.6839	0.1607	0.0817	0.0002	0.0011	-0.0006	4.26
57.	10.	5.34	0.28	109.95	16.08	0.00	0.7919	-0.0212	0.7668	0.2011	0.1105	0.0010	0.0031	0.0015	3.81
57.	11.	5.33	0.28	109.73	17.98	0.00	0.8697	-0.0300	0.8364	0.2425	0.1452	0.0026	0.0064	0.0082	3.45
57.	12.	5.33	0.28	109.67	20.01	0.00	0.9621	-0.0374	0.9168	0.2971	0.1837	0.0018	0.0108	0.0156	3.09
58.	1.	5.32	0.28	109.93	-2.09	5.00	0.0932	0.0355	0.0944	0.0321	-0.0912	-0.0004	-0.0048	-0.0178	2.94
58.	2.	5.33	0.28	110.09	0.07	5.00	0.1883	0.0308	0.1883	0.0311	-0.0692	-0.0028	-0.0044	-0.0162	6.05
58.	3.	5.32	0.28	109.93	2.01	5.00	0.2717	0.0258	0.2706	0.0356	-0.0517	-0.0045	-0.0041	-0.0149	7.60
58.	4.	5.31	0.28	109.99	4.07	5.00	0.3582	0.0204	0.3558	0.0462	-0.0352	-0.0048	-0.0034	-0.0128	7.70
58.	5.	5.31	0.28	109.99	6.01	5.00	0.4320	0.0148	0.4281	0.0606	-0.0149	-0.0056	-0.0023	-0.0103	7.07
58.	6.	5.31	0.28	109.94	8.01	5.00	0.5019	0.0093	0.4957	0.0801	0.0066	-0.0069	-0.0018	-0.0082	6.19
58.	7.	5.31	0.28	110.00	9.99	5.00	0.5655	0.0033	0.5563	0.1025	0.0304	-0.0092	-0.0019	-0.0076	5.43
58.	8.	5.31	0.28	109.91	12.00	5.00	0.6331	-0.0031	0.6200	0.1299	0.0542	-0.0078	-0.0011	-0.0061	4.77
58.	9.	5.31	0.28	110.27	14.00	5.00	0.6932	-0.0097	0.6750	0.1599	0.0803	-0.0054	0.0009	-0.0026	4.22
58.	10.	5.31	0.28	110.11	16.01	5.00	0.7724	-0.0176	0.7473	0.1981	0.1087	-0.0062	0.0037	0.0011	3.77
58.	11.	5.31	0.28	109.97	17.98	5.00	0.8692	-0.0254	0.8345	0.2467	0.1416	-0.0057	0.0079	0.0099	3.38
58.	12.	5.31	0.28	110.15	20.02	5.00	0.9435	-0.0322	0.8975	0.2956	0.1833	-0.0051	0.0128	0.0212	3.04
59.	1.	5.29	0.28	109.97	-2.00	-5.02	0.1078	0.0351	0.1089	0.0313	-0.0869	0.0022	0.0046	0.0147	3.47
59.	2.	5.30	0.28	110.36	-0.09	-5.02	0.1900	0.0307	0.1901	0.0305	-0.0672	0.0041	0.0042	0.0134	6.23
59.	3.	5.29	0.28	109.97	2.00	-5.02	0.2787	0.0256	0.2776	0.0356	-0.0485	0.0056	0.0036	0.0116	7.81
59.	4.	5.29	0.28	110.12	4.02	-5.02	0.3615	0.0206	0.3592	0.0463	-0.0323	0.0069	0.0027	0.0076	7.75
59.	5.	5.29	0.28	110.07	6.02	-5.02	0.4331	0.0152	0.4291	0.0612	-0.0136	0.0074	0.0016	0.0053	7.01
59.	6.	5.29	0.28	110.30	8.03	-5.02	0.4987	0.0100	0.4924	0.0805	0.0079	0.0080	0.0015	0.0041	6.12
59.	7.	5.29	0.28	110.03	10.06	-5.02	0.5667	0.0035	0.5574	0.1036	0.0319	0.0100	0.0019	0.0042	5.38
59.	8.	5.29	0.28	110.20	12.02	-5.02	0.6319	-0.0026	0.6186	0.1304	0.0552	0.0083	0.0017	0.0042	4.74
59.	9.	5.29	0.28	110.07	14.03	-5.02	0.6933	-0.0095	0.6750	0.1605	0.0808	0.0049	0.0015	0.0040	4.21
59.	10.	5.29	0.28	110.20	15.99	-5.02	0.7663	-0.0168	0.7413	0.1969	0.1080	0.0052	0.0002	0.0022	3.77
59.	11.	5.29	0.28	110.17	18.10	-5.02	0.8553	-0.0261	0.8211	0.2433	0.1415	0.0066	-0.0001	0.0033	3.38
59.	12.	5.29	0.28	110.20	20.03	-5.02	0.9398	-0.0331	0.8943	0.2937	0.1798	0.0040	-0.0056	-0.0122	3.05
60.	2.	4.43	0.22	70.04	-2.02	0.03	0.0796	0.0349	0.0808	0.0320	-0.0784	-0.0004	0.0002	0.0010	2.52
60.	3.	4.43	0.22	70.14	0.05	0.03	0.1797	0.0274	0.1797	0.0276	-0.0589	0.0001	0.0000	-0.0002	6.50
60.	4.	4.42	0.22	70.03	2.04	0.03	0.2683	0.0192	0.2674	0.0290	-0.0419	0.0003	-0.0003	-0.0012	9.22
60.	5.	4.41	0.22	69.93	4.01	0.03	0.3417	0.0113	0.3401	0.0356	-0.0282	-0.0001	-0.0002	-0.0011	9.57
60.	6.	4.42	0.22	70.11	6.03	0.03	0.4106	0.0028	0.4080	0.0465	-0.0126	-0.0007	-0.0001	-0.0010	8.78
60.	7.	4.42	0.22	70.16	8.08	0.03	0.4927	-0.0093	0.4891	0.0609	0.0078	-0.0005	0.0000	-0.0010	8.02
60.	8.	4.41	0.22	70.21	10.01	0.03	0.5692	-0.0219	0.5644	0.0785	0.0272	-0.0006	0.0001	-0.0015	7.19
60.	9.	4.42	0.22	70.34	12.04	0.03	0.6492	-0.0354	0.6423	0.1023	0.0504	-0.0006	0.0003	-0.0016	6.28
60.	10.	4.41	0.22	70.01	14.10	0.03	0.7264	-0.0468	0.7159	0.1335	0.0777	0.0002	0.0008	0.0002	5.36

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
60.	11.	4.41	0.22	70.20	16.08	0.03	0.7969	-0.0550	0.7810	0.1701	0.1096	-0.0010	0.0037	0.0035	4.59
60.	12.	4.41	0.22	70.04	18.08	0.03	0.8795	-0.0600	0.8547	0.2186	0.1469	-0.0022	0.0079	0.0111	3.91
60.	13.	4.40	0.22	70.07	20.03	0.03	0.9675	-0.0661	0.9317	0.2724	0.1830	-0.0042	0.0135	0.0192	3.42
61.	1.	5.47	0.28	110.24	-2.06	0.03	0.0732	0.0353	0.0744	0.0326	-0.0787	-0.0003	-0.0001	0.0004	2.28
61.	2.	5.45	0.28	109.89	0.10	0.03	0.1761	0.0274	0.1761	0.0278	-0.0586	0.0001	-0.0002	-0.0003	6.34
61.	3.	5.45	0.28	109.98	2.04	0.03	0.2623	0.0190	0.2614	0.0286	-0.0421	0.0002	-0.0003	-0.0013	9.14
61.	4.	5.45	0.28	110.14	4.06	0.03	0.3383	0.0107	0.3367	0.0350	-0.0283	0.0000	-0.0002	-0.0010	9.61
61.	5.	5.45	0.28	110.13	6.04	0.03	0.4066	0.0022	0.4041	0.0455	-0.0133	-0.0006	-0.0001	-0.0008	8.88
61.	6.	5.44	0.28	110.08	8.07	0.03	0.4876	-0.0098	0.4841	0.0596	0.0072	-0.0005	-0.0001	-0.0008	8.12
61.	7.	5.44	0.28	109.97	10.02	0.03	0.5640	-0.0227	0.5594	0.0769	0.0273	-0.0005	0.0001	-0.0014	7.28
61.	8.	5.44	0.28	110.24	12.07	0.03	0.6437	-0.0364	0.6371	0.1005	0.0508	-0.0006	0.0004	-0.0015	6.34
61.	9.	5.43	0.28	110.15	14.02	0.03	0.7164	-0.0473	0.7065	0.1295	0.0770	-0.0003	0.0007	0.0003	5.46
61.	10.	5.42	0.28	109.80	15.99	0.03	0.7902	-0.0559	0.7750	0.1661	0.1080	-0.0006	0.0036	0.0032	4.67
61.	11.	5.43	0.28	110.21	18.01	0.03	0.8700	-0.0605	0.8461	0.2140	0.1462	-0.0019	0.0075	0.0099	3.95
61.	12.	5.43	0.28	110.16	20.03	0.03	0.9611	-0.0663	0.9257	0.2700	0.1840	-0.0036	0.0132	0.0182	3.43
62.	1.	5.42	0.28	110.11	-2.04	5.02	0.0605	0.0354	0.0617	0.0332	-0.0843	0.0017	-0.0051	-0.0168	1.86
62.	2.	5.41	0.28	110.06	0.00	5.02	0.1579	0.0285	0.1579	0.0286	-0.0658	-0.0010	-0.0048	-0.0154	5.52
62.	3.	5.41	0.28	110.11	2.06	5.02	0.2503	0.0204	0.2494	0.0296	-0.0488	-0.0036	-0.0042	-0.0141	8.42
62.	4.	5.40	0.28	109.82	4.03	5.02	0.3294	0.0119	0.3278	0.0354	-0.0326	-0.0056	-0.0036	-0.0119	9.25
62.	5.	5.41	0.28	109.88	6.08	5.02	0.4078	0.0014	0.4053	0.0451	-0.0132	-0.0078	-0.0022	-0.0093	8.98
62.	6.	5.42	0.28	110.55	8.01	5.02	0.4827	-0.0096	0.4793	0.0586	0.0043	-0.0102	-0.0021	-0.0052	8.18
62.	7.	5.42	0.28	110.45	10.07	5.02	0.5628	-0.0224	0.5580	0.0775	0.0261	-0.0120	-0.0026	-0.0039	7.20
62.	8.	5.41	0.28	110.10	12.04	5.02	0.6442	-0.0342	0.6372	0.1024	0.0480	-0.0136	-0.0028	0.0000	6.22
62.	9.	5.40	0.28	109.78	14.02	5.02	0.7207	-0.0457	0.7102	0.1321	0.0746	-0.0159	-0.0016	0.0054	5.38
62.	10.	5.41	0.28	110.05	16.07	5.02	0.7934	-0.0540	0.7774	0.1699	0.1090	-0.0162	0.0019	0.0116	4.58
62.	11.	5.41	0.28	110.17	18.09	5.02	0.8641	-0.0570	0.8391	0.2166	0.1509	-0.0145	0.0092	0.0187	3.87
62.	12.	5.40	0.28	109.96	20.04	5.02	0.9445	-0.0615	0.9083	0.2688	0.1887	-0.0167	0.0151	0.0254	3.38
63.	1.	5.39	0.28	110.01	-2.09	-5.02	0.0683	0.0348	0.0695	0.0323	-0.0820	-0.0005	0.0052	0.0137	2.15
63.	2.	5.39	0.28	110.24	0.01	-5.02	0.1652	0.0279	0.1652	0.0281	-0.0625	0.0020	0.0048	0.0120	5.88
63.	3.	5.39	0.28	110.17	2.08	-5.02	0.2593	0.0197	0.2584	0.0294	-0.0454	0.0052	0.0041	0.0098	8.79
63.	4.	5.38	0.28	110.08	4.02	-5.02	0.3359	0.0114	0.3343	0.0354	-0.0296	0.0078	0.0031	0.0058	9.45
63.	5.	5.38	0.28	109.94	6.07	-5.02	0.4108	0.0014	0.4084	0.0454	-0.0118	0.0092	0.0021	0.0029	9.00
63.	6.	5.38	0.28	110.04	8.08	-5.02	0.4857	-0.0096	0.4823	0.0596	0.0063	0.0113	0.0026	-0.0001	8.10
63.	7.	5.38	0.28	110.00	10.01	-5.02	0.5619	-0.0218	0.5571	0.0773	0.0267	0.0129	0.0033	-0.0013	7.21
63.	8.	5.39	0.28	110.23	12.03	-5.02	0.6419	-0.0346	0.6350	0.1014	0.0502	0.0153	0.0039	-0.0037	6.27
63.	9.	5.38	0.28	109.88	14.03	-5.02	0.7185	-0.0443	0.7078	0.1330	0.0770	0.0149	0.0037	-0.0053	5.32
63.	10.	5.38	0.28	110.06	16.01	-5.02	0.7879	-0.0521	0.7717	0.1694	0.1094	0.0135	0.0011	-0.0094	4.56
63.	11.	5.38	0.28	109.90	18.07	-5.02	0.8667	-0.0579	0.8419	0.2163	0.1465	0.0122	-0.0018	-0.0122	3.89
63.	12.	5.38	0.28	110.16	20.01	-5.02	0.9455	-0.0628	0.9100	0.2675	0.1849	0.0156	-0.0085	-0.0232	3.40
64.	3.	4.71	0.22	69.91	-1.97	-0.01	0.0903	0.0308	0.0913	0.0277	-0.0721	-0.0009	0.0004	0.0007	3.29
64.	4.	4.70	0.22	69.82	-0.02	-0.01	0.1865	0.0250	0.1865	0.0251	-0.0530	-0.0003	0.0002	-0.0001	7.44
64.	5.	4.71	0.22	70.23	2.05	-0.01	0.2761	0.0177	0.2753	0.0279	-0.0353	0.0002	-0.0001	-0.0007	9.88
64.	6.	4.70	0.22	70.04	4.01	-0.01	0.3469	0.0113	0.3453	0.0360	-0.0233	0.0002	0.0000	-0.0008	9.59
64.	7.	4.70	0.22	70.11	6.05	-0.01	0.4175	0.0034	0.4148	0.0479	-0.0055	-0.0004	0.0000	-0.0013	8.65
64.	8.	4.69	0.22	70.11	7.99	-0.01	0.4957	-0.0066	0.4918	0.0632	0.0177	0.0002	0.0001	-0.0016	7.78
64.	9.	4.69	0.22	69.96	9.96	-0.01	0.5758	-0.0178	0.5702	0.0832	0.0420	0.0001	0.0002	-0.0018	6.85
64.	10.	4.68	0.22	69.95	12.04	-0.01	0.6620	-0.0284	0.6534	0.1118	0.0715	0.0003	0.0004	-0.0012	5.84
64.	11.	4.68	0.22	69.97	13.96	-0.01	0.7439	-0.0356	0.7304	0.1469	0.1033	0.0015	0.0012	0.0006	4.97
64.	12.	4.67	0.22	69.87	15.99	-0.01	0.8310	-0.0416	0.8103	0.1913	0.1399	-0.0005	0.0037	0.0024	4.24

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
64.	13.	4.68	0.22	70.33	17.99	-0.01	0.9228	-0.0455	0.8917	0.2446	0.1793	-0.0024	0.0076	0.0097	3.65
64.	14.	4.67	0.22	70.01	20.03	-0.01	1.0336	-0.0479	0.9874	0.3127	0.2250	-0.0046	0.0126	0.0208	3.16
65.	1.	5.79	0.28	109.99	-2.00	-0.01	0.0828	0.0317	0.0838	0.0288	-0.0721	-0.0011	0.0006	-0.0004	2.91
65.	2.	5.77	0.28	109.51	-0.02	-0.01	0.1797	0.0257	0.1798	0.0258	-0.0536	-0.0004	0.0004	-0.0007	6.98
65.	3.	5.78	0.28	110.22	1.97	-0.01	0.2675	0.0187	0.2667	0.0282	-0.0369	-0.0001	0.0003	-0.0015	9.47
65.	4.	5.77	0.28	109.96	4.06	-0.01	0.3416	0.0119	0.3399	0.0364	-0.0245	-0.0005	0.0004	-0.0017	9.33
65.	5.	5.76	0.28	109.79	5.99	-0.01	0.4085	0.0041	0.4058	0.0473	-0.0063	0.0000	0.0006	-0.0017	8.57
65.	6.	5.77	0.28	110.25	8.02	-0.01	0.4890	-0.0067	0.4851	0.0624	0.0182	0.0011	0.0006	-0.0019	7.77
65.	7.	5.77	0.28	110.22	9.96	-0.01	0.5660	-0.0177	0.5605	0.0817	0.0428	0.0009	0.0007	-0.0026	6.86
65.	8.	5.76	0.28	110.13	12.00	-0.01	0.6498	-0.0285	0.6415	0.1088	0.0721	0.0010	0.0009	-0.0018	5.90
65.	9.	5.75	0.28	109.83	13.98	-0.01	0.7336	-0.0362	0.7207	0.1440	0.1045	0.0018	0.0011	0.0000	5.01
65.	10.	5.75	0.28	109.90	16.01	-0.01	0.8235	-0.0420	0.8031	0.1890	0.1420	0.0007	0.0037	0.0020	4.25
65.	11.	5.74	0.28	109.90	18.04	-0.01	0.9212	-0.0464	0.8902	0.2440	0.1822	-0.0016	0.0074	0.0089	3.65
65.	12.	5.74	0.28	109.94	20.02	-0.01	1.0246	-0.0477	0.9790	0.3094	0.2247	-0.0035	0.0124	0.0181	3.16
66.	1.	5.72	0.28	109.87	-2.00	5.00	0.0650	0.0331	0.0661	0.0309	-0.0771	0.0021	-0.0030	-0.0141	2.14
66.	2.	5.71	0.28	109.72	0.08	5.00	0.1647	0.0279	0.1646	0.0282	-0.0582	-0.0007	-0.0026	-0.0129	5.83
66.	3.	5.71	0.28	109.81	1.99	5.00	0.2505	0.0213	0.2496	0.0303	-0.0426	-0.0032	-0.0017	-0.0111	8.25
66.	4.	5.71	0.28	109.82	4.02	5.00	0.3286	0.0136	0.3268	0.0369	-0.0241	-0.0046	-0.0015	-0.0094	8.85
66.	5.	5.71	0.28	110.04	6.06	5.00	0.4057	0.0047	0.4030	0.0481	-0.0038	-0.0059	-0.0010	-0.0088	8.37
66.	6.	5.71	0.28	110.08	7.98	5.00	0.4830	-0.0053	0.4790	0.0627	0.0170	-0.0089	-0.0010	-0.0044	7.64
66.	7.	5.70	0.28	109.74	9.98	5.00	0.5655	-0.0166	0.5598	0.0828	0.0416	-0.0113	-0.0015	-0.0010	6.76
66.	8.	5.69	0.28	109.64	12.05	5.00	0.6531	-0.0272	0.6444	0.1112	0.0686	-0.0134	-0.0014	0.0041	5.80
66.	9.	5.69	0.28	109.43	14.00	5.00	0.7331	-0.0359	0.7200	0.1444	0.1014	-0.0151	0.0003	0.0074	4.99
66.	10.	5.70	0.28	109.91	16.02	5.00	0.8128	-0.0405	0.7924	0.1877	0.1408	-0.0169	0.0041	0.0122	4.22
66.	11.	5.70	0.28	110.02	18.03	5.00	0.9099	-0.0431	0.8786	0.2435	0.1827	-0.0198	0.0097	0.0198	3.61
66.	12.	5.70	0.28	109.96	20.02	5.00	1.0160	-0.0456	0.9702	0.3084	0.2260	-0.0225	0.0138	0.0273	3.15
67.	1.	5.69	0.28	110.02	-2.03	-5.00	0.0729	0.0331	0.0740	0.0306	-0.0741	0.0001	0.0046	0.0094	2.42
67.	2.	5.69	0.28	110.16	-0.09	-5.00	0.1654	0.0280	0.1655	0.0278	-0.0565	0.0028	0.0043	0.0074	5.95
67.	3.	5.68	0.28	109.83	1.99	-5.00	0.2597	0.0205	0.2588	0.0298	-0.0399	0.0063	0.0034	0.0041	8.69
67.	4.	5.68	0.28	110.00	3.98	-5.00	0.3352	0.0129	0.3335	0.0365	-0.0225	0.0089	0.0029	0.0023	9.13
67.	5.	5.68	0.28	110.09	6.02	-5.00	0.4084	0.0043	0.4057	0.0477	-0.0040	0.0103	0.0024	0.0006	8.51
67.	6.	5.68	0.28	109.83	7.97	-5.00	0.4837	-0.0055	0.4798	0.0624	0.0168	0.0130	0.0029	-0.0032	7.68
67.	7.	5.68	0.28	109.87	9.95	-5.00	0.5659	-0.0163	0.5602	0.0828	0.0412	0.0152	0.0035	-0.0059	6.76
67.	8.	5.68	0.28	110.03	12.03	-5.00	0.6517	-0.0273	0.6431	0.1106	0.0709	0.0168	0.0034	-0.0079	5.81
67.	9.	5.69	0.28	110.29	14.00	-5.00	0.7334	-0.0347	0.7200	0.1456	0.1022	0.0168	0.0025	-0.0089	4.95
67.	10.	5.68	0.28	109.85	16.02	-5.00	0.8239	-0.0407	0.8031	0.1907	0.1375	0.0188	0.0005	-0.0100	4.21
67.	11.	5.68	0.28	110.14	17.99	-5.00	0.9102	-0.0450	0.8796	0.2411	0.1761	0.0195	-0.0010	-0.0123	3.65
67.	12.	5.68	0.28	110.18	20.08	-5.00	1.0157	-0.0474	0.9702	0.3075	0.2219	0.0210	-0.0050	-0.0231	3.16
68.	2.	4.59	0.22	69.79	-2.02	0.00	0.0688	0.0384	0.0701	0.0360	-0.0837	-0.0005	0.0002	0.0007	1.95
68.	3.	4.57	0.22	69.69	0.02	0.00	0.1650	0.0310	0.1649	0.0311	-0.0654	0.0000	0.0002	-0.0002	5.30
68.	4.	4.57	0.22	69.92	2.03	0.00	0.2553	0.0223	0.2543	0.0316	-0.0487	0.0001	0.0001	-0.0014	8.04
68.	5.	4.57	0.22	69.90	4.03	0.00	0.3311	0.0137	0.3294	0.0373	-0.0347	-0.0002	0.0001	-0.0009	8.83
68.	6.	4.57	0.22	70.01	6.01	0.00	0.4057	0.0049	0.4029	0.0480	-0.0186	-0.0001	0.0005	-0.0002	8.40
68.	7.	4.57	0.22	69.95	8.02	0.00	0.4892	-0.0051	0.4851	0.0640	-0.0010	0.0011	0.0008	0.0000	7.58
68.	8.	4.56	0.22	69.92	10.02	0.00	0.5589	-0.0163	0.5532	0.0823	0.0205	0.0022	0.0015	-0.0011	6.72
68.	9.	4.56	0.22	70.00	12.03	0.00	0.6364	-0.0308	0.6288	0.1039	0.0388	0.0006	0.0013	0.0003	6.05
68.	10.	4.56	0.22	70.03	14.01	0.00	0.7093	-0.0450	0.6991	0.1299	0.0587	0.0001	0.0012	0.0033	5.38
68.	11.	4.56	0.22	70.19	15.99	0.00	0.7700	-0.0545	0.7553	0.1618	0.0842	-0.0017	0.0044	0.0064	4.67
68.	12.	4.56	0.22	70.18	18.00	0.00	0.8451	-0.0630	0.8232	0.2038	0.1111	-0.0023	0.0081	0.0162	4.04

Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
68.	13.	4.56	0.22	70.16	20.00	0.00	0.9220	-0.0717	0.8909	0.2508	0.1430	0.0012	0.0132	0.0238	3.55
69.	1.	5.65	0.28	109.94	-2.03	0.00	0.0618	0.0397	0.0632	0.0374	-0.0826	0.0002	0.0006	-0.0009	1.69
69.	2.	5.62	0.28	109.91	0.01	0.00	0.1571	0.0324	0.1571	0.0325	-0.0649	0.0006	0.0007	-0.0016	4.83
69.	3.	5.61	0.28	110.00	2.01	0.00	0.2455	0.0238	0.2445	0.0326	-0.0481	0.0013	0.0007	-0.0027	7.50
69.	4.	5.61	0.28	110.16	4.02	0.00	0.3235	0.0147	0.3217	0.0377	-0.0343	0.0007	0.0006	-0.0020	8.53
69.	5.	5.60	0.28	110.00	6.03	0.00	0.3982	0.0054	0.3954	0.0477	-0.0185	0.0005	0.0008	-0.0007	8.29
69.	6.	5.60	0.28	110.15	8.00	0.00	0.4835	-0.0060	0.4797	0.0622	-0.0026	0.0002	0.0007	0.0011	7.71
69.	7.	5.60	0.28	110.13	10.01	0.00	0.5574	-0.0196	0.5523	0.0787	0.0188	0.0008	0.0005	0.0015	7.02
69.	8.	5.59	0.28	109.76	12.00	0.00	0.6307	-0.0330	0.6238	0.1002	0.0377	-0.0002	0.0007	0.0014	6.22
69.	9.	5.59	0.28	110.05	14.02	0.00	0.7040	-0.0469	0.6944	0.1267	0.0582	-0.0008	0.0008	0.0036	5.48
69.	10.	5.59	0.28	110.13	16.03	0.00	0.7661	-0.0562	0.7518	0.1595	0.0849	-0.0010	0.0044	0.0059	4.71
69.	11.	5.59	0.28	110.22	17.98	0.00	0.8387	-0.0647	0.8177	0.1999	0.1116	-0.0021	0.0079	0.0150	4.09
69.	12.	5.59	0.28	110.40	20.03	0.00	0.9112	-0.0716	0.8806	0.2475	0.1465	0.0022	0.0141	0.0233	3.56
70.	1.	5.56	0.28	109.49	-2.02	5.00	0.0536	0.0399	0.0549	0.0380	-0.0886	0.0010	-0.0055	-0.0190	1.44
70.	2.	5.56	0.28	109.88	0.02	5.00	0.1489	0.0328	0.1489	0.0329	-0.0712	-0.0008	-0.0054	-0.0182	4.52
70.	3.	5.56	0.28	109.69	2.04	5.00	0.2402	0.0242	0.2392	0.0329	-0.0544	-0.0030	-0.0049	-0.0178	7.26
70.	4.	5.56	0.28	110.01	4.04	5.00	0.3192	0.0153	0.3173	0.0381	-0.0375	-0.0038	-0.0046	-0.0171	8.32
70.	5.	5.56	0.28	110.07	6.03	5.00	0.3986	0.0048	0.3959	0.0472	-0.0196	-0.0059	-0.0027	-0.0126	8.38
70.	6.	5.56	0.28	109.96	8.03	5.00	0.4798	-0.0073	0.4761	0.0606	-0.0025	-0.0097	-0.0020	-0.0078	7.86
70.	7.	5.56	0.28	110.14	10.03	5.00	0.5581	-0.0198	0.5530	0.0788	0.0156	-0.0111	-0.0026	-0.0089	7.01
70.	8.	5.56	0.28	110.17	12.02	5.00	0.6294	-0.0321	0.6223	0.1010	0.0356	-0.0109	-0.0028	-0.0087	6.16
70.	9.	5.55	0.28	109.88	13.99	5.00	0.7062	-0.0456	0.6963	0.1281	0.0552	-0.0122	-0.0020	-0.0046	5.43
70.	10.	5.55	0.28	109.93	16.03	5.00	0.7677	-0.0528	0.7525	0.1632	0.0848	-0.0130	0.0023	0.0000	4.61
70.	11.	5.55	0.28	110.03	17.99	5.00	0.8312	-0.0611	0.8095	0.2010	0.1127	-0.0117	0.0069	0.0102	4.03
70.	12.	5.56	0.28	110.30	20.00	5.00	0.9084	-0.0715	0.8781	0.2463	0.1438	-0.0110	0.0116	0.0206	3.57
71.	1.	5.55	0.28	110.40	-2.03	-5.00	0.0603	0.0396	0.0617	0.0375	-0.0864	-0.0005	0.0064	0.0181	1.65
71.	2.	5.54	0.28	110.25	0.04	-5.00	0.1562	0.0321	0.1562	0.0323	-0.0681	0.0016	0.0059	0.0158	4.84
71.	3.	5.53	0.28	109.77	2.03	-5.00	0.2452	0.0237	0.2442	0.0326	-0.0520	0.0038	0.0056	0.0143	7.50
71.	4.	5.53	0.28	110.23	4.02	-5.00	0.3249	0.0147	0.3231	0.0378	-0.0358	0.0054	0.0047	0.0121	8.56
71.	5.	5.53	0.28	110.29	6.04	-5.00	0.4005	0.0045	0.3978	0.0472	-0.0195	0.0074	0.0026	0.0069	8.44
71.	6.	5.54	0.28	110.45	8.04	-5.00	0.4780	-0.0069	0.4743	0.0609	-0.0029	0.0114	0.0026	0.0041	7.79
71.	7.	5.53	0.28	110.13	10.03	-5.00	0.5562	-0.0193	0.5510	0.0790	0.0152	0.0125	0.0034	0.0058	6.98
71.	8.	5.53	0.28	110.19	12.04	-5.00	0.6310	-0.0323	0.6238	0.1014	0.0356	0.0119	0.0040	0.0084	6.15
71.	9.	5.53	0.28	110.25	14.06	-5.00	0.7068	-0.0440	0.6963	0.1307	0.0574	0.0122	0.0042	0.0071	5.33
71.	10.	5.53	0.28	109.99	16.03	-5.00	0.7684	-0.0531	0.7532	0.1632	0.0832	0.0129	0.0023	0.0028	4.61
71.	11.	5.53	0.28	110.02	18.04	-5.00	0.8363	-0.0614	0.8142	0.2031	0.1100	0.0097	0.0004	-0.0006	4.01
71.	12.	5.52	0.28	109.76	20.00	-5.00	0.9035	-0.0708	0.8732	0.2452	0.1422	0.0107	-0.0065	-0.0145	3.56
72.	2.	4.56	0.22	70.06	-2.02	-0.01	-0.0111	0.0289	-0.0101	0.0292	-0.0637	-0.0012	0.0002	0.0015	-0.34
72.	3.	4.55	0.22	69.98	0.09	-0.01	0.0923	0.0211	0.0922	0.0213	-0.0439	-0.0009	0.0000	0.0005	4.34
72.	4.	4.54	0.22	69.85	2.08	-0.01	0.1828	0.0128	0.1822	0.0195	-0.0273	-0.0010	-0.0002	-0.0004	9.32
72.	5.	4.53	0.22	69.66	4.06	-0.01	0.2606	0.0042	0.2596	0.0228	-0.0135	-0.0011	-0.0002	0.0000	11.37
72.	6.	4.53	0.22	69.81	6.07	-0.01	0.3312	-0.0040	0.3298	0.0315	0.0010	-0.0012	-0.0001	0.0003	10.49
72.	7.	4.55	0.22	70.47	8.06	-0.01	0.4057	-0.0145	0.4037	0.0431	0.0205	-0.0011	-0.0001	0.0006	9.36
72.	8.	4.55	0.22	70.24	10.03	-0.01	0.4833	-0.0270	0.4806	0.0585	0.0409	-0.0009	-0.0001	0.0000	8.22
72.	9.	4.55	0.22	70.29	12.03	-0.01	0.5629	-0.0404	0.5590	0.0789	0.0631	-0.0009	0.0002	-0.0004	7.08
72.	10.	4.54	0.22	70.10	15.07	-0.01	0.6828	-0.0570	0.6741	0.1240	0.1022	0.0000	0.0017	0.0035	5.44
72.	11.	4.54	0.22	70.06	14.09	-0.01	0.6429	-0.0529	0.6365	0.1067	0.0885	-0.0010	0.0006	0.0016	5.97
72.	12.	4.54	0.22	70.14	16.06	-0.01	0.7255	-0.0615	0.7142	0.1434	0.1170	-0.0008	0.0035	0.0064	4.98
72.	13.	4.53	0.22	69.99	18.01	-0.01	0.7987	-0.0673	0.7804	0.1852	0.1532	-0.0027	0.0075	0.0122	4.21

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Run	Point	$R/10^6$	M	q	α	β	C_N	C_A	C_L	C_D	C_m	C_l	C_n	C_Y	L/D
72.	14.	4.53	0.22	70.11	20.09	-0.01	0.8946	-0.0744	0.8657	0.2402	0.1909	-0.0046	0.0134	0.0214	3.60
73.	1.	5.61	0.28	110.07	-2.07	-0.01	-0.0186	0.0289	-0.0175	0.0295	-0.0638	-0.0009	0.0000	0.0011	-0.59
73.	2.	5.61	0.28	109.88	-0.03	-0.01	0.0812	0.0215	0.0812	0.0215	-0.0444	-0.0007	-0.0001	0.0006	3.79
73.	3.	5.61	0.28	110.19	2.07	-0.01	0.1773	0.0125	0.1767	0.0190	-0.0266	-0.0007	-0.0003	-0.0007	9.29
73.	4.	5.60	0.28	110.04	4.06	-0.01	0.2551	0.0038	0.2541	0.0221	-0.0132	-0.0008	-0.0002	-0.0002	11.51
73.	5.	5.59	0.28	109.93	6.09	-0.01	0.3266	-0.0047	0.3252	0.0304	0.0010	-0.0009	-0.0001	0.0001	10.69
73.	6.	5.59	0.28	110.20	8.06	-0.01	0.4017	-0.0154	0.3999	0.0417	0.0209	-0.0006	-0.0002	0.0004	9.59
73.	7.	5.59	0.28	110.36	10.02	-0.01	0.4774	-0.0277	0.4749	0.0566	0.0411	-0.0004	-0.0001	-0.0001	8.39
73.	8.	5.58	0.28	109.99	12.07	-0.01	0.5572	-0.0415	0.5536	0.0770	0.0636	-0.0007	0.0003	-0.0003	7.19
73.	9.	5.58	0.28	110.00	13.97	-0.01	0.6305	-0.0527	0.6246	0.1024	0.0871	-0.0007	0.0006	0.0011	6.10
73.	10.	5.57	0.28	109.95	16.01	-0.01	0.7139	-0.0623	0.7034	0.1388	0.1171	0.0001	0.0032	0.0052	5.07
73.	11.	5.57	0.28	110.00	18.08	-0.01	0.7986	-0.0682	0.7803	0.1853	0.1559	-0.0025	0.0079	0.0128	4.21
73.	12.	5.58	0.28	110.42	20.09	-0.01	0.8887	-0.0746	0.8603	0.2380	0.1922	-0.0041	0.0131	0.0197	3.61

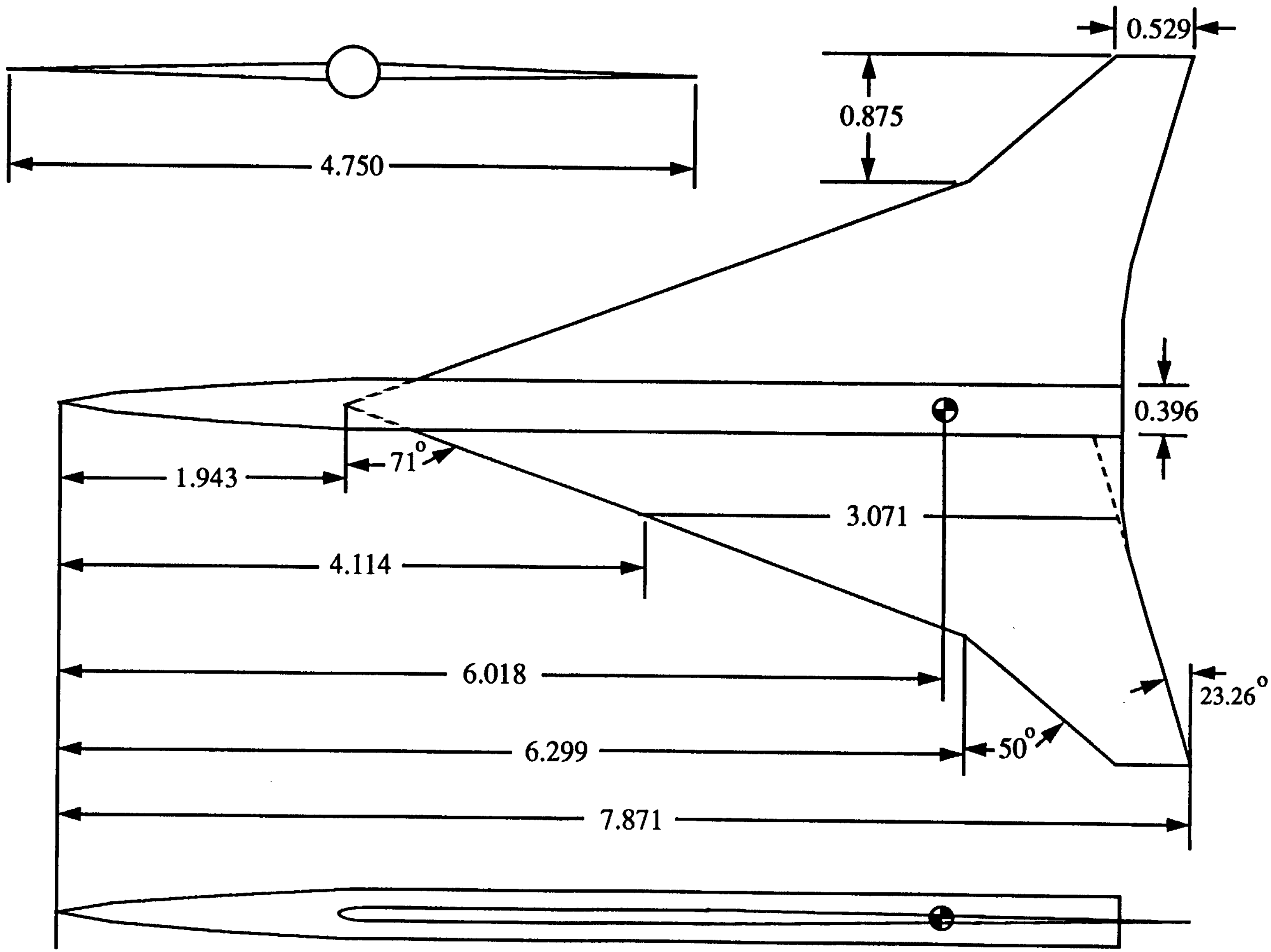


Figure 1. Geometric characteristics of the model. All linear dimensions are in feet.

