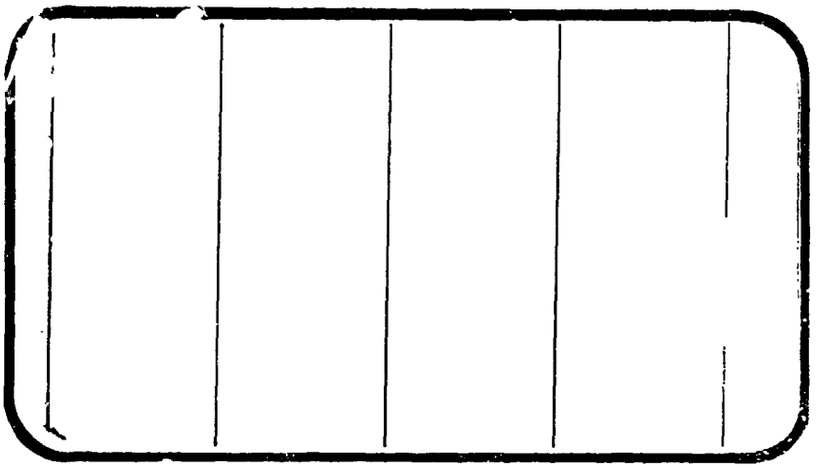
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA CR-
141513



(NASA-CR-141513) RESULTS OF INVESTIGATION ON AN 0.004-SCALE 140C MODIFIED CONFIGURATION SPACE SHUTTLE VEHICLE ORBITER MODEL (74-0) IN THE NASA/LANGLEY RESEARCH CENTER HYPERSONIC NITROGEN TUNNEL (OA89)

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SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA MANagement services
SPACE DIVISION CHRYSLER CORPORATION

March, 1975

DMS-DR-2214
NASA CR-141,513

RESULTS OF INVESTIGATIONS ON AN 0.004-SCALE 140C MODIFIED CONFIGURATION SPACE SHUTTLE VEHICLE ORBITER MODEL (74-0) IN THE NASA/LANGLEY RESEARCH CENTER HYPERSONIC NITROGEN TUNNEL (0A89)

By

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Prepared under NASA Contract Number NAS9-13247

By

Data Management Services
Chrysler Corporation Space Division
New Orleans, La. 70189

for

Engineering Analysis Division

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

WIND TUNNEL TEST SPECIFICS:

Test Number:	HNT 30, 31
NASA Series Number:	OA89
Model Number:	74-0
Test Dates:	12 July through 6 August 1974 and 30 August through 5 September 1974
Occupancy Hours:	136

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Chrysler Corporation Space Division assumes no responsibility for the data presented other than display characteristics.

RESULTS OF INVESTIGATIONS ON AN 0.004-SCALE 140C MODIFIED CONFIGURATION SPACE SHUTTLE VEHICLE ORBITER MODEL (74-0) IN THE NASA/LANGLEY RESEARCH CENTER HYPERSONIC NITROGEN TUNNEL (0A89)

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P. J. Hawthorne, Rockwell International Space Division

ABSTRACT

This report documents data obtained during a wind tunnel test of an 0.004-scale 140C modified configuration SSV Orbiter in the NASA/Langley Research Center 22-inch Hypersonic Nitrogen Tunnel. The test was conducted during July, August and September 1974 and 136 occupancy hours were charged. All presented runs were conducted at a nominal Mach number of 19.8 and at a Reynolds number of approximately 0.68×10^6 per foot.

The complete 140C modified model was tested with various elevon settings and additionally in wing off/bodyflap off configuration at angles of attack from -5 to 42.5 degrees at zero yaw.

Purpose of this test was to obtain high hypersonic longitudinal and lateral-directional stability and control characteristics of the updated SSV configuration in an initially diatomic medium.

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* PLOT SCHEDULE:

A) CN vs. ALPHA, CN vs CLM, CL vs. ALPHA, CL vs. CLM, CA, CLM, L/D, and CD vs. ALPHA

B) CY and CYN vs. ALPHA

NOMENCLATURE
General

SYMBOL	PLOT SYMBOL	DEFINITION
a		speed of sound; m/sec, ft/sec
C_p	CP	pressure coefficient; $(p_l - p_\infty)/q$
M	MACH	Mach number; V/a
p		pressure; N/m^2, psf
q	Q(NSM) Q(PSF)	dynamic pressure; $1/2\rho V^2$, N/m^2, psf
RN/L	RN/L,RN	Reynolds number; based on model length
V		velocity; m/sec, ft/sec
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
ψ	PSI	angle of yaw, degrees
ϕ	PHI	angle of roll, degrees
ρ		mass density; kg/m^3, $slugs/ft^3$

Reference & C.G. Definitions

A_b		base area; m^2, ft^2
b	BREF	wing span or reference span; m, ft
c.g.		center of gravity
l_{REF} $\bar{c}$	LREF	reference length or wing mean aerodynamic chord; m, ft
S	SREF	wing area or reference area; m^2, ft^2
	MRP	moment reference point
	XMRP	moment reference point on X axis
	YMRP	moment reference point on Y axis
	ZMRP	moment reference point on Z axis

SUBSCRIPTS

b	base
l	local
s	static conditions
t	total conditions
∞	free stream

NOMENCLATURE (Continued)

Body-Axis System

SYMBOL	PLOT SYMBOL	DEFINITION
C_N	CN	normal-force coefficient; $\frac{\text{normal force}}{qS}$
C_A	CA	axial-force coefficient; $\frac{\text{axial force}}{qS}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_{A_b}	CAB	base-force coefficient; $\frac{\text{base force}}{qS}$ $-A_b(p_b - p_\infty)/qS$
C_{A_f}	CAF	forebody axial force coefficient, $C_A - C_{A_b}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CYN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CBL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$
		Stability-Axis System
C_L	CL	lift coefficient; $\frac{\text{lift}}{qS}$
C_D	CD	drag coefficient; $\frac{\text{drag}}{qS}$
C_{D_b}	CDB	base-drag coefficient; $\frac{\text{base drag}}{qS}$
C_{D_f}	CDF	forebody drag coefficient; $C_D - C_{D_b}$
C_Y	CY	side-force coefficient; $\frac{\text{side force}}{qS}$
C_m	CLM	pitching-moment coefficient; $\frac{\text{pitching moment}}{qS\ell_{REF}}$
C_n	CLN	yawing-moment coefficient; $\frac{\text{yawing moment}}{qSb}$
C_ℓ	CSL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$
L/D	L/D	lift-to-drag ratio; C_L/C_D
L/D_f	L/DF	lift to forebody drag ratio; C_L/C_{D_f}

NOMENCLATURE (Continued)
Additional Nomenclature

Symbol	Plot Symbol	Definition
IML		inner mold line
MRC		moment reference center
OML		outer mold line
X_{cp}/ℓ_B	XCP/L	longitudinal center of pressure location, fraction of body length
X_o		Orbiter longitudinal station, in.
Y_o		Orbiter lateral station, in
Z_o		Orbiter vertical station, in
α_i		wing incidence angle, degrees
δ_{BF}	BDFLAP	bodyflap deflection angle, degrees
δ_R	RUDDER	rudder deflection angle, degrees
δ_{SB}	SPDBRK	speedbrake deflection angle, degrees
δ_a	AILRON	aileron, total aileron deflection angle, degrees, (left aileron - right aileron)/2
δ_e	ELEVTR	elevator surface deflection angle, positive deflection trailing edge down, degrees
	BALANC	parameter name to document balance utilized in testing, BALANC = 1 (LaRC HN05), BALANC = 2 (LaRC HN06), see Remarks section
	STING	parameter name for sting, sting parameter values of 25 and 45 denote a 25° and 45° sting used for testing, respectively

REMARKS

OA89 was conducted in three distinct portions, from July 12 through July 29, July 30 to August 6 and from August 30 through September 5, 1974.

During the first time period, the model was installed in the tunnel on the Langley Research Center HNO 6 component water cooled balance on a 45° bent sting. On July 24 it was found that the model was running slightly yawed, and this along with certain balance problems prompted re-running of the basic configuration blows to determine incremental effects of these problems. On July 29, the thermocouple indicating balance water temperature indicated 32°F during the afternoon run, and subsequent investigation revealed a broken bellows in the water cooling line, and that ice had been forming in the balance due to evaporative cooling. A balance change was then made to the lower range HNO 5 component water cooled balance, still on the 45° bent sting.

From July 30 to August 6 selected runs were made with the HNO 5 instrument, and it was undertaken to rerun the test with an abbreviated run schedule due to time constraints on the 74-0 model utilization. The test article was then removed from the test section for use elsewhere; this entire entry is referred to by Langley Research Center as test HNT 30.

The second installation was made at the end of August to investigate suspected sting effects; this time the HNO 5 balance was used with a 25° bent sting. This is known as the HNT 31 test series. Base pressure data were taken with only one pressure tap during OA89, instead of the two shown in the pretest report. Data were collected at total pressures of 2200 and

REMARKS (Concluded)

5000 psi during both HNT 30 and HNT 31, but the P_T = 2200 psi data is considered to be of questionable quality and only the P_T = 5000 psi data utilizing the HNO 5 balance is presented here, and none of the HNO 6 balance data are presented.

CONFIGURATIONS INVESTIGATED

During test 0A89, the 140C modified vehicle was tested in full up and wing off configurations. The basic aircraft is of blended wing body design with a double delta wing, full span elevons and a single centerline vertical tail with rudder and/or speedbrake capability. A bodyflap and short pod orbital maneuvering system (OMS) were mounted on the aft fuselage bottom edge and upper sidewalls, respectively.

The following letter designations are used to denote the components of the -140C modified configurations:

B_{62} — Fuselage to the outer mold line contours of drawings VL70-000202B, -000200B & 000203 for the aft body contour (except OMS), the VL70-000202B drawing was used in lieu of the C revision specified on the VL70-000140C control drawing since the C revision was not available. The MPS nozzles are not simulated.

C_{12} — Canopy to VL70-000202B lines; see B_{62} above.

E_{43} — Elevon used with VL70-000200B wing, with 6" gaps. The hingeline is unswept and located at X_o = 1387.

F_{10} — Center pivot bodyflap hinge line at X_0 = 1532 and planform as denoted on VL70-000200B drawing.

M_{14} — Baseline short nose Orbital Maneuvering System (OMS) pods mounted on the upper base of the fuselage. Shape is defined by drawing VL70-08457. Rocket engine nozzles are simulated.

R_5 — Rudder utilized with V_8 vertical tail and shown on VL70-000146A.

V_8 — 45° sweep leading edge single centerline mounted vertical tail of modified diamond section as per VL70-000146A.

W_{127} — VL70-000200B wing. Wing is of 81°/45° sweep leading edge and is 6 inches F.S. thicker at the body than -140A. Airfoil is RIC modified NASA 0011.3 at Y_0 = 199, 0012-64 at theoretical tip. α_i = +0° 30' dihedral = 3° 30' at TE., tip is defined by VL70-006092.

CONFIGURATIONS INVESTIGATED (Concluded)

Component descriptor sheets are given in Table III.

The tested configurations were denoted as:

140C modified = $B_{62}\ C_{12}\ E_{43}\ F_{10}\ M_{14}\ R_5\ V_8\ W_{127}$

140C modified wing and body flap off = $B_{62}\ C_{12}\ M_{14}\ R_5$

TEST FACILITY DESCRIPTION

The NASA/Langley Research Center 18-inch Hypersonic Nitrogen Tunnel is a blow down facility with a normal operational time of up to two hours for force and moment testing. This long run time is possible because the nitrogen is obtained in liquid form, mechanically pumped to 17,000 psig P_T, and then vaporized and heated to 2900°F T_T prior to entry into the nozzle. The test section is of the open jet variety with a water cooled diffusor that exits into a 60-foot diameter vacuum sphere.

Models are sting mounted on an injectable blade strut with externally controllable pitch capability and manually setable yaw freedom. Force testing is done utilizing 5 component water cooled internal strain gauge balances, with injection time kept to a absolute minimum (less than 5 seconds) to alleviate balance drift problems due to aerodynamic heating. Air is also blown on the model to cool it while in the retracted position between injections.

Recent calibrations of the tunnel indicate that the most satisfactory conditions to obtain force data are:

Total pressure = 5000 psi

Total temp = 3360 °R

RN/foot = 0.68×10^6

Mach = 19.80

The most recent operational parameters of the contoured nozzle are best obtained from the LaRC Hypersonic Analysis Section (Phone (804) 827-2483).

TEST FACILITY DESCRIPTION (Concluded)

The tunnel is also equipped with an electron beam flow vizualization device which allows color photographs with depth of field to be made of the flow system, allowing interpretation of shock interactions and flow separation phenomena.

DATA REDUCTION

Those data presented were obtained with the LaRC HNO 5 internal strain gauge balance at one set of tunnel conditions only (refer to the Remarks section). Data were converted to standard NASA force and moment coefficients and are presented about a nominal moment reference center in both stability and body axis systems.

Additionally, the normal force center of pressure is presented as:

$$X_{cp}/\ell_B = \frac{X_{CG}}{\ell_B} - \frac{C_m}{CN}\frac{(\bar{c})}{\ell_B}$$

where X_{cp} is the longitudinal distance from the inner mold line nose station (X_o = 238 inches full scale) to the center of pressure. X_{CG} is the distance from inner mold line to the moment reference point (X_{CG} = XMRP - 238 = 838.7 inches). The body length (ℓ_B) is 1290.3 inches.

The following reference dimensions were used to reduce the data to coefficient form:

S_{ref} = 2690.0 ft^2

LREF = $\bar{c}$ = 474.81 in.

BREF = b = 936.68 in.

X_{MRP} = 1076.7 in. X_o

Y_{MRP} = 0.0 in. Y_o

Z_{MRP} = 375.0 in. Z_o

TABLE I.

TEST : 0A89 | DATE : Jan., 1975

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per feet)	DYNAMIC PRESSURE (psf)	STAGNATION TEMPERATURE (degrees Fahrenheit)
19.80	0.68×10^6/foot	40	2900°F

BALANCE UTILIZED: HNO 5

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	51 lbf	0.5%	
SF	3 lbf	0.5%	
AF	31 lbf	0.5%	
PM	5 in lbf	0.5%	
RM	no flexure		
YM	3 in lbf	0.5%	

COMMENTS: P_T 5000 psi

TABLE II.

TEST : LaRC M19NT 30,31 (ΦA89) — DATA SET/RUN NUMBER COLLATION SUMMARY — DATE : 10/23/74

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES δ_e	δ_a	ζ_{BF}	δ_{SB}	NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)	TEST RUN NUMBERS
RQDCO1	140C ΦRB 74Φ	A	O	0	0	0	55		19.8	
2				20		16.3			23	
3				-35		-11.7			26	
4				0	10				28	
5	WINGS + BODY FLAP ΦF			—	—	—			30	
6	140C ΦRB 74Φ	B		0	0	0			32	
7				10		16.3			4	
8				20					3	
9				-40		-11.7			8	
									2	

"R" DATA | CN | CA | CLM | CY | CYN | CL | CD | L/D | XCP/L | MACH | ALPHA | 9

A' DATA | BETA | RN | Q(PSF) | MACH | ALPHA | 3

TYPE OF DATA α OR β SCHEDULES

$\alpha(A) = 15° \rightarrow 42.5°$ ($\Delta\alpha = 2.5°$)

$\alpha(B) = -5° \rightarrow 40°$ ($\Delta\alpha = 5°$)

COEFFICENT SCHEDULES

IDVAR (1) IVAR (2) NDV

TABLE III MODEL DIMENSIONAL DATA

MODEL COMPONENT : BODY - B_{4e}

GENERAL DESCRIPTION : Configuration 140C orbiter fuselage MCR 200-R_4. Similar to 140A'B fuselage except aft body revised and improved midbody-wing-boot fairing. X_o = 950 to X_o = 1040.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C -000202C -000205A -000200B -000203

DIMENSIONS .		FULL SCALE	MODEL SCALE
Length (OML: Fwd Sta. X_o=235)	In.	1293.3	5.173
Length (IML: Fwd Sta. X_o=238).	In.	1290.3	5.161
Max. Width (@ X_o = 1528.3)	In.	264.0	1.056
Max Depth (@ X = 1464)	In.	250.0	1.000
Fineness Ratio (OML Length/Max. Width)		4.899	4.899
Area - Ft^2			
Max. Cross-Sectional		340.885	0.0055
Planform			
Wetted			
Base			

TABLE III (CONT'D)

MODEL COMPONENT : CANOPY - C_{12}

GENERAL DESCRIPTION : Configuration 140C orbiter canopy vehicle cabin No. 31 updated to MCR 200-R_4. Used with fuselage B_{62}.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C -000202B -000204

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X_o =434.643 to 578) In.	143.357	0.573
Max Width (@ X_o = 513.127). In.	152.412	0.610
Max Depth (Z_o = 501 to 449.39) In.	51.61	0.206
Fineness Ratio		
Area		
Max. Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III (CONT'D)

MODEL COMPONENT: ELEVON - E_{43}

GENERAL DESCRIPTION: Configuration 140A 'B orbiter elevons.

DATA are for one side, used on 74-0 model with W_{127}. E_{43} is 6" F.S. straight slotted gap version of E_{24}. gaps are at elevon 'body flare juncture and at Y_o = 311.0 MODEL SCALE: 0.004

DRAWING NUMBER: VL70- 000200, -006089, -006092
R80006 Lockheed Missile & Space Co., Huntsville, Ala.

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Ft^2	210.0	0.003
Span (equivalent), In.	349.2	1.397
Inb'd equivalent chord, In.	118.004	0.472
Outb'd equivalent chord, In.	55.192	0.221
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.2096	0.2096
At Outb'd equiv. chord	0.4004	0.4004
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Tailing Edge	-10.056	-10.056
Hingeline	0.00	0.00
Area Moment ((Product of area & $\bar{c}$)) Ft^3	1587.25	0.0001
Mean Aerodynamic Chord, In.	90.7	0.363

TABLE III (CONT'D)

MODEL COMPONENT : BODY FLAP - F_{10}

GENERAL DESCRIPTION : Configuration 140C body flap. Hingeline located at X_o = 1532, Z_o = 287.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C, VL70-355114

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X_o=1525.5 to 1613) In.	87.50	0.350
Max Width (@ L.E., X_o = 1525.5) In.	256.00	1.024
Max Depth (X_o = 1532). In.	19.798	0.792
Fineness Ratio		
Area - $Ft.^2$		
Max. Cross-Sectional (@ H.L.)	35.196	0.00056
Planform	135.00	0.0022
Wetted		
Base (@ X_o = 1613)	4.89	0.000078

TABLE III (CONT'D)

MODEL COMPONENT : OMS POD - M_{14}

GENERAL DESCRIPTION : Preliminary IML version of short OMS pod.

(First used on 0.015 scale Model 36-O for test No. OA83).

MODEL SCALE: .004

DRAWING NUMBER : VL70-008457

DIMENSIONS : (For 1 of 2 sides)	FULL SCALE	MODEL SCALE
Length (OMS Fwd Sta X_o =1311). In.	254.0	1.036
Max Width (@ X_o = 1511) In.	135.6	0.5424
Max Depth (@ X_o = 1511) In.	73.6	0.2944
Fineness Ratio	2.54080	2.54080
Area - Ft^2		
Max. Cross-Sectional	54.507	0.00087
Planform		
Wetted		
Base		

TABLE III (CONT'D)

MODEL COMPONENT: VERTICAL - V_8

GENERAL DESCRIPTION: Configuration 140C orbiter vertical tail (identical to configuration 140A 'B vertical tail).

MODEL SCALE: 0.004

DRAWING NUMBER: VL70-000140C -000146B

DIMENSIONS:	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - Ft^2		
Planform	413.253	0.0068
Span (Theo) - In.	315.72	1.263
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	0.404	0.404
Sweep-Back Angles, Deg.		
Leading Edge	45.000	45.000
Trailing Edge	26.2	26.2
0.25 Element Line	41.13	41.13
Chords:		
Root (Theo) WP	268.50	1.074
Tip (Theo) WP	108.47	0.434
MAC	199.81	0.799
Fus. Sta. of .25 MAC	1463.35	5.853
W.P. of .25 MAC	635.52	2.542
B.L. of .25 MAC	0.0	0.0
Airfoil Section		
Leading Wedge Angle - Deg.	10.000	10.000
Trailing Wedge Angle - Deg.	14.92	14.92
Leading Edge Radius	2.00	0.008
Void Area	13.17	0.00021
Blanketed Area	0.0	0.0

TABLE III (CONT'D)

MODEL COMPONENT: RUDDER - R_5

GENERAL DESCRIPTION: Conf-guration 140C orbiter rudder (identical to Configuration 140A 'B rudder).

MODEL SCALE: 0.004

DRAWING NUMBER: VL70-000146B -000095

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Ft^2	100.15	0.0016
Span (equivalent) . In.	201.00	0.804
Inb'd equivalent chord . In.	91.585	0.366
Outb'd equivalent chord In.	50.833	0.203
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.400	0.400
At Outb'd equiv. chord	0.400	0.400
Sweep Back Angles, degrees		
Leading Edge	34.83	34.83
Tailing Edge	26.25	26.25
Hingeline	34.83	34.83
Area Moment (Product of Area & $\bar{c}$) normal to hinge line) . Ft^3	610.92	0.000039
Mean Aerodynamic Chord In.	73.2	0.293

TABLE III. (Concluded)

MODEL COMPONENT: WING-W_{127}

GENERAL DESCRIPTION: Configuration 140C orbiter wing, MCR 200-R, similar to 140A 'B wind W_{116} but with refinements: improved wing-boot-midbody fairing (X_o = 940 to X_o = 1040).

MODEL SCALE: 0.00/

TEST NO.

DWG. NO. VL70-000140C, -000200B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo.) Ft^2 Planform	2690.00	0.043
Span (Theo In.	936.68	3.747
Aspect Ratio	2.265	2.265
Rate of Taper	1.177	1.177
Taper Ratio	0.200	0.200
Dihedral Angle, degrees	3.500	3.500
Incidence Angle, degrees	0.500	0.500
Aerodynamic Twist, degrees	3.000	3.000
Sweep Back Angles, degrees		
Leading Edge	34.000	45.000
Trailing Edge	- 10.056	- 10.056
0.25 Element Line	35.209	35.209
Chords:		
Root (Theo) B.P.0.0.	689.24	2.757
Tip, (Theo) B.P.	137.85	0.551
MAC	474.81	1.899
Fus. Sta. of .25 MAC	1136.83	4.547
W.P. of .25 MAC	290.58	1.162
B.L. of .25 MAC	182.13	0.729
EXPOSED DATA		
Area (Theo) Ft^2	1751.50	7.006
Span, (Theo) In. BP108	720.68	2.883
Aspect Ratio	2.059	2.059
Taper Ratio	0.245	0.245
Chords		
Root BP108	562.09	2.248
Tip 1.00 $\frac{b}{2}$	137.85	0.551
MAC	392.83	1.531
Fus. Sta. of .25 MAC	1185.98	4.744
W.P. of .25 MAC	294.30	1.177
B.L. of .25 MAC	251.77	1.007
Airfoil Section (Rockwell Mod NASA) XXXX-64		
Root $\frac{b}{2}$ =	0.113	0.113
Tip $\frac{b}{2}$ =	0.120	0.120
Data for (1) of (2) Sides		
Leading Edge Cuff Planform Area Ft^2	11[illegible]	0.0018
Leading Edge Intersects Fus M. L. @ Sta	500.00	2.000
Leading Edge Intersects Wing @ Sta	1024.00	4.096

Notes:

1. Positive directions of force coefficients, moment coefficients, and angles are indicated by arrows
2. For clarity, origins of wind and stability axes have been displaced from the center of gravity

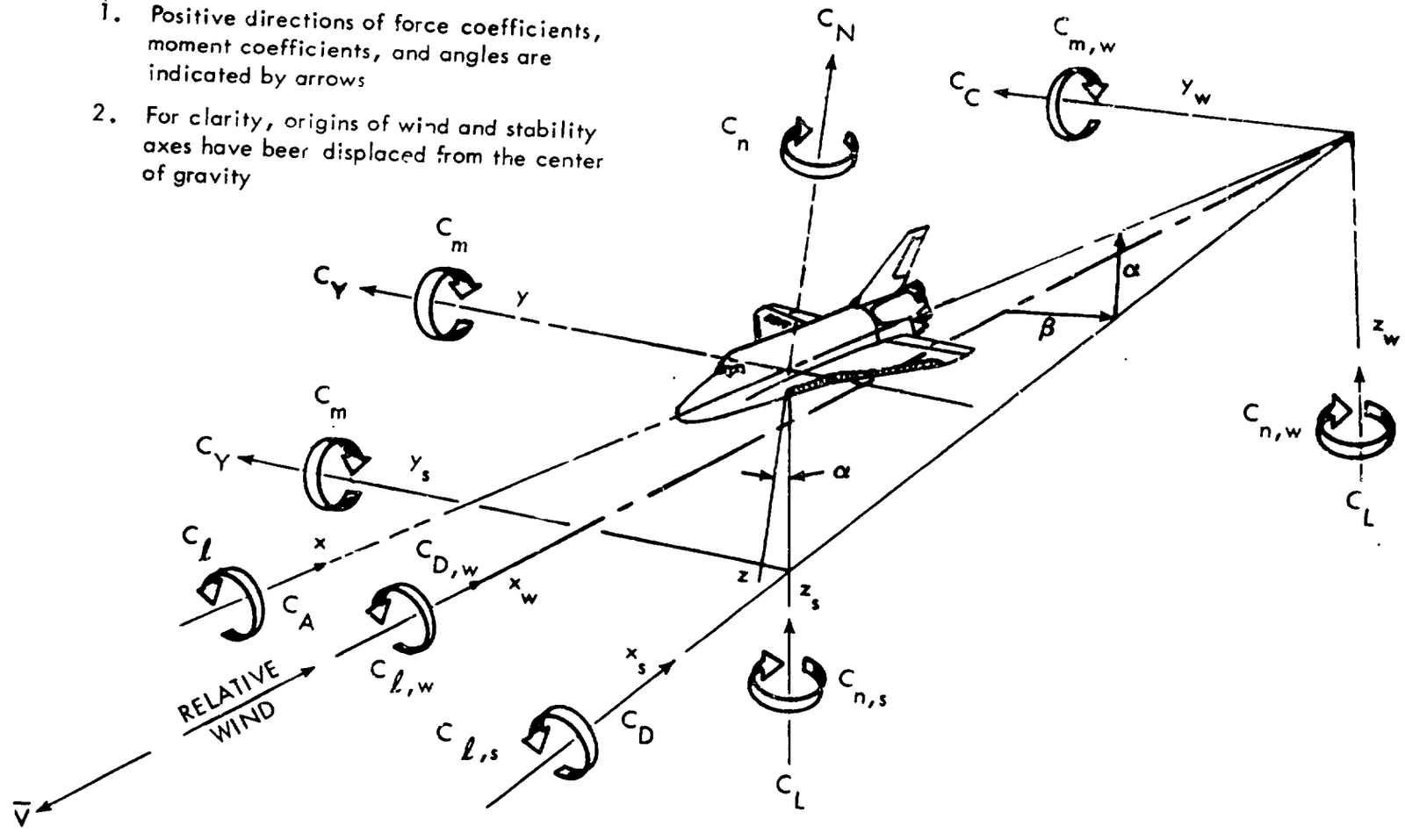


Figure 1. - Axis systems.