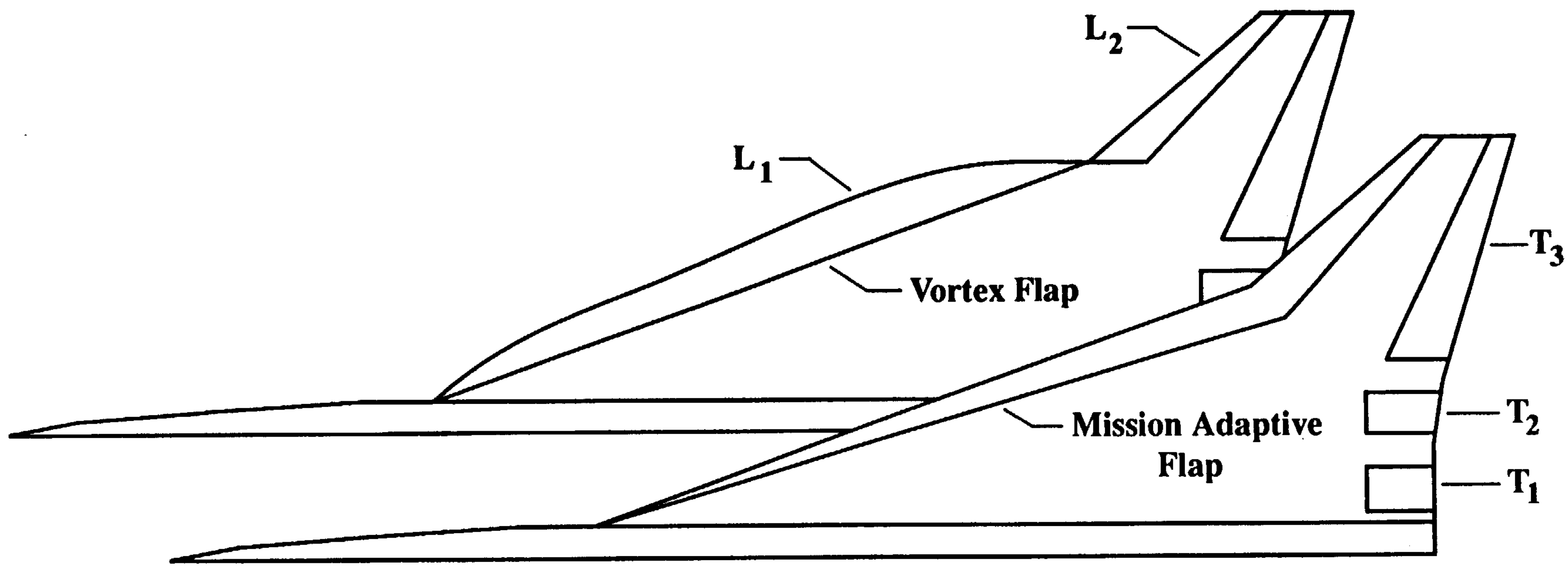


Figure 2. Flap designations for both leading- and trailing-edge flap segments.

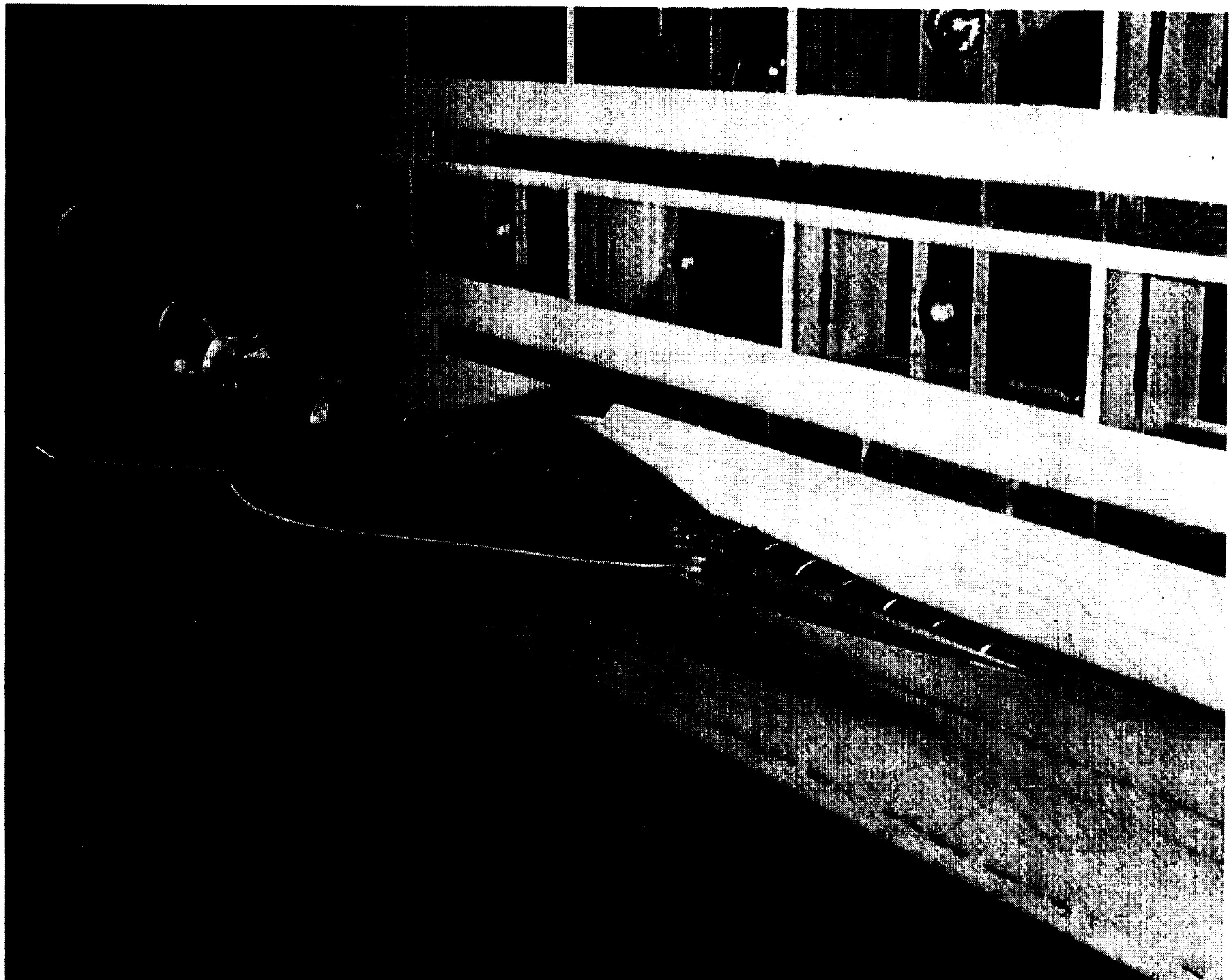


Figure 3. Vortex flap configuration of model mounted in the 14- by 22-Foot Subsonic Tunnel.

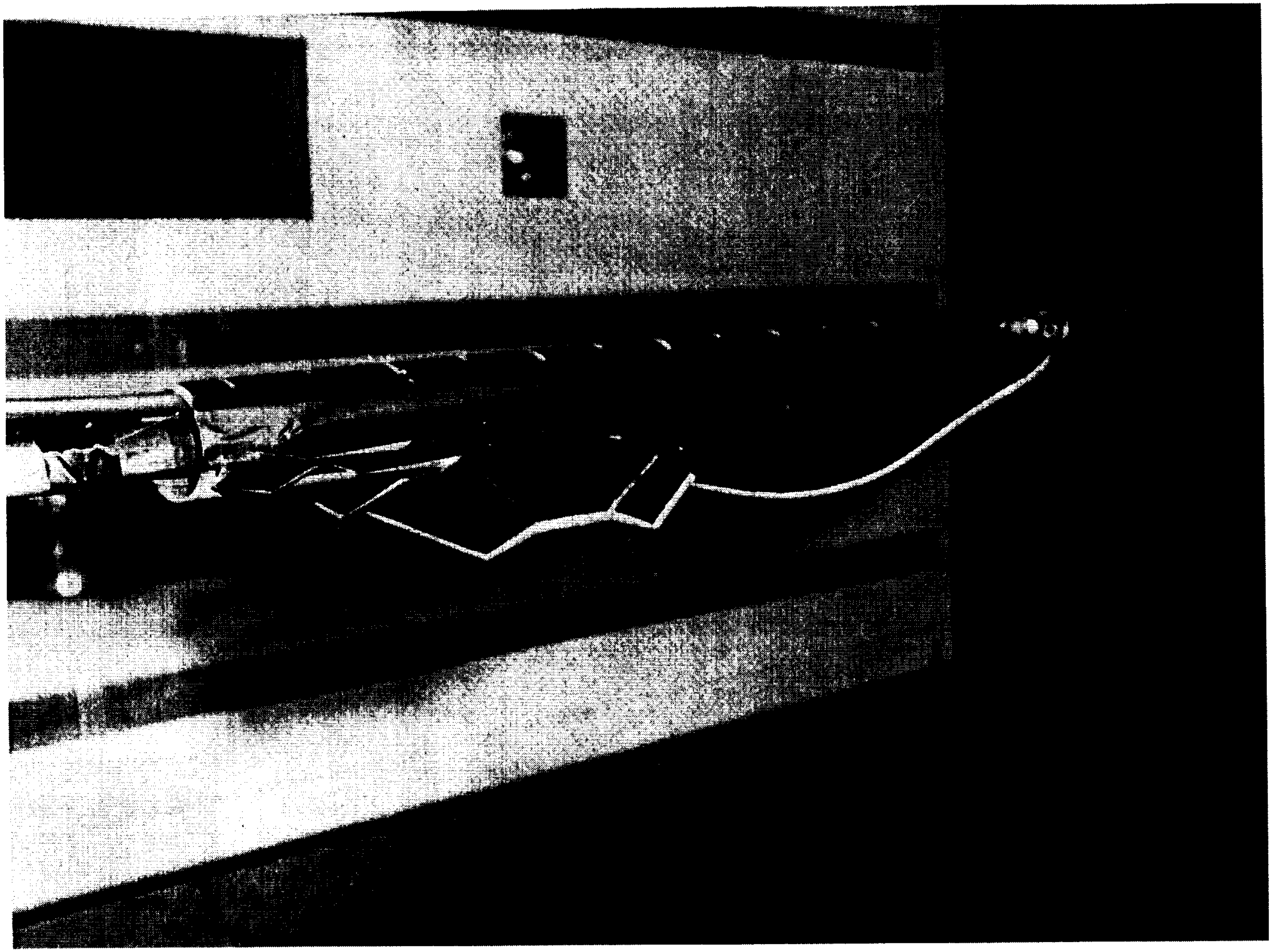


Figure 4. Side view of vortex flap configuration with leading-edges at $\delta_{L1/2} = 40^o/26.4^o$, and $\delta_{T1/2/3} = 20^o/20^o/20^o$.

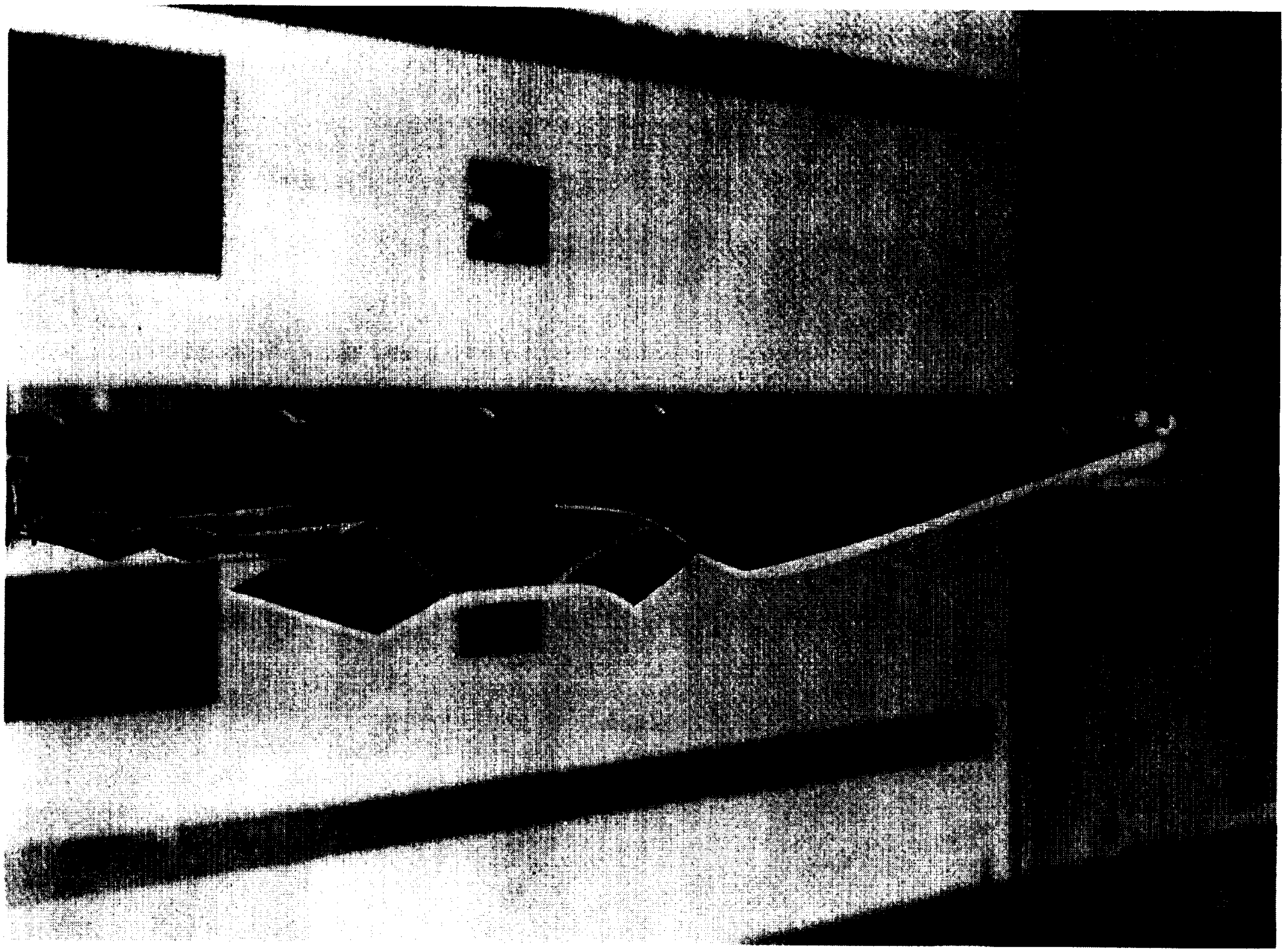
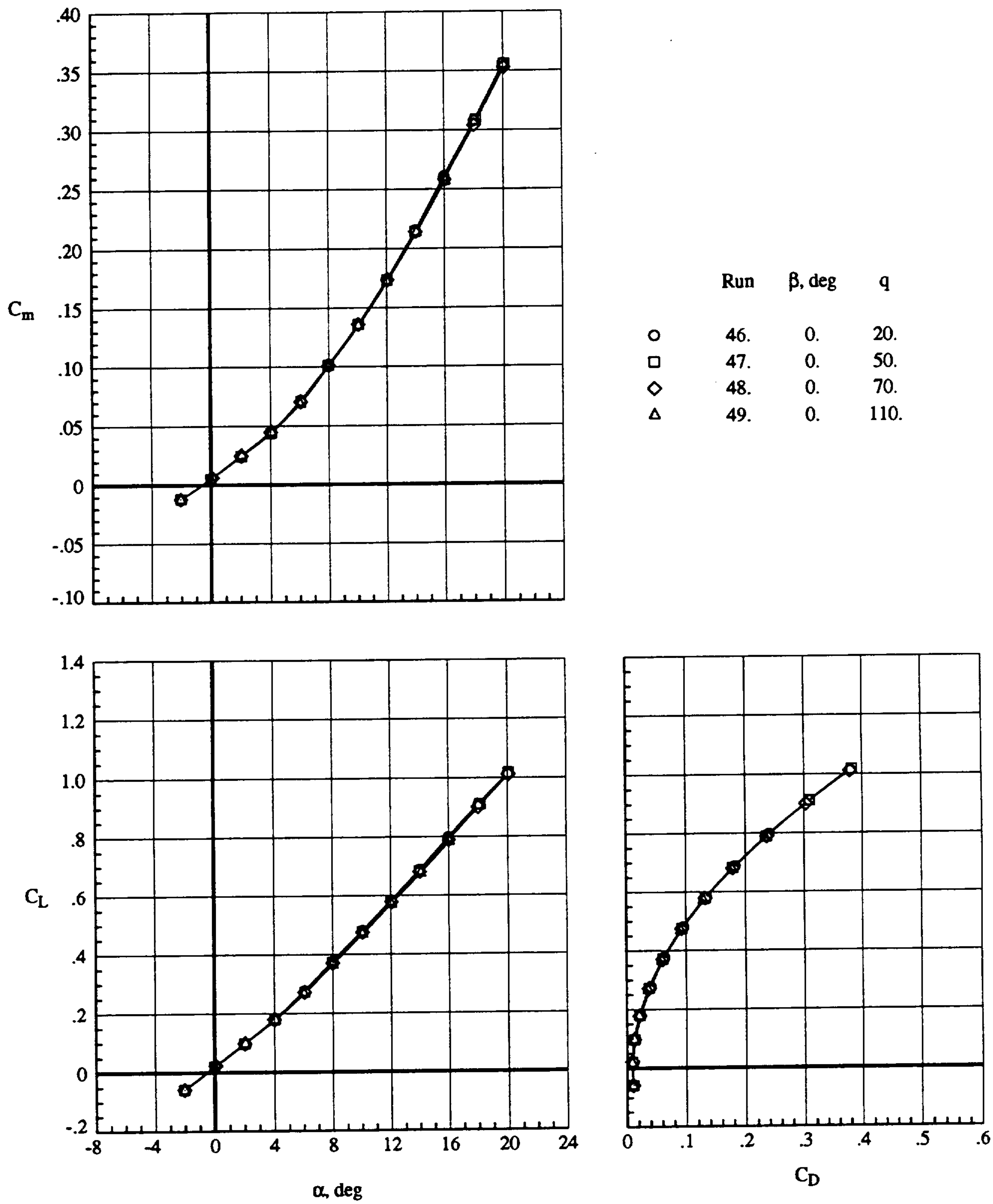


Figure 5. Side view of mission adaptive leading-edge flap configuration with trailing-edges at $\delta_{T1/2/3} = 10^{o}/10^{o}/12.9^{o}$.

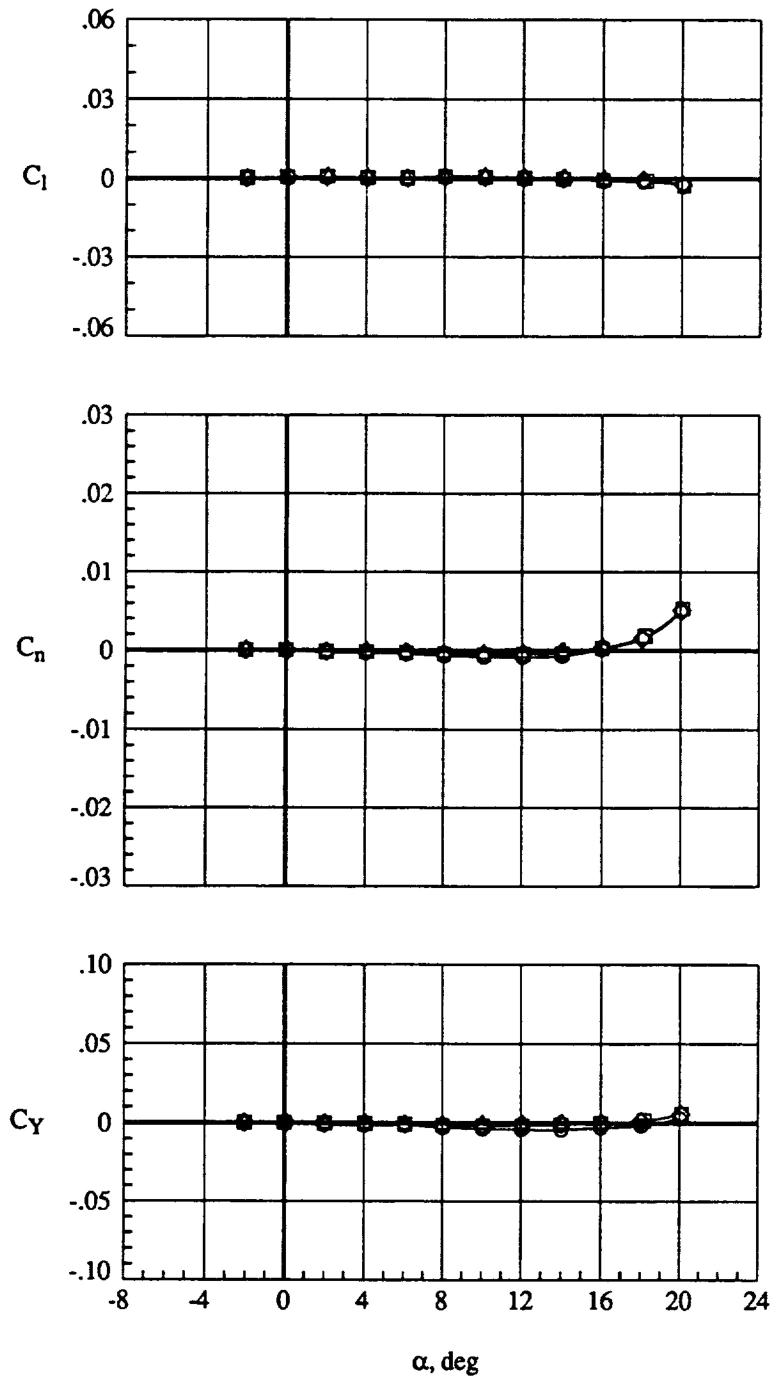


	Run	β, deg	q
○	46.	0.	20.
□	47.	0.	50.
◇	48.	0.	70.
△	49.	0.	110.

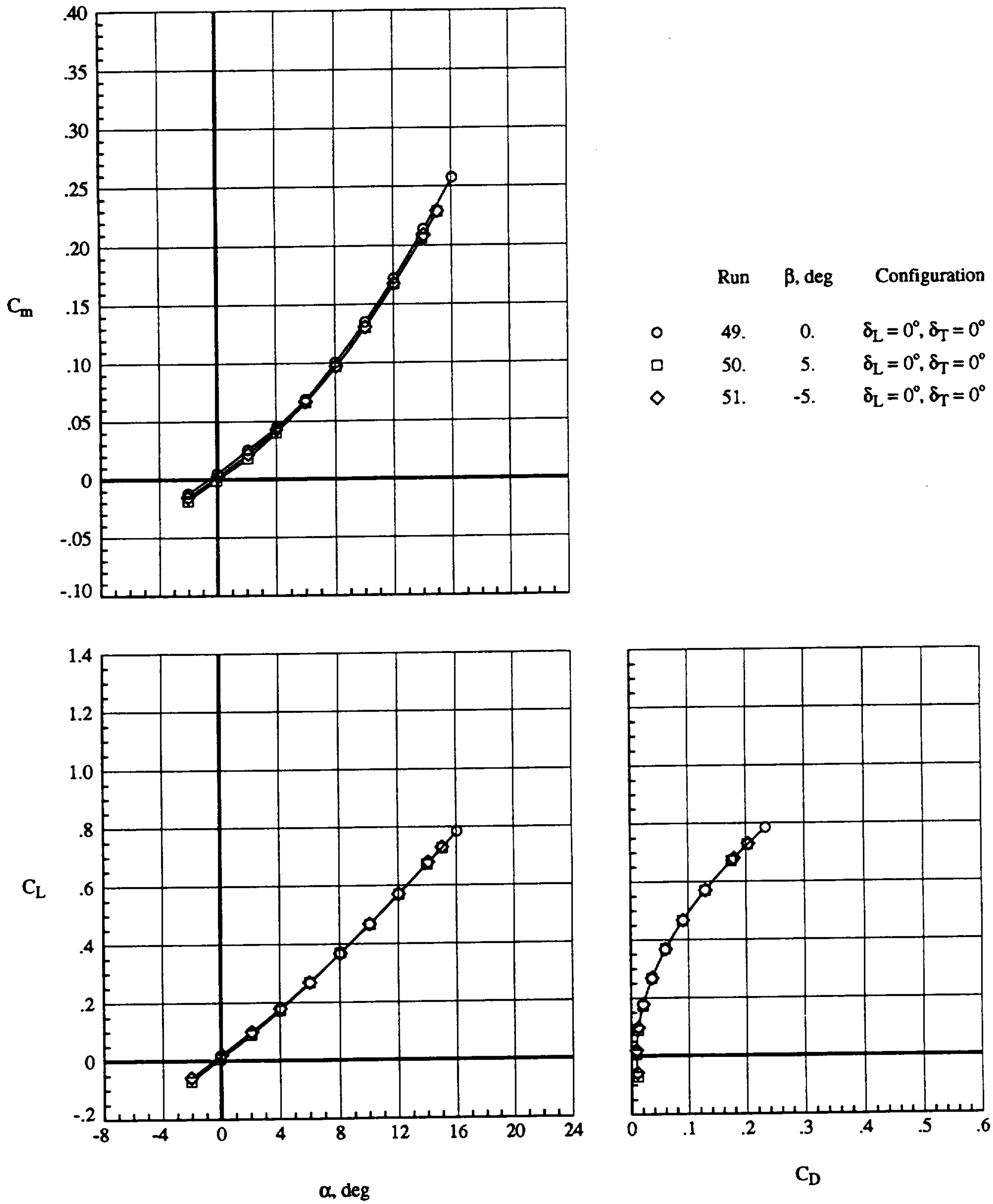
(a) Longitudinal aerodynamics

Figure 6. Effect of tunnel dynamic pressure with vortex flap at $\delta_L = 0°$; $\delta_T = 0°$.

	Run	β, deg	q
○	46.	0.	20.
□	47.	0.	50.
◇	48.	0.	70.
△	49.	0.	110.

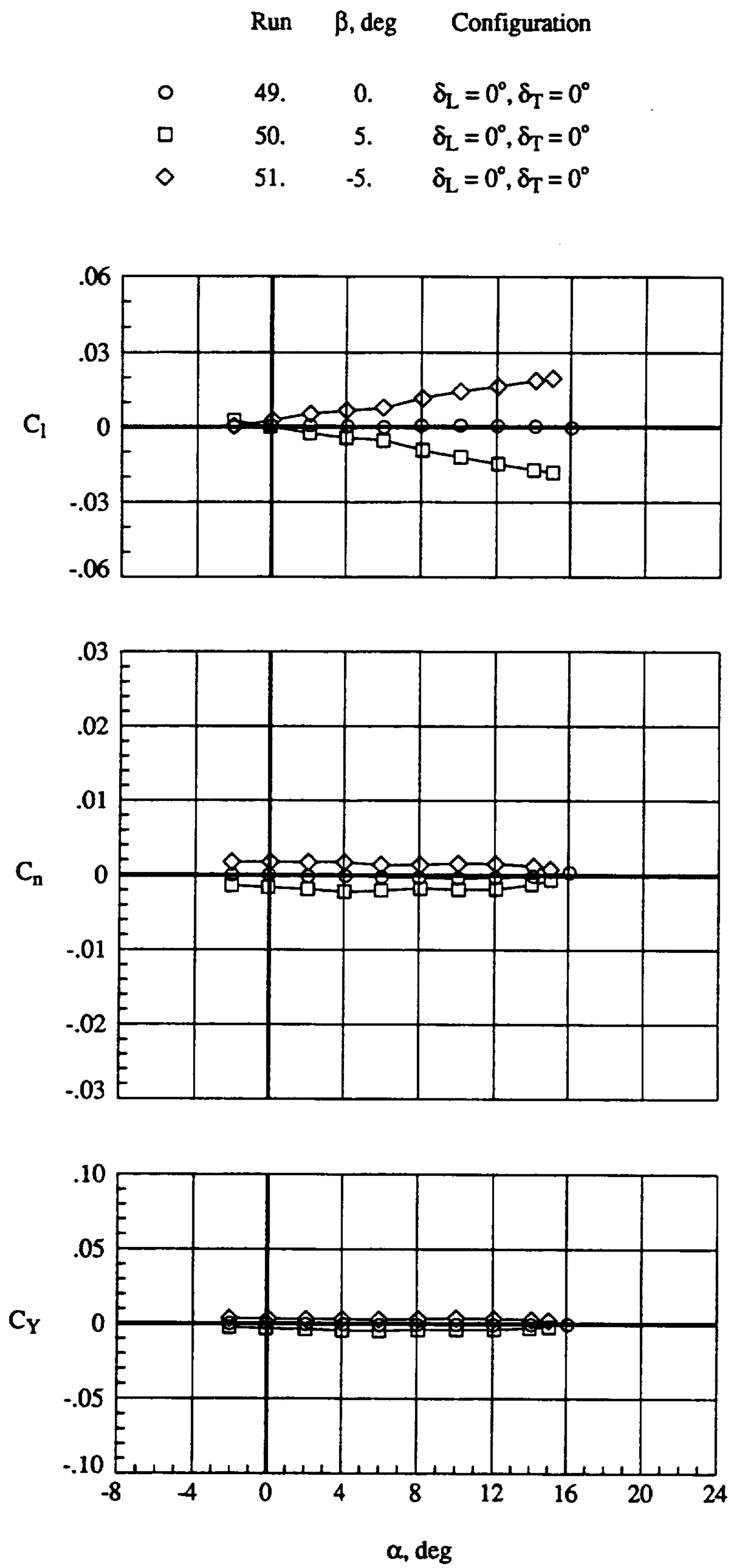


(b) Lateral aerodynamics
Figure 6. Concluded.

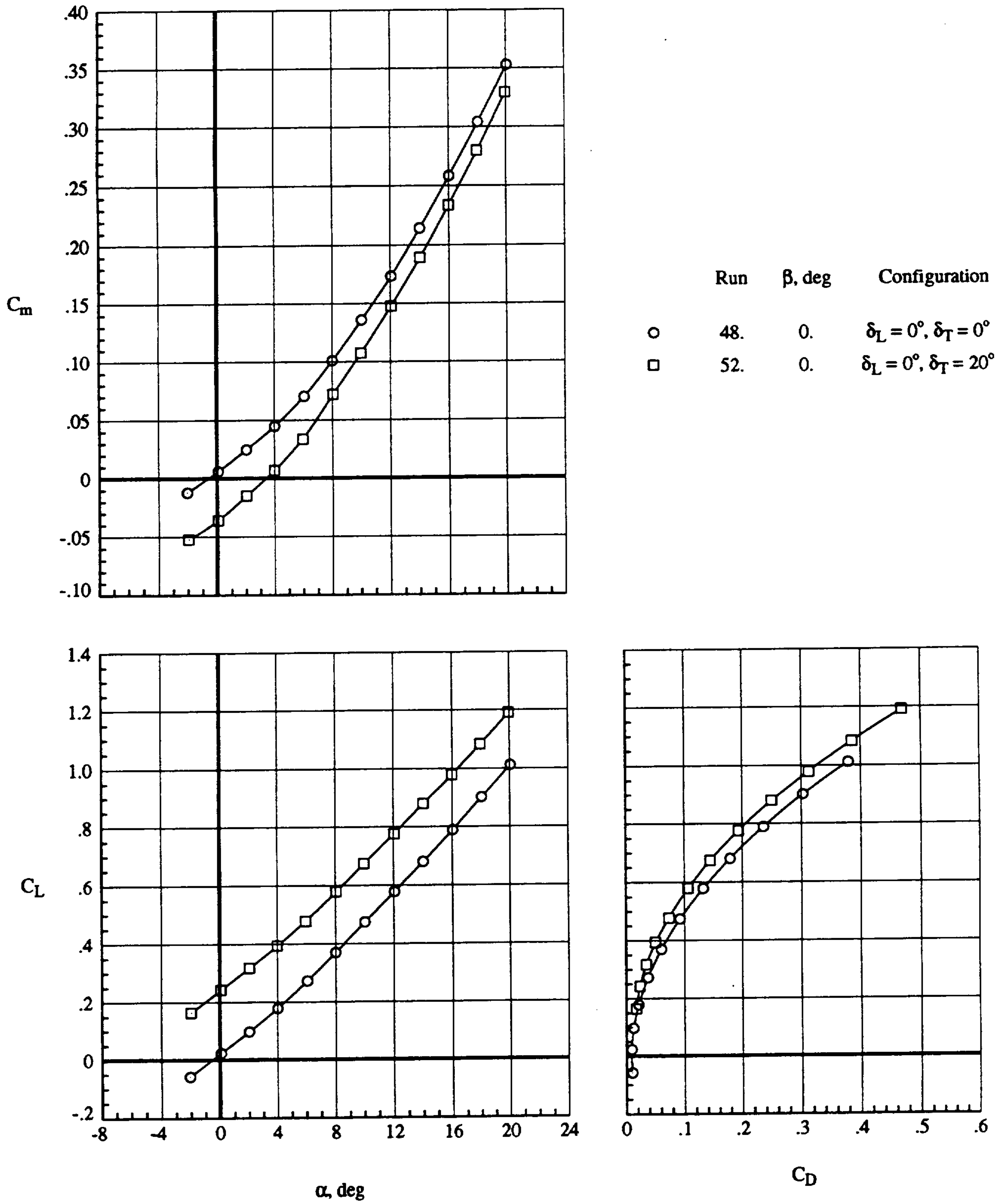


(a) Longitudinal aerodynamics

Figure 7. Effect of sideslip with vortex flap at $\delta_L = 0°$, $\delta_T = 0°$, q=110 psf.

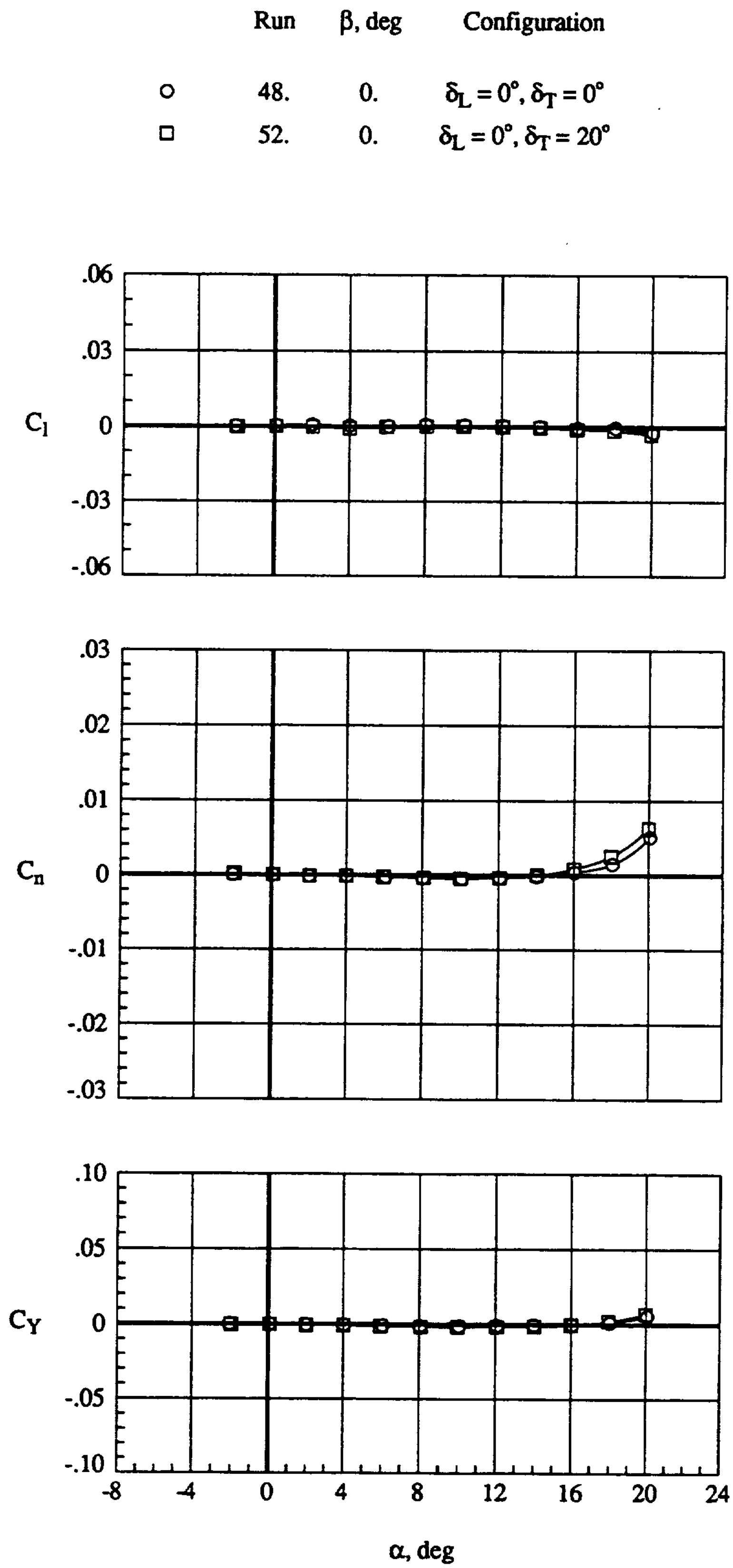


(b) Lateral aerodynamics
Figure 7. Concluded.



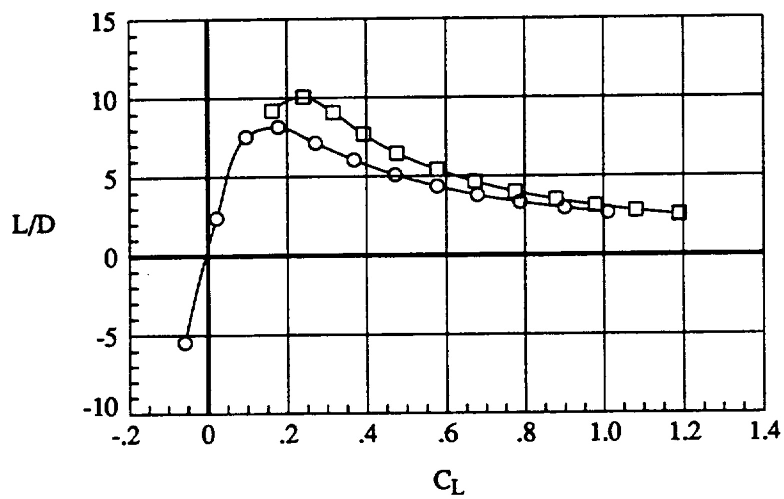
(a) Longitudinal aerodynamics

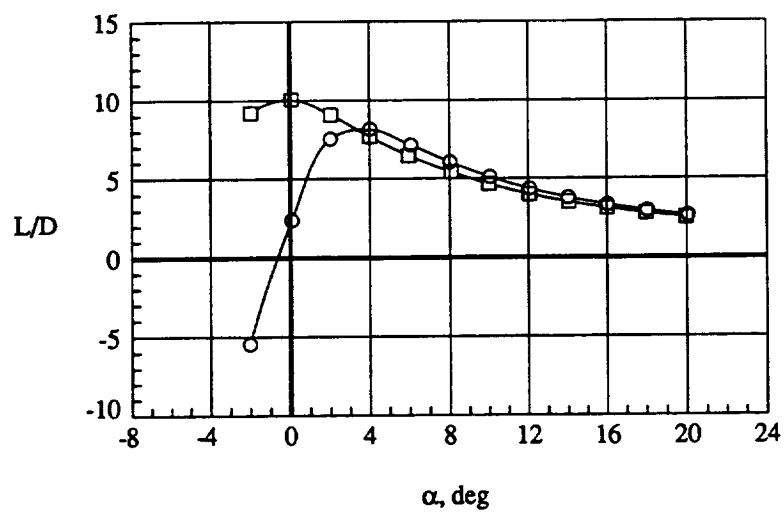
Figure 8. Effect of trailing-edge flaps with vortex flap at $\delta_L = 0°$, q=70 psf.



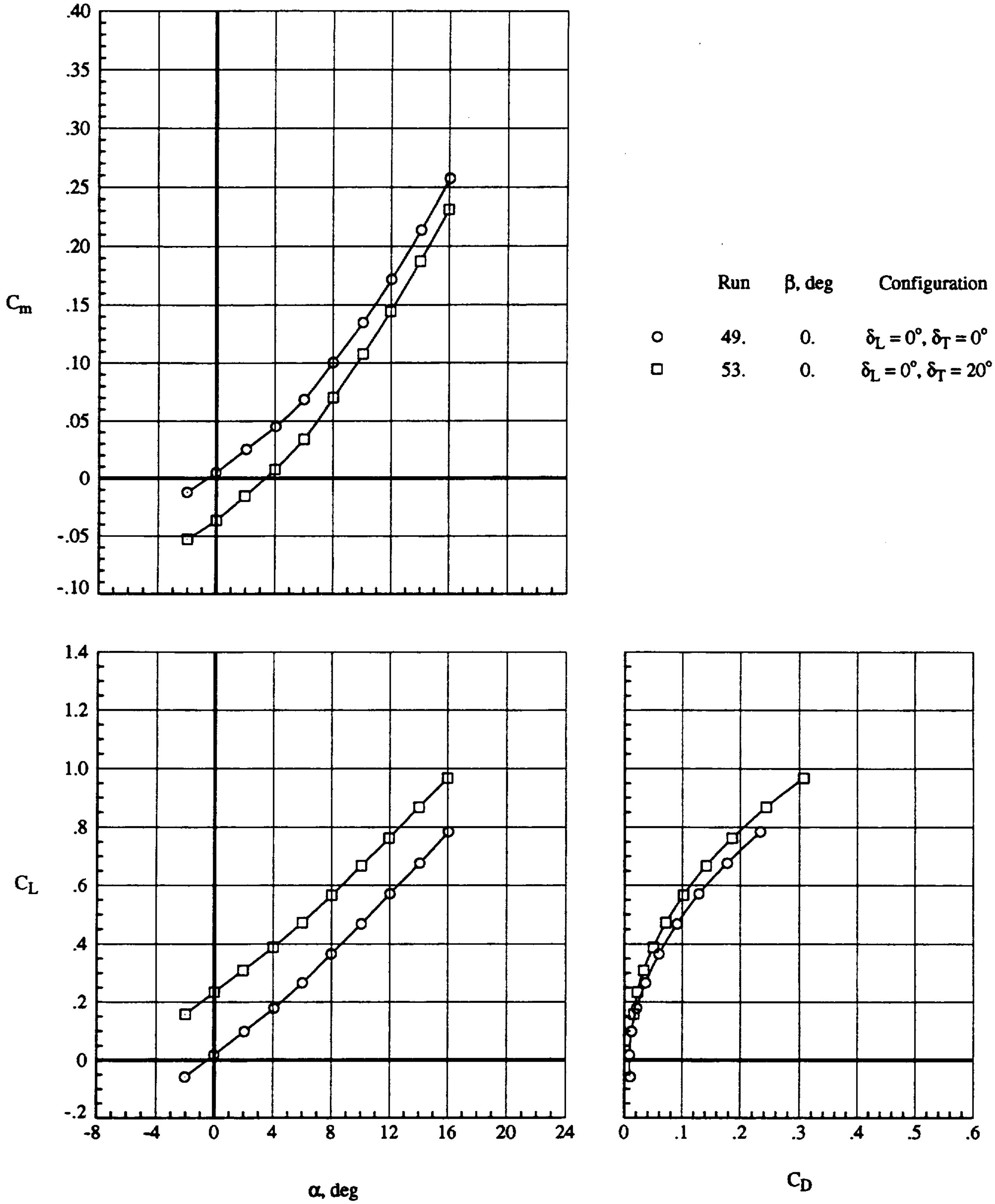
(b) Lateral aerodynamics
Figure 8. Continued.

	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	52.	0.	$\delta_L = 0°, \delta_T = 20°$





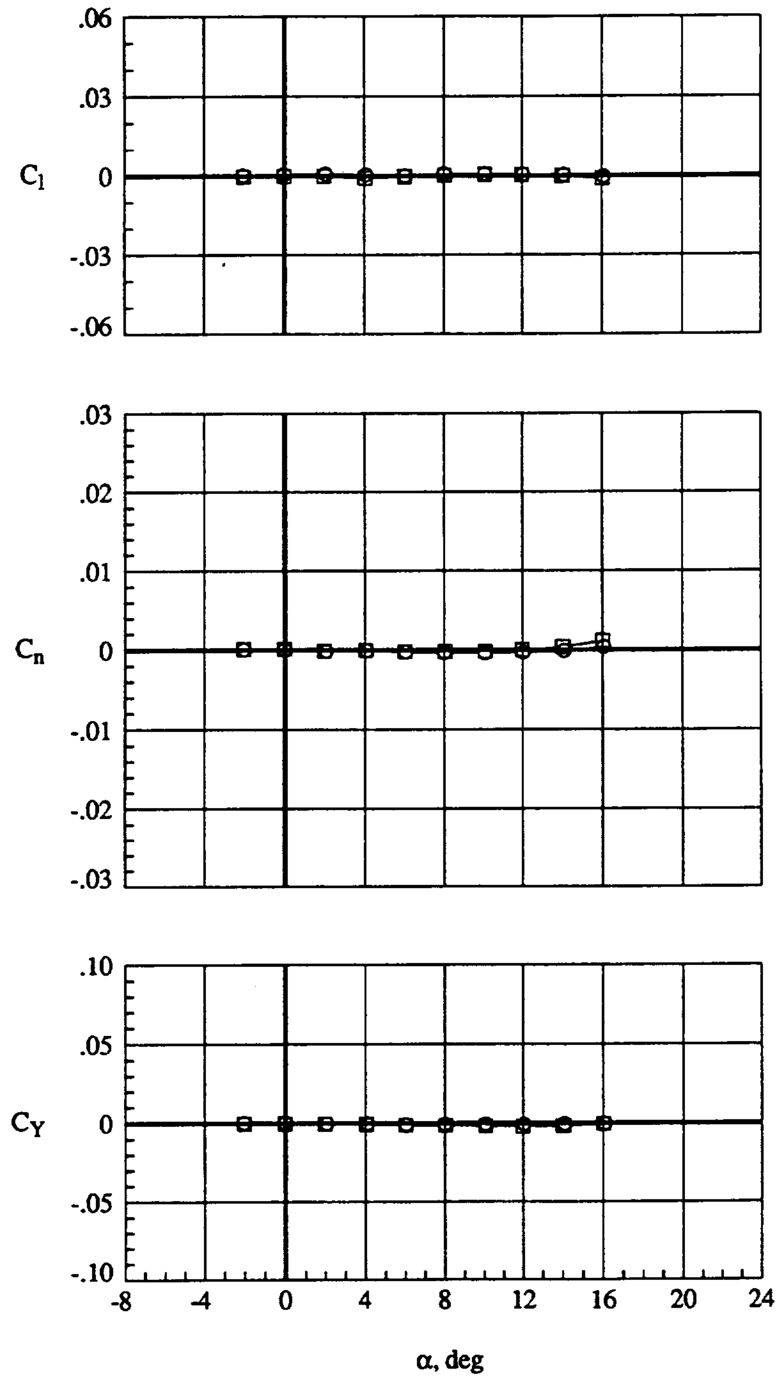
(c) Lift / Drag performance
Figure 8. Concluded.



(a) Longitudinal aerodynamics

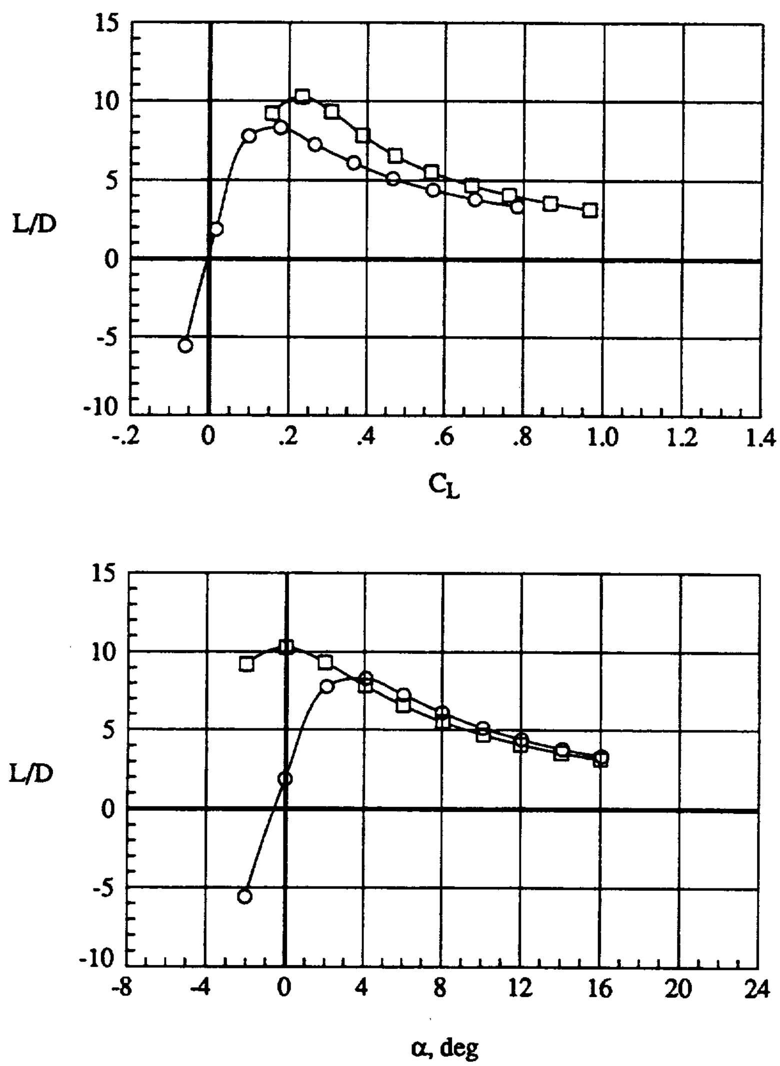
Figure 9. Effect of trailing-edge flaps with vortex flap at $\delta_L = 0°$, q=110 psf.

	Run	β, deg	Configuration
○	49.	0.	$\delta_L = 0°, \delta_T = 0°$
□	53.	0.	$\delta_L = 0°, \delta_T = 20°$

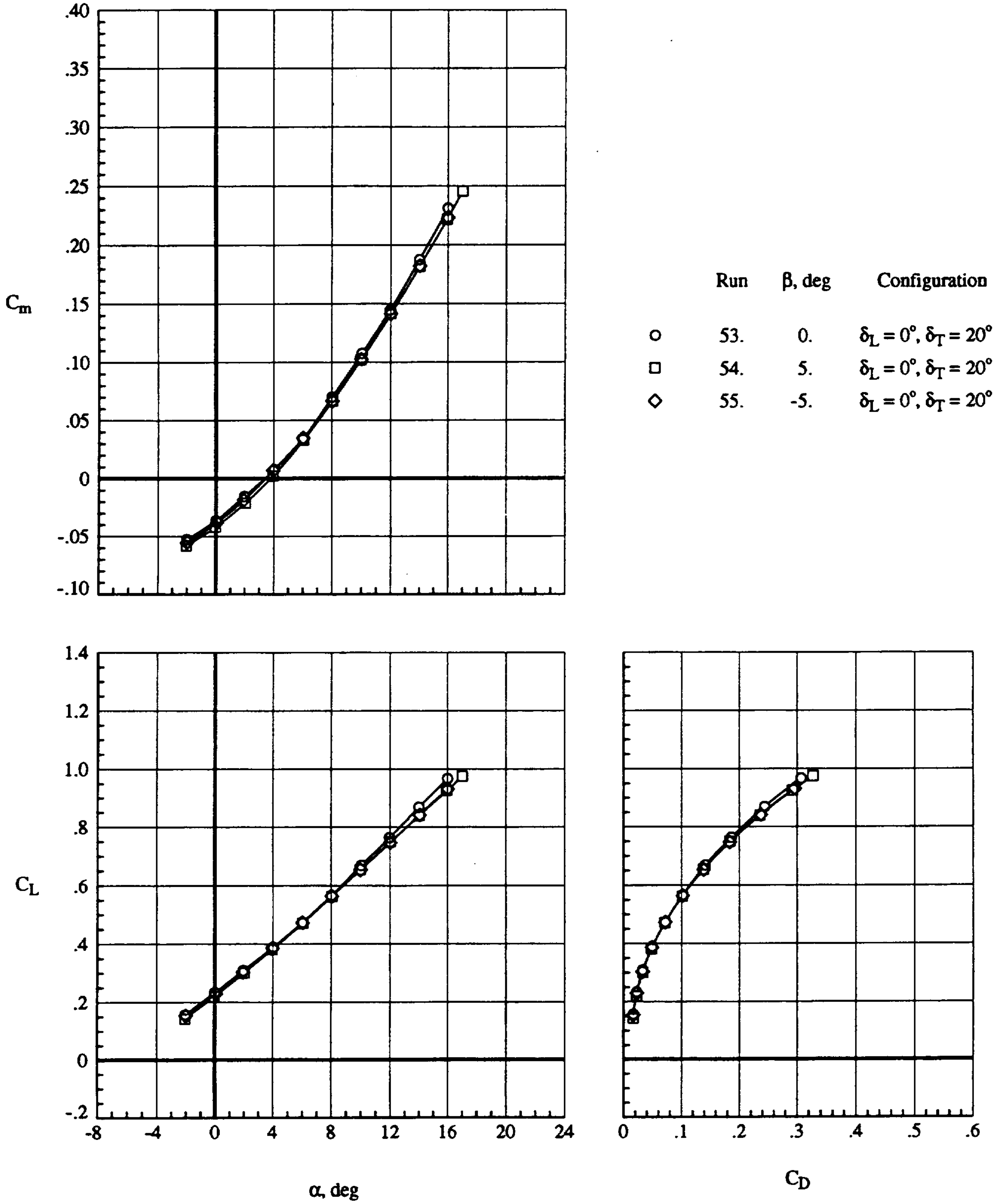


(b) Lateral aerodynamics
Figure 9. Continued.

	Run	β, deg	Configuration
○	49.	0.	$\delta_L = 0°, \delta_T = 0°$
□	53.	0.	$\delta_L = 0°, \delta_T = 20°$



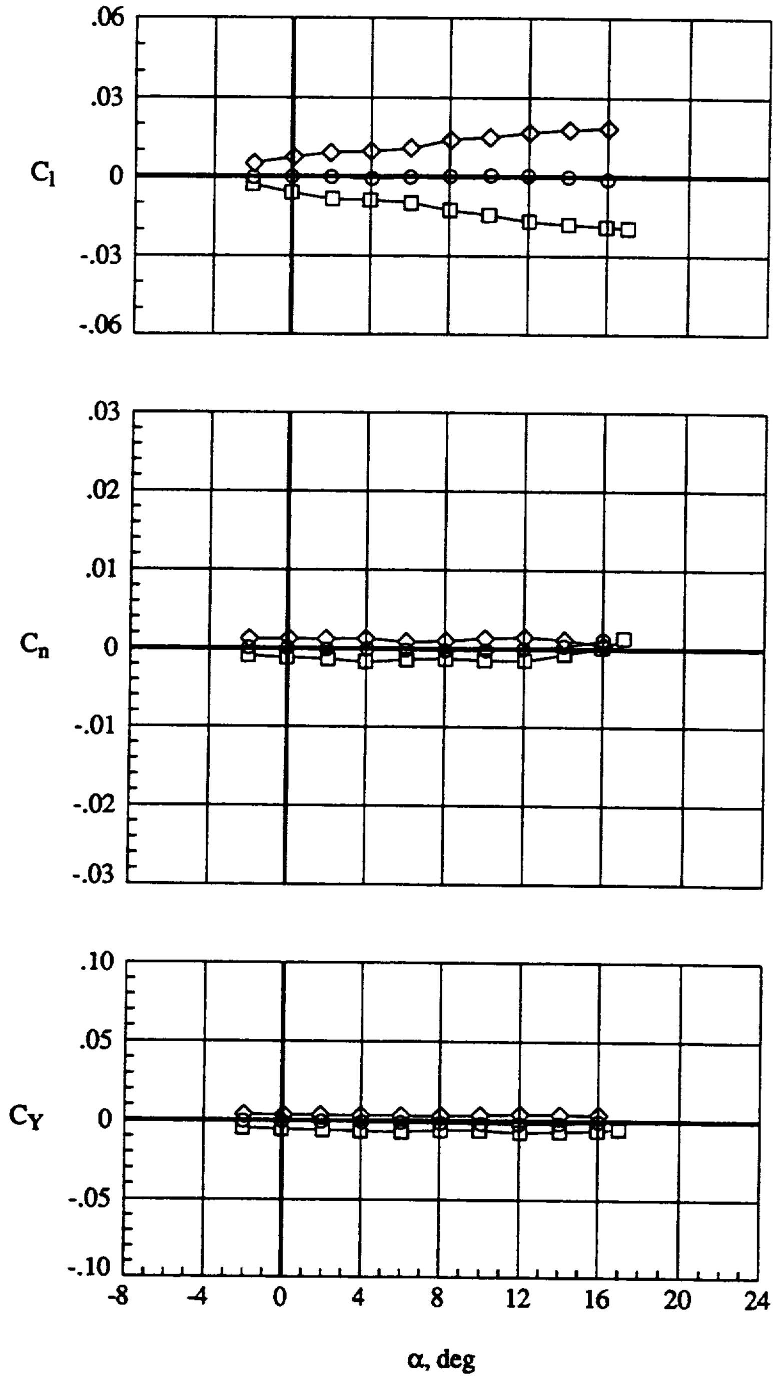
(c) Lift / Drag performance
Figure 9. Concluded.



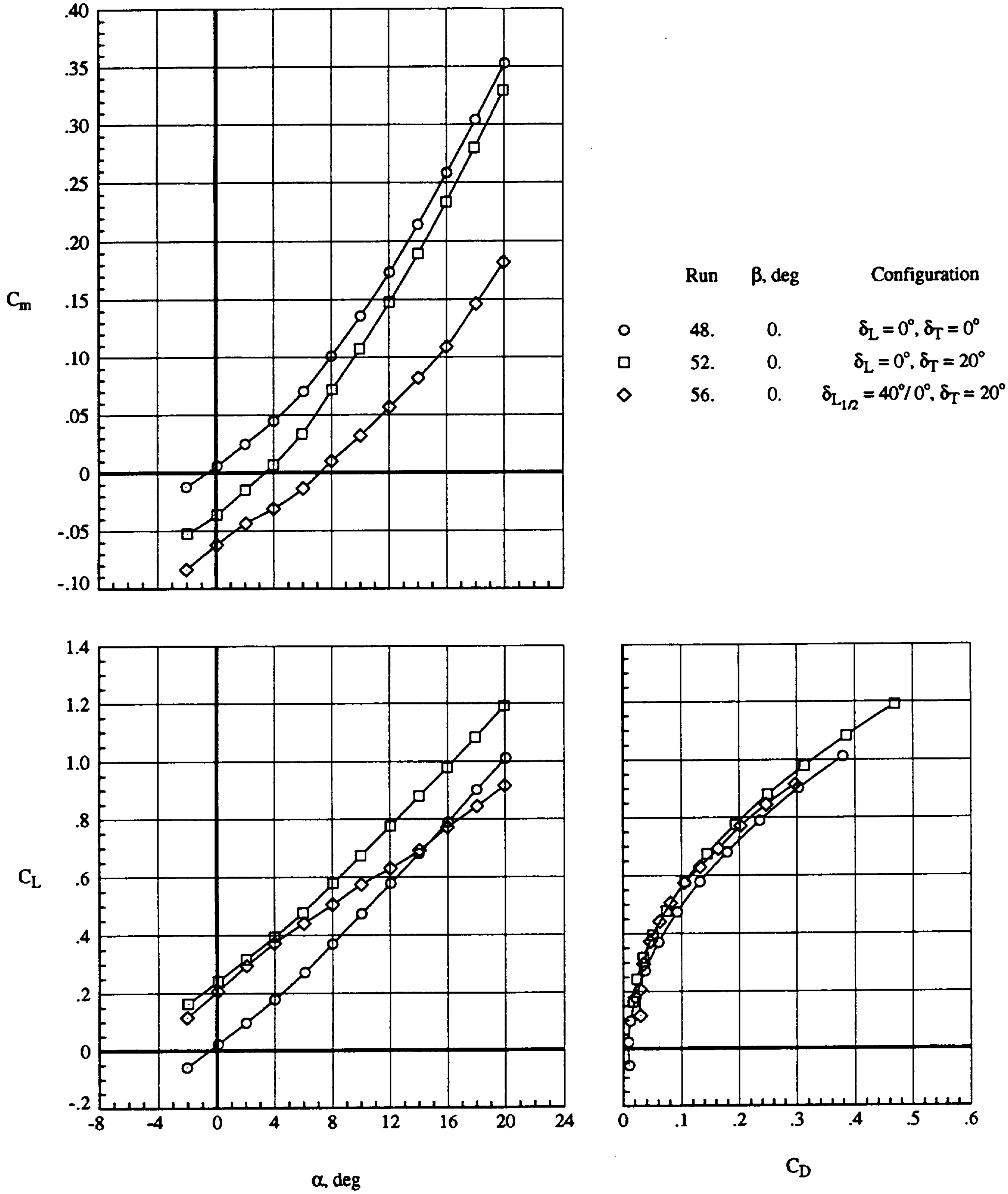
(a) Longitudinal aerodynamics

Figure 10. Effect of sideslip with vortex flap at $\delta_L = 0°$; $\delta_T = 20°$, q=110 psf.

	Run	β, deg	Configuration
○	53.	0.	$\delta_L = 0°, \delta_T = 20°$
□	54.	5.	$\delta_L = 0°, \delta_T = 20°$
◇	55.	-5.	$\delta_L = 0°, \delta_T = 20°$



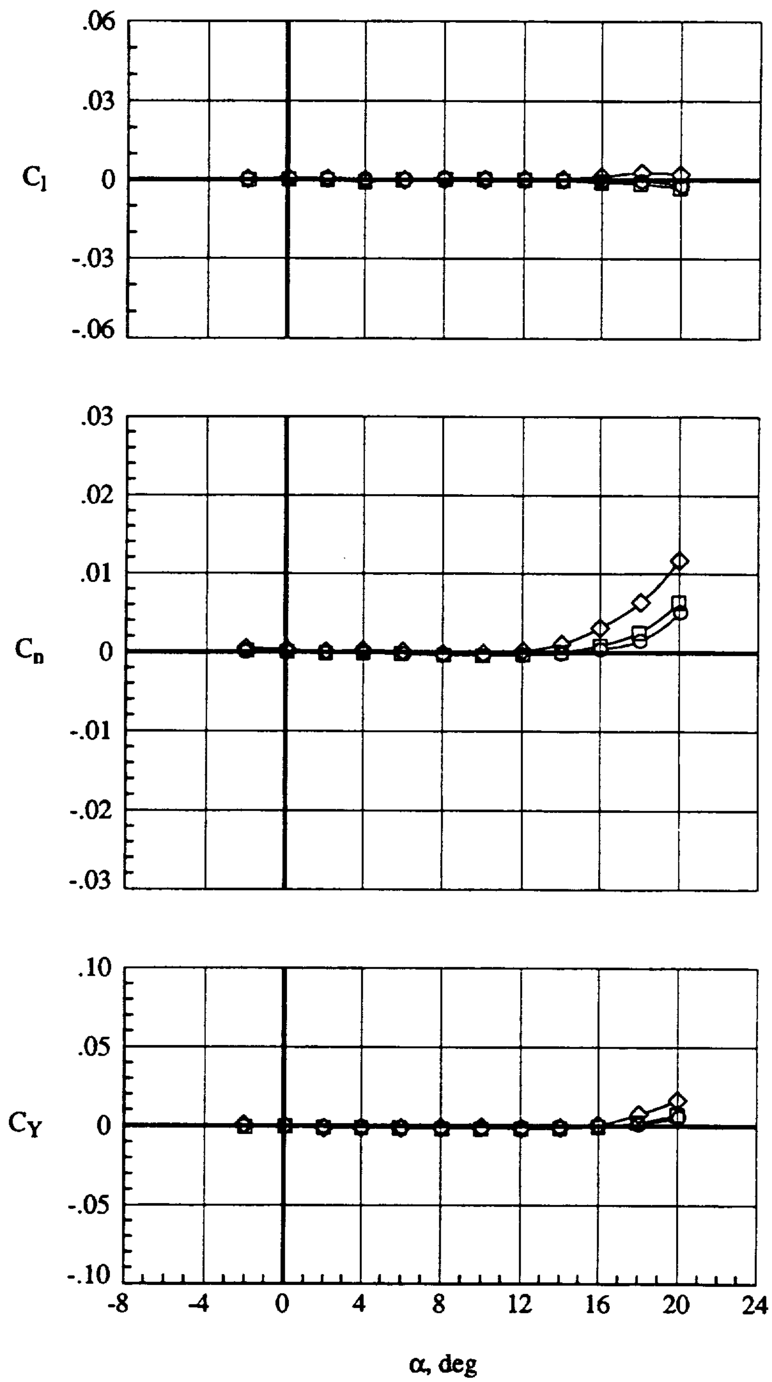
(b) Lateral aerodynamics
Figure 10. Concluded.



(a) Longitudinal aerodynamics

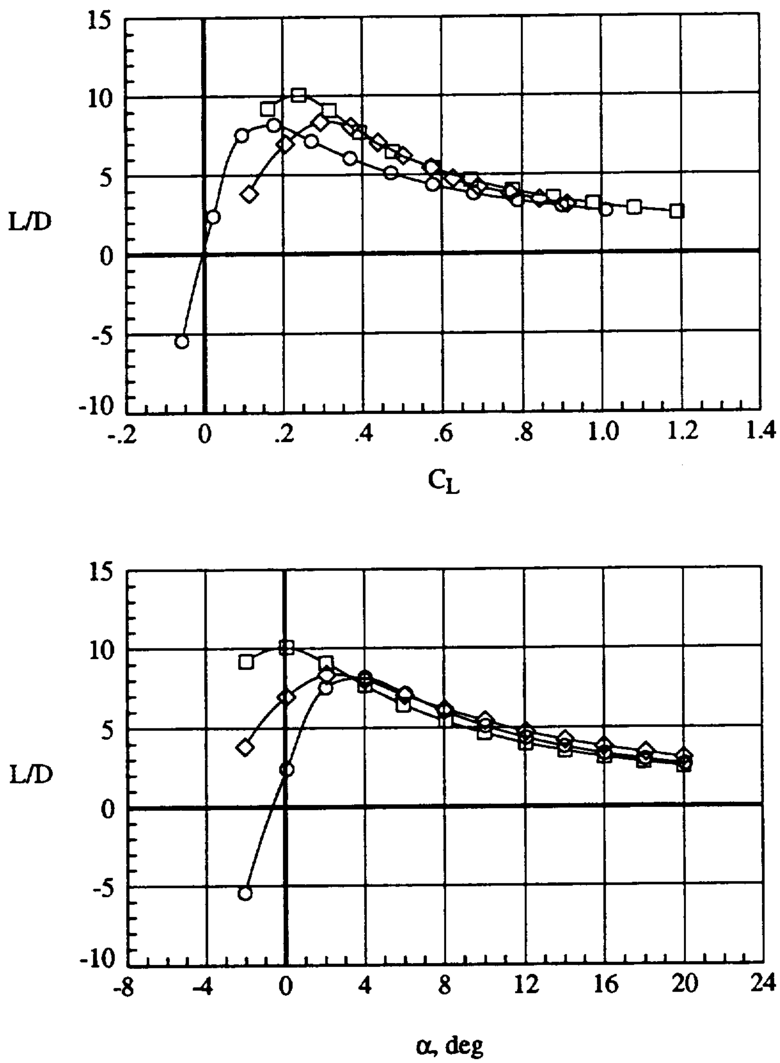
Figure 11. Effect of deflected vortex flap with $\delta_T = 20°$, q=70 psf.

	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	52.	0.	$\delta_L = 0°, \delta_T = 20°$
◇	56.	0.	$\delta_{L_{1/2}} = 40°/0°, \delta_T = 20°$

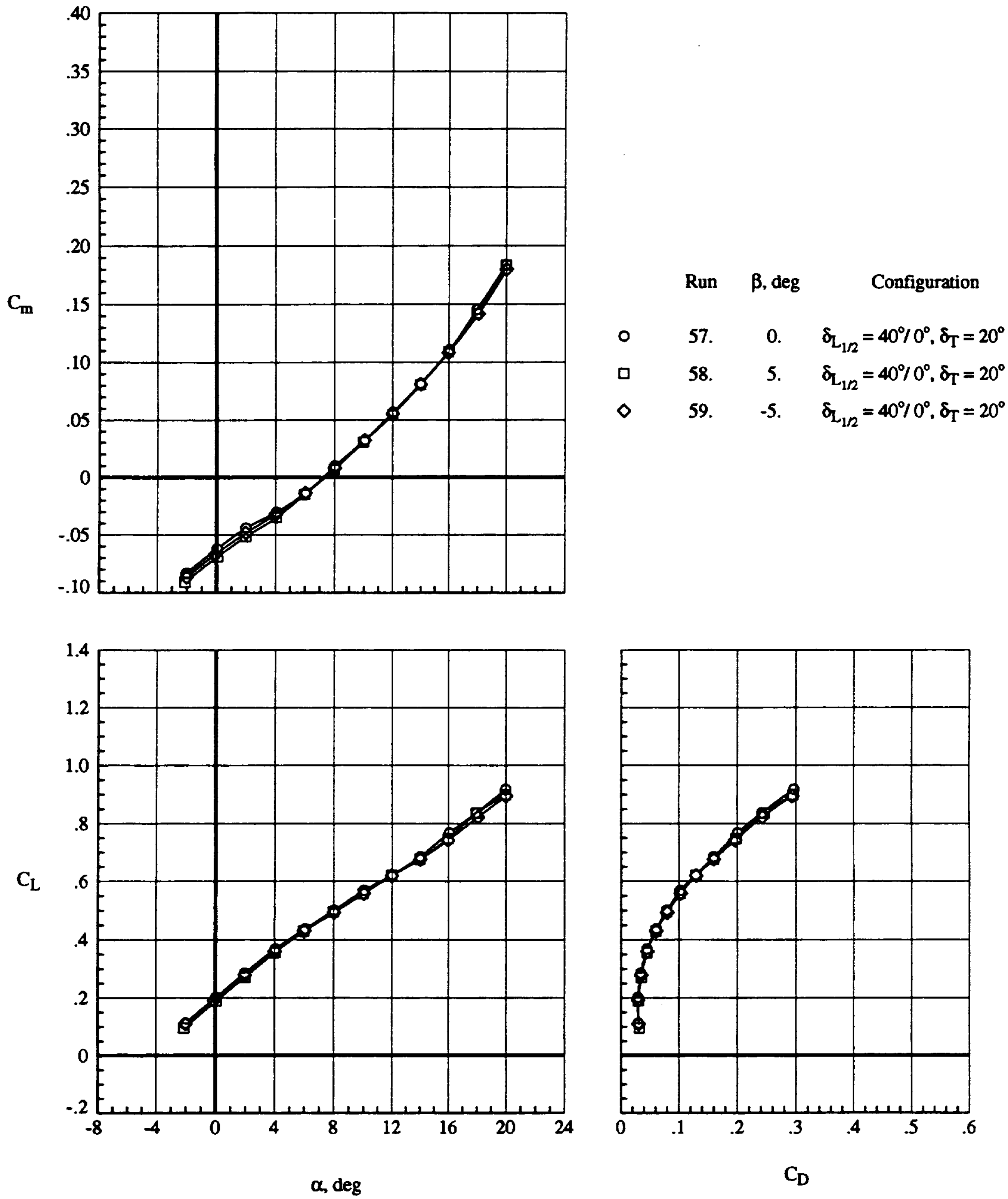


(b) Lateral aerodynamics
Figure 11. Continued.

	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	52.	0.	$\delta_L = 0°, \delta_T = 20°$
◇	56.	0.	$\delta_{L_{1/2}} = 40°/ 0°, \delta_T = 20°$

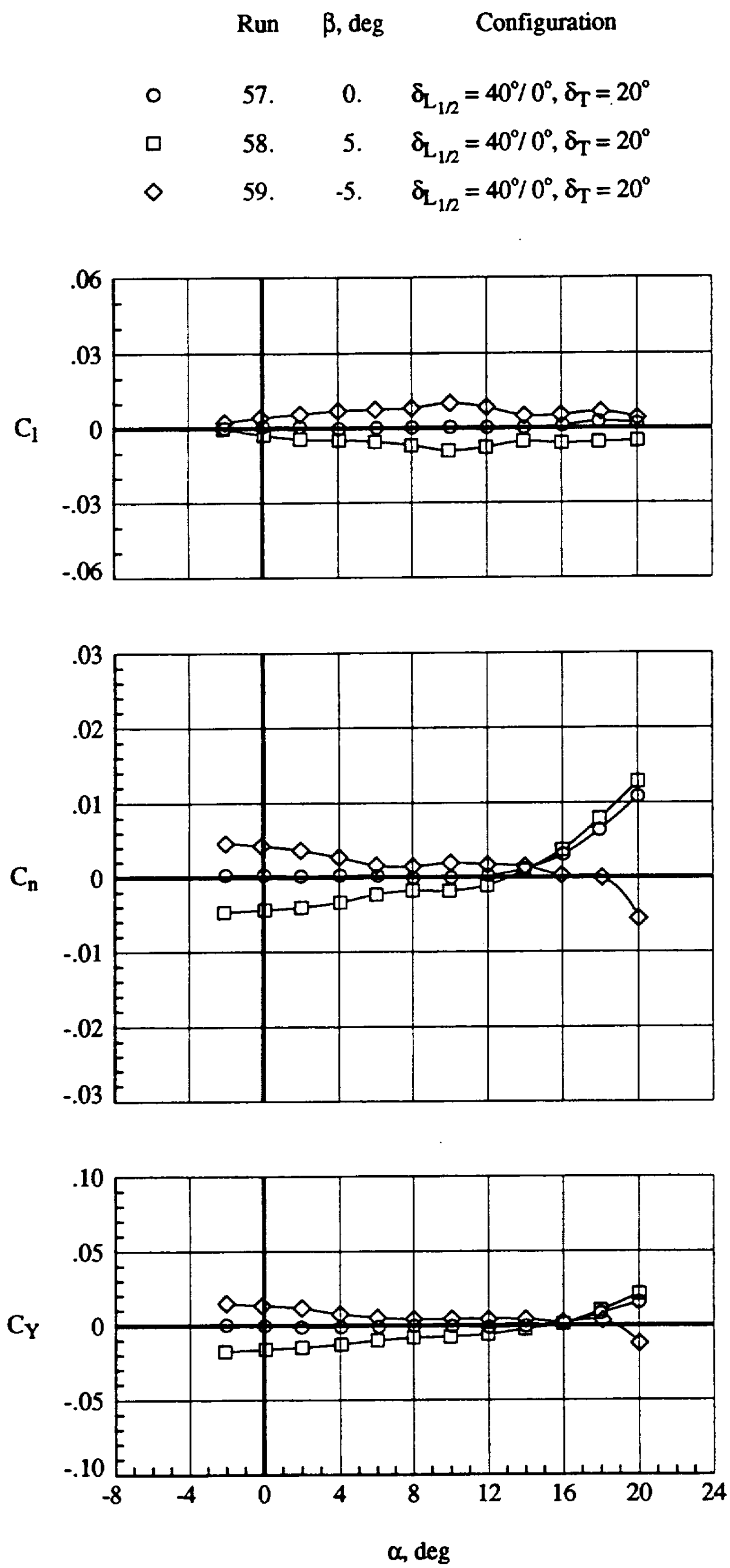


(c) Lift / Drag performance
Figure 11. Concluded.