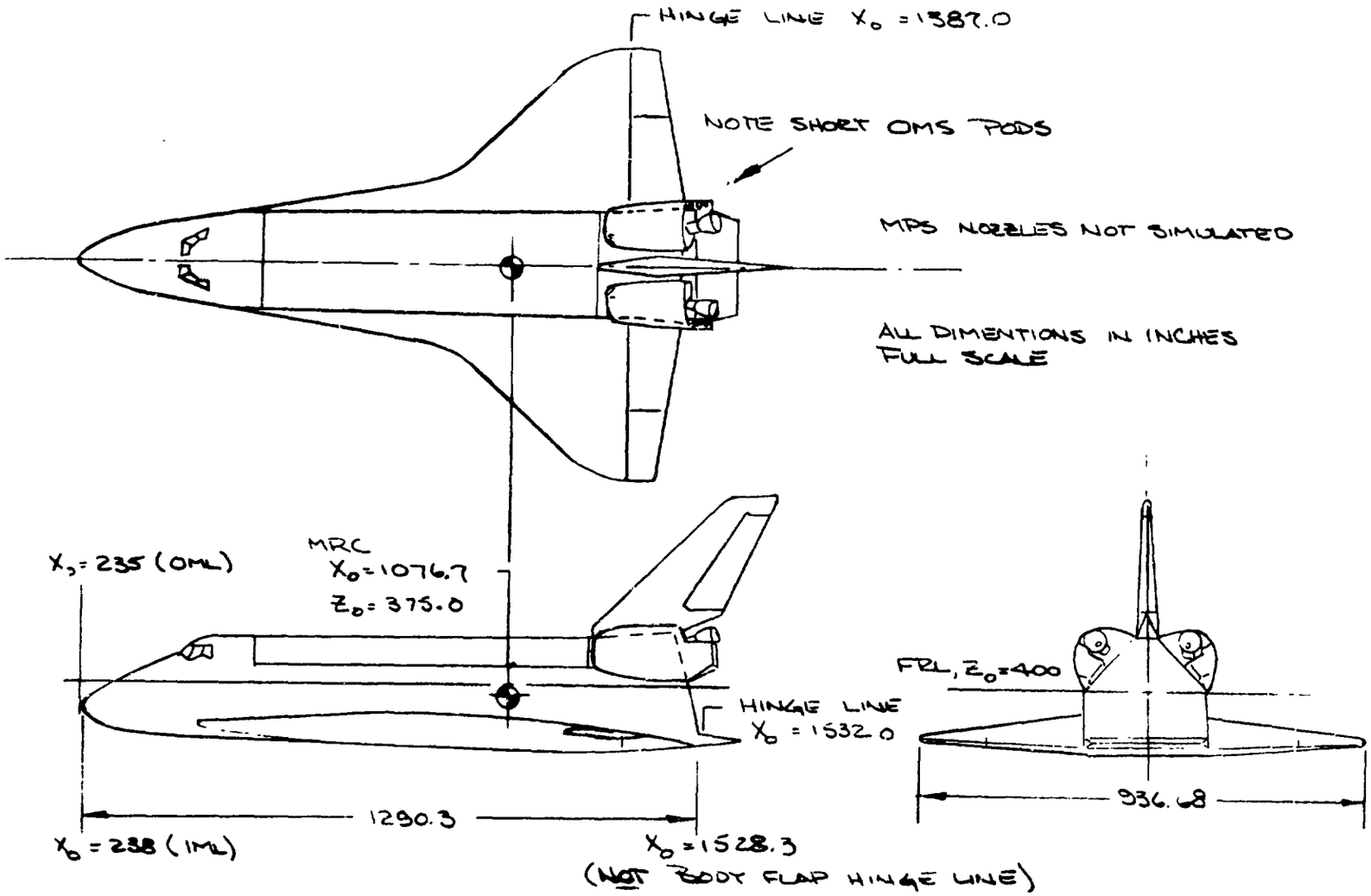
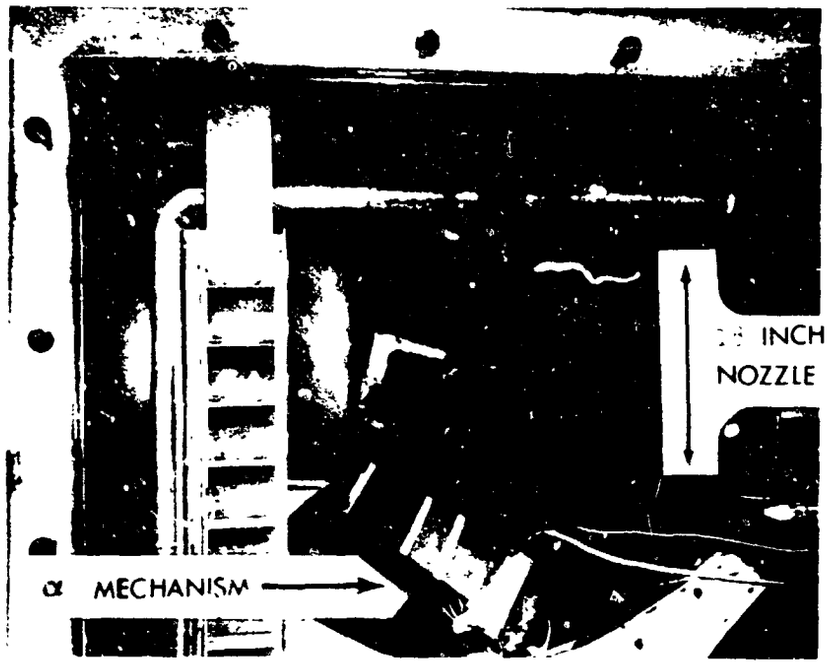


Figure 2. - 140C modified Orbiter for test OA89



a. Test Section with Model Injected, 45° Bent Sting

b. 74-0 Model on 45° Sting

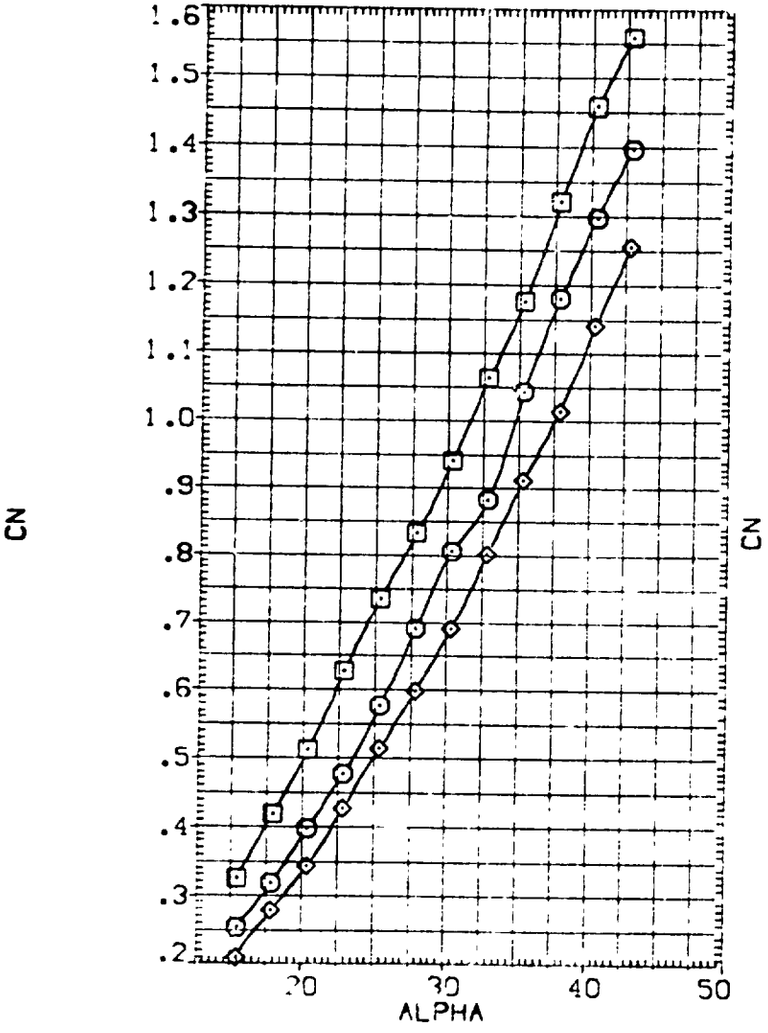
Figure 3. - Model photographs.

DATA FIGURES

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPDBRK
(RQ0001)	□	M19 N.T.-30(0A-89) (B62C12F10M14)(V127E43)(V8R5)	0.000	.000	.000	55.000
(RQ0002)	◇	M19 N.T.-30(0A-89) (B62C12F10M14)(V127E43)(V8R5)	20.000	.000	16.300	55.000
(RQ0003)	◇	M19 N.T.-30(0A-89) (B62C12F10M14)(V127E43)(V8R5)	-35.000	.000	-11.700	55.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XO
YMRP	.0000	IN. YO
ZMRP	375.0000	IN. ZO
SCALE	.0040	



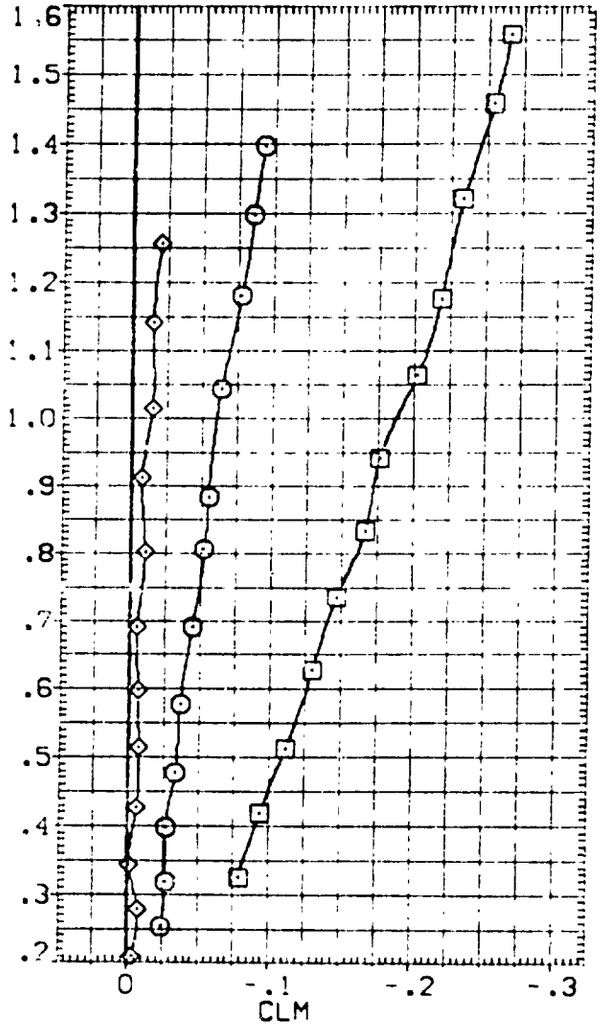


FIGURE 4 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(45DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
(R00001)	□	M19 N.T.-30(0A-69) (B62C12F10M14)(V127E43)(V8R5)	.000	.000	.000	55.000
(R00002)	▽	M19 N.T.-30(0A-69) (B62C12F10M14)(V127E43)(V8R5)	20.000	.000	16.300	55.000
(R00003)	◇	M19 N.T.-30(0A-69) (B62C12F10M14)(V127E43)(V8R5)	-35.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.5800	INCHES
XMRP	1076.7000	IN. XG
YMRP	.0000	IN. YG
ZMRP	375.0000	IN. ZG
SCALE	.0040	

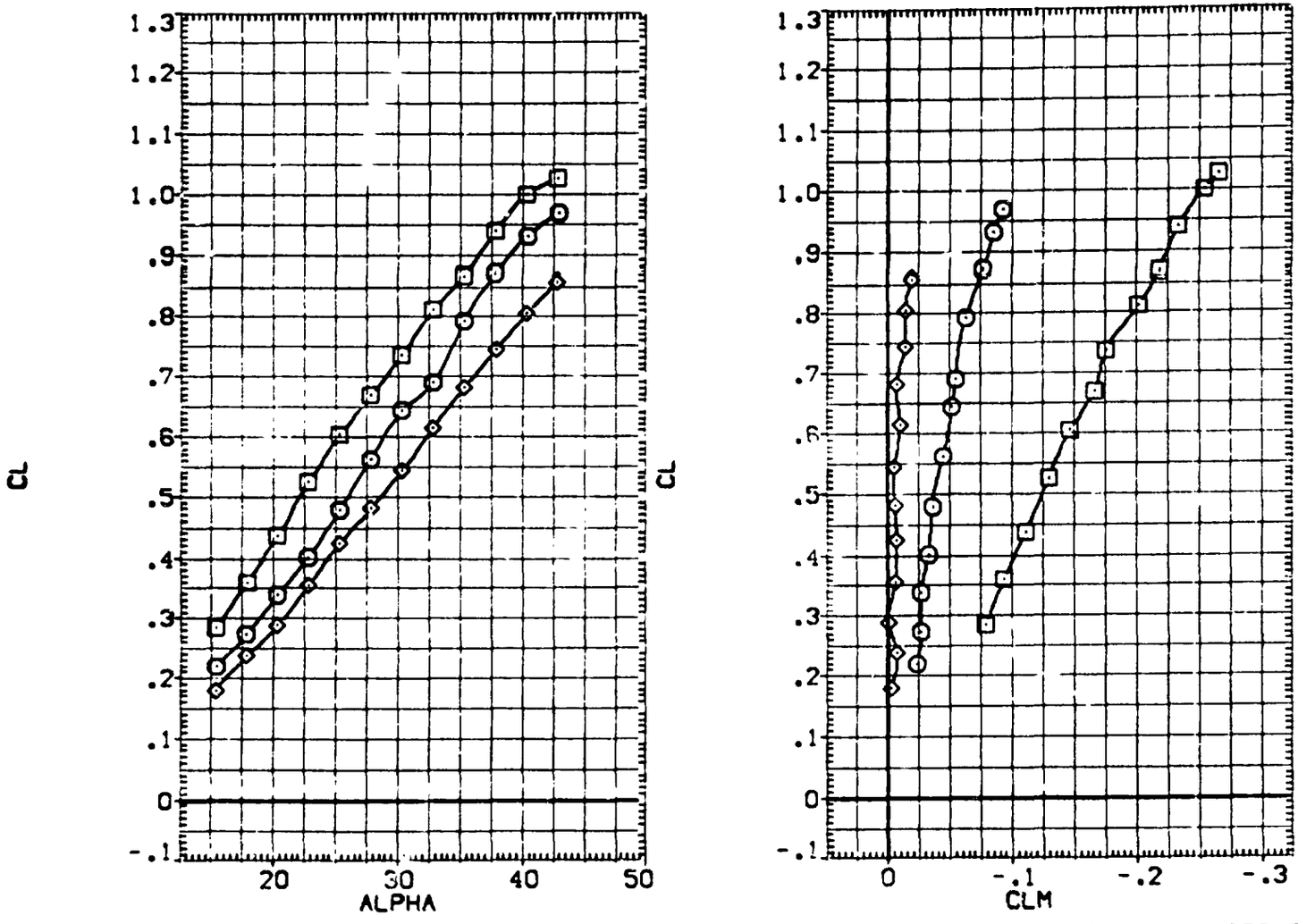


FIGURE 4 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(45DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BOFLAP	SPOBRK
[RQ0001]	□	M19 N.T.-30[OA-89] [B62C12F10M14][V127E43][V8R5]	.000	.000	.000	55.000
[RQ0002]	◇	M19 N.T.-30[OA-89] [B62C12F10M14][V127E43][V8F5]	20.000	.000	16.300	55.000
[RQ0003]	△	M19 N.T.-30[OA-89] [B62C12F10M14][V127E43][V8R5]	-35.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XO
YMRP	.0000	IN. YO
ZMRP	375.0000	IN. ZO
SCALE	.0040	