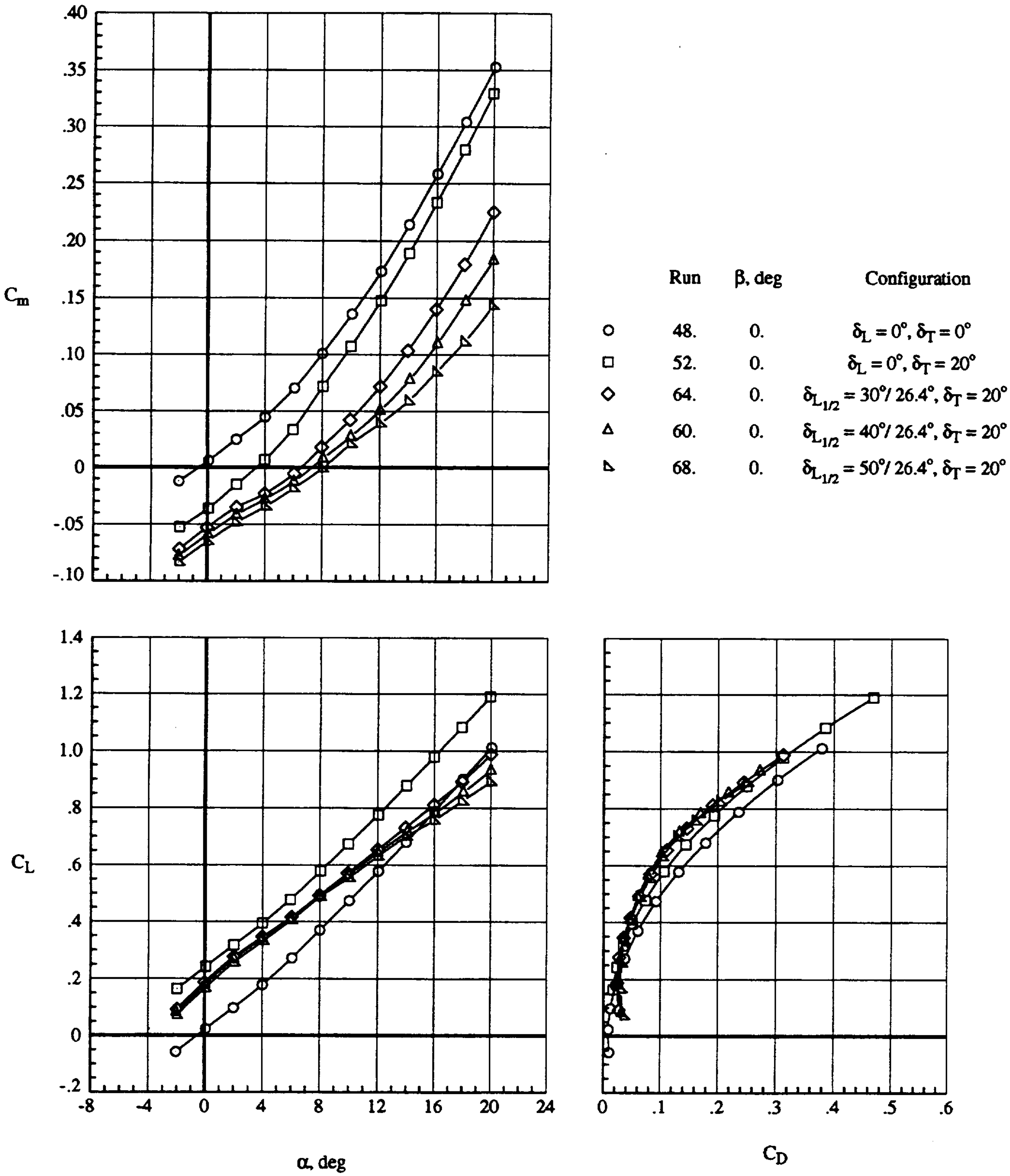


(a) Longitudinal aerodynamics

Figure 12. Effect of sideslip with deflected vortex flap and $\delta_T = 20°$; q=110 psf.



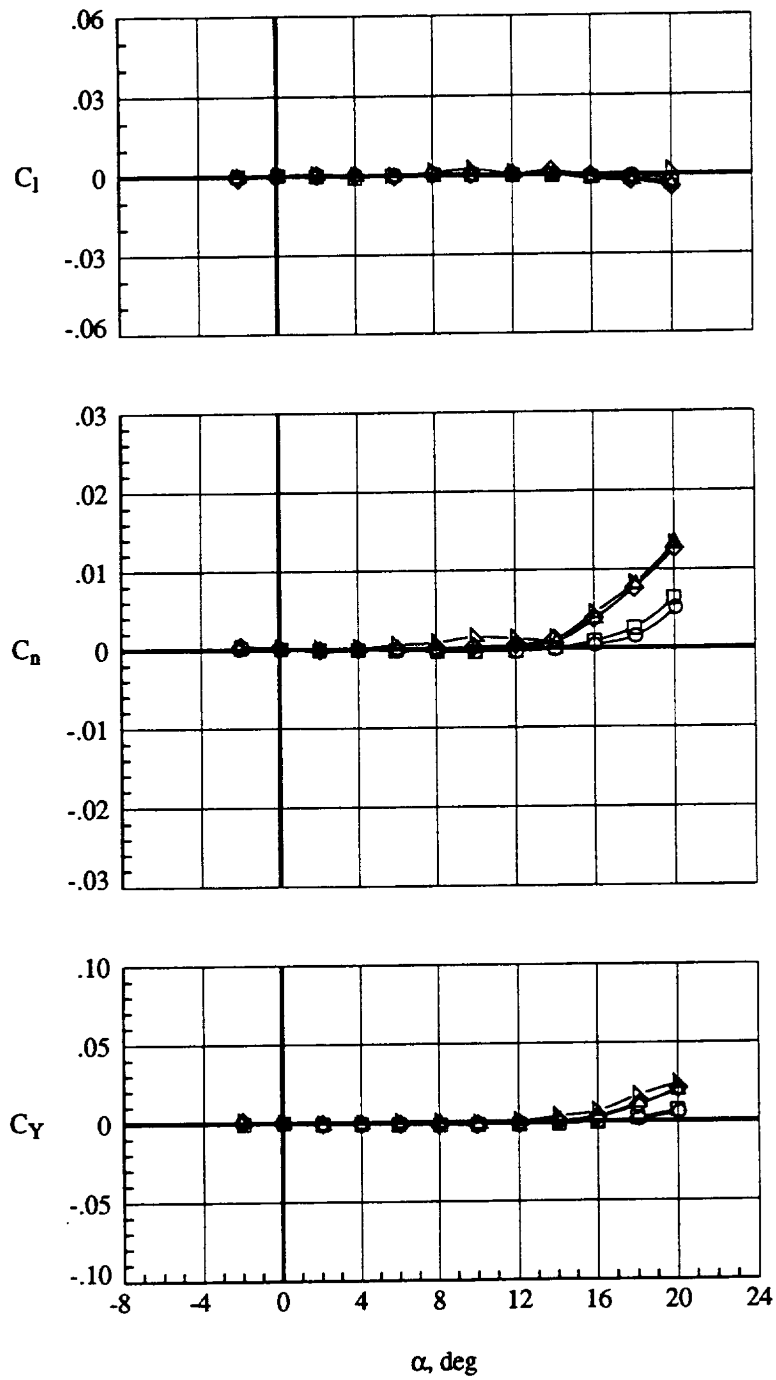
(b) Lateral aerodynamics
Figure 12. Concluded.



(a) Longitudinal aerodynamics

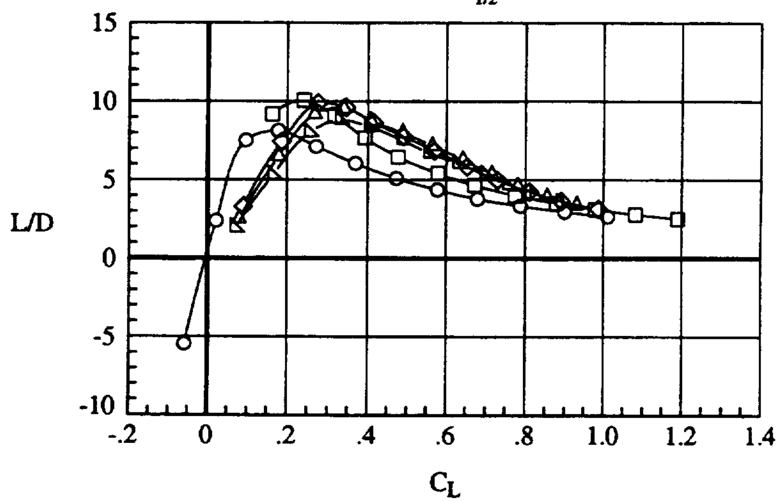
Figure 13. Effect of deflecting the vortex flap with the outboard leading-edge flap. $\delta_T = 20°$, q=70 psf.

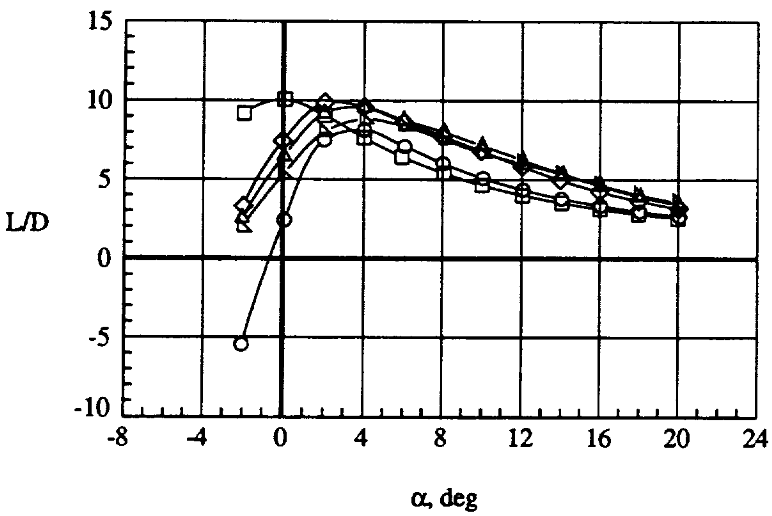
	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	52.	0.	$\delta_L = 0°, \delta_T = 20°$
◇	64.	0.	$\delta_{L_{1/2}} = 30°/26.4°, \delta_T = 20°$
△	60.	0.	$\delta_{L_{1/2}} = 40°/26.4°, \delta_T = 20°$
◺	68.	0.	$\delta_{L_{1/2}} = 50°/26.4°, \delta_T = 20°$



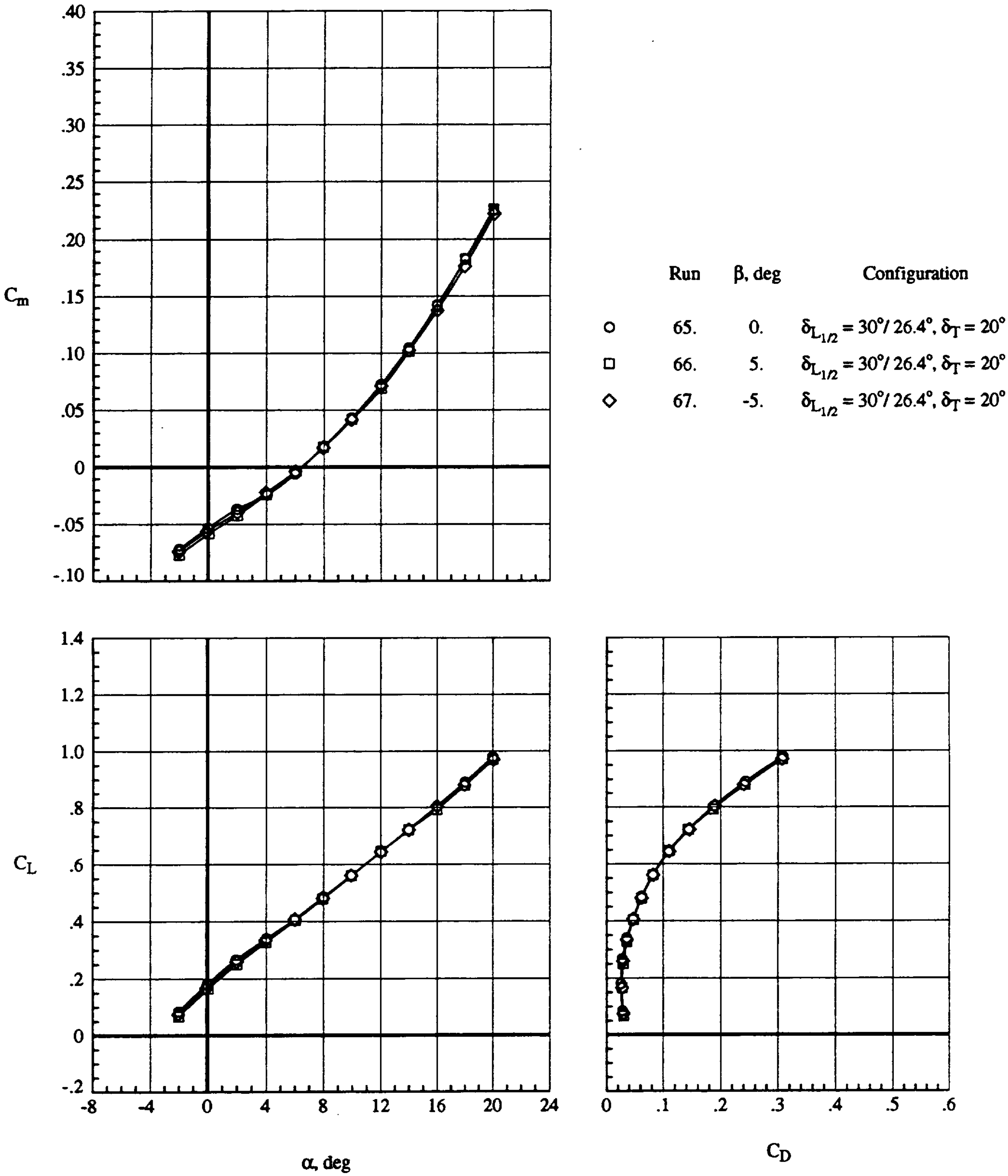
(b) Lateral aerodynamics
Figure 13. Continued.

	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	52.	0.	$\delta_L = 0°, \delta_T = 20°$
◇	64.	0.	$\delta_{L_{1/2}} = 30°/26.4°, \delta_T = 20°$
△	60.	0.	$\delta_{L_{1/2}} = 40°/26.4°, \delta_T = 20°$
◺	68.	0.	$\delta_{L_{1/2}} = 50°/26.4°, \delta_T = 20°$



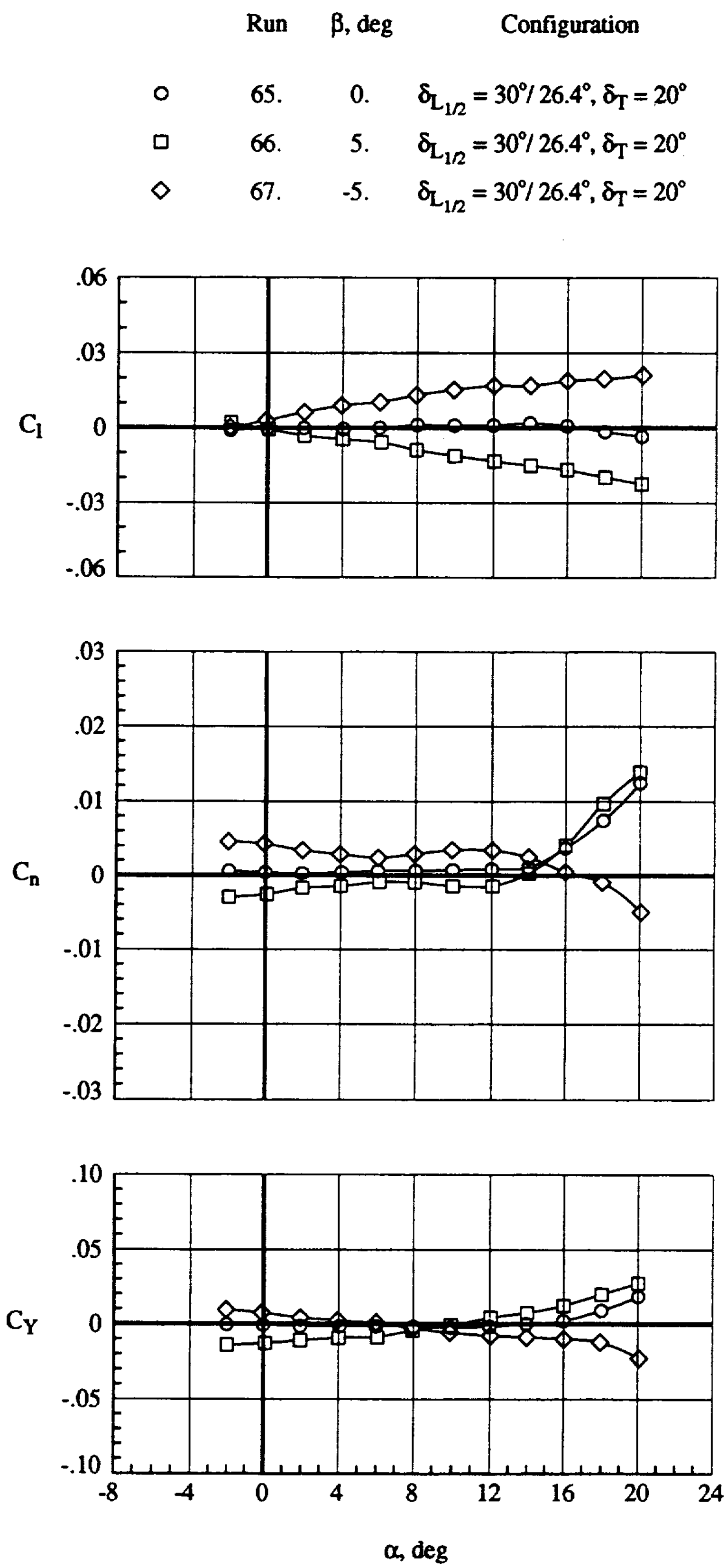


(c) Lift / Drag performance
Figure 13. Concluded.

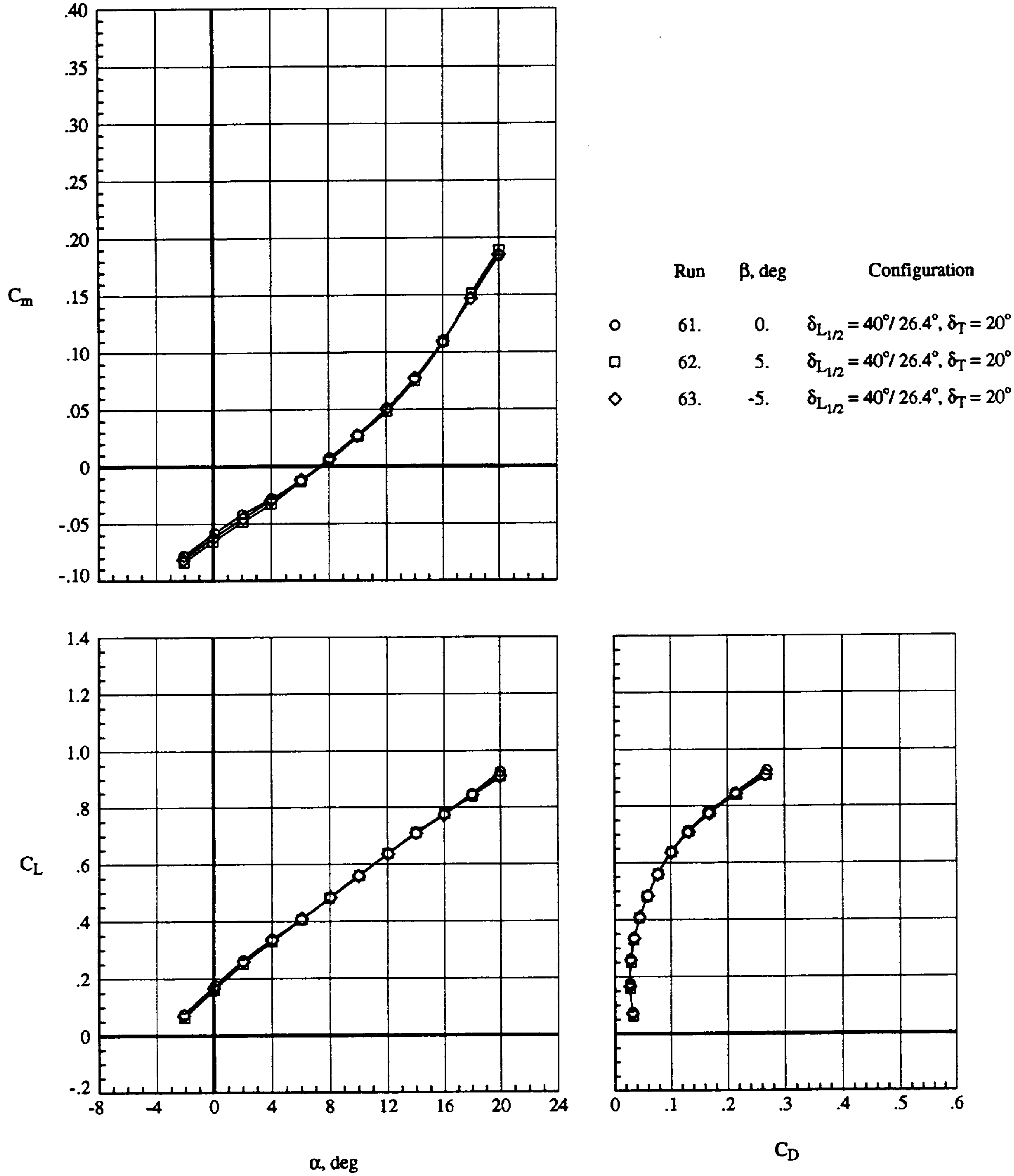


(a) Longitudinal aerodynamics

Figure 14. Effect of sideslip with vortex flap at δ_{L_1} = 30° and outboard leading-edge flap at δ_{L_2} = 26.4°. δ_T = 20°, q=110 psf.

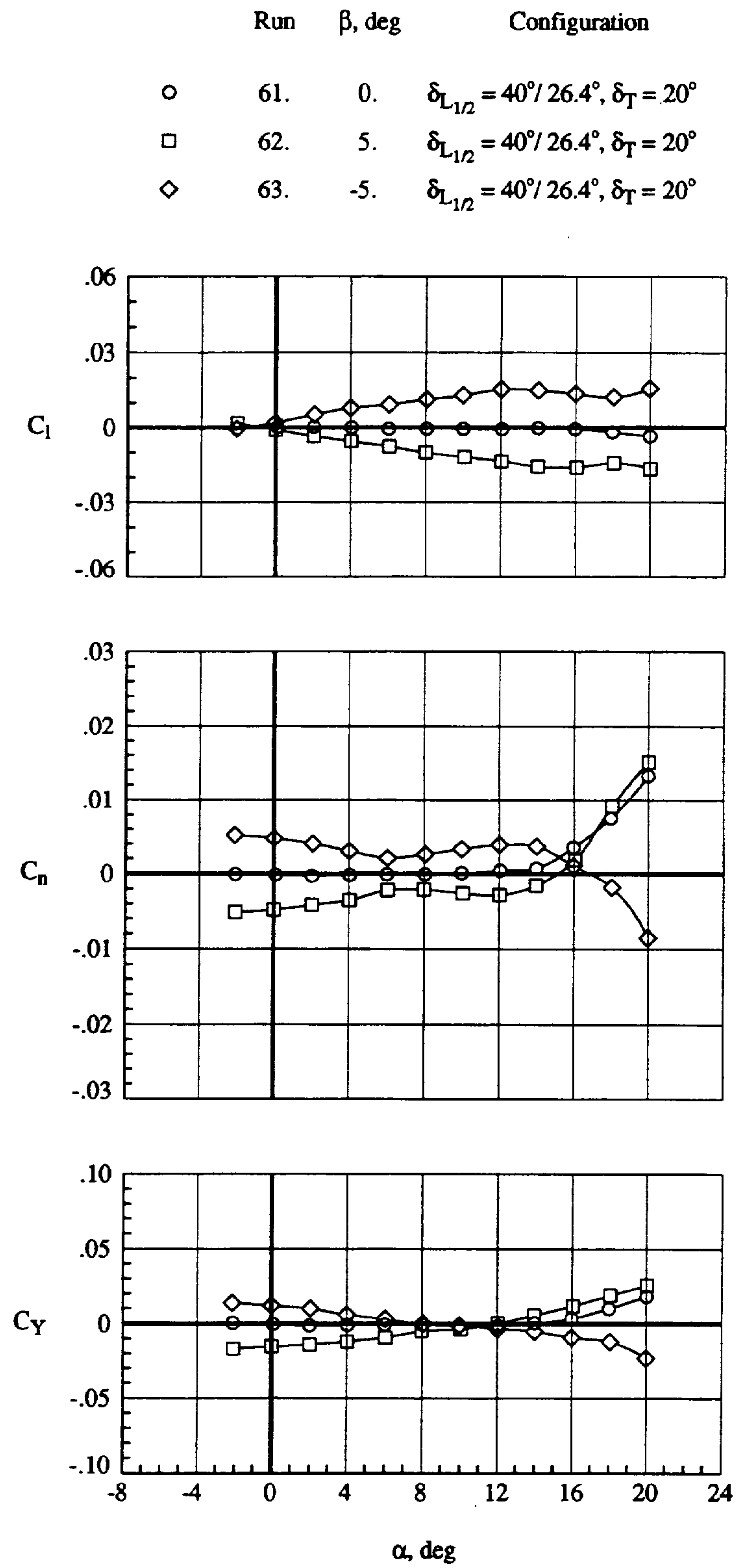


(b) Lateral aerodynamics
Figure 14. Concluded.

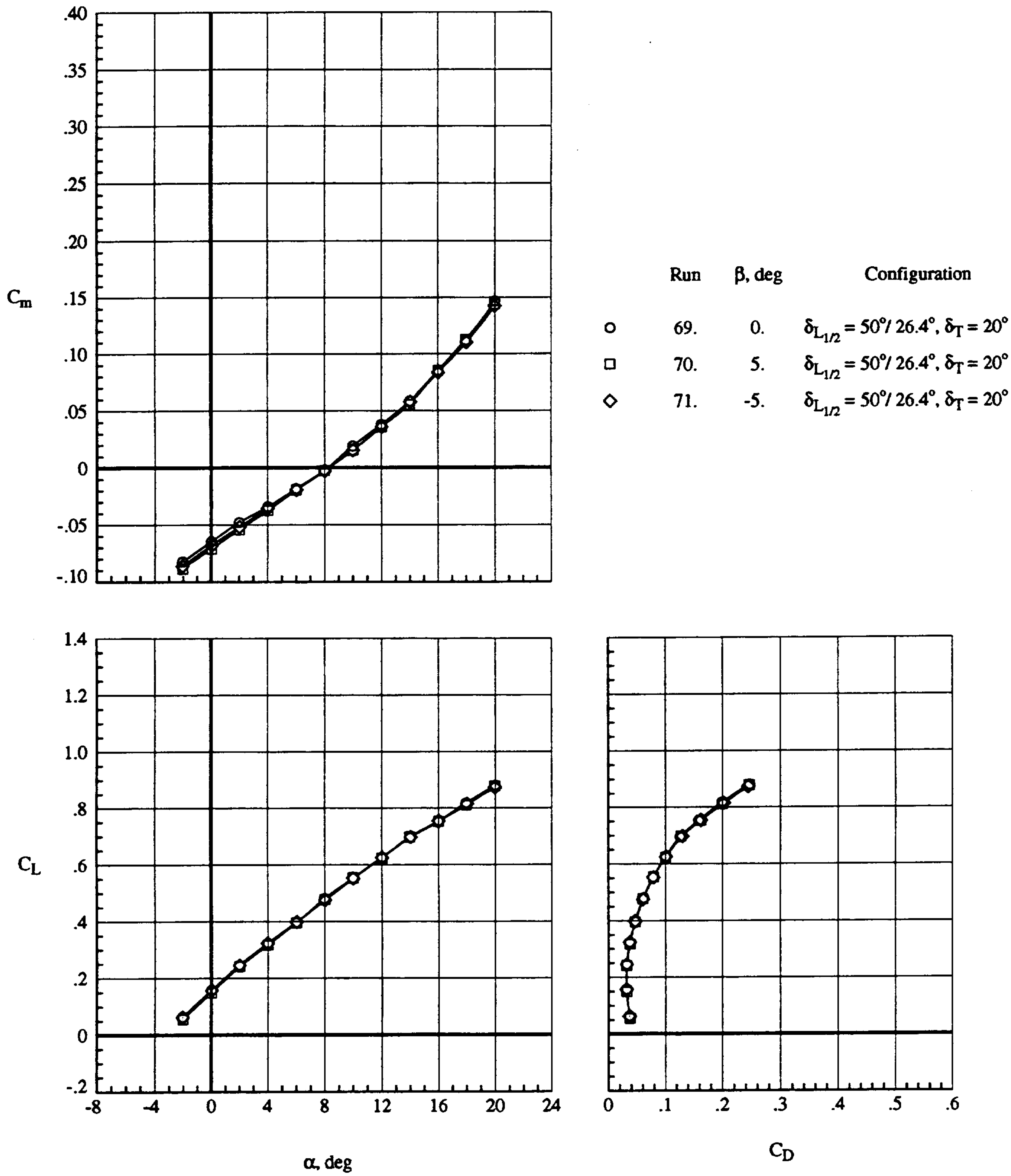


(a) Longitudinal aerodynamics

Figure 15. Effect of sideslip with vortex flap at $\delta_{L_1} = 40°$ and outboard leading-edge flap at $\delta_{L_2} = 26.4°$. $\delta_T = 20°$, q=110 psf.



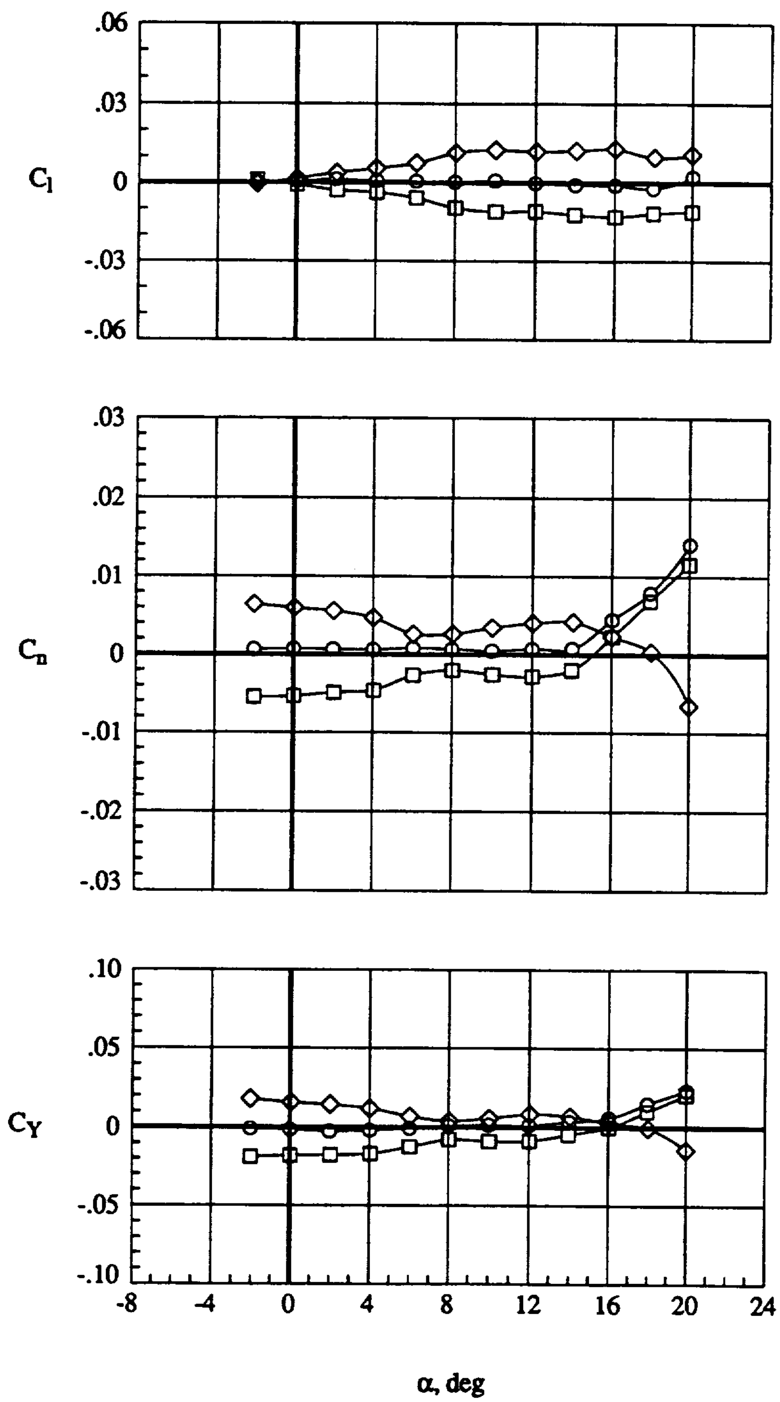
(b) Lateral aerodynamics
Figure 15. Concluded.



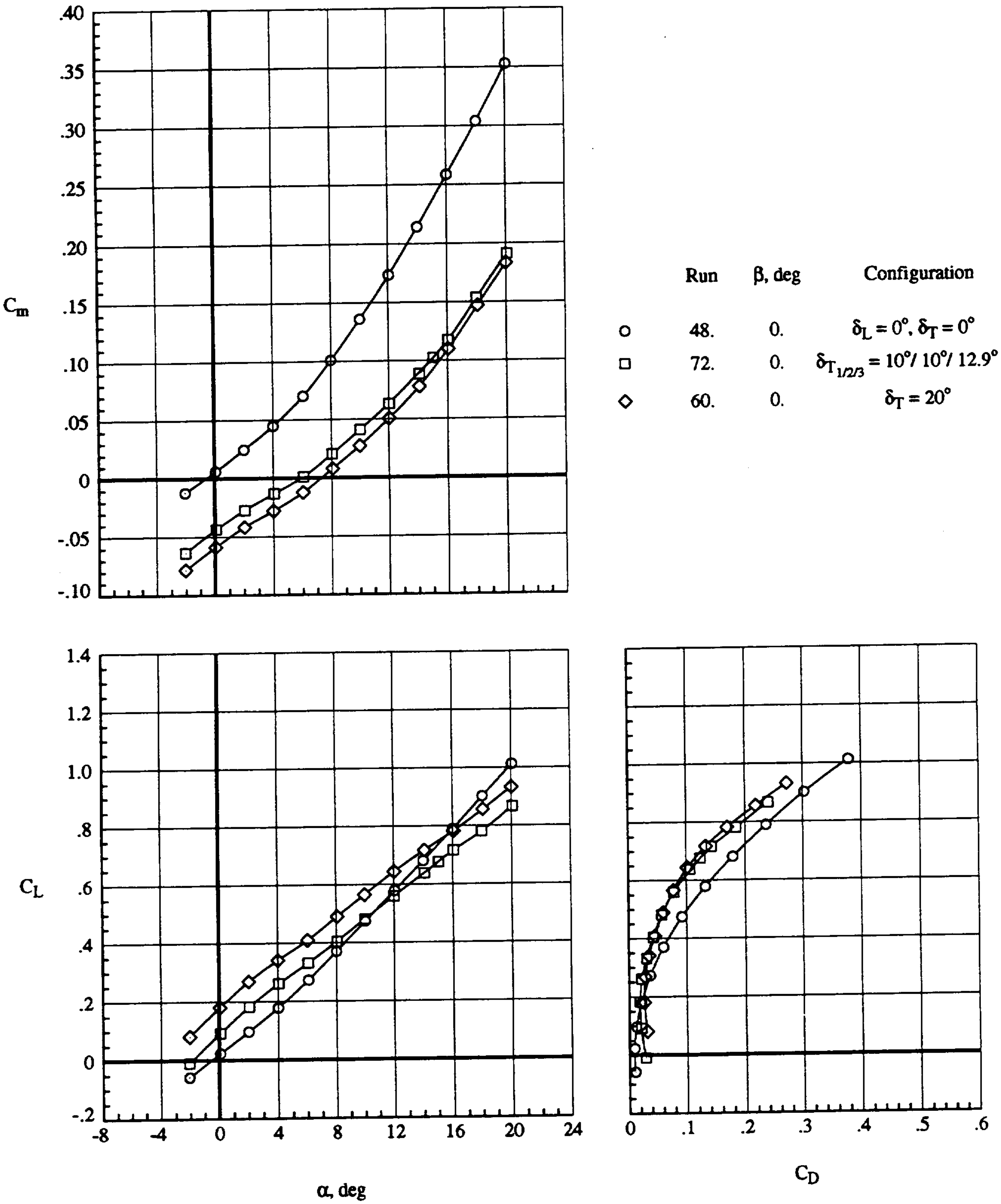
(a) Longitudinal aerodynamics

Figure 16. Effect of sideslip with vortex flap at $\delta_{L_1} = 50°$ and outboard leading-edge flap at $\delta_{L_2} = 26.4°$. $\delta_T = 20°$, q=110 psf.