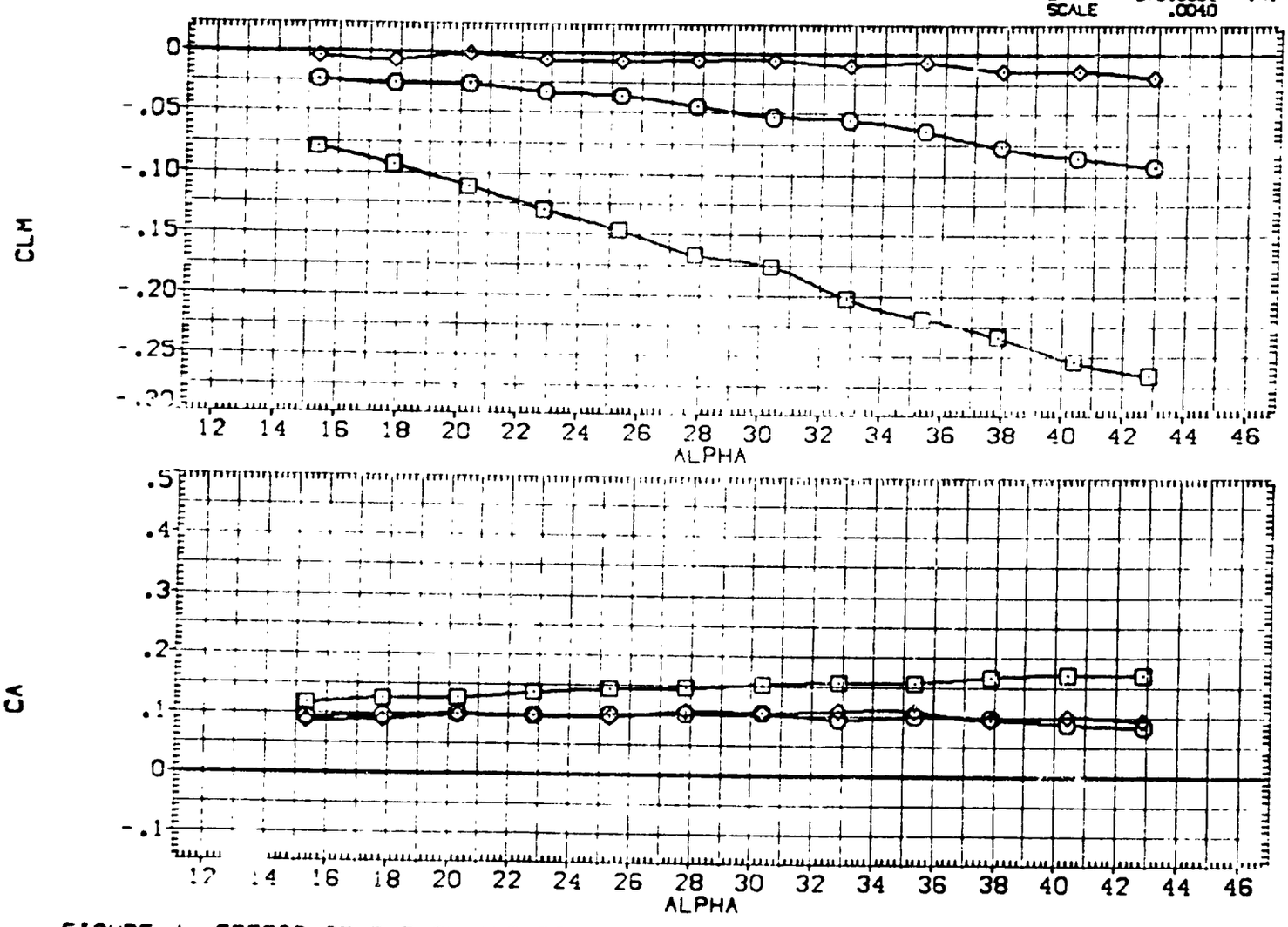


FIGURE 4 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(45DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPDBRK
[RQ0001]	○	M19 N.T.-30[0A-69] [B62C12F10M14][V127E43][V0R5]	.000	.000	.000	55.000
[RQ0002]	□	M19 N.T.-30[0A-69] [B62C12F10M14][V127E43][V0R5]	20.000	.000	16.300	55.000
[RQ0003]	◇	M19 N.T.-30[0A-69] [B62C12F10M14][V127E43][V0R5]	-35.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

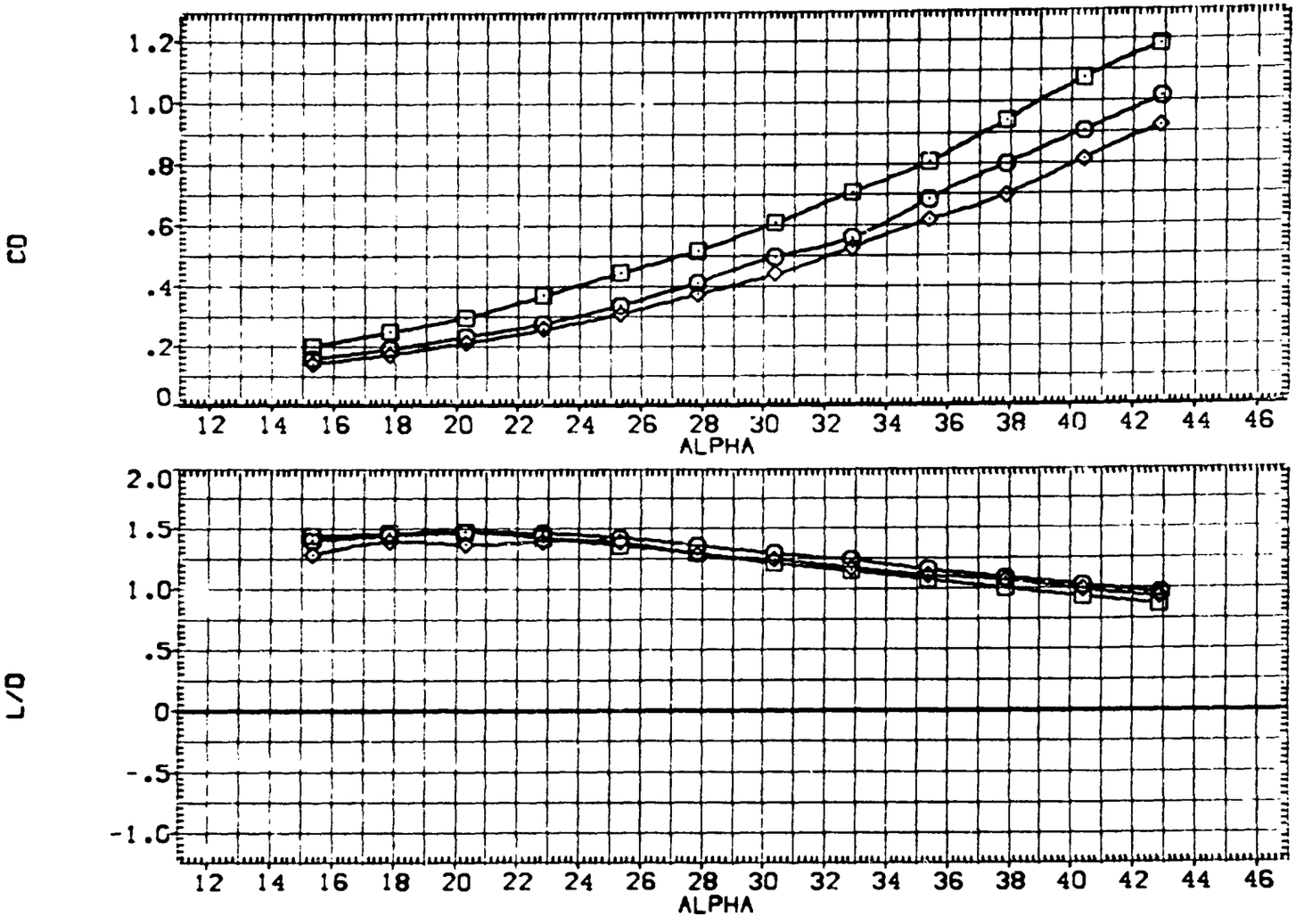


FIGURE 4 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(45DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELE/TR	AILRON	BDFLAP	SPDBRK
(R00006)	□	M19 N.T.-3I(0A-89) (B62C12F10H14)(V127E43)(V8R5)	.000	.000	.000	55.000
(R00007)	△	M19 N.T.-3I(0A-89) (B62C12F10H14)(V127E43)(V8R5)	10.000	.000	16.300	55.000
(R00008)	◇	M19 N.T.-3I(0A-89) (B62C12F10H14)(V127E43)(V8R5)	20.000	.000	16.300	55.000
(R00009)	⊠	M19 N.T.-3I(0A-89) (B62C12F10H14)(V127E43)(V8R5)	-40.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.6100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

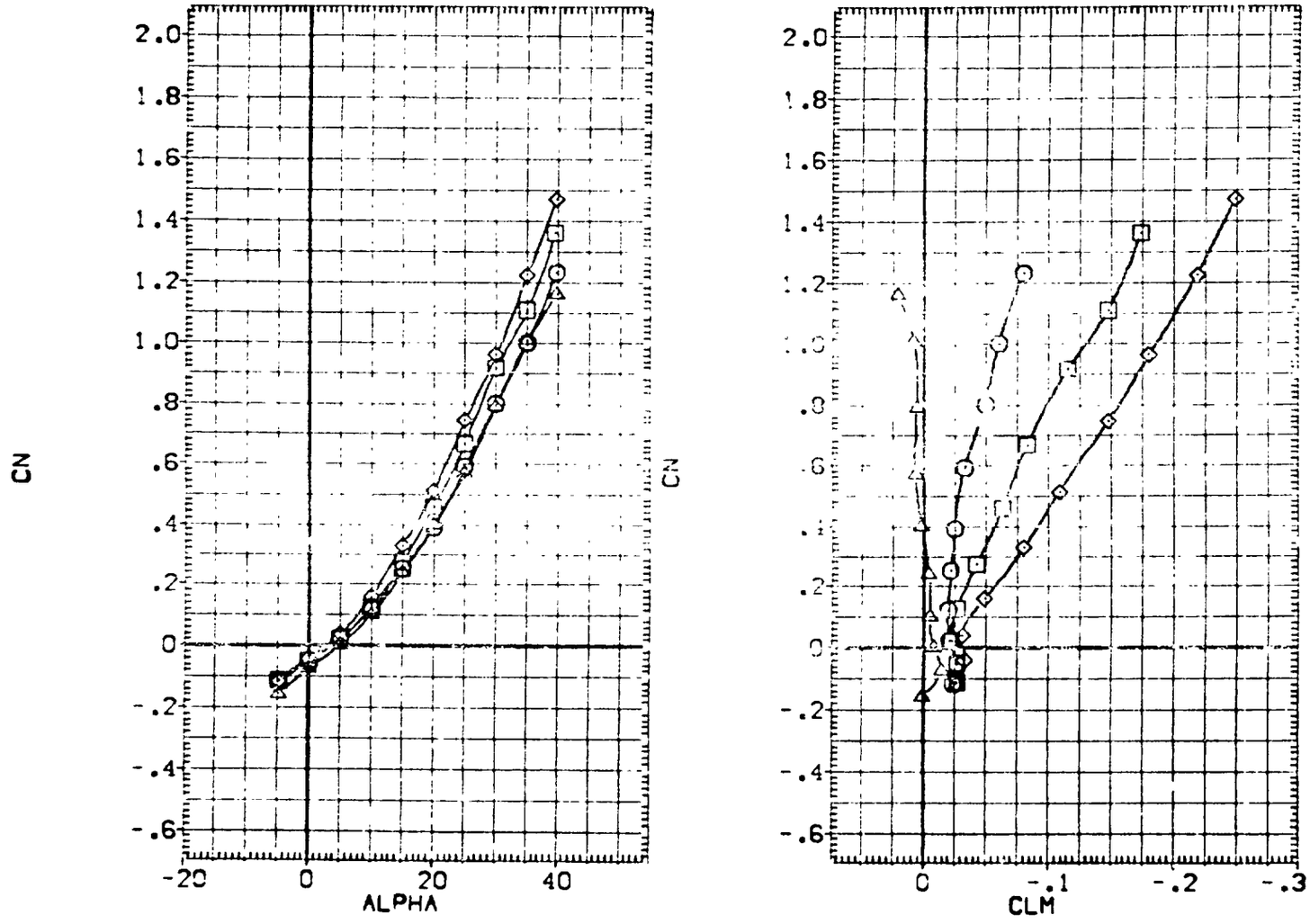


FIGURE 5 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(25DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
{R00006}	□	M19 N.T.-3|0A-89| |B62C12F1DM14||V127E43||VBR5|	.000	.000	.000	55.000
{R00007}	□	M19 N.T.-3|0A-89| |B62C12F1DM14||V127E43||VBR5|	10.000	.000	16.300	55.000
{R00008}	⊠	M19 N.T.-3|0A-89| |B62C12F1DM14||V127E43||VBR5|	20.000	.000	16.300	55.000
{R00009}	△	M19 N.T.-3|0A-89| |B62C12F1DM14||V127E43||VBR5|	-40.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6900	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

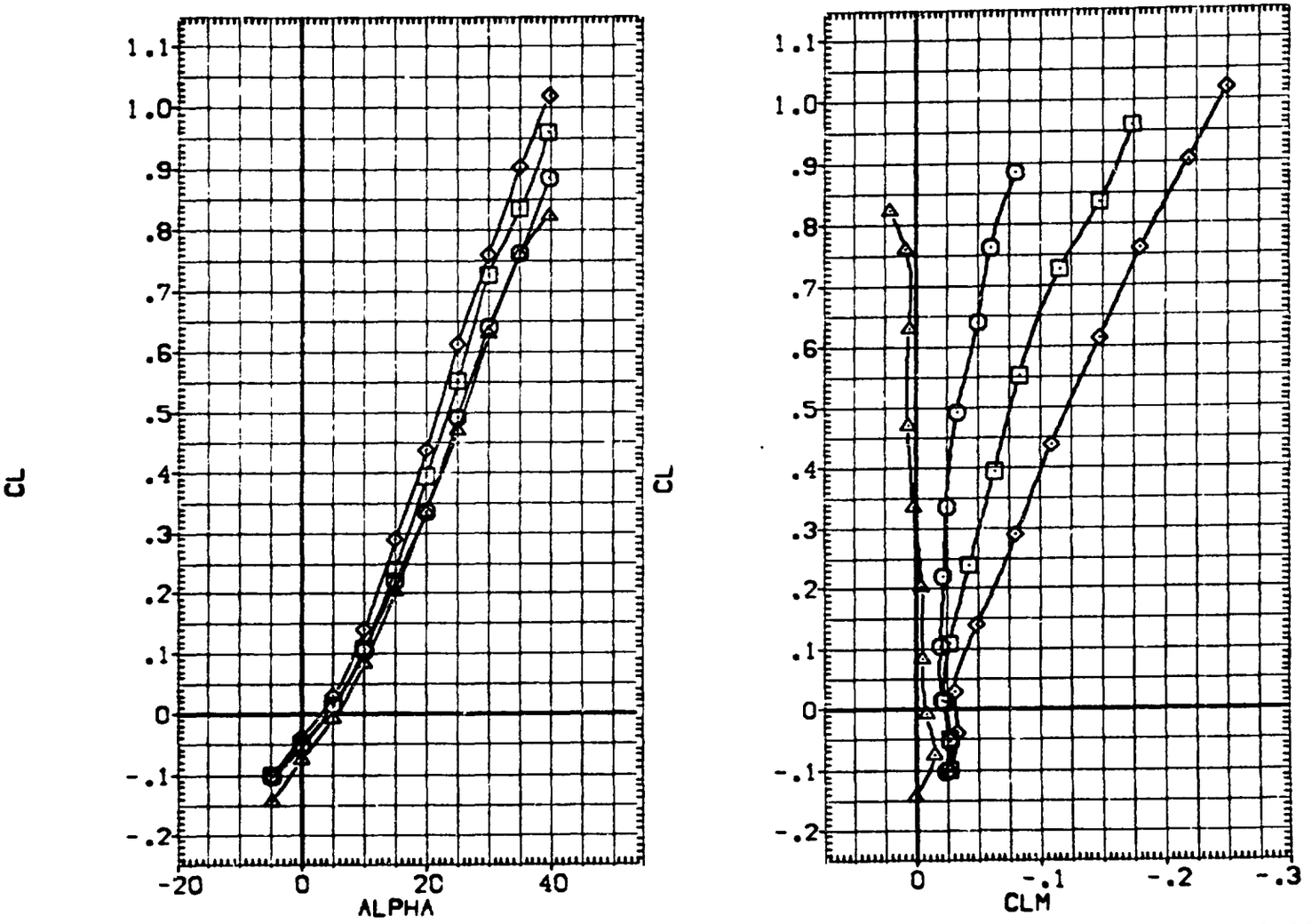


FIGURE 5 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(25DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPDBRK
(R00006)	○	M19 N.T.-31(DA-89) (B62C12F10M14)(V127E43)(V8R5)	.000	.000	.000	55.000
(R00007)	□	M19 N.T.-31(DA-89) (B62C12F10M14)(V127E43)(V8R5)	10.000	.000	16.300	55.000
(R00008)	⋈	M19 N.T.-31(DA-89) (B62C12F10M14)(V127E43)(V8R5)	20.000	.000	16.300	55.000
(R00009)	△	M19 N.T.-31(DA-89) (B62C12F10M14)(V127E43)(V8R5)	-40.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

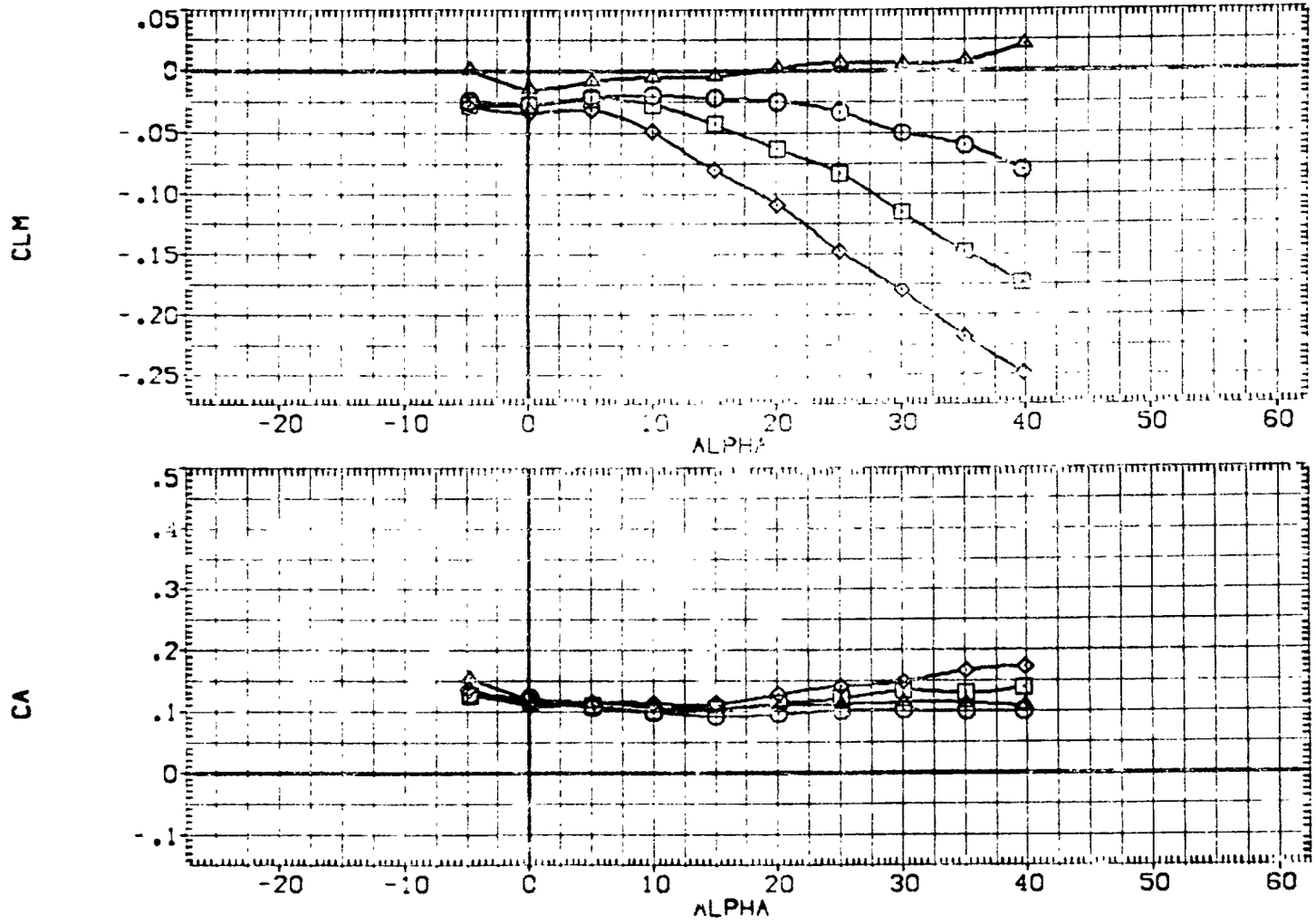


FIGURE 5 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(25DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPDBRK
(RQQ006)	□	M19 N.T.-31(0A-89) (B62C12F10M14)(W127E43)(V8R5)	.000	.000	.000	55.000
(RQQ007)	◇	M19 N.T.-31(0A-89) (B62C12F10M14)(W127E43)(V8R5)	10.000	.000	16.300	55.000
(RQL008)	⊠	M19 N.T.-31(0A-89) (B62C12F10M14)(W127E43)(V8R5)	20.000	.000	16.300	55.000
(RQL009)	△	M19 N.T.-31(0A-89) (B62C12F10M14)(W127E43)(V8R5)	-40.000	.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

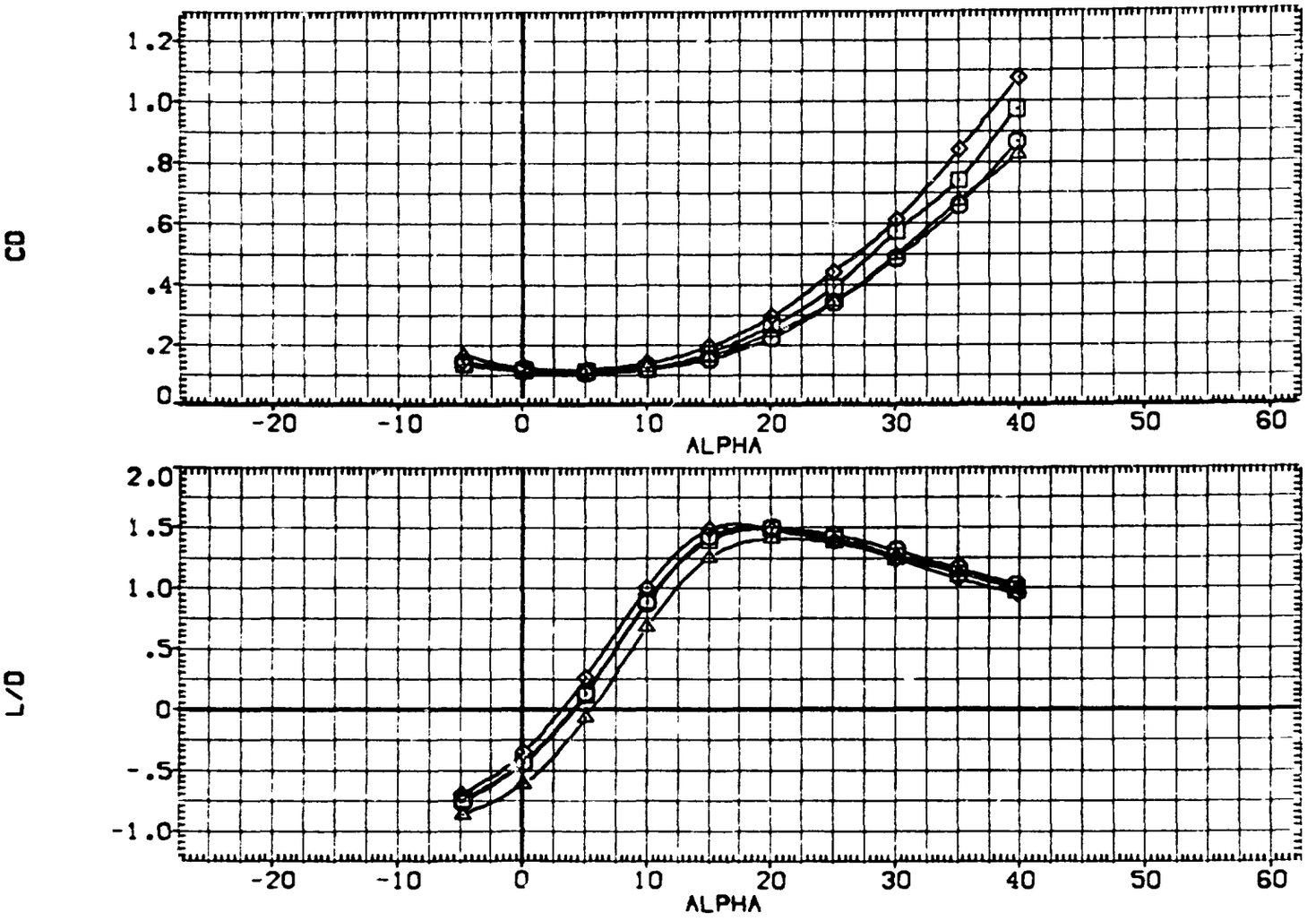


FIGURE 5 EFFECT OF ELEVON AND BODY FLAP DEFLECTION ON LONG CHARACT(25DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
[R00001]	○	M19 N.T.-30[DA-89] [B62C12F10H14][V127E43][V8R5]	.000	.000	.000	55.000
[R00004]	□	M19 N.T.-30[DA-89] [B62C12F10H14][V127E43][V8R5]	.000	10.000	-11.700	55.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