	Run	β, deg	Configuration
○	69.	0.	$\delta_{L_{1/2}} = 50°/26.4°, \delta_T = 20°$
□	70.	5.	$\delta_{L_{1/2}} = 50°/26.4°, \delta_T = 20°$
◇	71.	-5.	$\delta_{L_{1/2}} = 50°/26.4°, \delta_T = 20°$

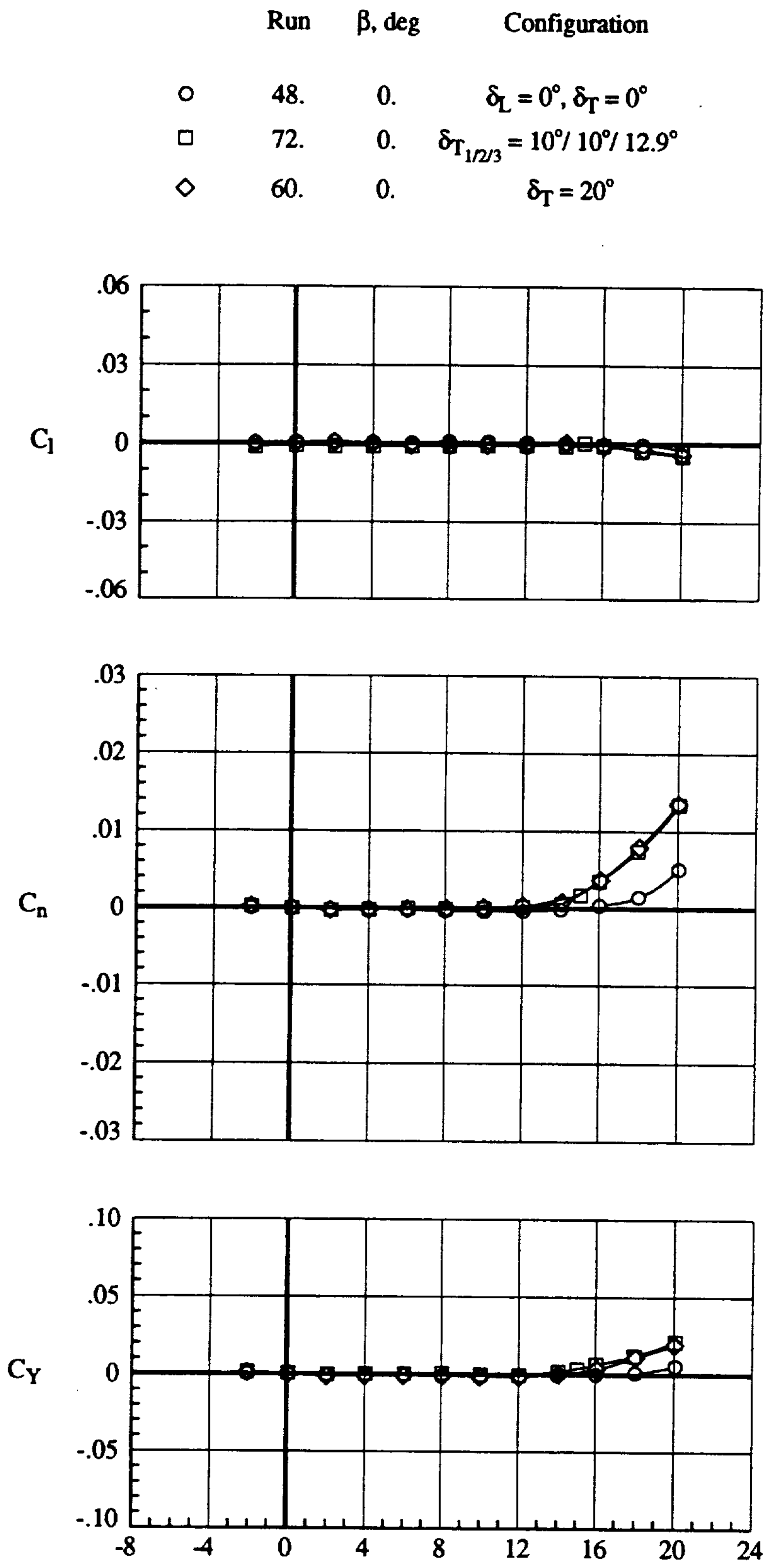


(b) Lateral aerodynamics
Figure 16. Concluded.



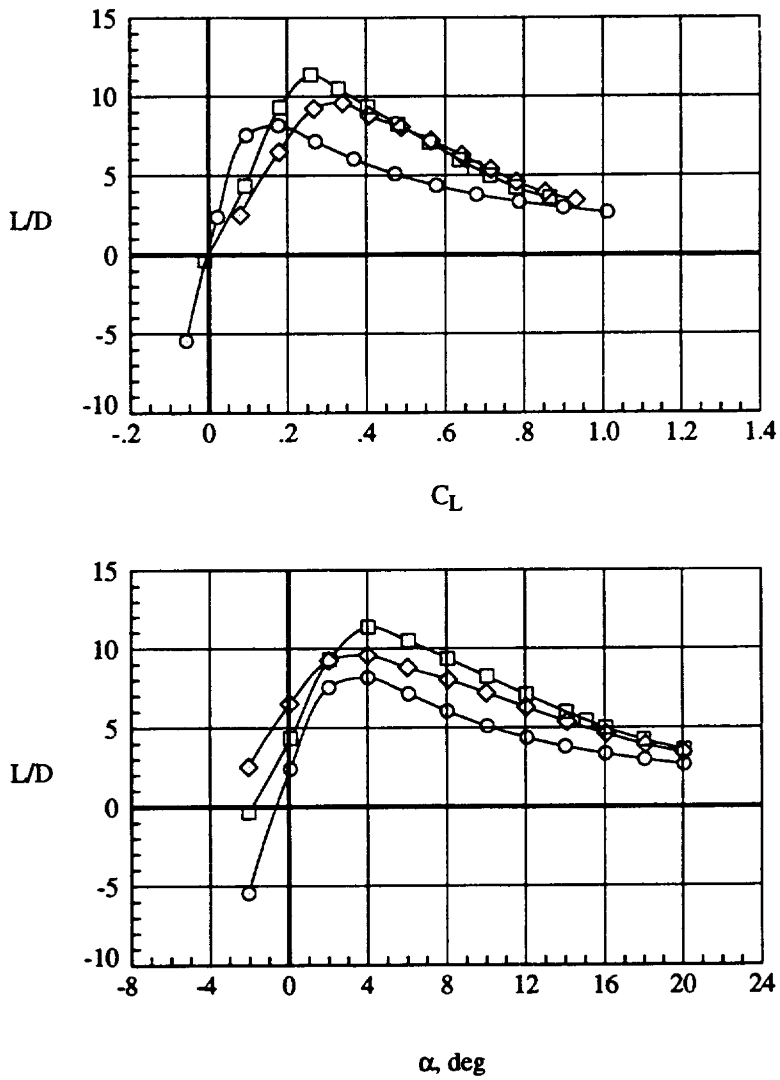
(a) Longitudinal aerodynamics

Figure 17. Effect of deflecting outboard trailing-edge flap with $\delta_{L_{1/2}} = 40°/ 26.4°$, q=70 psf.

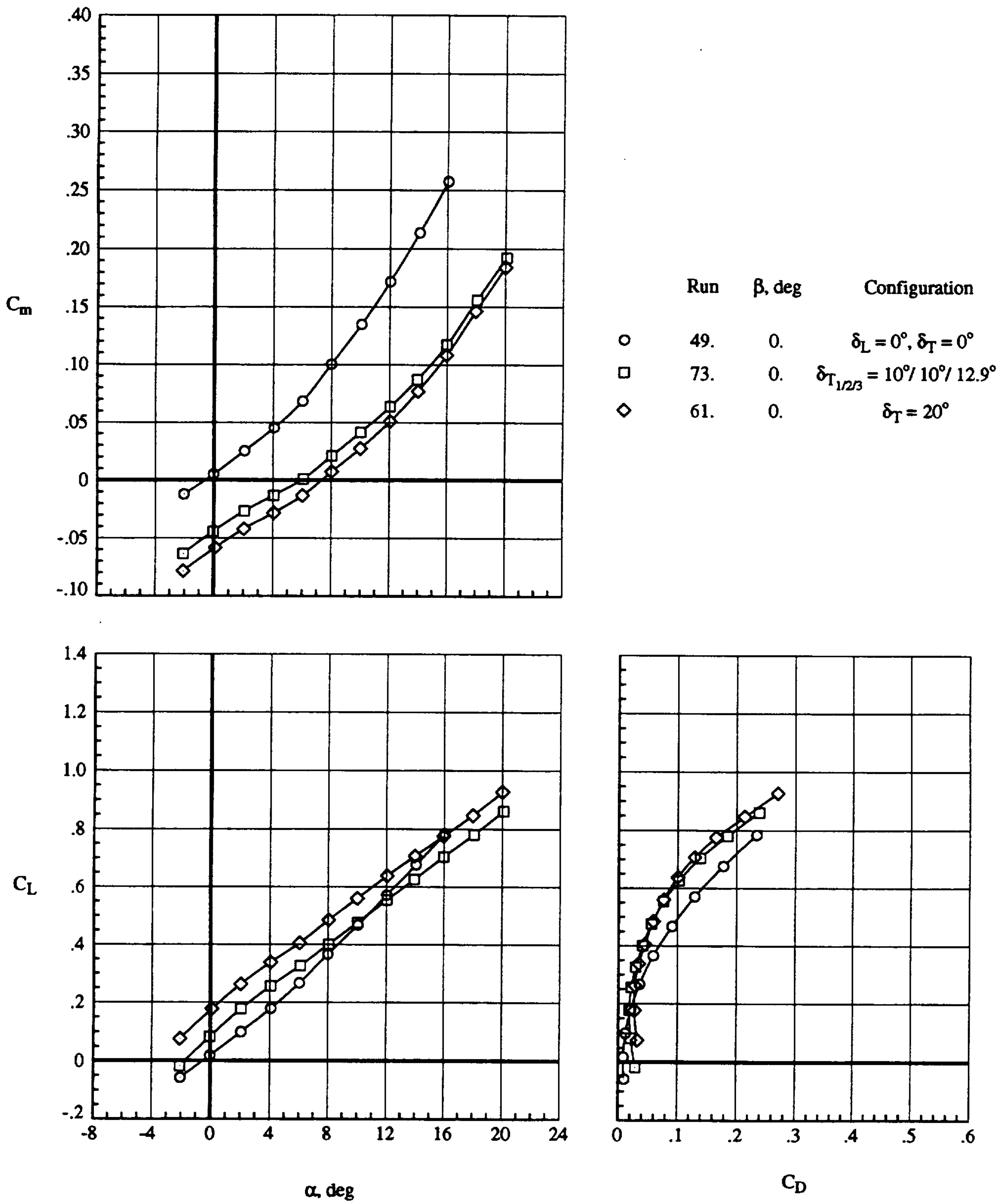


(b) Lateral aerodynamics
Figure 17. Continued.

	Run	β, deg	Configuration
○	48.	0.	$\delta_L = 0°, \delta_T = 0°$
□	72.	0.	$\delta_{T_{1/2/3}} = 10°/10°/12.9°$
◇	60.	0.	$\delta_T = 20°$

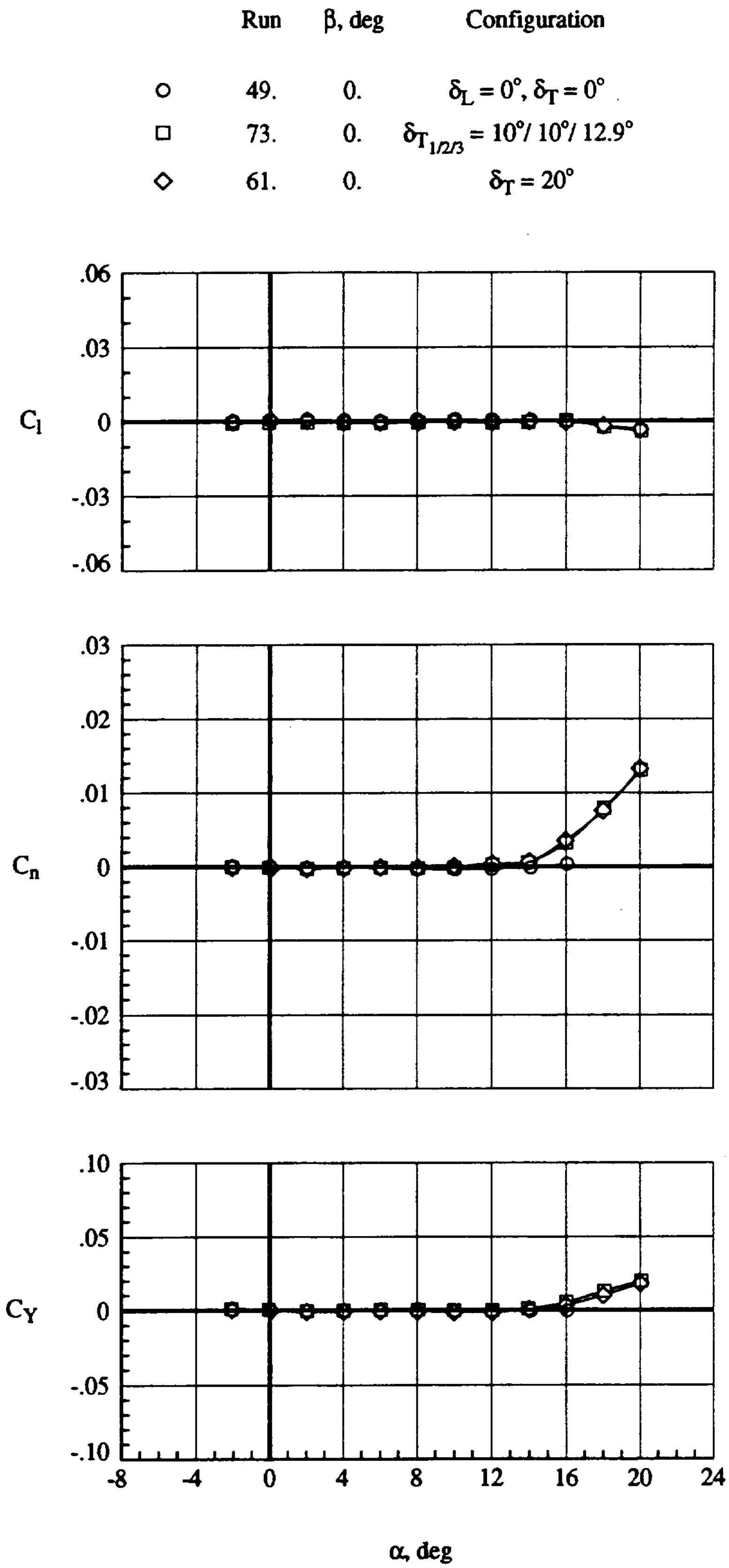


(c) Lift / Drag performance
Figure 17. Concluded.



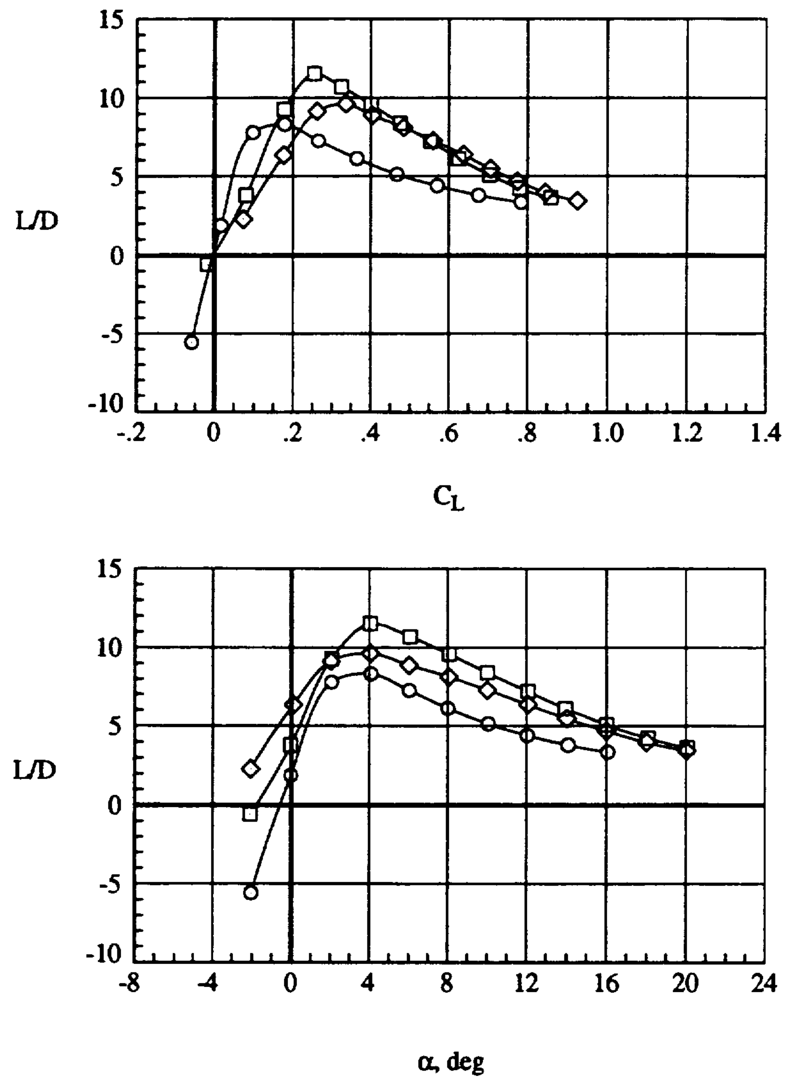
(a) Longitudinal aerodynamics

Figure 18. Effect of deflecting outboard trailing-edge flap with $\delta_{L_{1/2}} = 40°/ 26.4°$, q=110 psf.



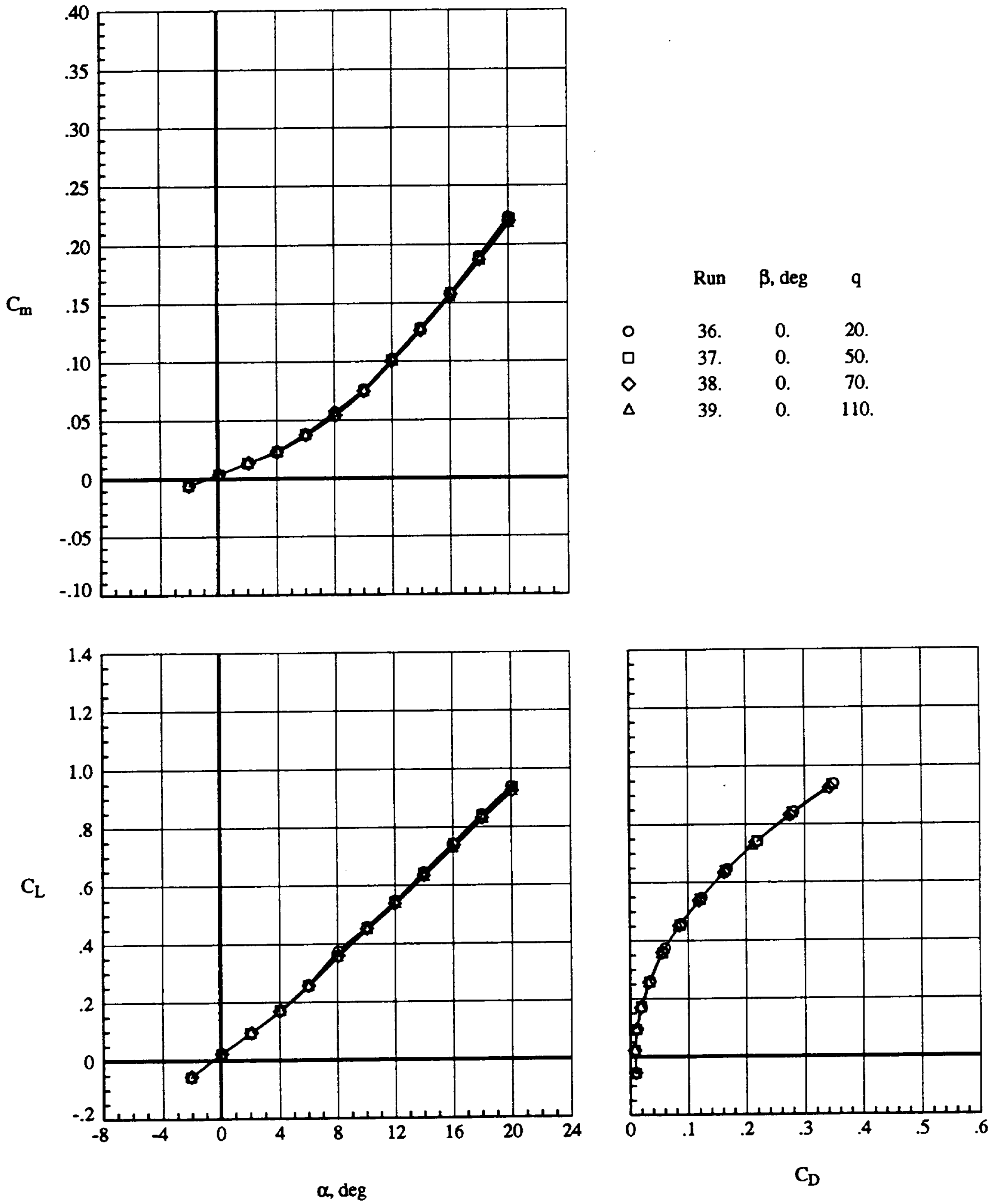
(b) Lateral aerodynamics
Figure 18. Continued.

	Run	β, deg	Configuration
○	49.	0.	$\delta_L = 0°, \delta_T = 0°$
□	73.	0.	$\delta_{T_{1/2/3}} = 10°/ 10°/ 12.9°$
◇	61.	0.	$\delta_T = 20°$



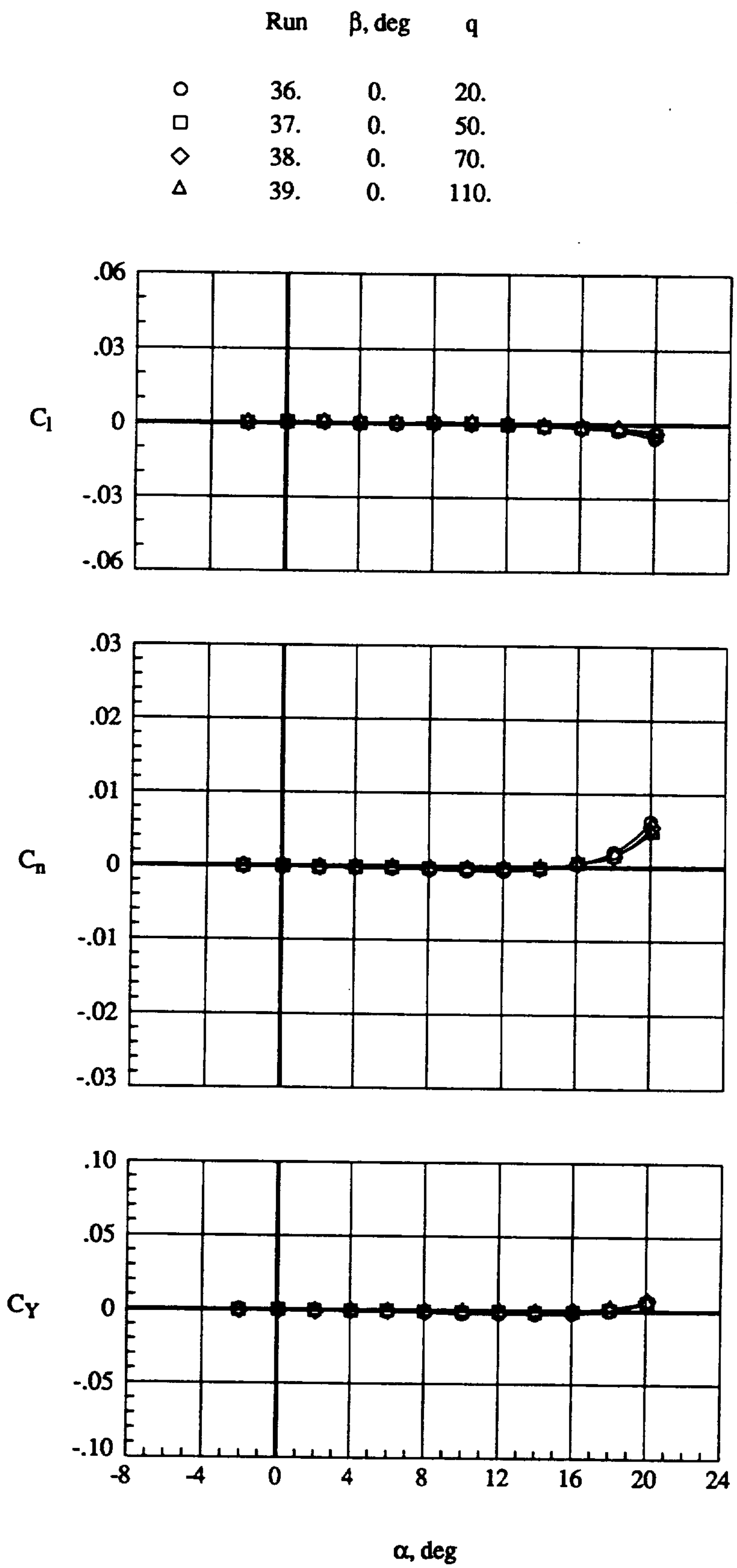
(c) Lift / Drag performance

Figure 18. Concluded.



(a) Longitudinal aerodynamics

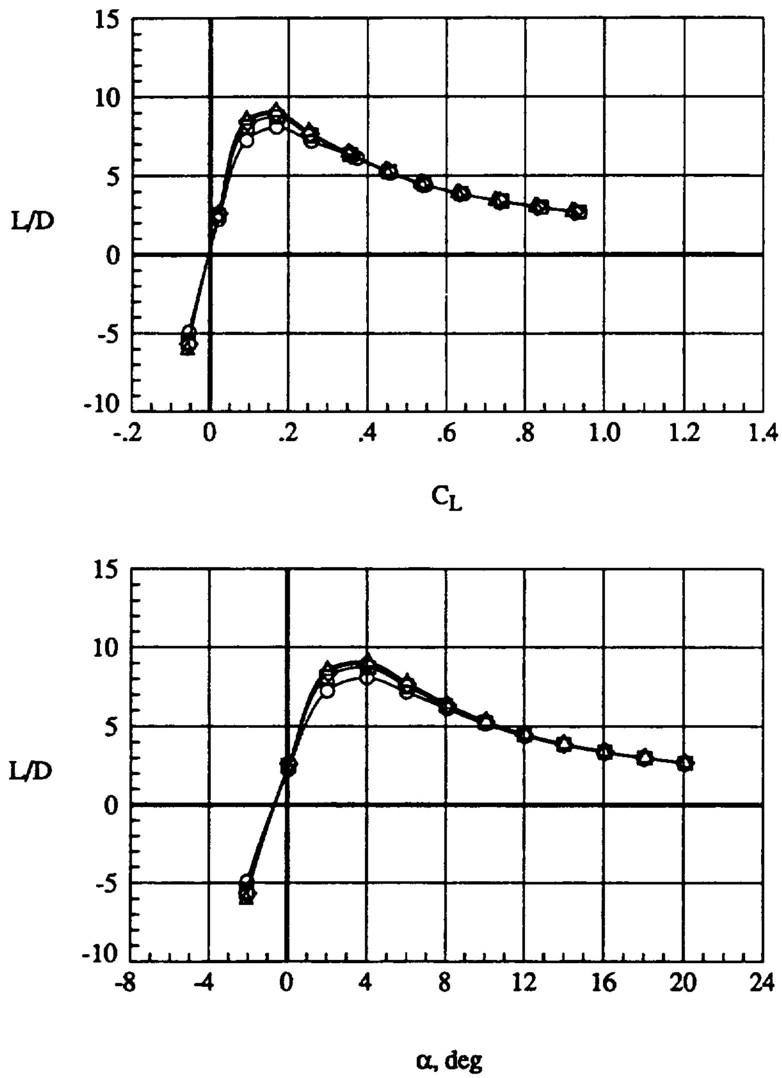
Figure 19. Effect of tunnel dynamic pressure on the baseline configuration, $\delta_L = 0°$, and $\delta_T = 0°$.



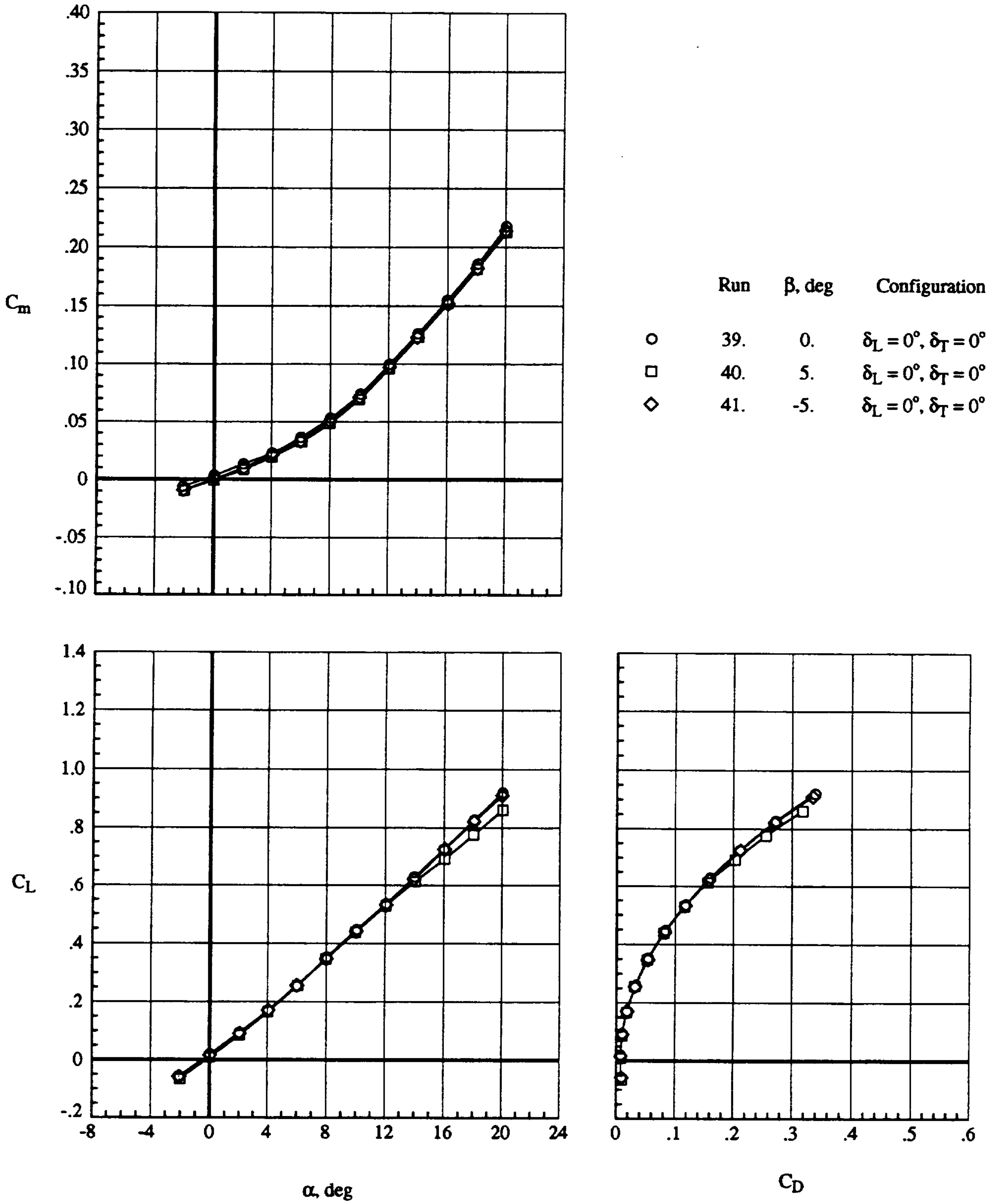
(b) Lateral aerodynamics

Figure 19. Continued.

	Run	β, deg	q
○	36.	0.	20.
□	37.	0.	50.
◇	38.	0.	70.
△	39.	0.	110.

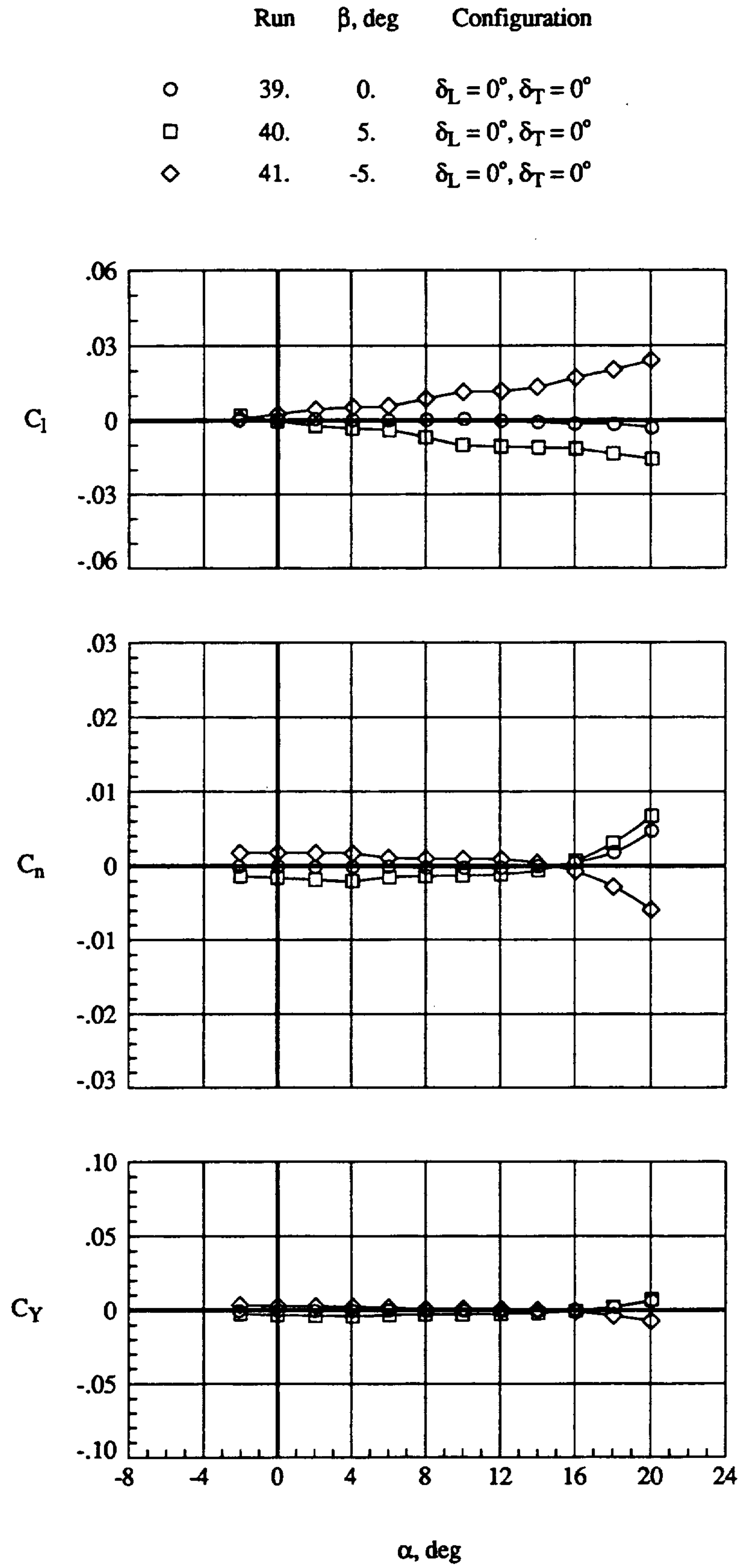


(c) Lift / Drag performance
Figure 19. Concluded.