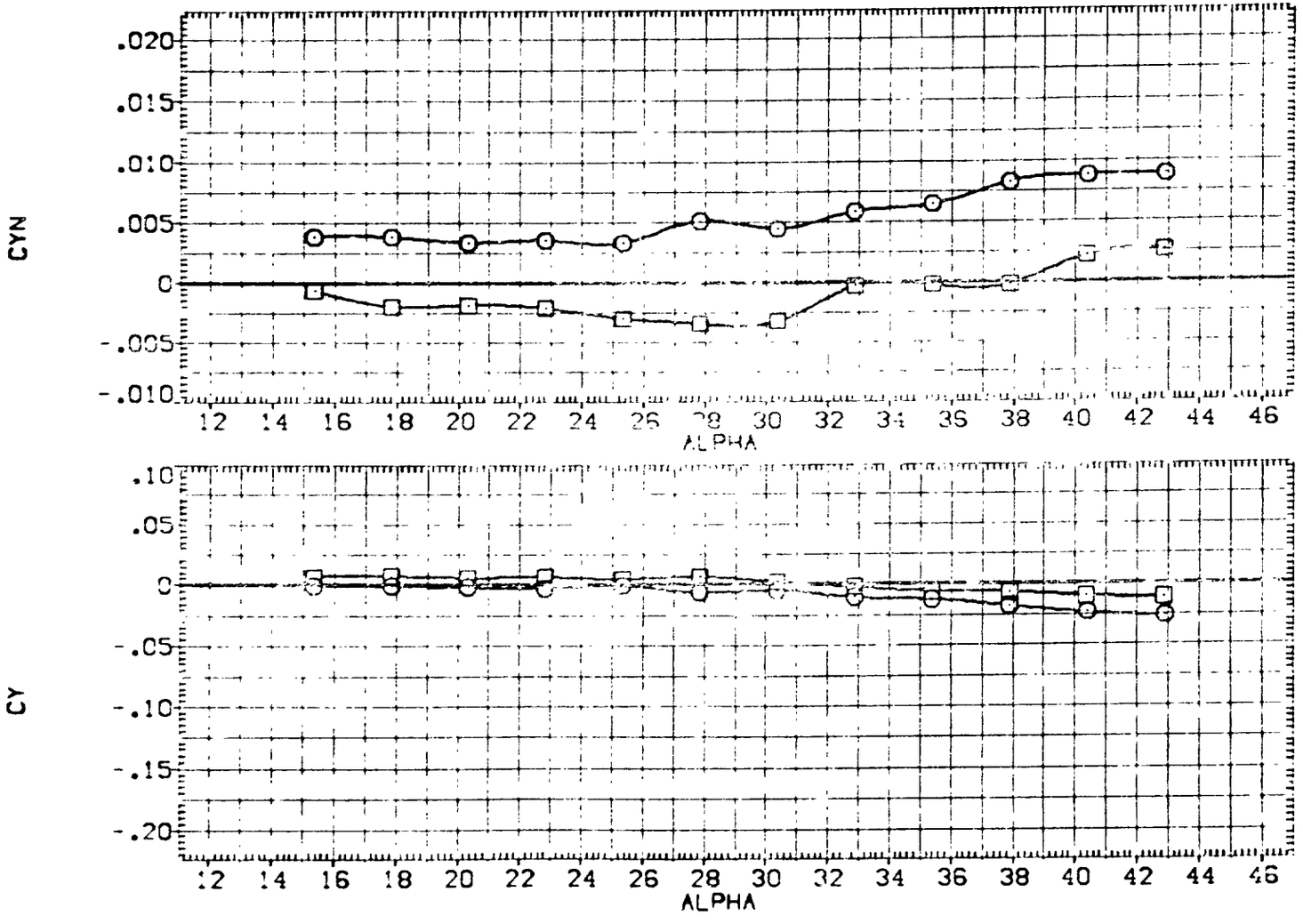


FIGURE 6 EFFECT OF AILERON AND BODY FLAP DEFLECTION ON LAT-DIRECT (45DEG STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
[RQ0005]	□	M19 N.T.-30[0A-89] [B62C12 M14][ ][V8R5]				55.000
[RQ0001]	○	M19 N.T.-30[0A-89] [B62C12F10M14][V127E43][V8R5]	.300	.000	.000	55.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. F
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

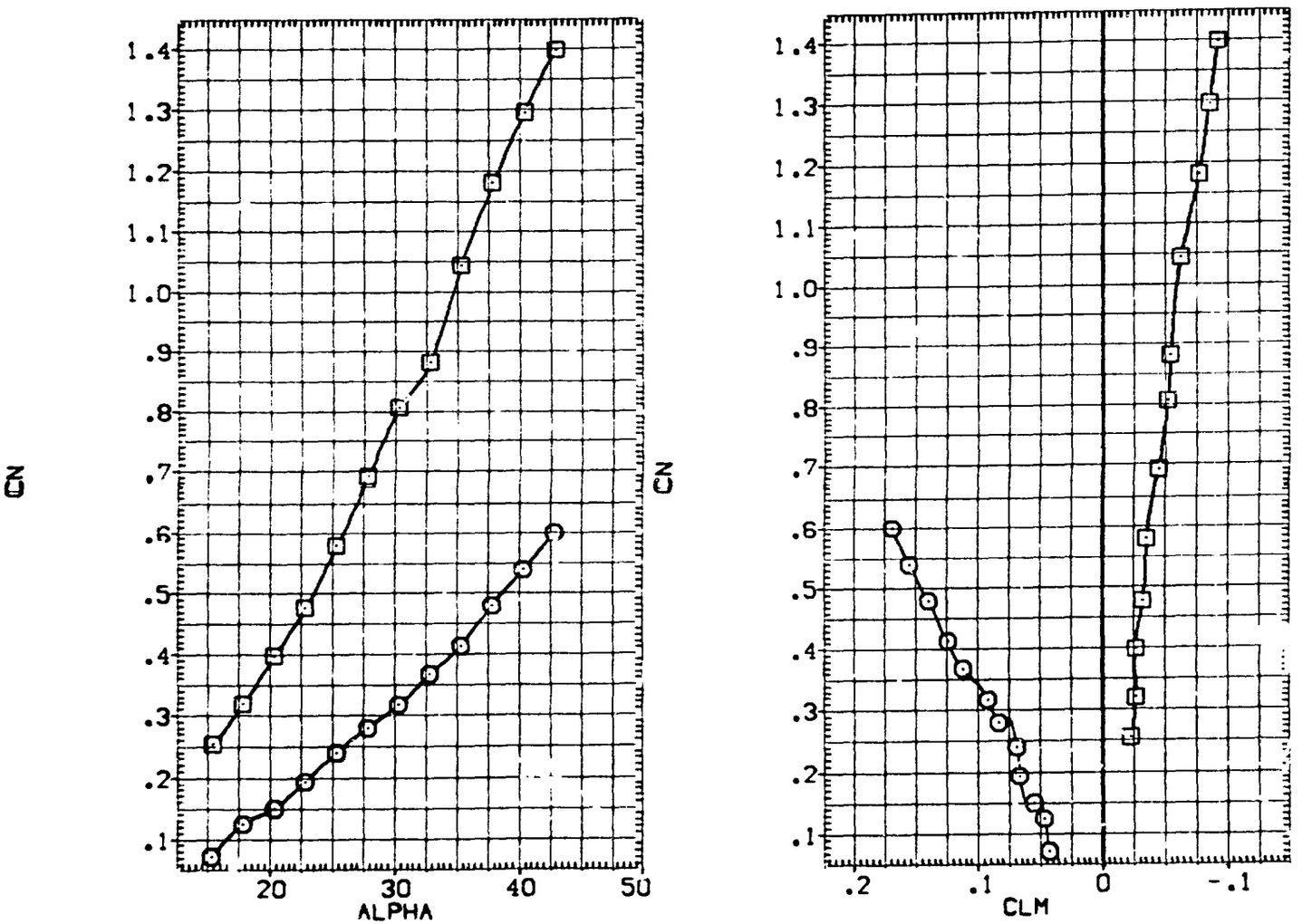


FIGURE 7 EFFECT OF WING AND BODY FLAP ON LONG. CHARACT. (45 DEG. STING)

(A)MACH = 19.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
[RQ0005]	M19 N.T.-30[DA-89] [B62C12 M14][ ][V8R5]				55.000
[RQ0001]	M19 N.T.-30[DA-89] [B62C12F10M14][V127E43][/8R5]	.000	.000	.000	55.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.68	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

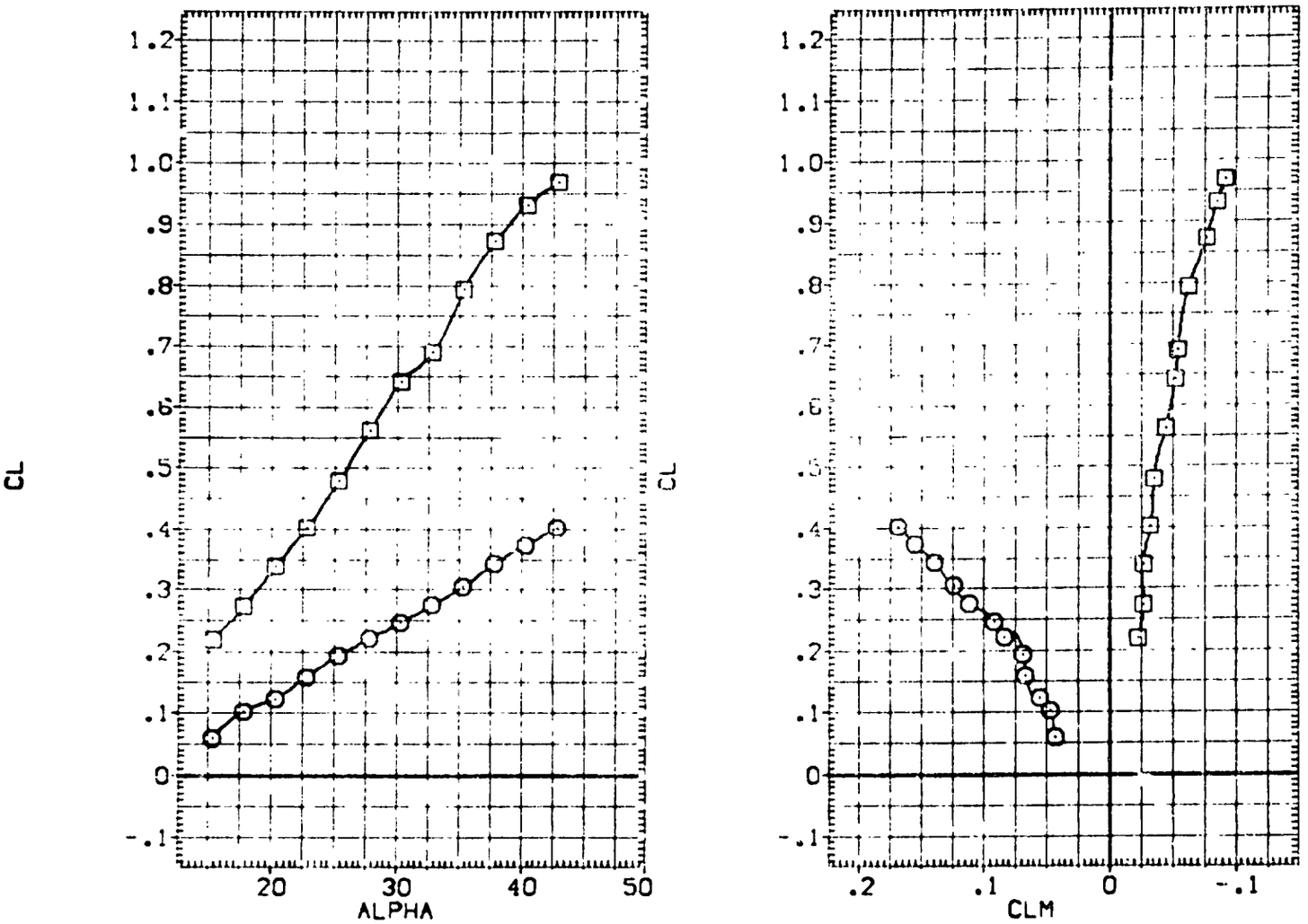


FIGURE 7 EFFECT OF WING AND BODY FLAP ON LONG. CHARACT. (45 DEG. STING)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOSRK
[R00005]	□	MIS N.T.-30[0A-00] [B62C12 M14][ ][V8R5]	55.000			
[R00001]	□	MIS N.T.-30[0A-00] [B62C12F10M14][V127E43][V8R5]	.000	.000	.000	55.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. X0
YMRP	.0000	IN. Y0
ZMRP	375.0000	IN. Z0
SCALE	.0040	

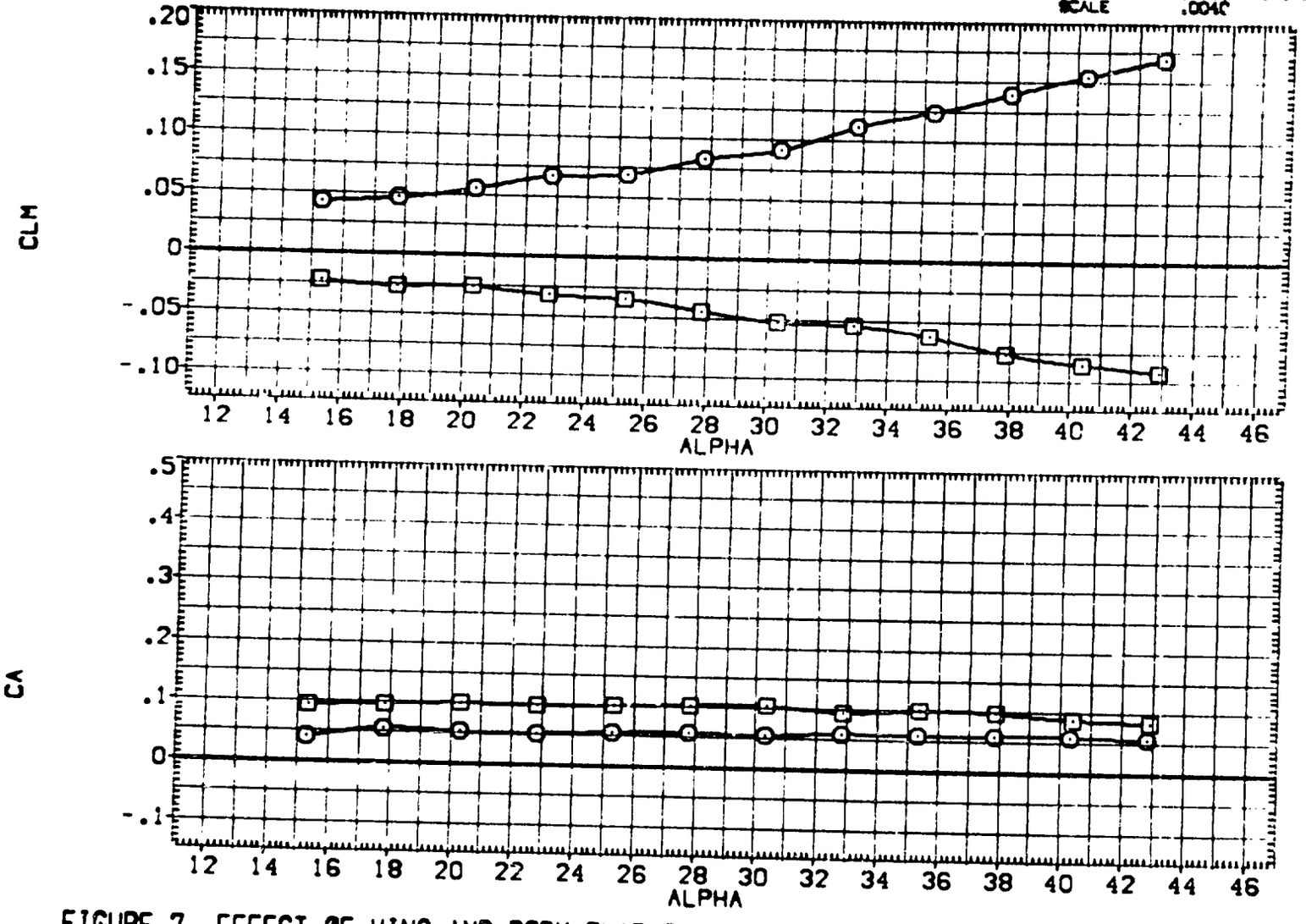


FIGURE 7 EFFECT OF WING AND BODY FLAP ON LONG. CHARACT. (45 DEG. STING)