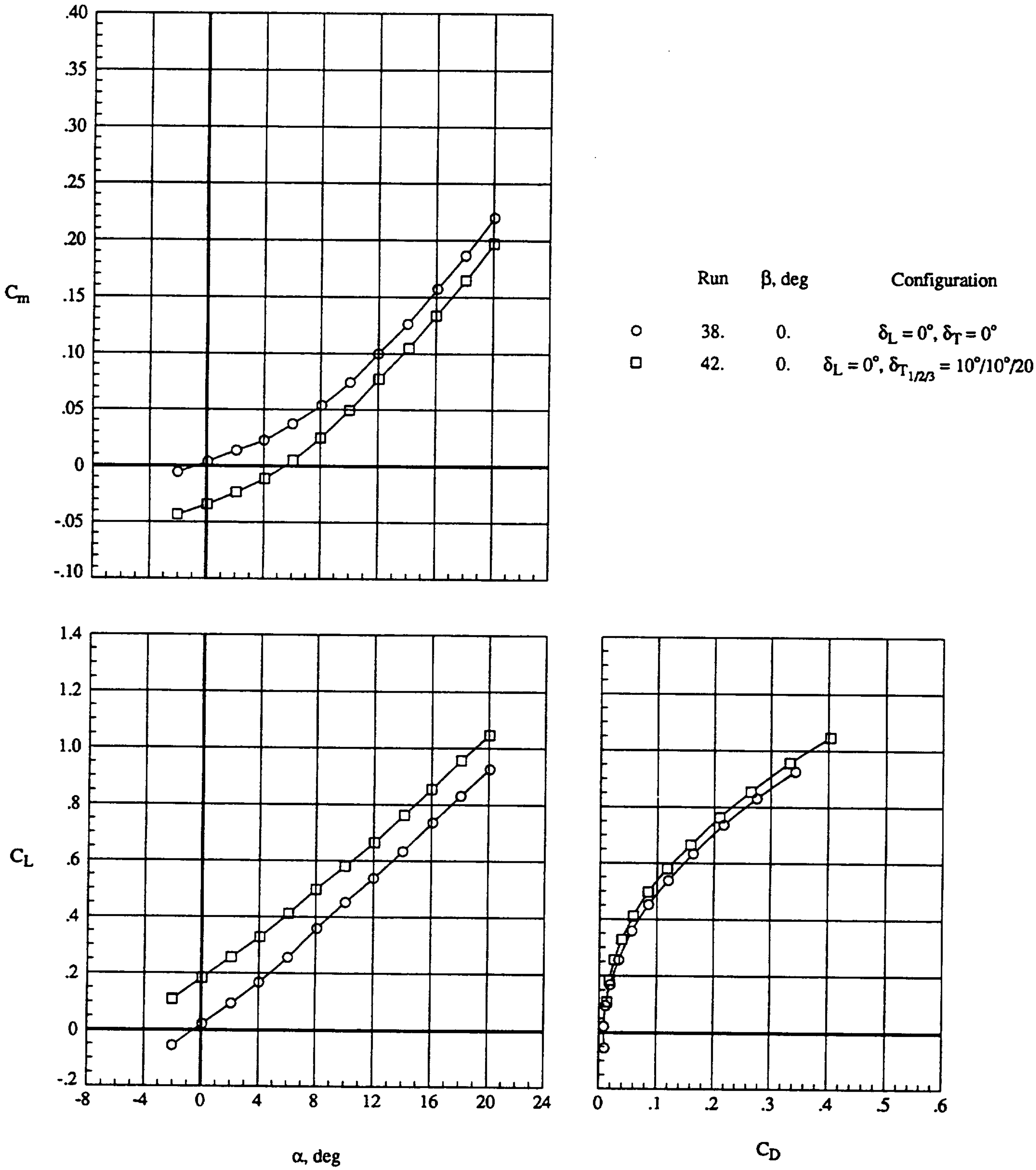


(a) Longitudinal aerodynamics

Figure 20. Effect of sideslip on baseline configuration, q=110 psf.



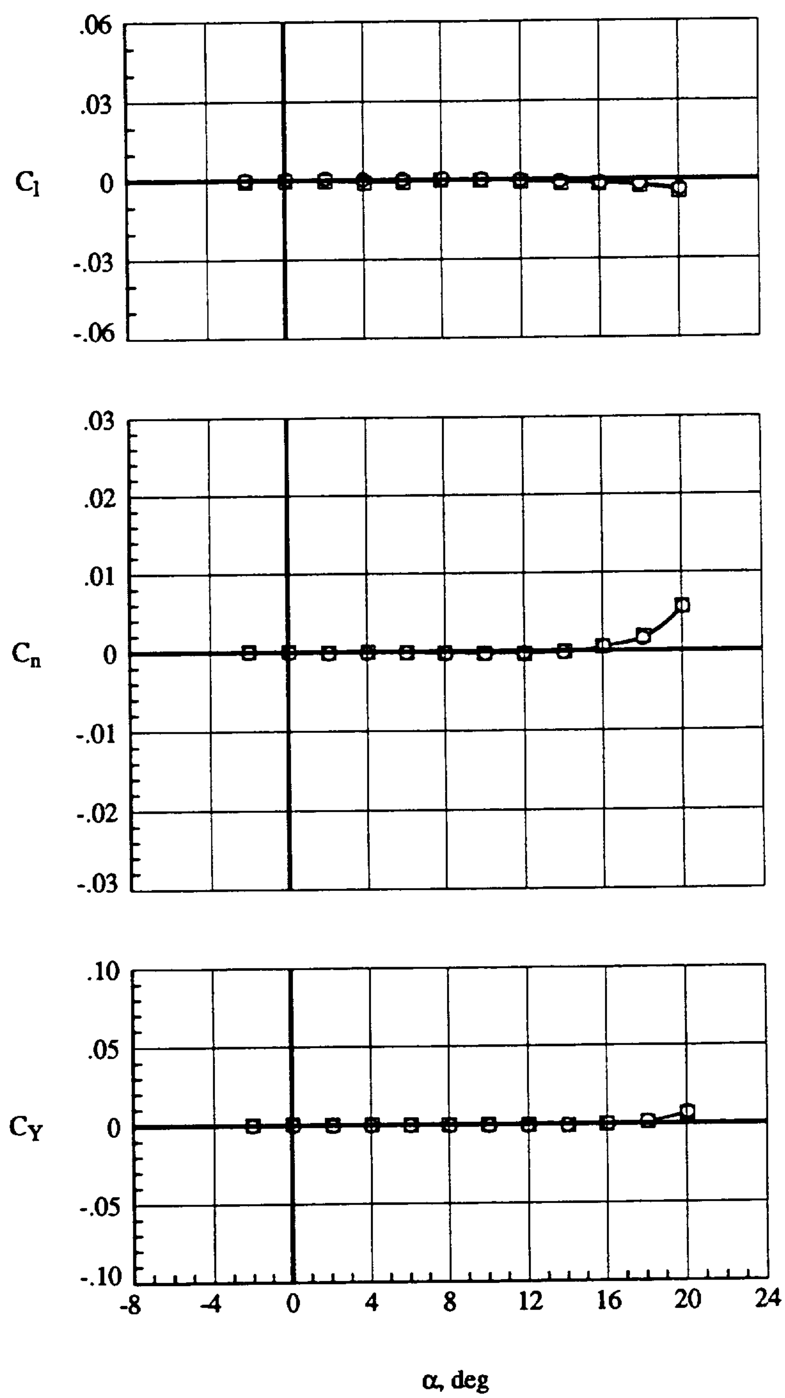
(b) Lateral aerodynamics
Figure 20. Concluded.



(a) Longitudinal aerodynamics

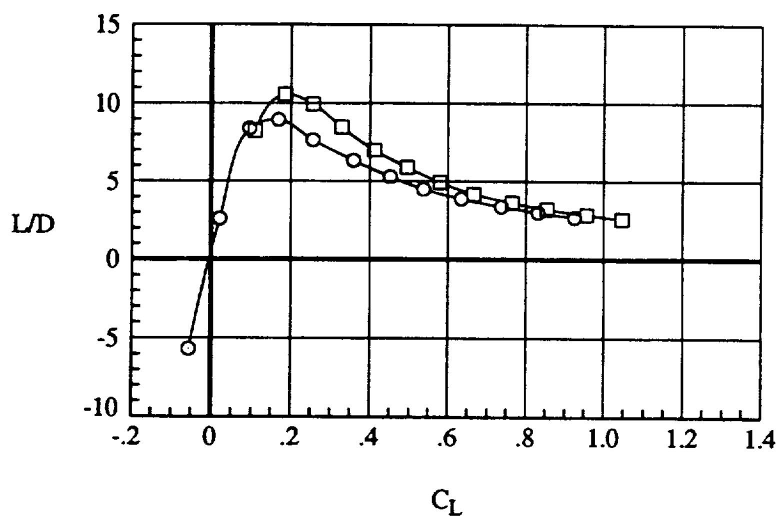
Figure 21. Effect of trailing-edge flaps on baseline configuration. $\delta_L = 0°$, q=70 psf.

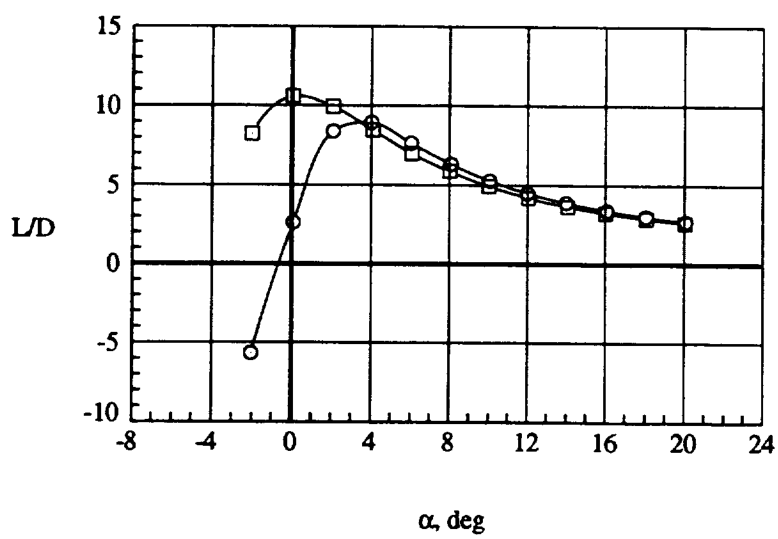
	Run	β, deg	Configuration
○	38.	0.	$\delta_L = 0°, \delta_T = 0°$
□	42.	0.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$



(b) Lateral aerodynamics
Figure 21. Continued.

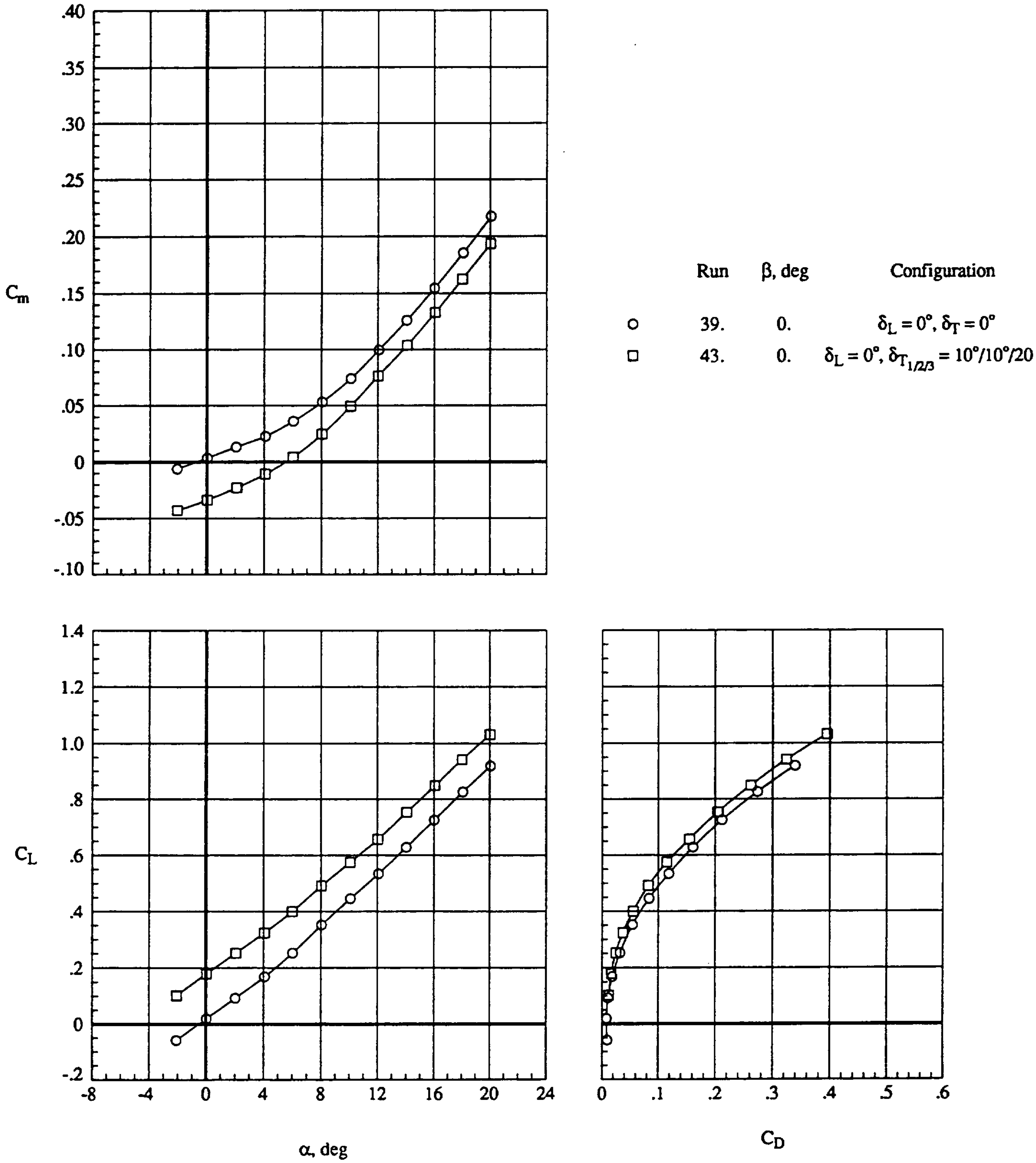
	Run	β, deg	Configuration
○	38.	0.	$\delta_L = 0°, \delta_T = 0°$
□	42.	0.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$





(c) Lift / Drag performance

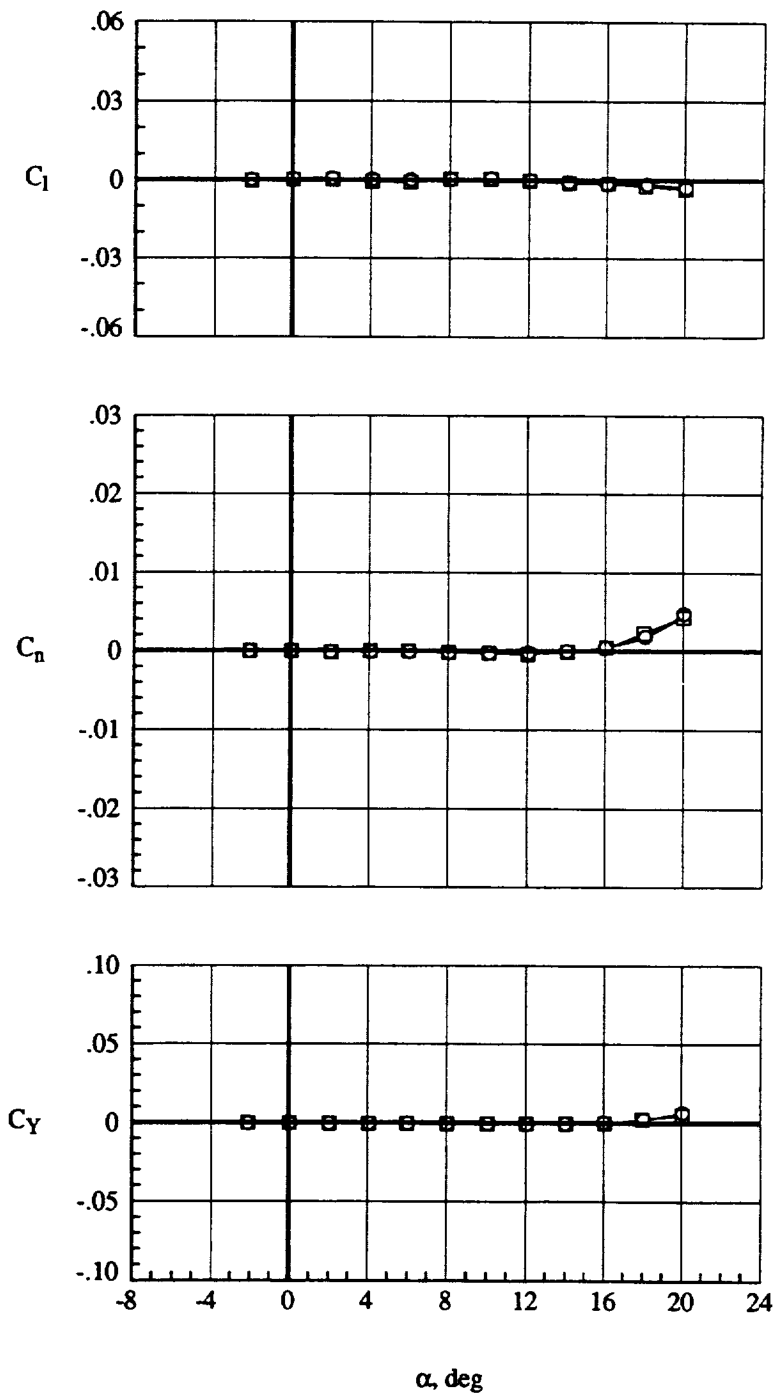
Figure 21. Concluded.



(a) Longitudinal aerodynamics

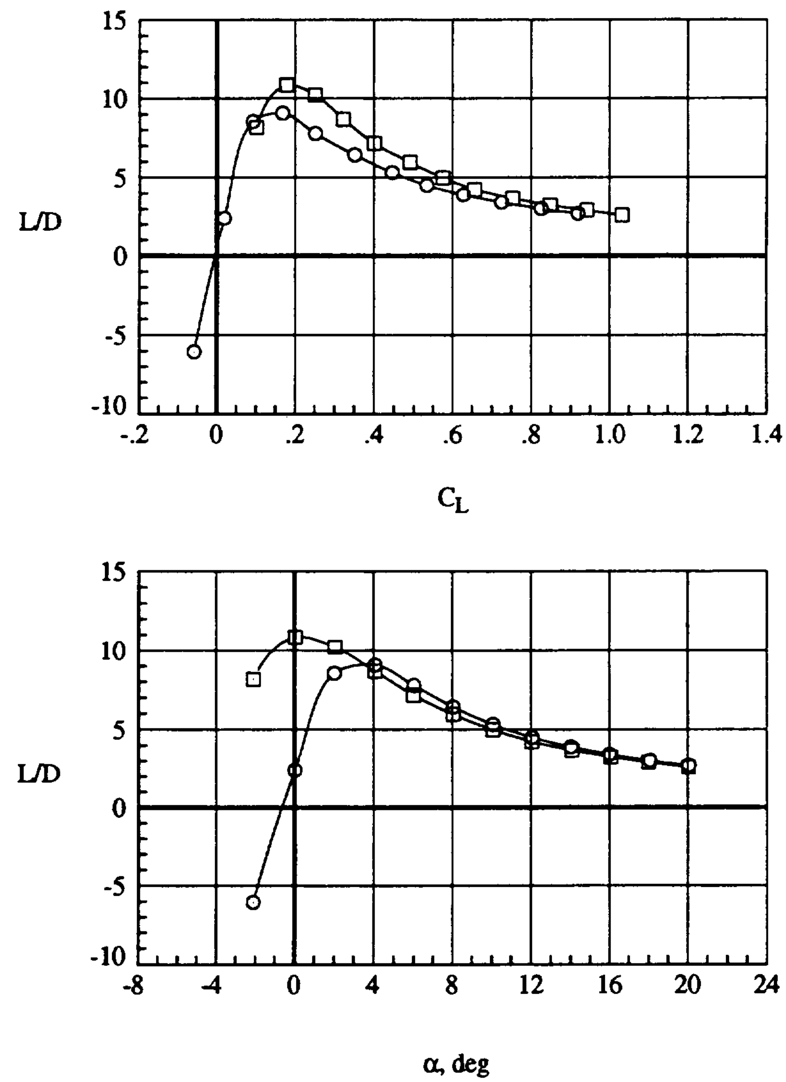
Figure 22. Effect of trailing-edge flaps on baseline configuration, q=110 psf.

	Run	β, deg	Configuration
○	39.	0.	$\delta_L = 0°, \delta_T = 0°$
□	43.	0.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$



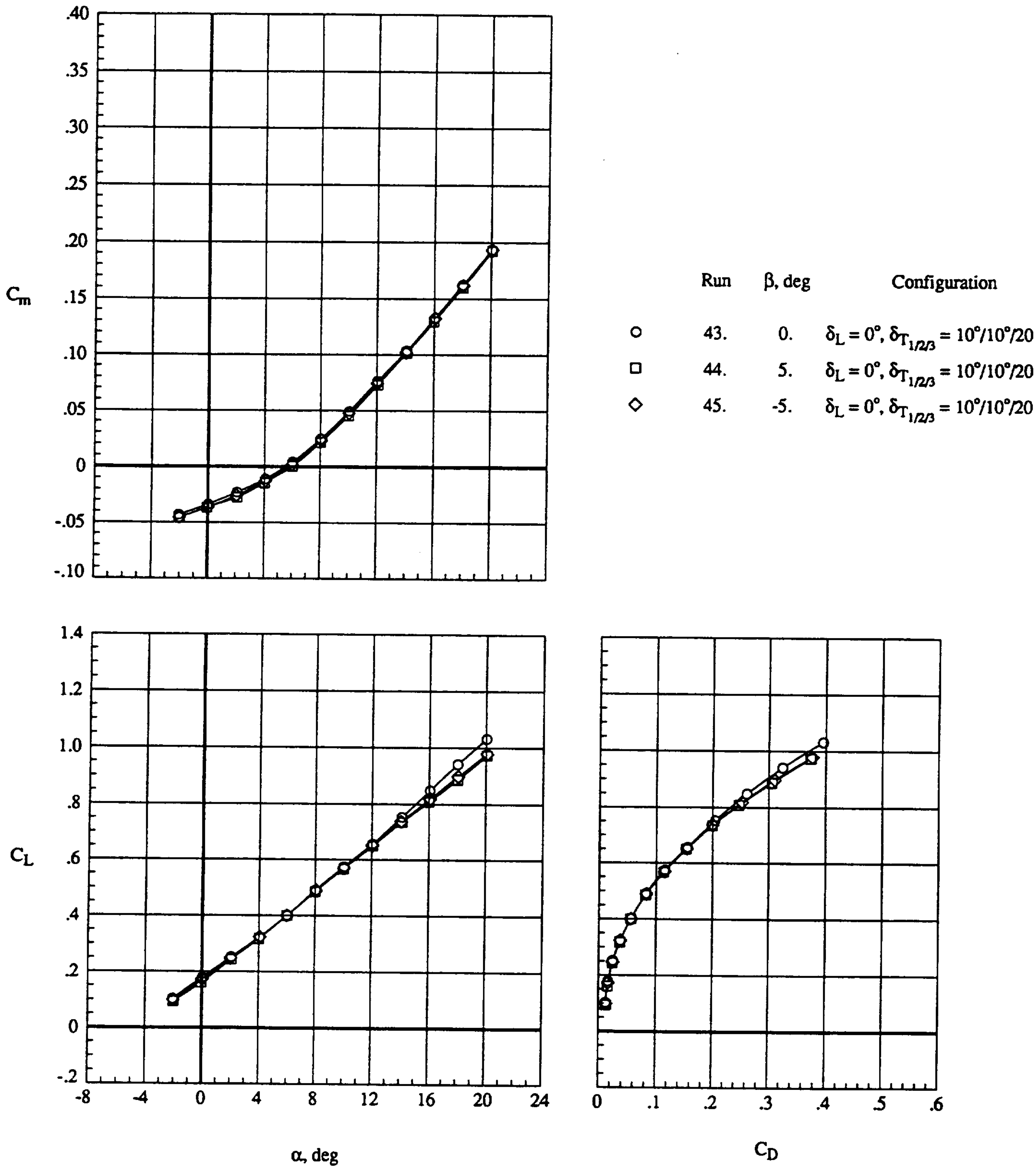
(b) Lateral aerodynamics
Figure 22. Continued.

	Run	β, deg	Configuration
○	39.	0.	$\delta_L = 0°, \delta_T = 0°$
□	43.	0.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$



(c) Lift / Drag performance

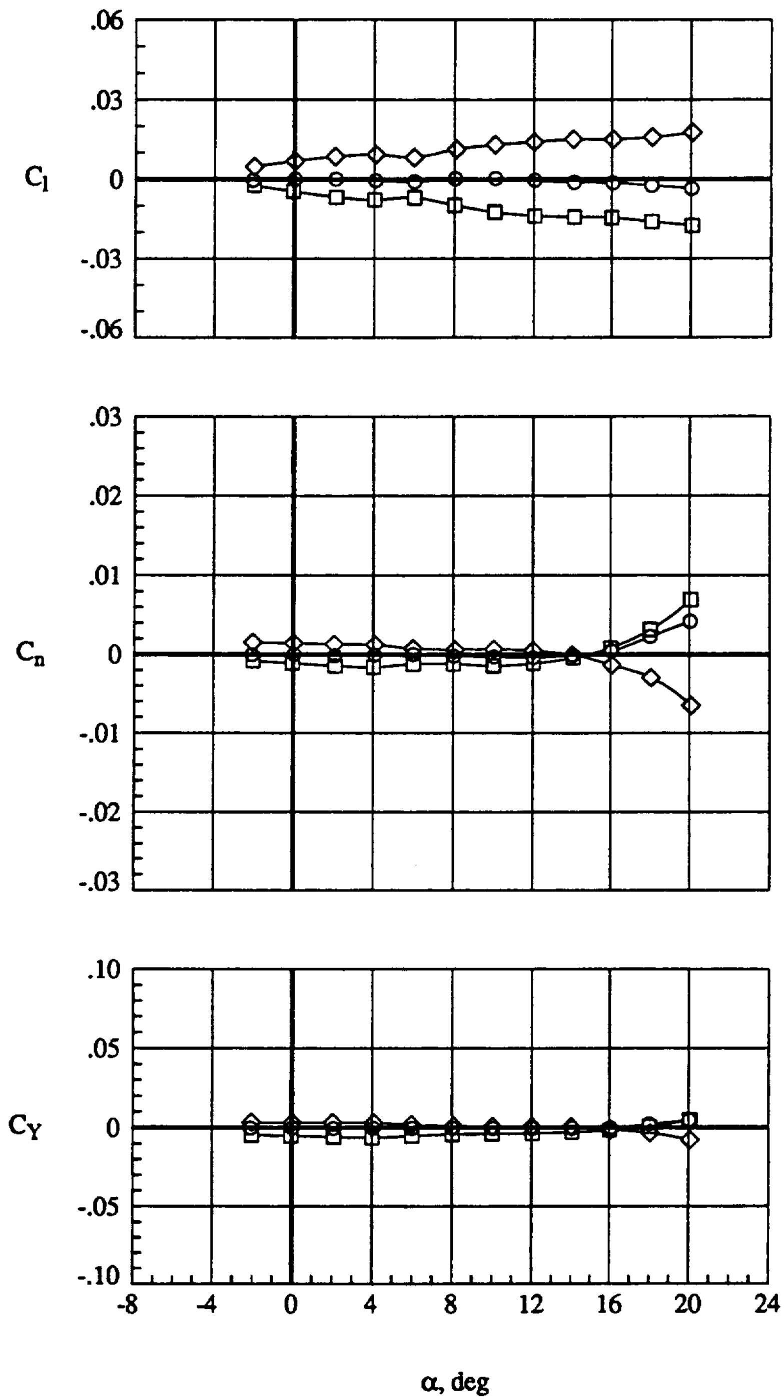
Figure 22. Concluded.



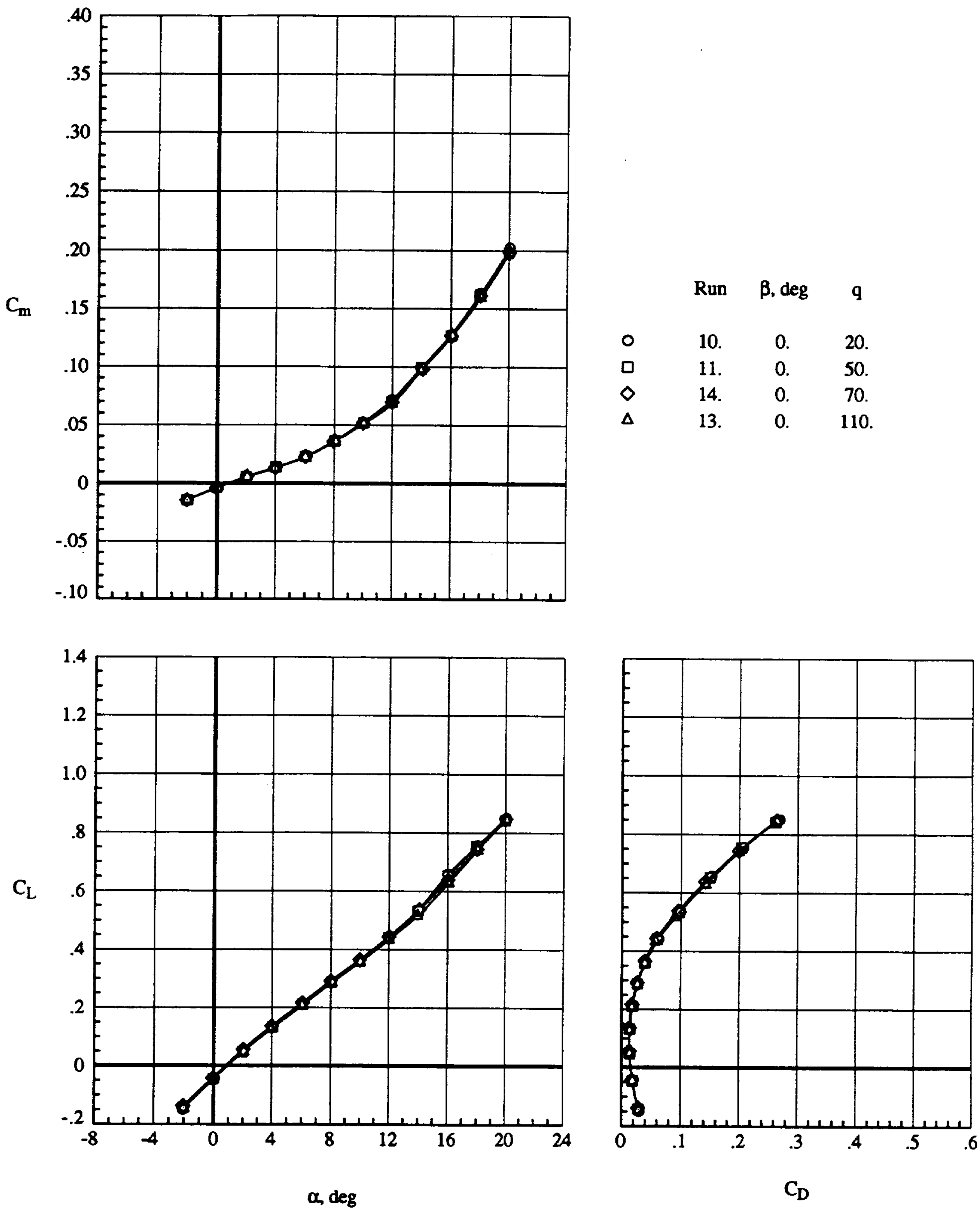
(a) Longitudinal aerodynamics

Figure 23. Effect of sideslip on baseline configuration with trailing-edge flaps deflected, q=110 psf.

	Run	β, deg	Configuration
○	43.	0.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$
□	44.	5.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$
◇	45.	-5.	$\delta_L = 0°, \delta_{T_{1/2/3}} = 10°/10°/20$



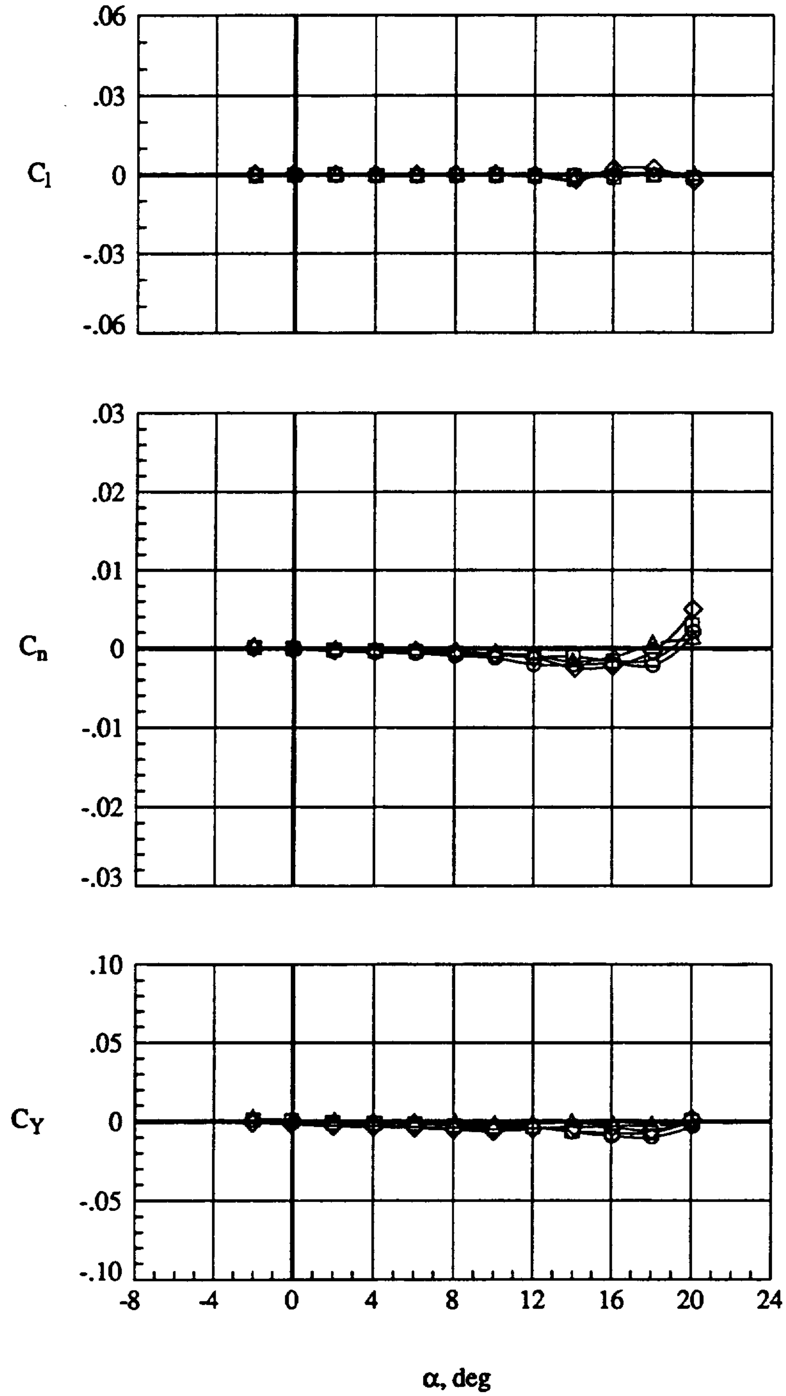
(b) Lateral aerodynamics
Figure 23. Concluded.



(a) Longitudinal aerodynamics

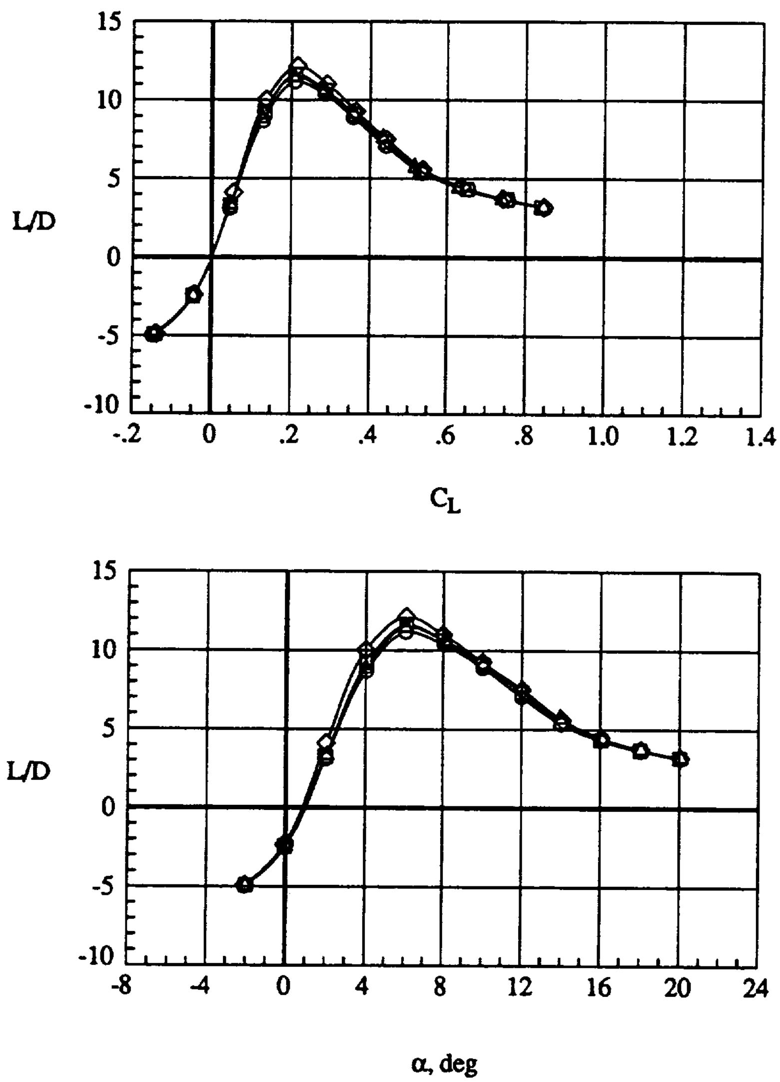
Figure 24. Effect of tunnel dynamic pressure on the mission adaptive flap configuration.