(A)MACH = 19.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	AILRON	BDFLAP	SPOBRK
{RD0005}	M19 N.T.-30{DA-89} {B62C12 M14}{ }{V8R5}				55.000
{RD0001}	M19 N.T.-30{DA-89} {B62C12F10M14}{V12Z7E43}{V8R5}	.000	.000	.000	55.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.3800	INCHES
XMRP	1076.7000	IN.
YMRP	.0000	IN.
ZMRP	375.0000	IN.
SCALE	.0040	

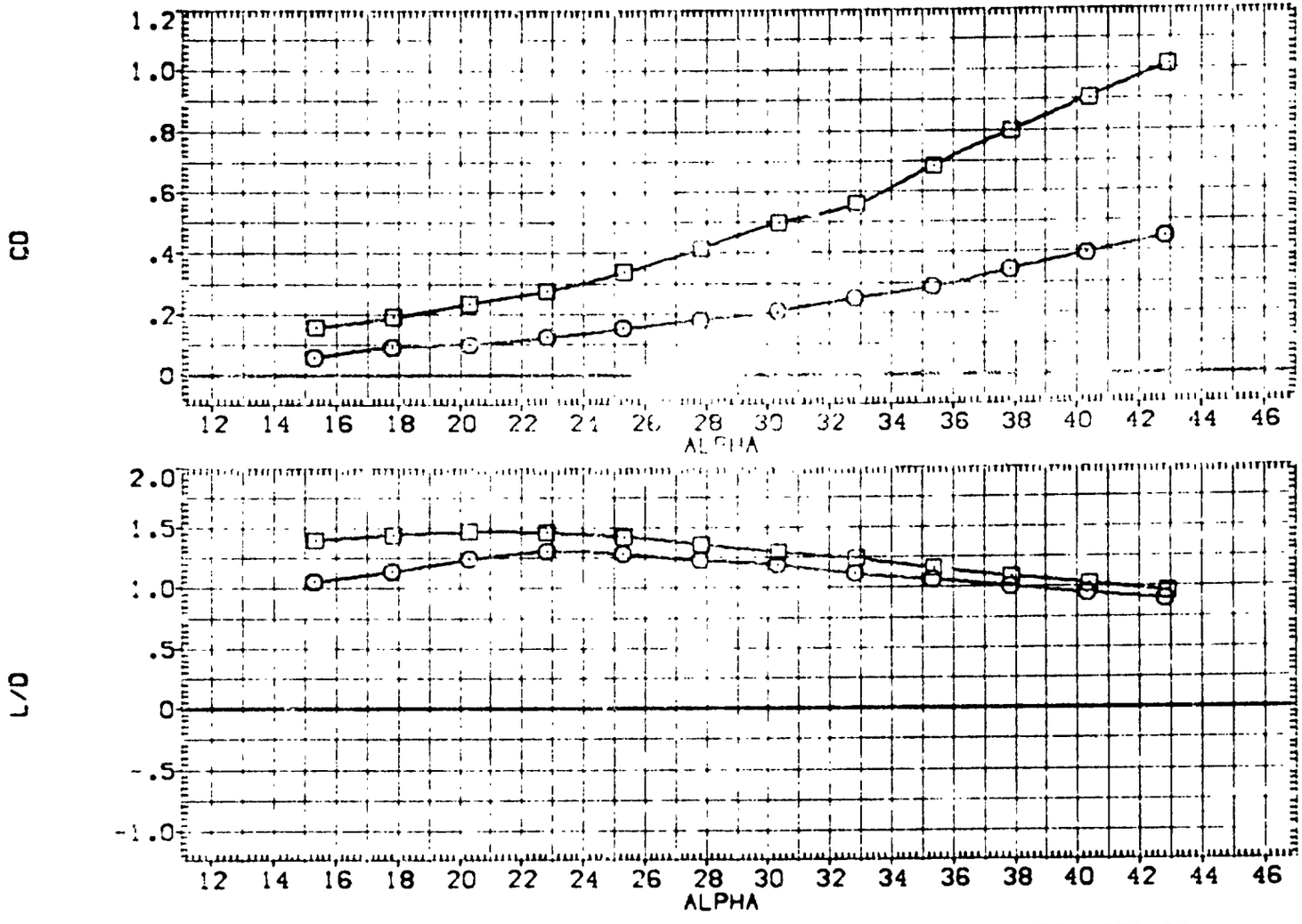


FIGURE 7 EFFECT OF WING AND BODY FLAP ON LONG. CHARACT. (45 DEG. STING)

(A)MACH = 19.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BOFLAP	SPOBRK	STING
[RQ0001]	M19 N.T.-30[0A-89] [862C12F1DM14][V127E43][VBR5]	.000	.000	55.000	45.000
[RQ0006]	M19 N.T.-31[0A-89] [862C12F1DM14][V127E43][VBR5]	.000	.000	55.000	25.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	933.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

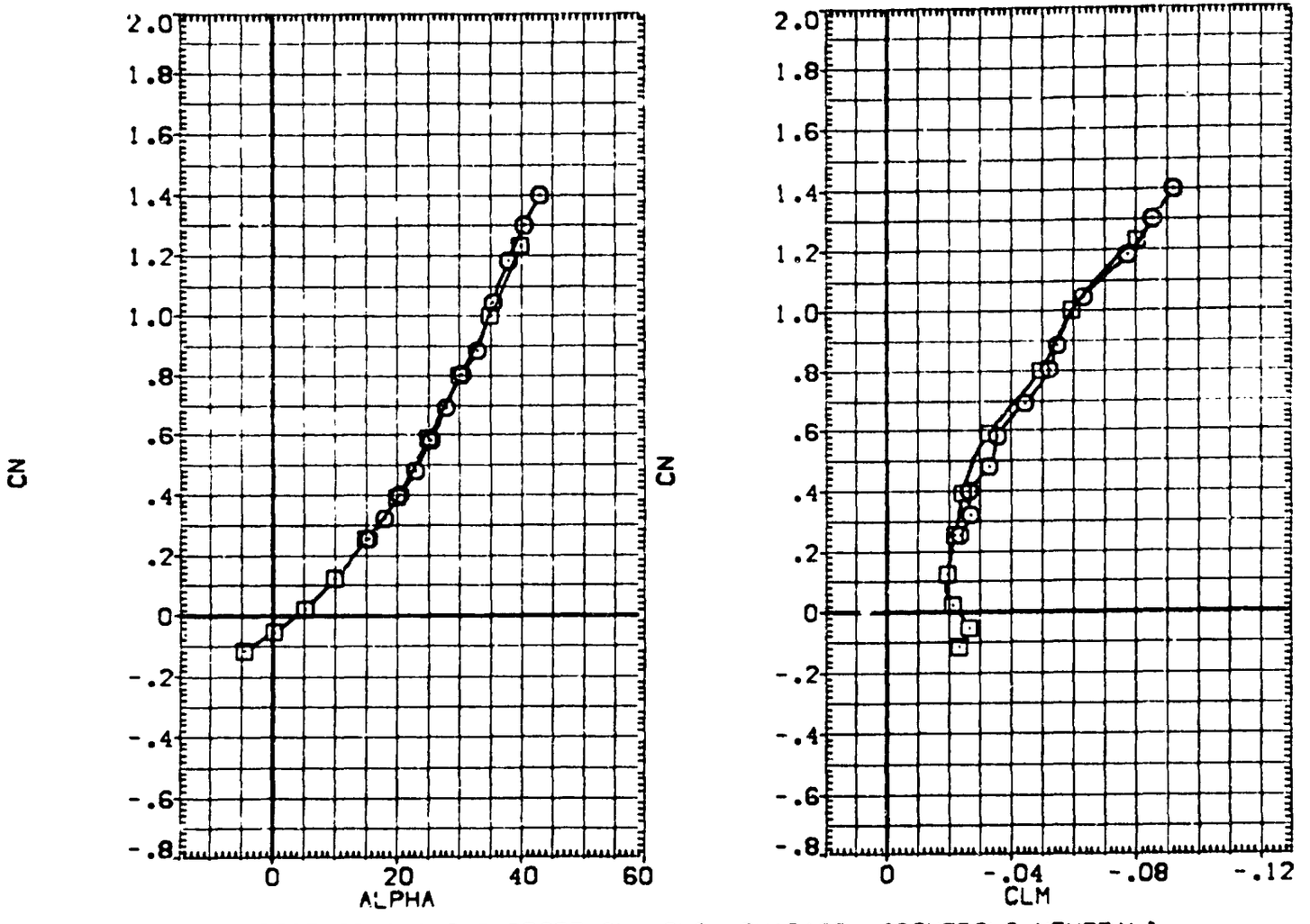


FIGURE 8 EFFECT OF STING SUPPORT ON LONG. CHARACT. (CONTROLS NEUTRAL)

(A)MACH = 19.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BOFLAP	SPOBRK	STING
[R00001]	M19 N.T.-30[OA-09] [B62C12F10H14][V127E43][V8R5]	.000	.000	55.000	45.000
[R00006]	M19 N.T.-31[OA-09] [B62C12F10H14][V127E43][V8R5]	.000	.000	55.000	25.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

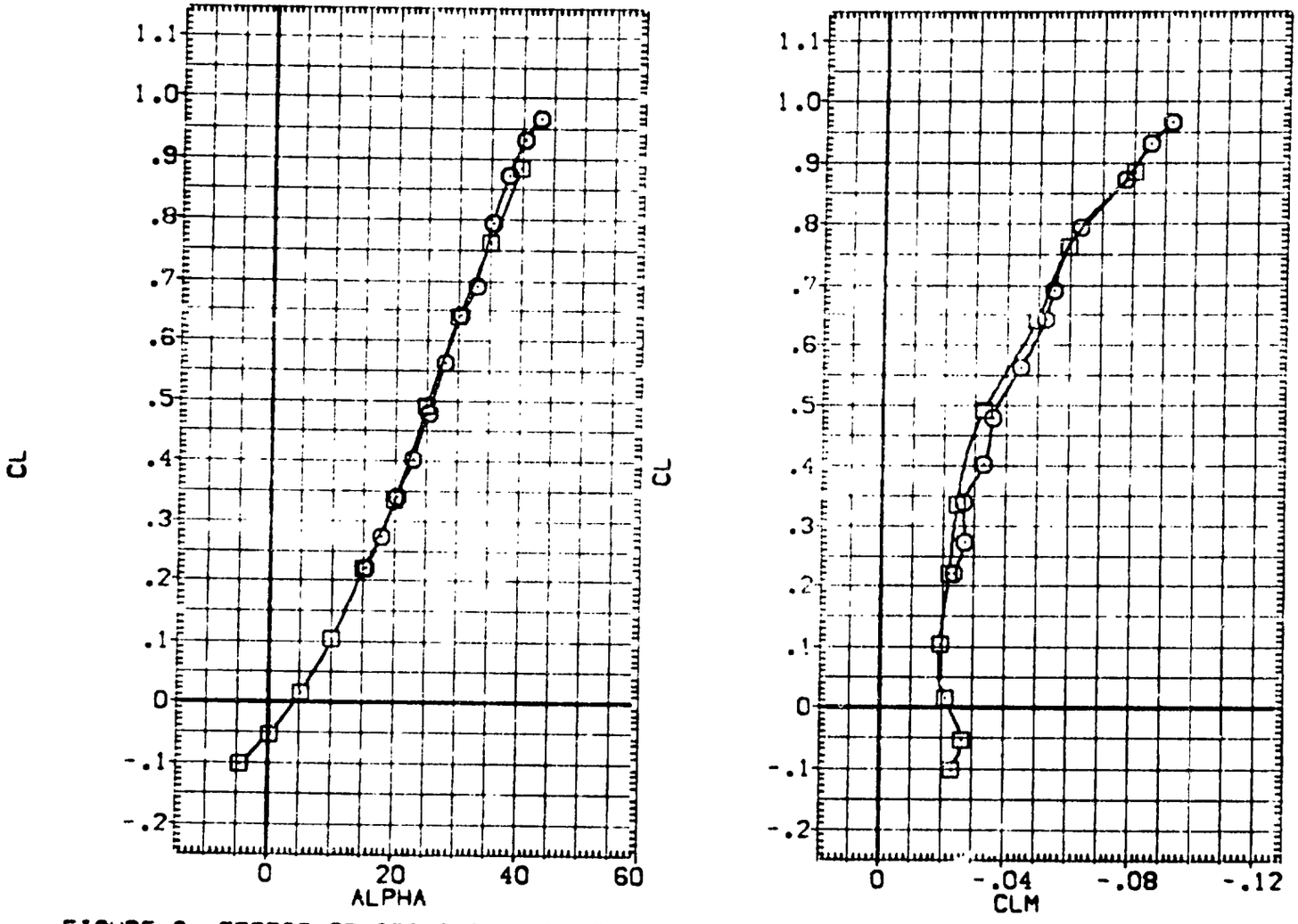


FIGURE 8 EFFECT OF STING SUPPORT ON LONG. CHARACT. (CONTROLS NEUTRAL)