	Run	β, deg	q
○	10.	0.	20.
□	11.	0.	50.
◇	14.	0.	70.
△	13.	0.	110.

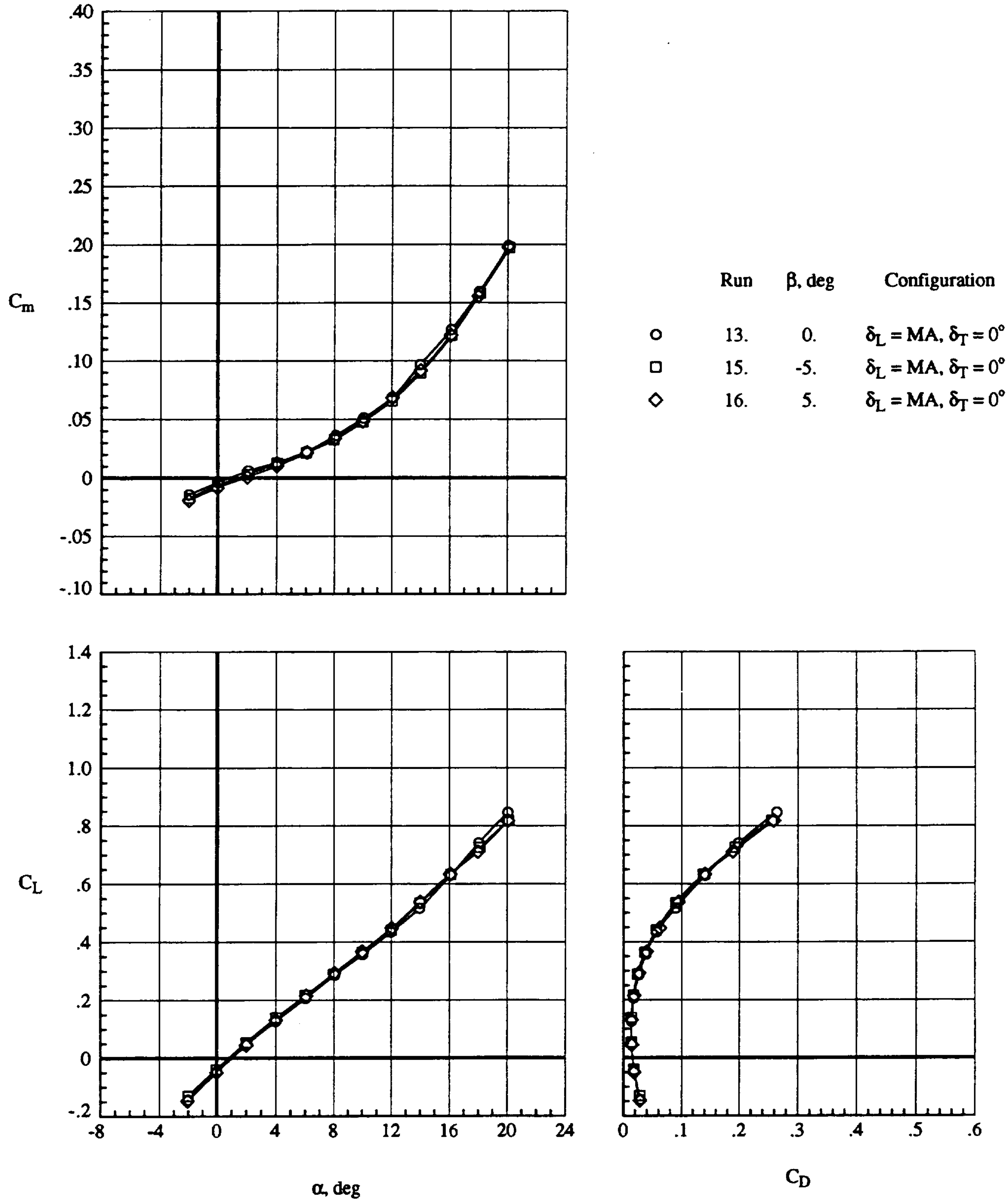


(b) Lateral aerodynamics
Figure 24. Continued.

	Run	β, deg	q
○	10.	0.	20.
□	11.	0.	50.
◇	14.	0.	70.
△	13.	0.	110.



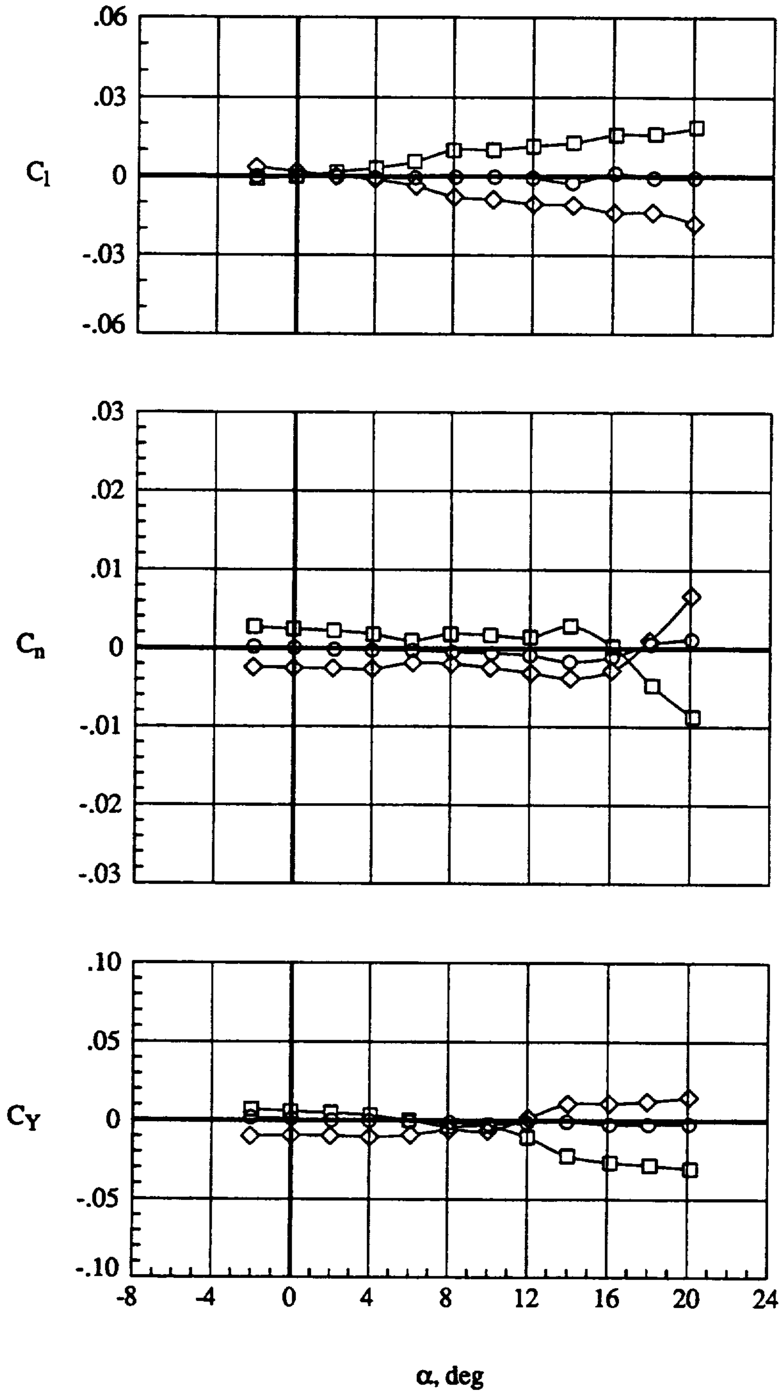
(c) Lift / Drag performance
Figure 24. Concluded.



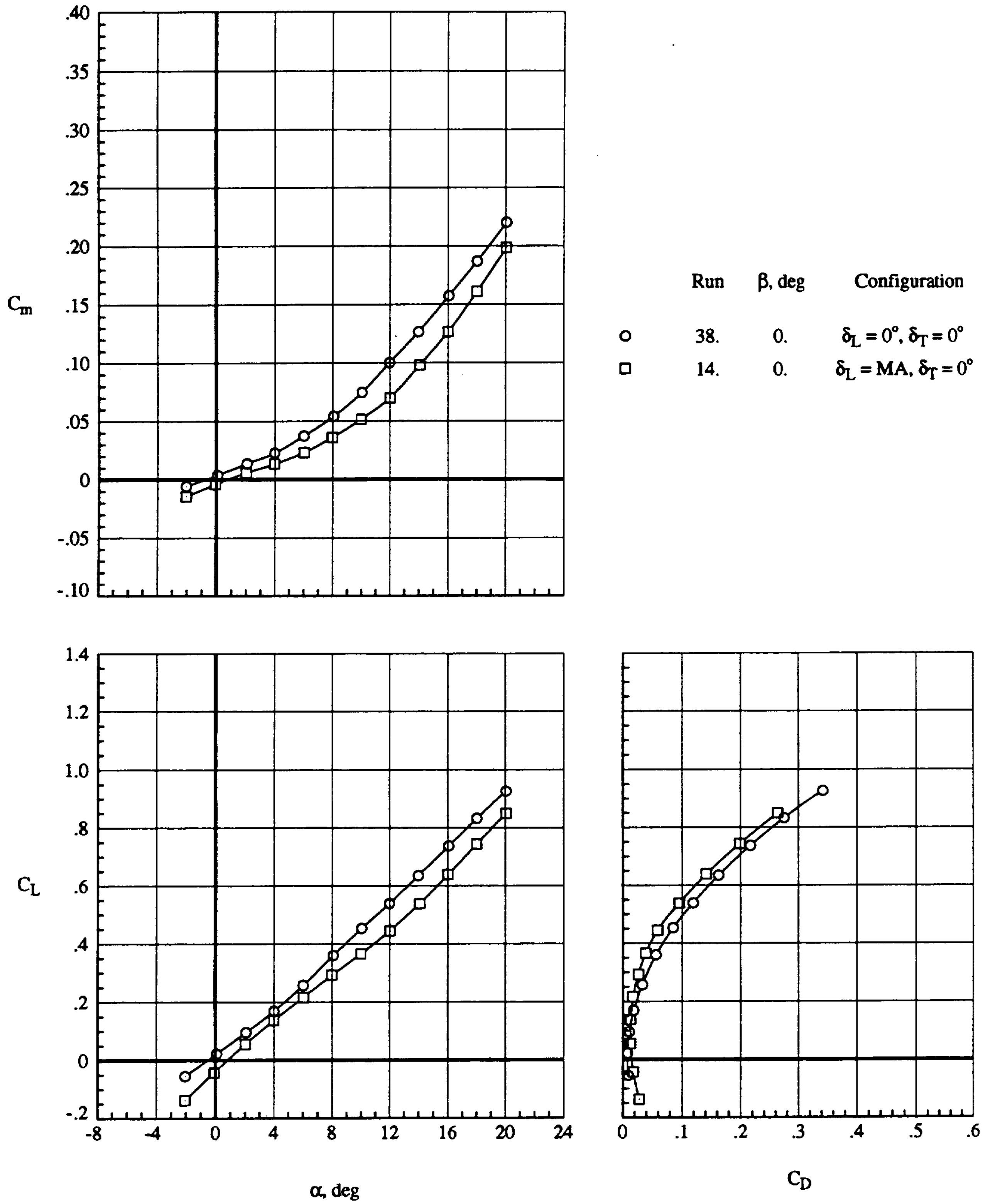
(a) Longitudinal aerodynamics

Figure 25. Effect of sideslip on the mission adaptive flap configuration, q=110 psf.

	Run	β, deg	Configuration
○	13.	0.	δ_L = MA, $\delta_T = 0°$
□	15.	-5.	δ_L = MA, $\delta_T = 0°$
◇	16.	5.	δ_L = MA, $\delta_T = 0°$



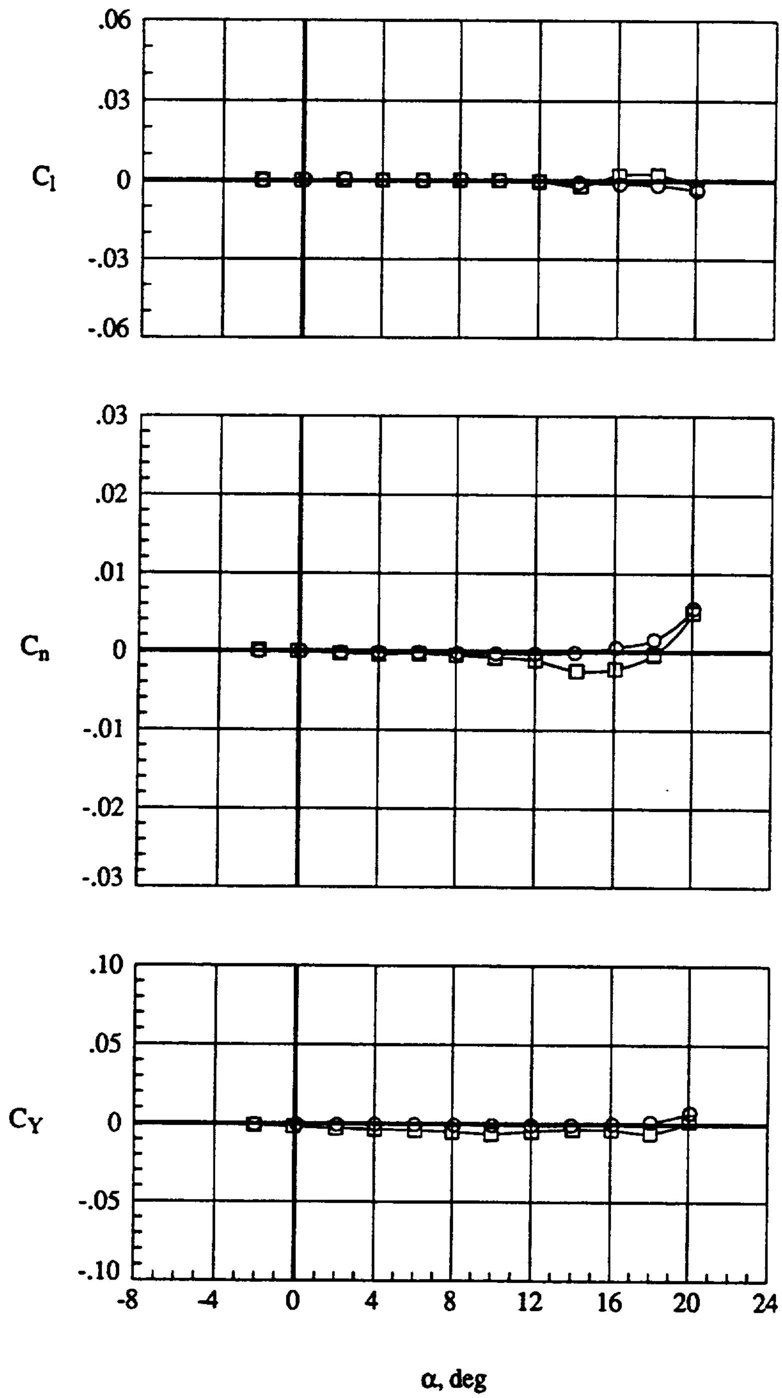
(b) Lateral aerodynamics
Figure 25. Concluded.



(a) Longitudinal aerodynamics

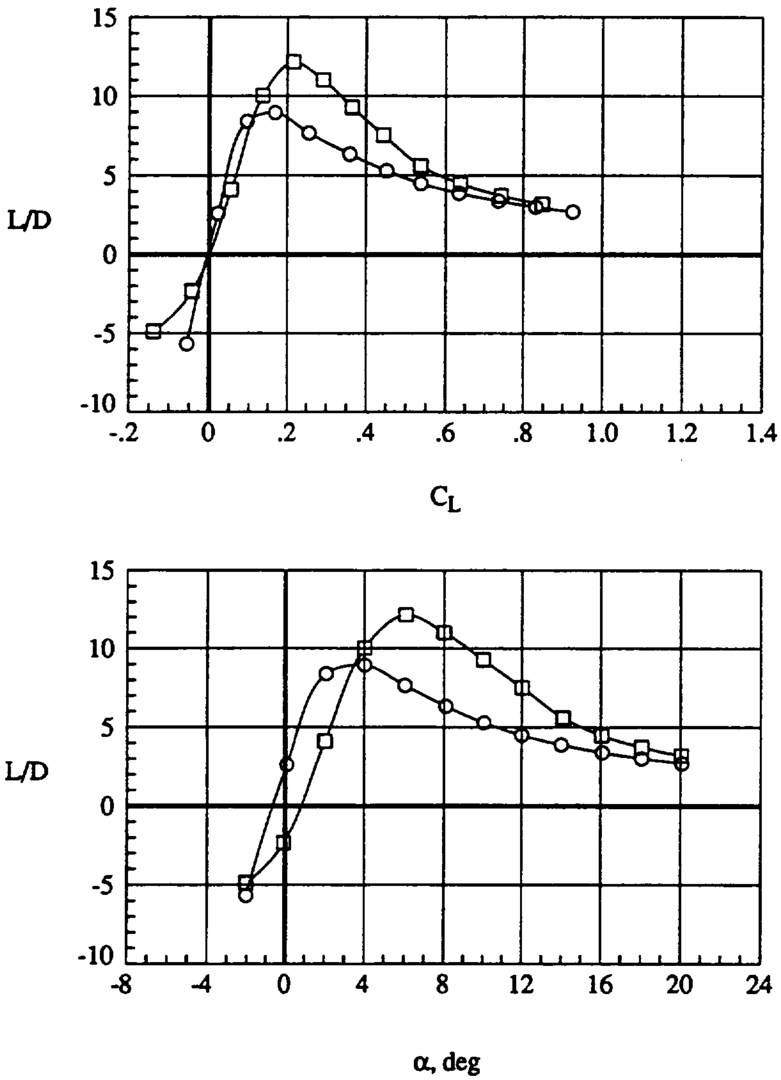
Figure 26. Effect of mission adaptive leading-edge flap with $\delta_T = 0°$, q=70 psf.

	Run	β, deg	Configuration
○	38.	0.	$\delta_L = 0°, \delta_T = 0°$
□	14.	0.	$\delta_L = MA, \delta_T = 0°$



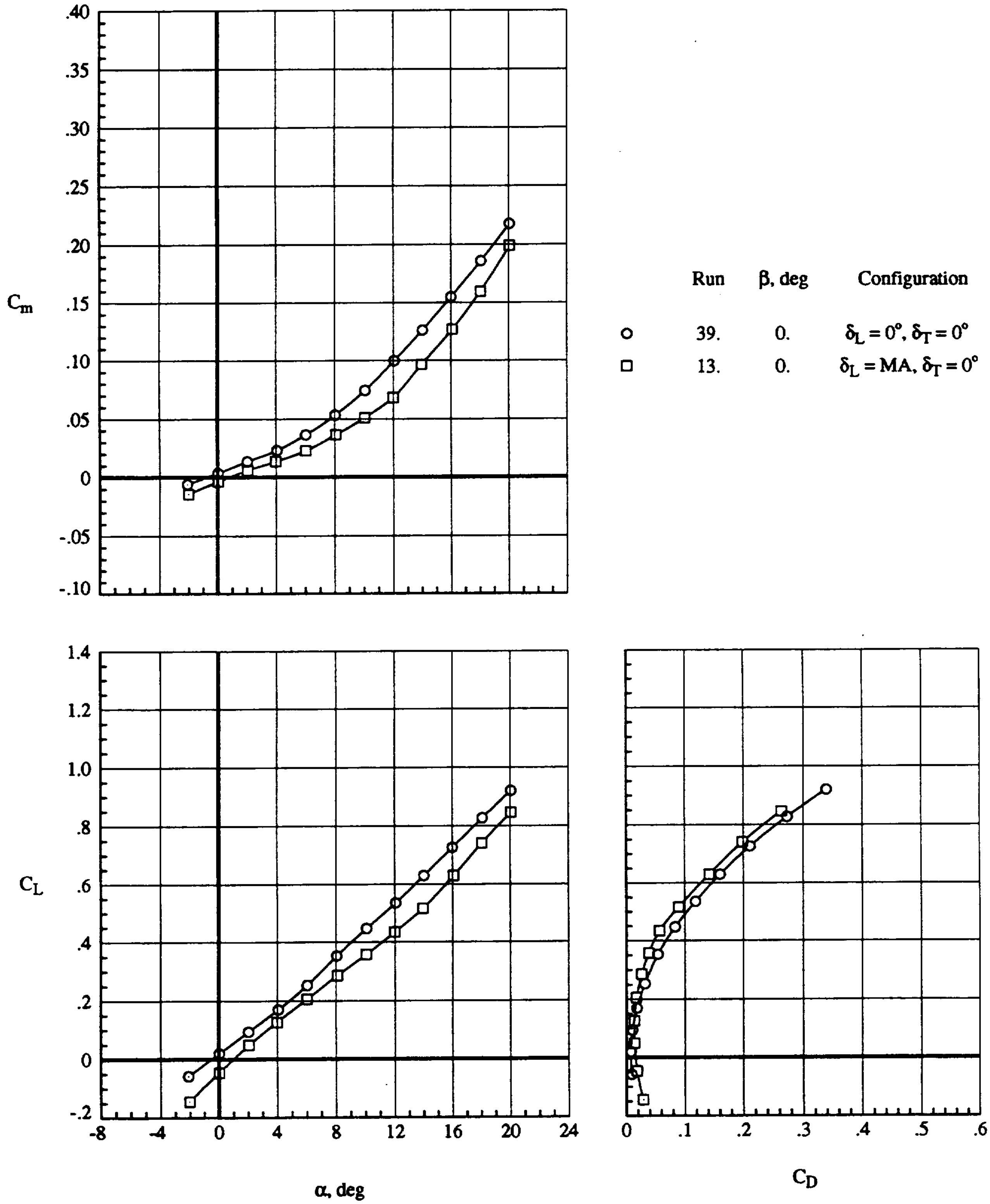
(b) Lateral aerodynamics
Figure 26. Continued.

	Run	β, deg	Configuration
○	38.	0.	$\delta_L = 0°, \delta_T = 0°$
□	14.	0.	$\delta_L = MA, \delta_T = 0°$



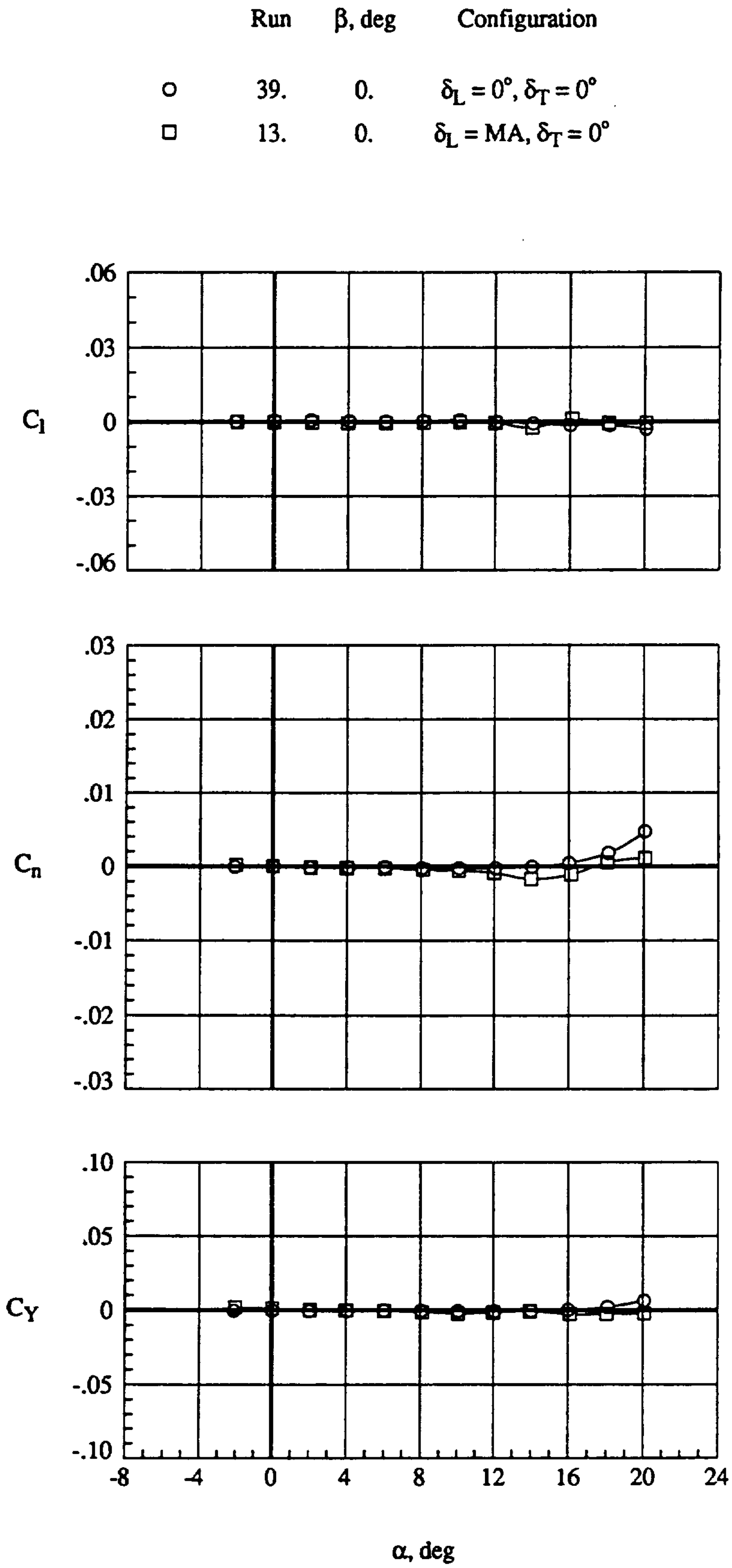
(c) Lift / Drag performance

Figure 26. Concluded.



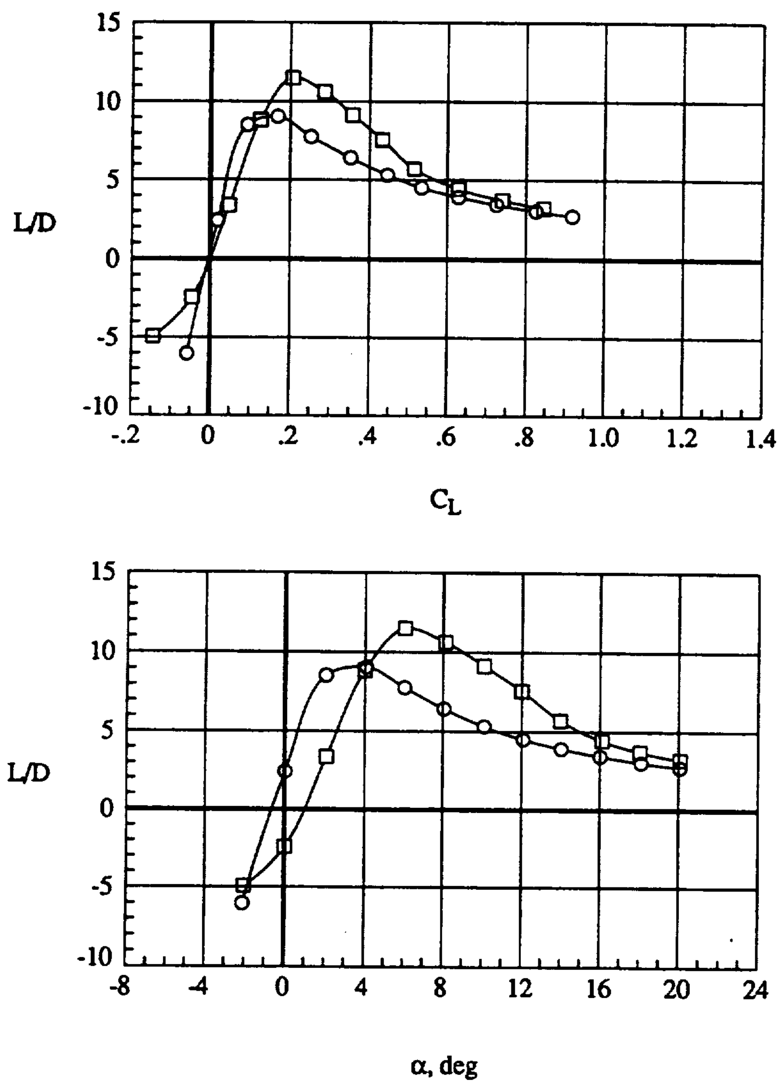
(a) Longitudinal aerodynamics

Figure 27. Effect of mission adaptive leading-edge flap with $\delta_T = 0°$, q=110 psf.

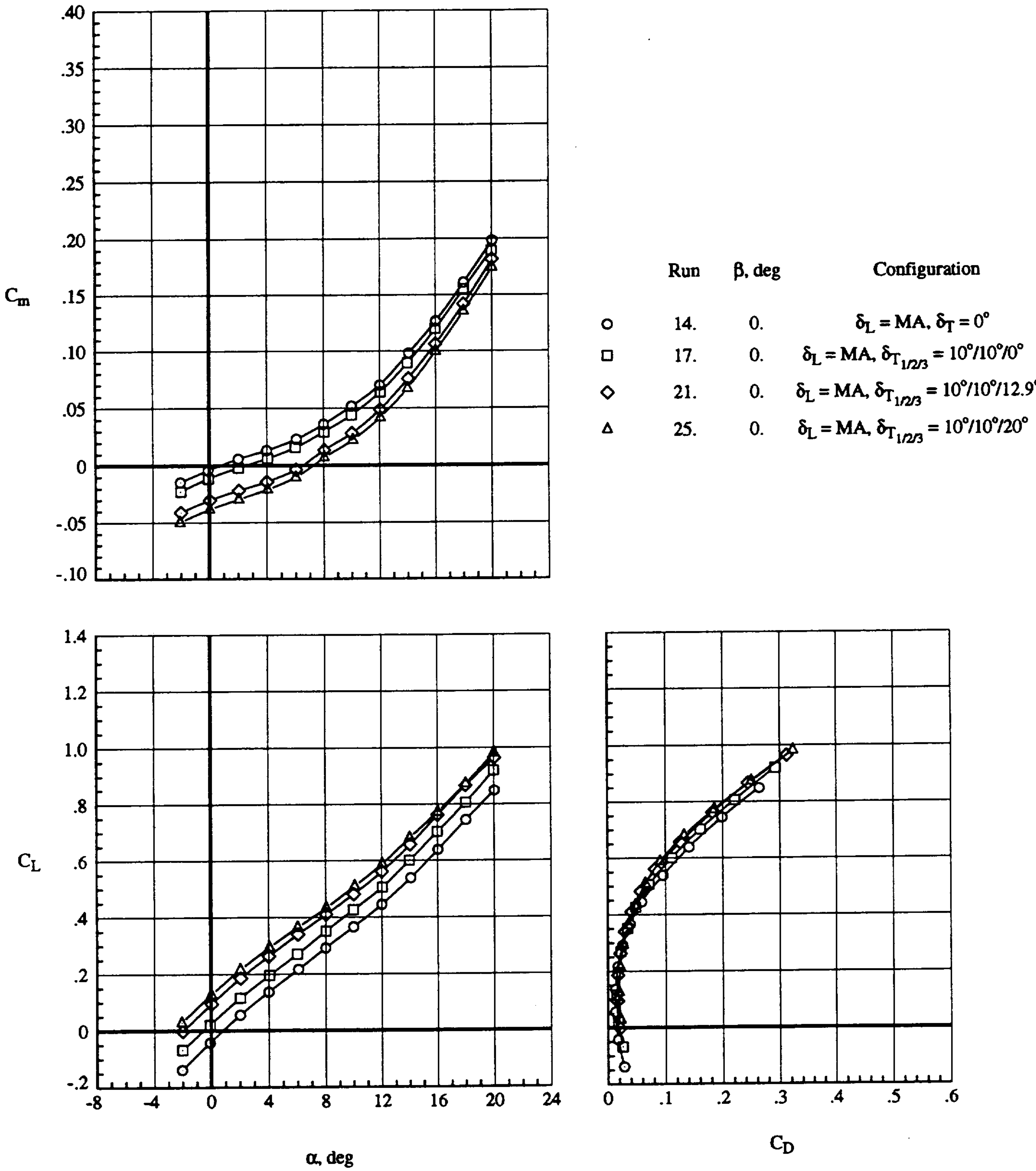


(b) Lateral aerodynamics
Figure 27. Continued.

	Run	β, deg	Configuration
○	39.	0.	$\delta_L = 0°, \delta_T = 0°$
□	13.	0.	$\delta_L = MA, \delta_T = 0°$

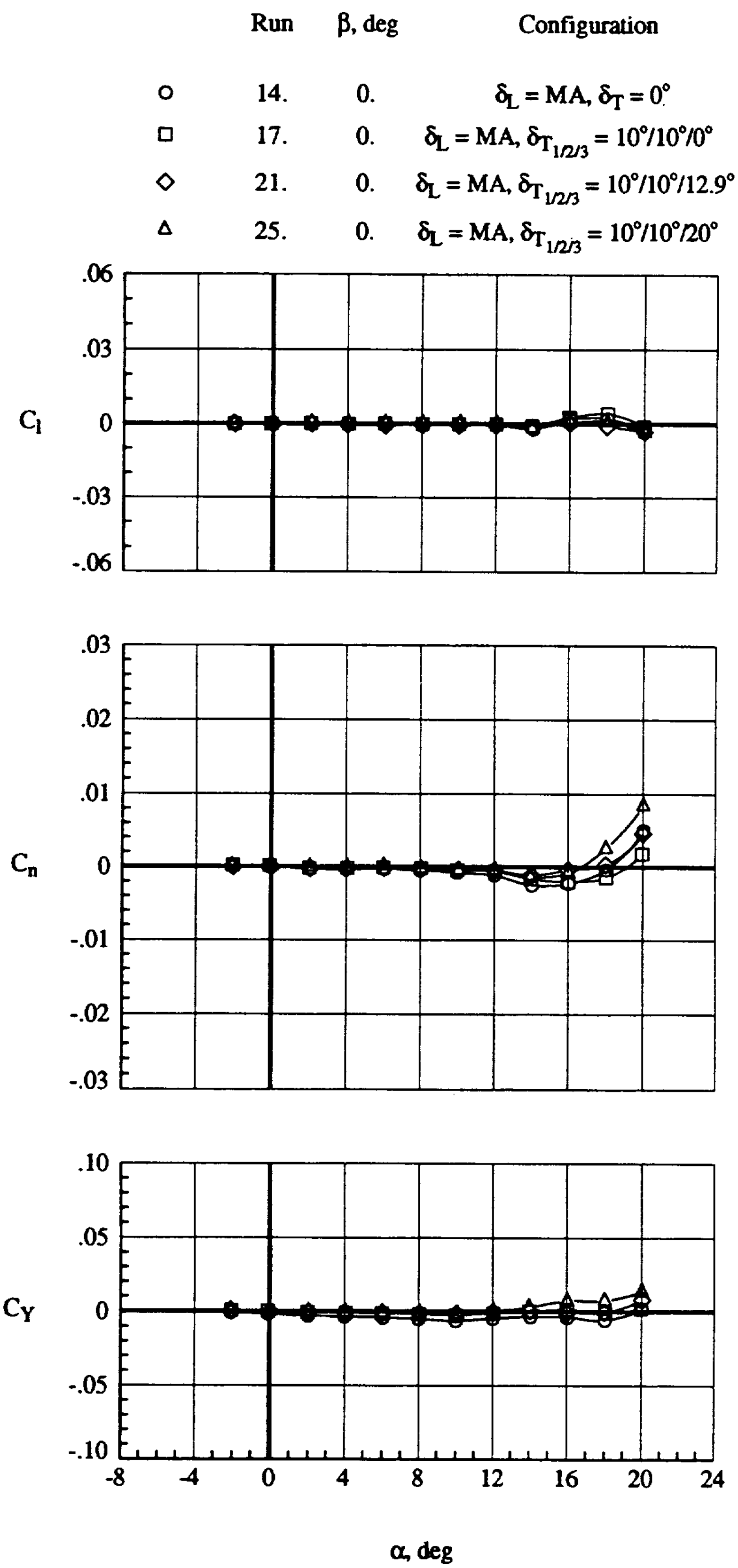


(c) Lift / Drag performance
Figure 27. Concluded.



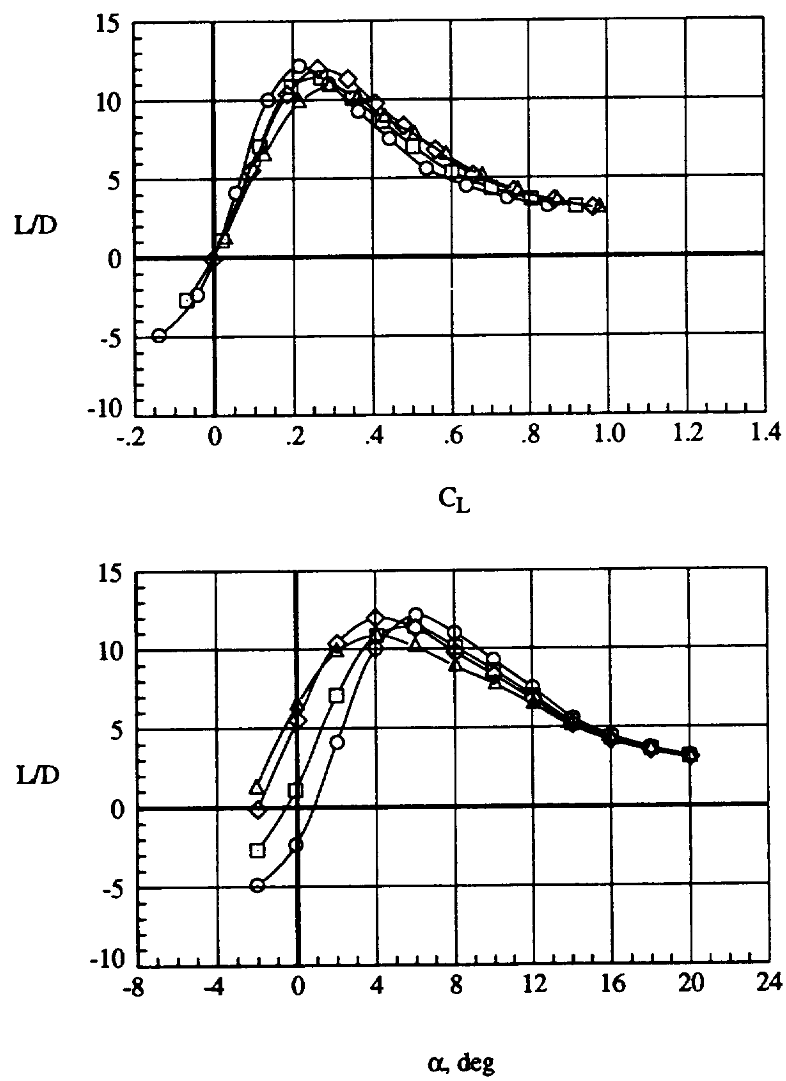
(a) Longitudinal aerodynamics

Figure 28. Effect of outboard trailing-edge flap with mission adaptive leading-edge flap, $\delta_{T_{1/2}}$ = 10°/10°, q=70 psf.

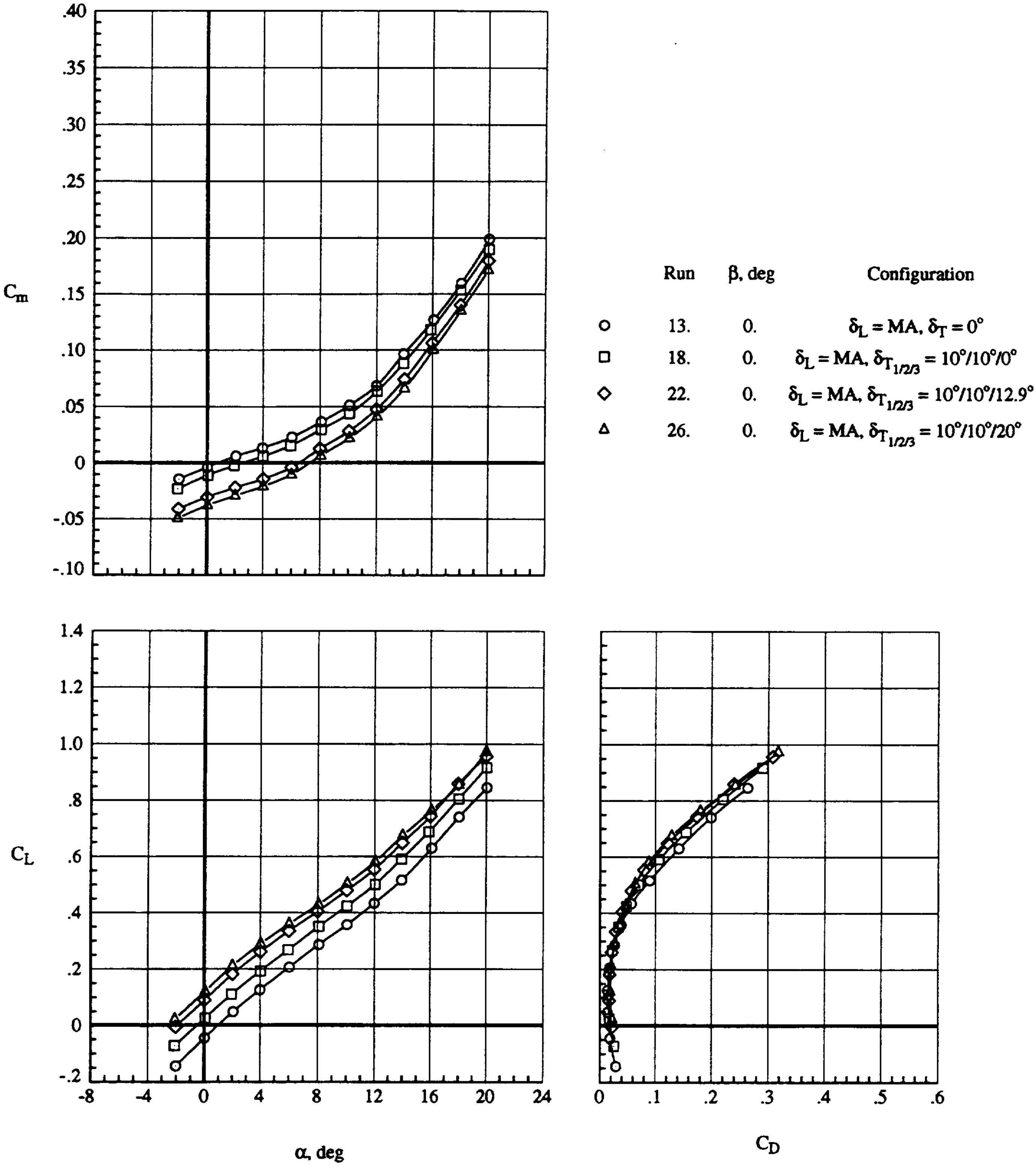


(b) Lateral aerodynamics
Figure 28. Continued.

	Run	β, deg	Configuration
○	14.	0.	δ_L = MA, $\delta_T = 0°$
□	17.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/0°$
◇	21.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/12.9°$
△	25.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/20°$

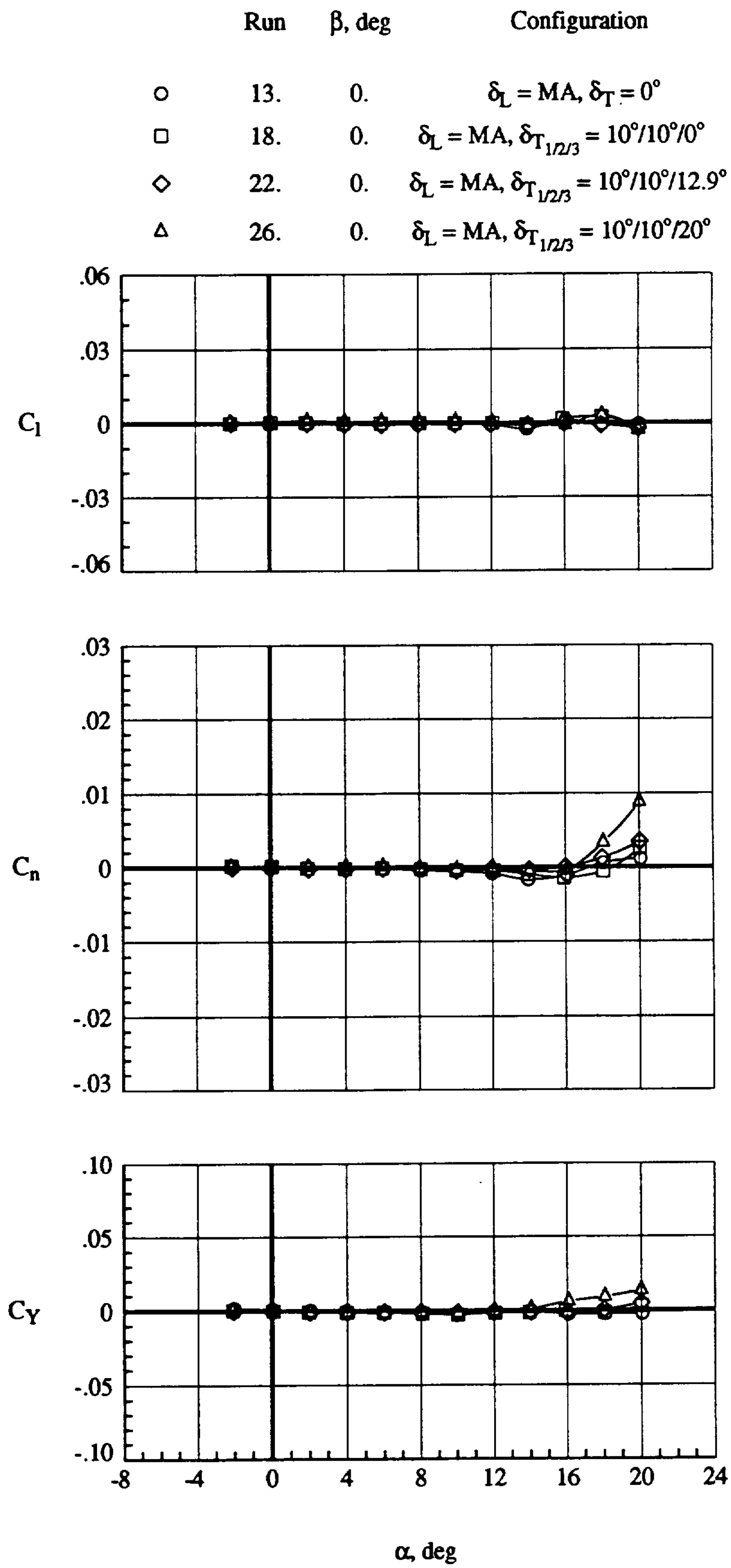


(c) Lift / Drag performance
Figure 28. Concluded.



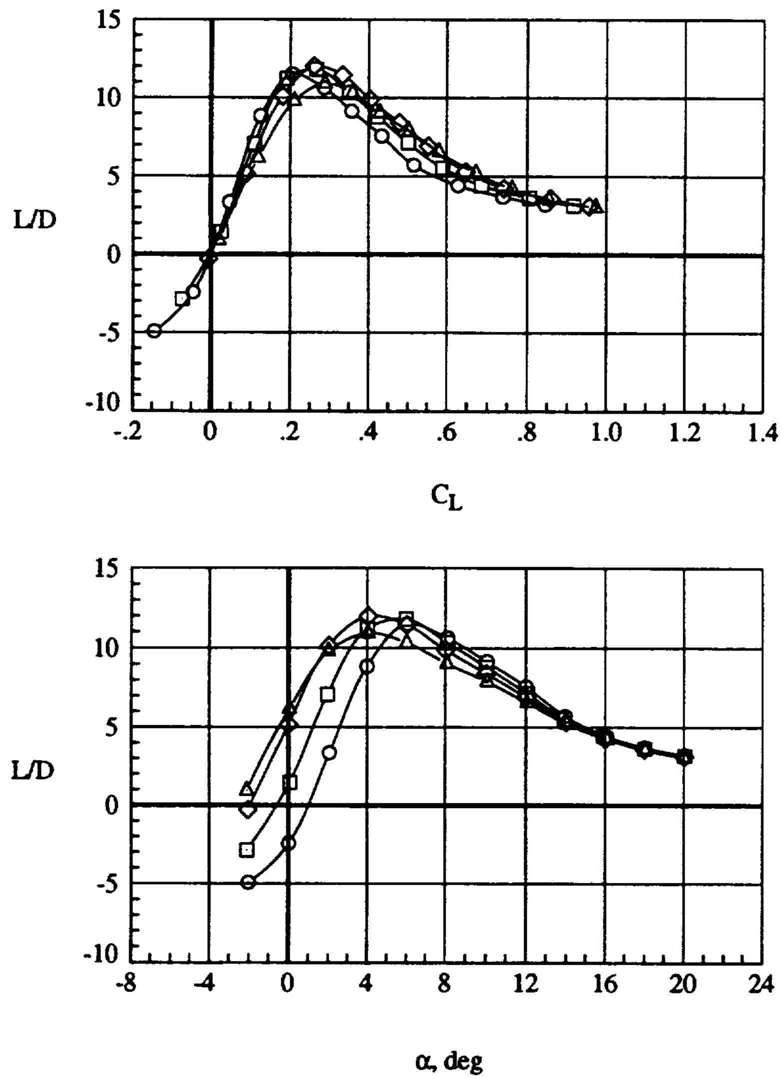
(a) Longitudinal aerodynamics

Figure 29. Effect of outboard trailing-edge flap with mission adaptive leading-edge flap, $\delta_{T_{1/2}} = 10°/10°$, q=110 psf.

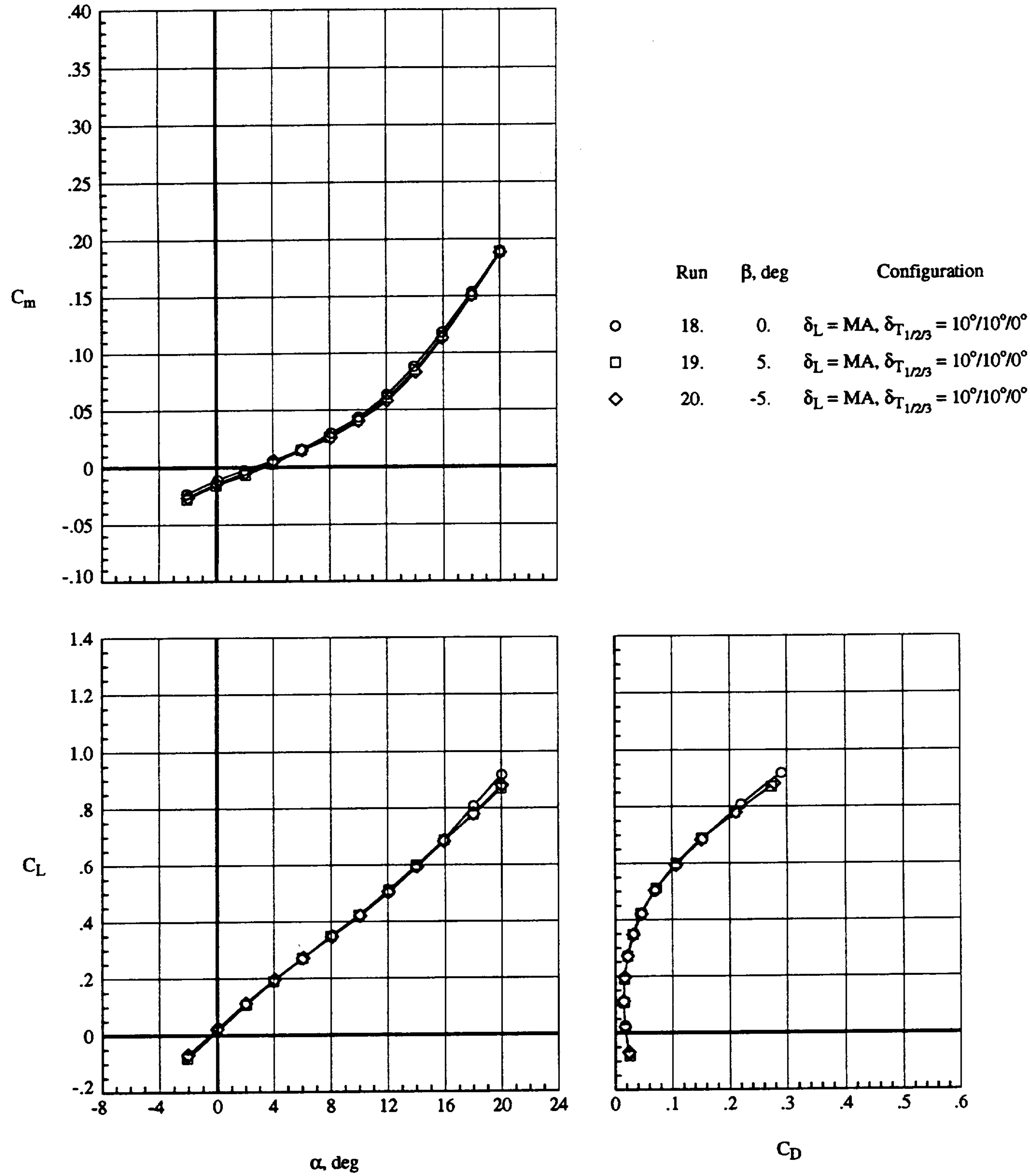


(b) Lateral aerodynamics
Figure 29. Continued.

	Run	β, deg	Configuration
○	13.	0.	δ_L = MA, $\delta_T = 0°$
□	18.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/0°$
◇	22.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/12.9°$
△	26.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/20°$



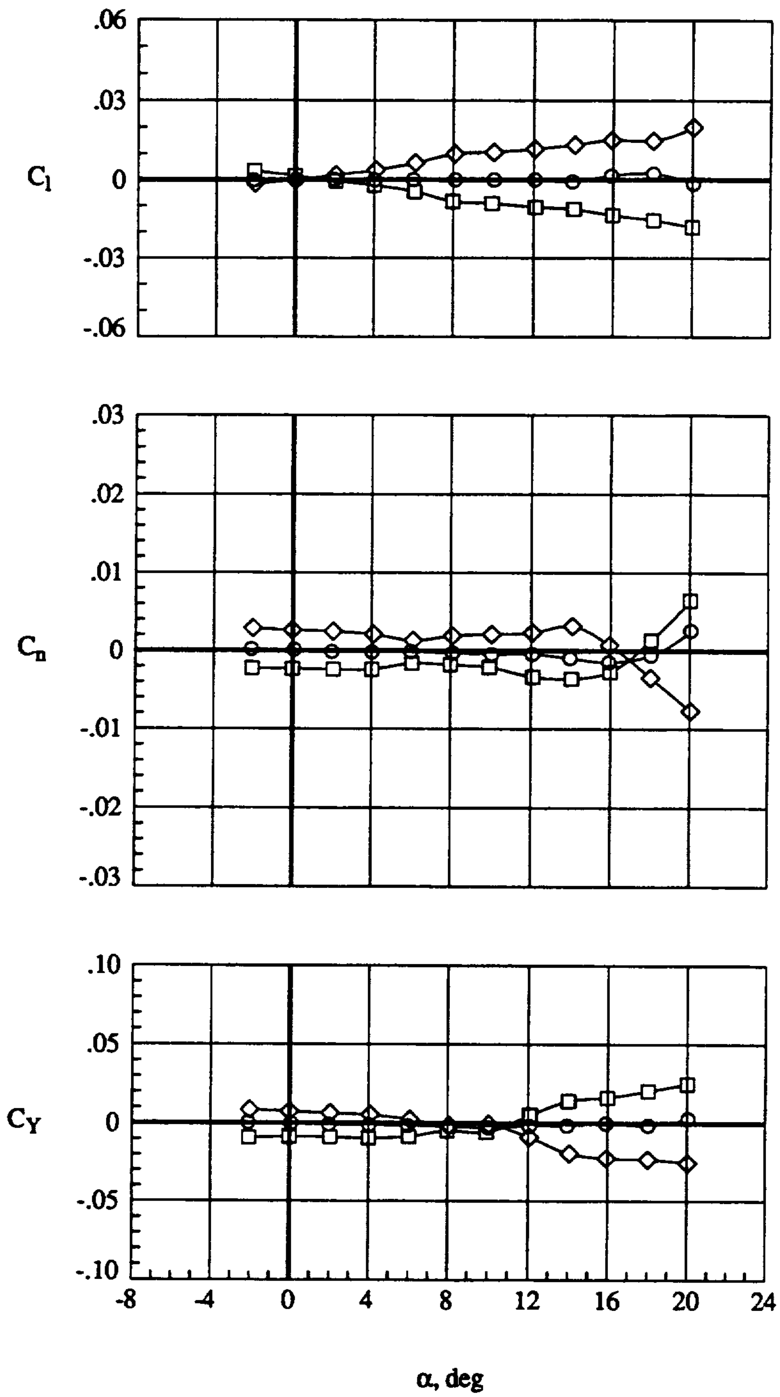
(c) Lift / Drag performance
Figure 29. Concluded.



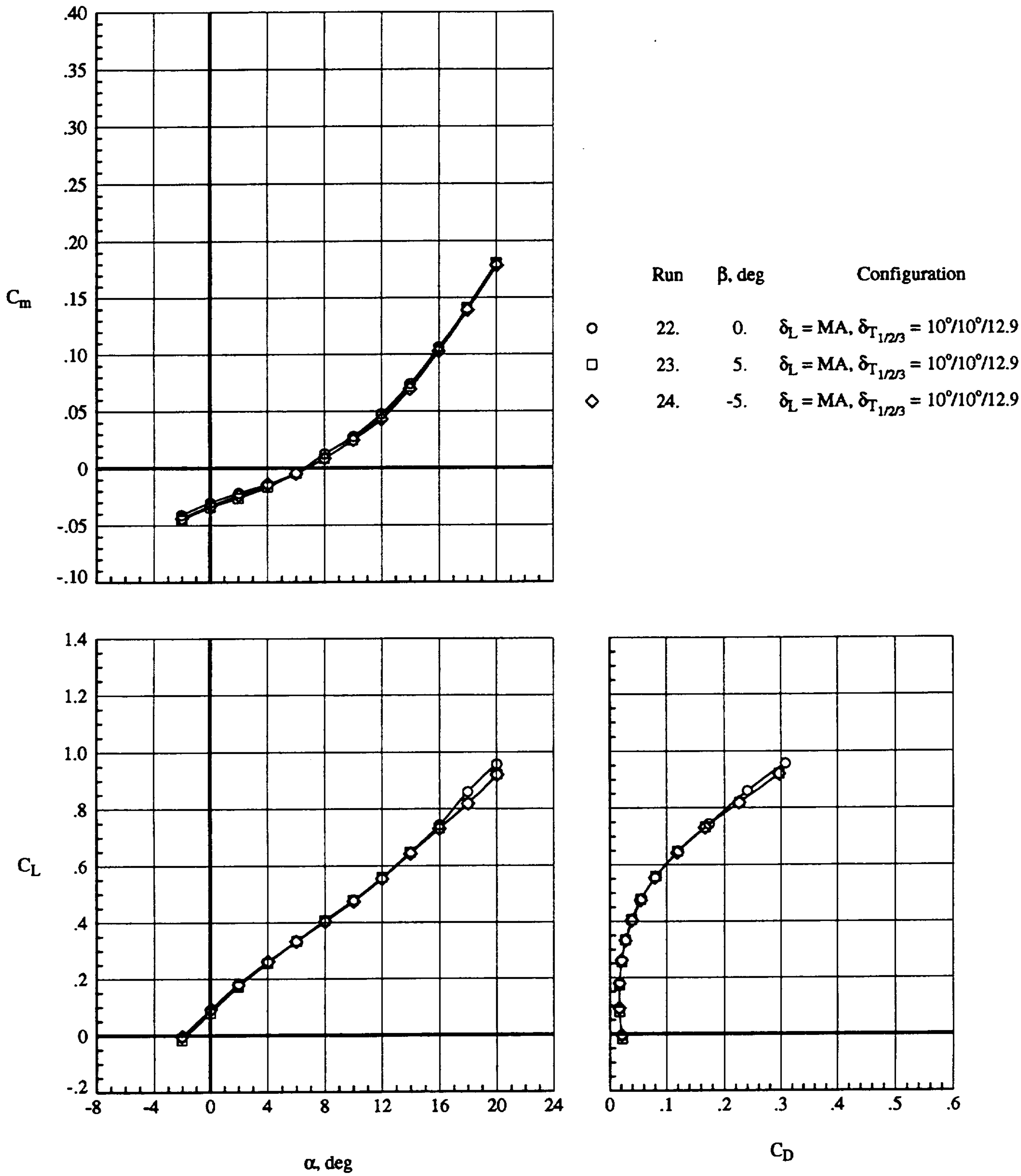
(a) Longitudinal aerodynamics

Figure 30. Effect of sideslip on the mission adaptive leading-edge with $\delta_{T_{1/2/3}}$ = 10°/10°/0°, q=110 psf.

	Run	β, deg	Configuration
○	18.	0.	$\delta_L = MA, \delta_{T_{1/2/3}} = 10°/10°/0°$
□	19.	5.	$\delta_L = MA, \delta_{T_{1/2/3}} = 10°/10°/0°$
◇	20.	-5.	$\delta_L = MA, \delta_{T_{1/2/3}} = 10°/10°/0°$



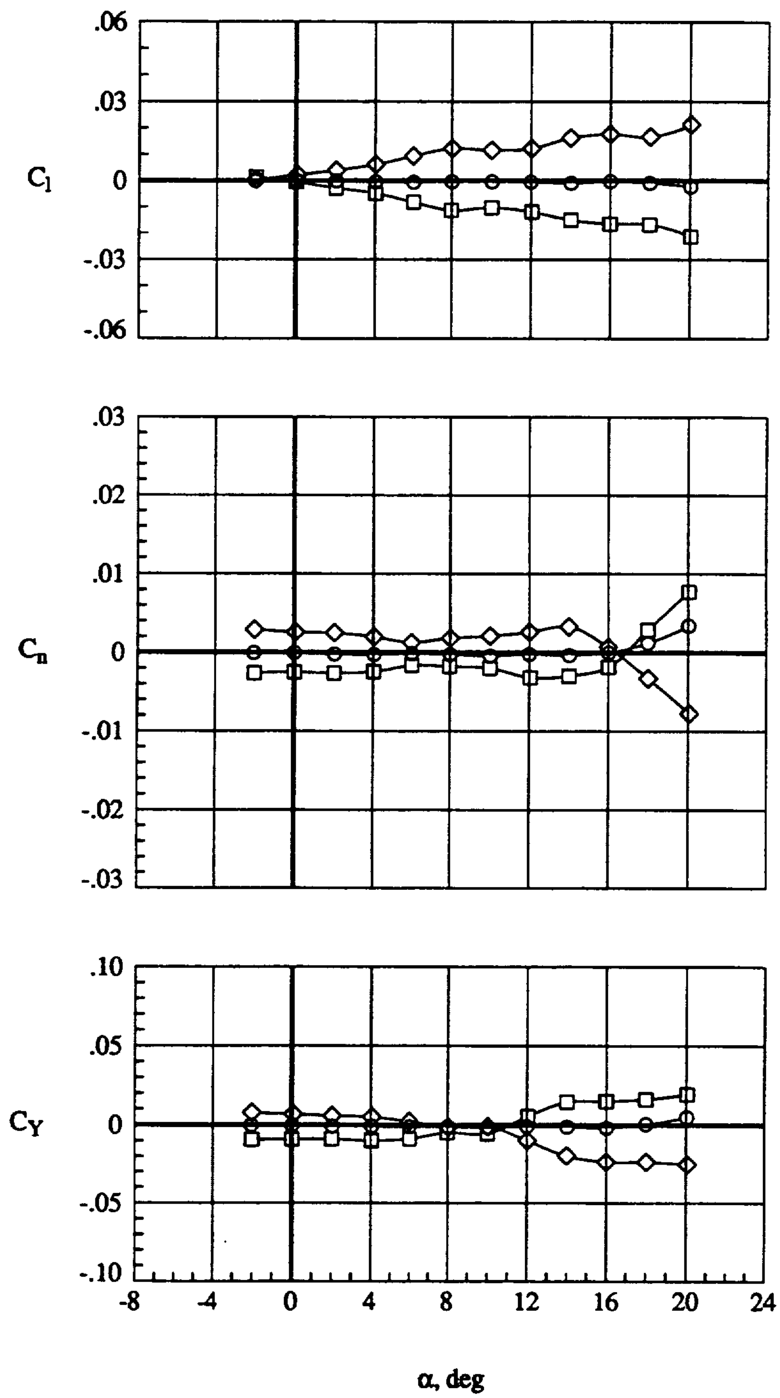
(b) Lateral aerodynamics
Figure 30. Concluded.



(a) Longitudinal aerodynamics

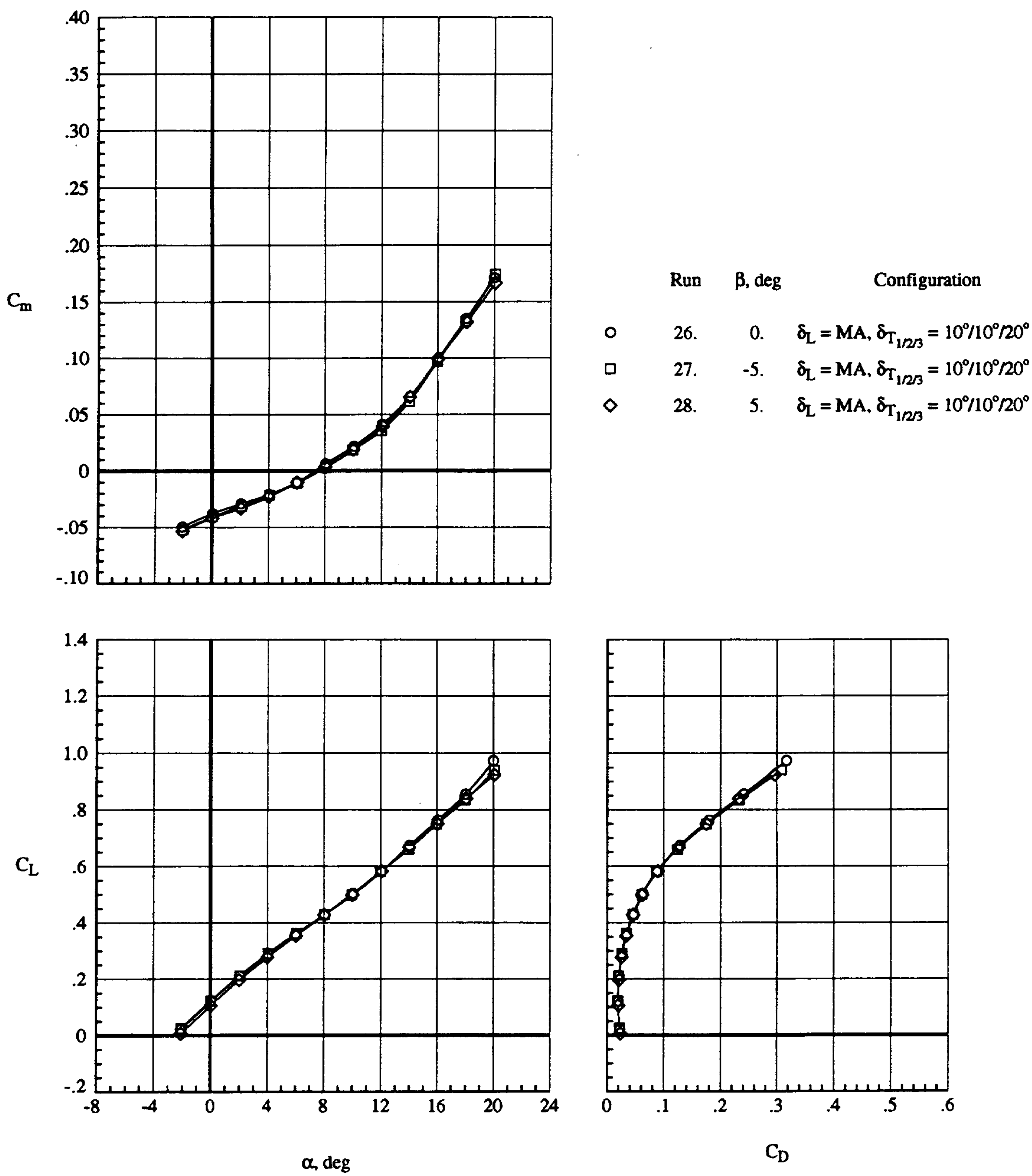
Figure 31. Effect of sideslip on the mission adaptive leading-edge with $\delta_{T_{1/2/3}}$ = 10°/10°/12.9°, q=110 psf.

	Run	β, deg	Configuration
○	22.	0.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/12.9$
□	23.	5.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/12.9$
◇	24.	-5.	δ_L = MA, $\delta_{T_{1/2/3}} = 10°/10°/12.9$



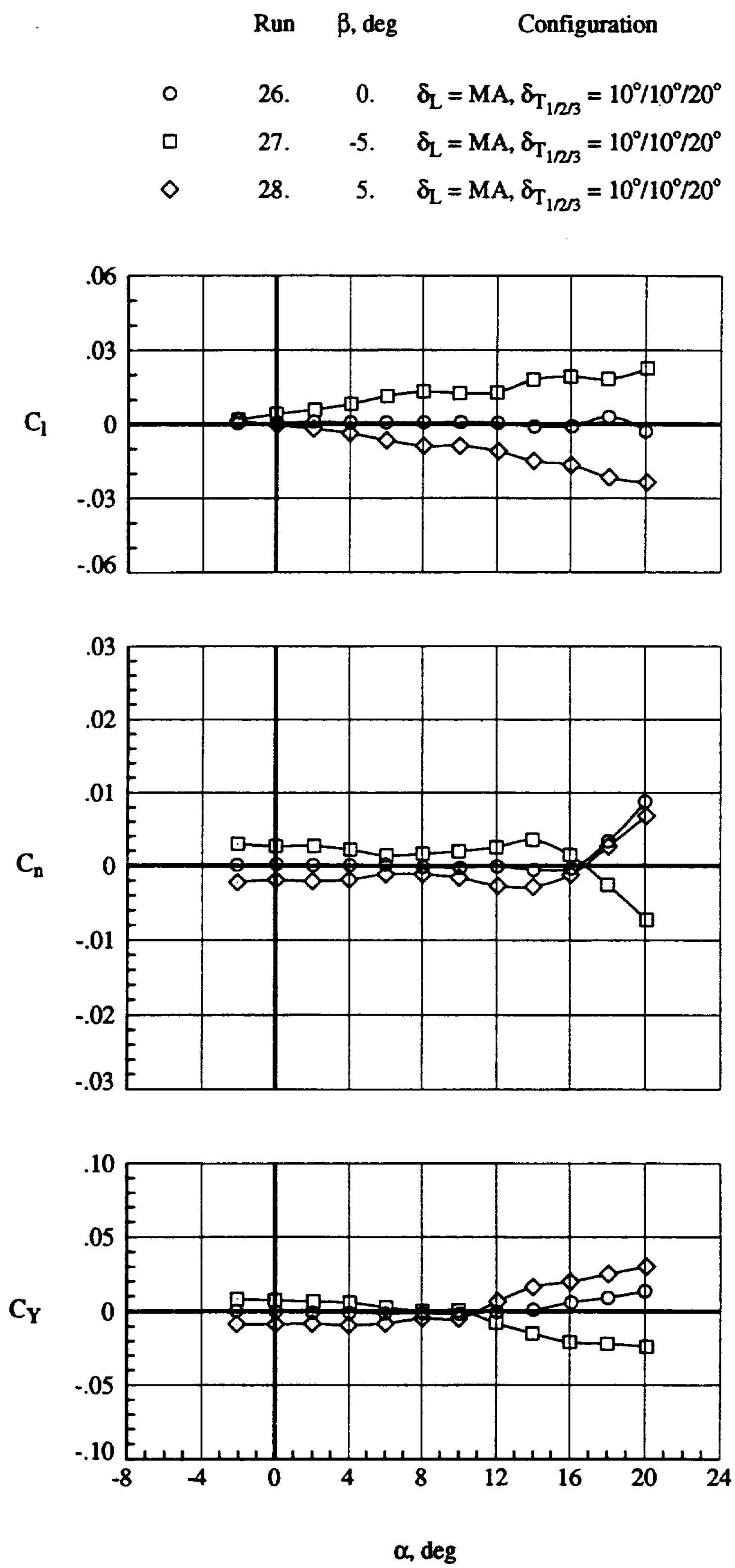
(b) Lateral aerodynamics

Figure 31. Concluded.



(a) Longitudinal aerodynamics

Figure 32. Effect of sideslip on the mission adaptive leading-edge with $\delta_{T_{1/2/3}}$ = 10°/10°/20°, q=110 psf.



(b) Lateral aerodynamics
Figure 32. Concluded.

Appendix A

Instrumentation Accuracy

Forces and moments were measured with a six-component strain-gauge balance identified as NASA LaRC VST-3. The accuracy and error range for each component is as follows:

Component	Max Load Range (lb or in-lb)	Error Range
Normal Force	±3000	±0.6%
Axial Force	±500	±0.75%
Pitching Moment	±10000	±0.5%
Rolling Moment	±7500	±1.1%
Yawing Moment	±4500	±1.4%
Side Force	±1800	±0.8%

The angle-of-attack sensor had an accuracy of ±0.01°. Tunnel and atmospheric conditions were measured using standard facility instrumentation as described in reference 11.

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13. ABSTRACT *(Maximum 200 words)*
A wind tunnel investigation of two separate leading-edge flaps, designed for vortex- and attached-flow, respectively, were conducted on a High Speed Civil Transport (HSCT) configuration in the Langley 14- by 22-Foot Subsonic Tunnel. Data were obtained over a Mach number range of 0.12 to 0.27, with corresponding chord Reynolds numbers of 2.50×10^6 to 5.50×10^6. Variations of the leading-edge flap deflection angle were tested with outboard leading-edge flaps deflected 0° and 26.4°. Trailing-edge flaps were deflected 0°, 10°, 12.9° and 20°. The longitudinal and lateral aerodynamic data are presented without analysis. A complete tabulated data listing is also presented herein. The data associated with each deflected leading-edge flap indicate L/D improvements over the undeflected configuration. These improvements may be instrumental in providing the necessary lift augmentation required by an actual HSCT during the climb-out and landing phases of the flight envelope. However, further tests will have to be done to assess their full potential.

14. SUBJECT TERMS
High-Speed Civil Transport; HSCT; HSR; Vortex flap; Attached-flow flap; Mission adaptive flap

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