(A)MACH = 19.80

DATA SET SYMBOL		CONFIGURATION DESCRIPTION	ELEVTR	BOFLAP	SPOBRK	STING
{R00001}	8	MIS N.T.-30{DA-89} {B62C12F10H14}{V127E43}{V8R5}	.000	.000	55.000	15.000
{R00006}		MIS N.T.-31{DA-89} {B62C12F10H14}{V127E43}{V8R5}	.000	.000	55.000	25.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.000	

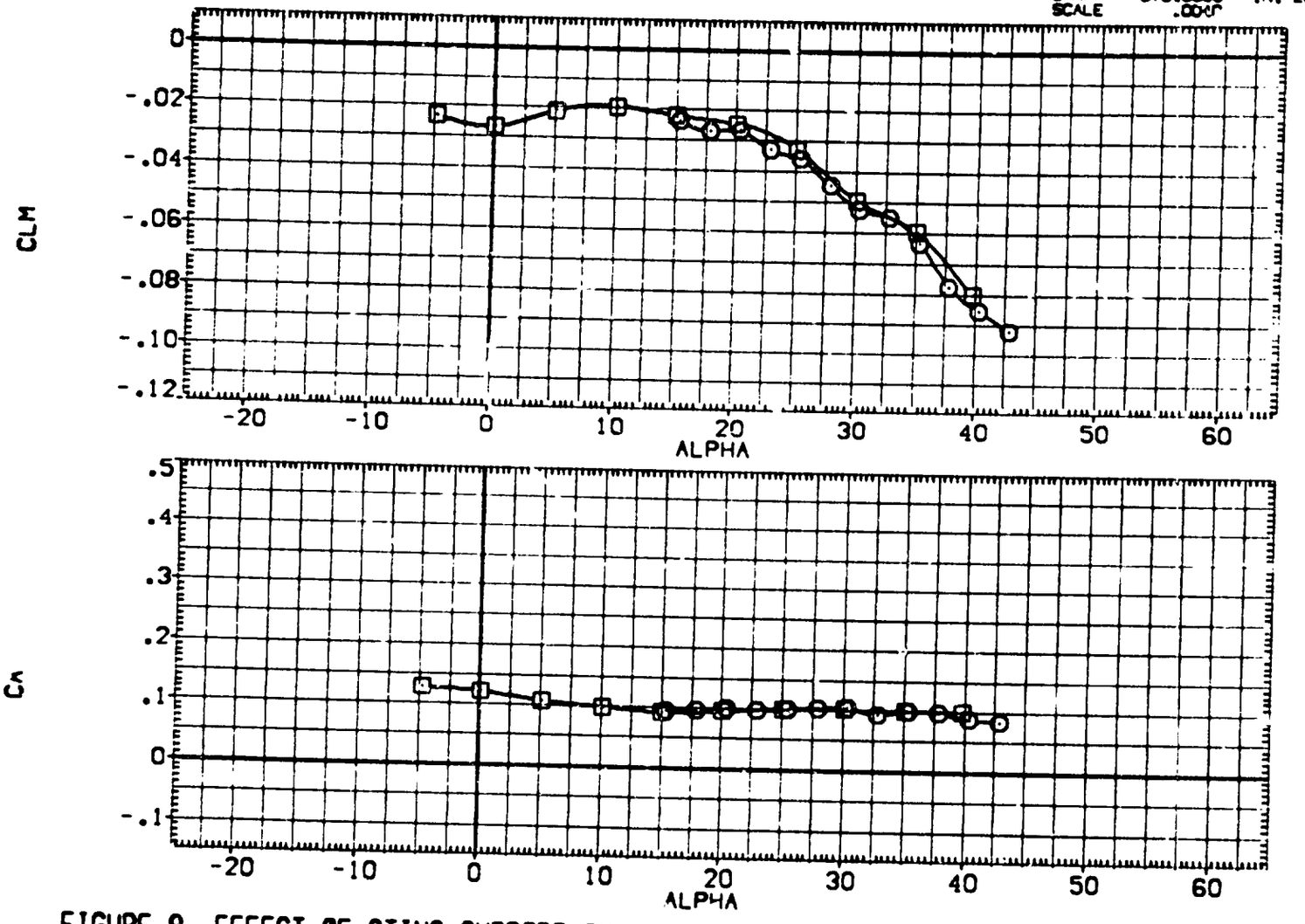


FIGURE 8 EFFECT OF STING SUPPORT ON LONG. CHARACT. (CONTROLS NEUTRAL)
(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BOFLAP	SPOBRK	STING
{R00001}	○	M19 N.T.-30{0A-89} {B62C12F10M14}{V127E43}{V6R5}	.000	.000	55.000	45.000
{R00006}	□	M19 N.T.-31{0A-89} {B62C12F10M14}{V127E43}{V6R5}	.000	.000	55.000	25.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XG
YMRP	.0000	IN. YG
ZMRP	375.0000	IN. ZG
SCALE	.0040	

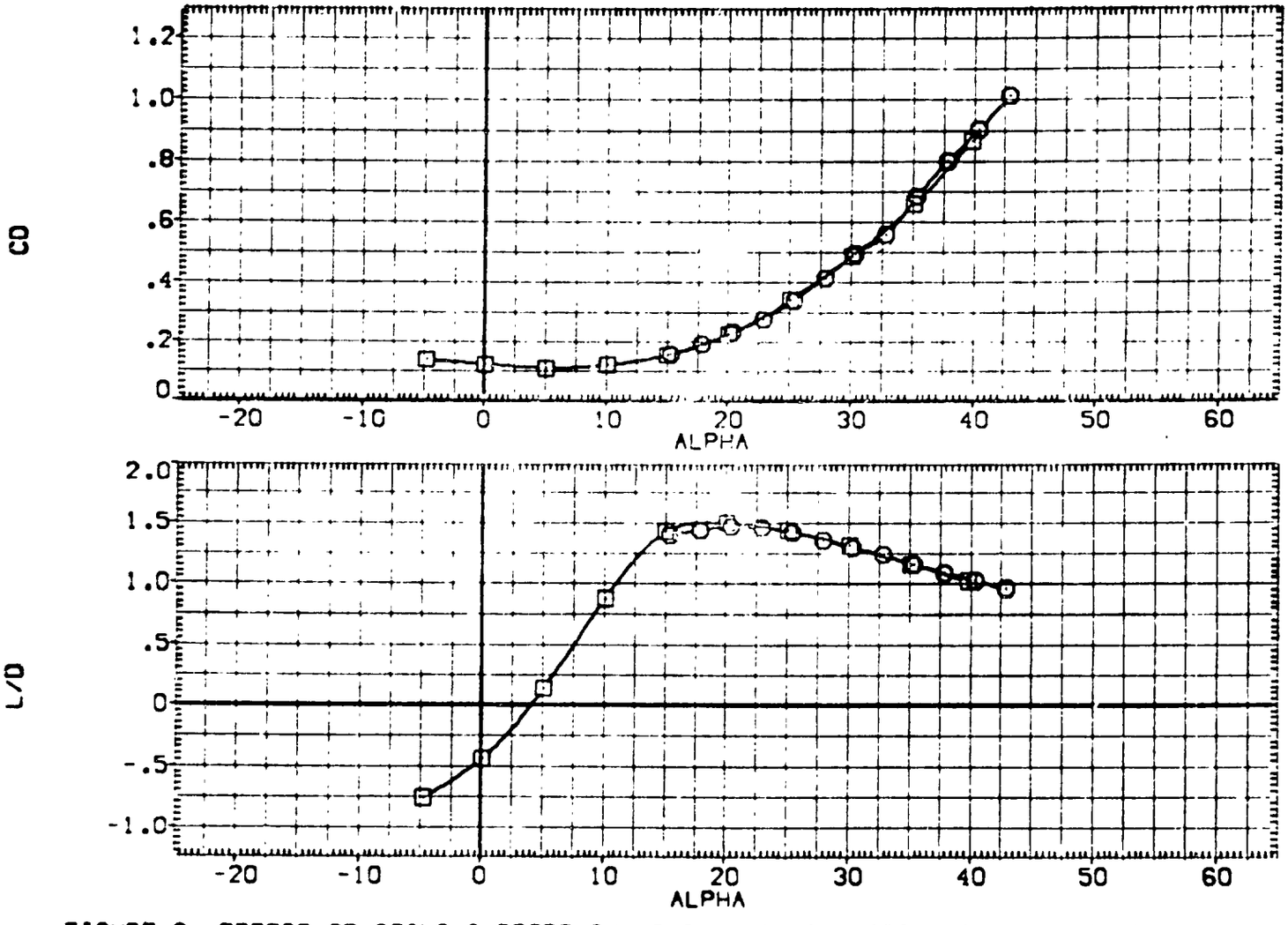


FIGURE 8 EFFECT OF STING SUPPORT ON LONG. CHARACT. (CONTROLS NEUTRAL)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BDFLAP	SPOSRK	STING
(A00002)	○	M19 N.T.-30(OA-69) (B62C12F10M14)(V12/E43)(VBR5)	20.000	16.300	55.000	45.000
(A00008)	□	M19 N.T.-31(OA-69) (B62C12F10M14)(V12/E43)(VBR5)	20.000	16.300	55.000	25.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. IN.
LREF	474.8100	IN.
BREF	936.6800	IN.
XMRP	1076.7000	IN.
YMRP	.0000	IN.
ZMRP	375.0000	IN.
SCALE	.0040	

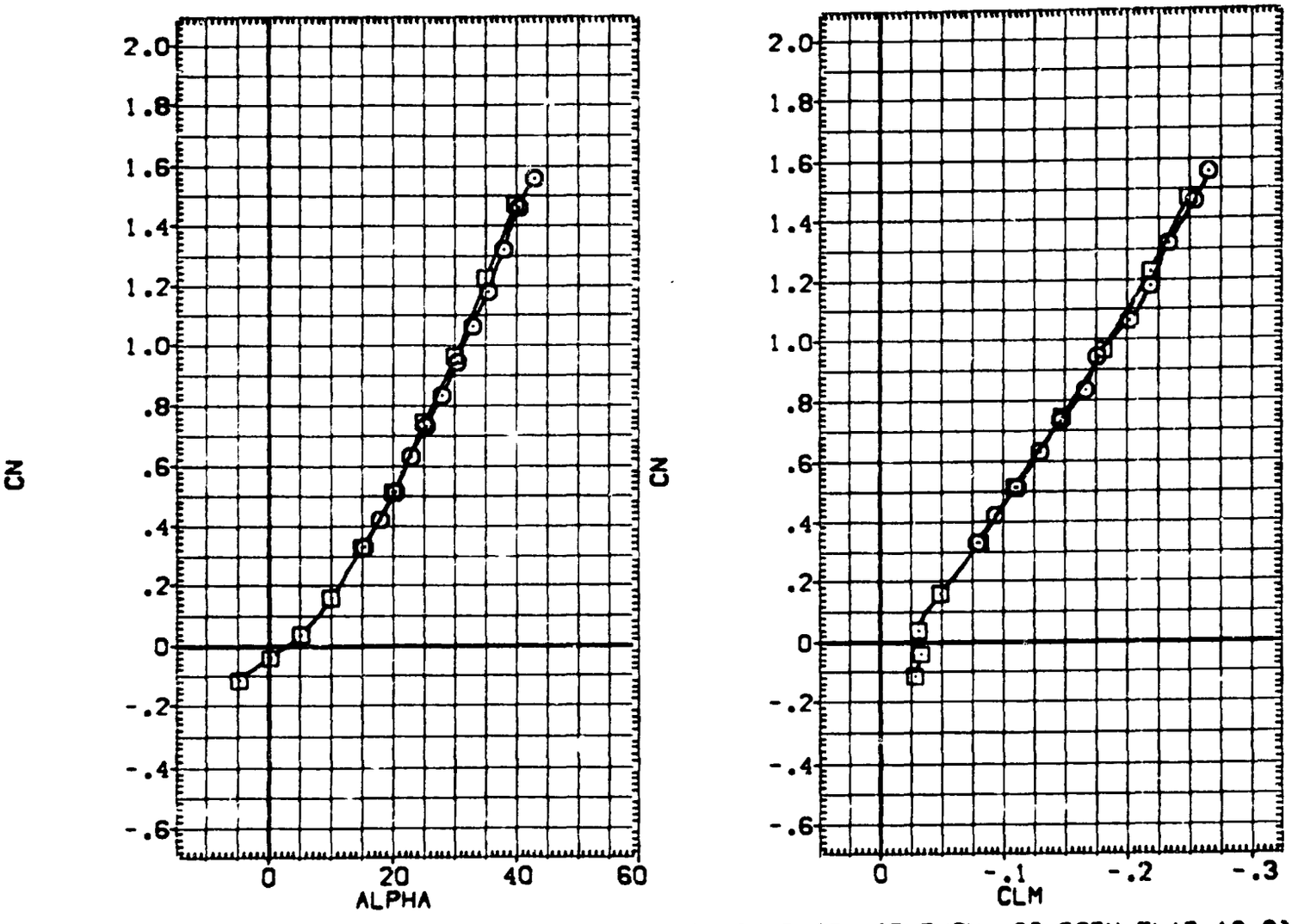


FIGURE 9 EFFECT OF STING SUPPORT ON LONG. CHARACT. (ELEVON= 20.BODY FLAP=16.3)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BDFLAP	SPOBRK	STING
[R00002]		M19 N.T.-30[OA-69] [B62C12F10M14][V127E43][VBR5]	20.000	16.300	55.000	45.000
[R00008]		M19 N.T.-31[OA-69] [B62C12F10M14][V127E43][VBR5]	20.000	16.300	55.000	25.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

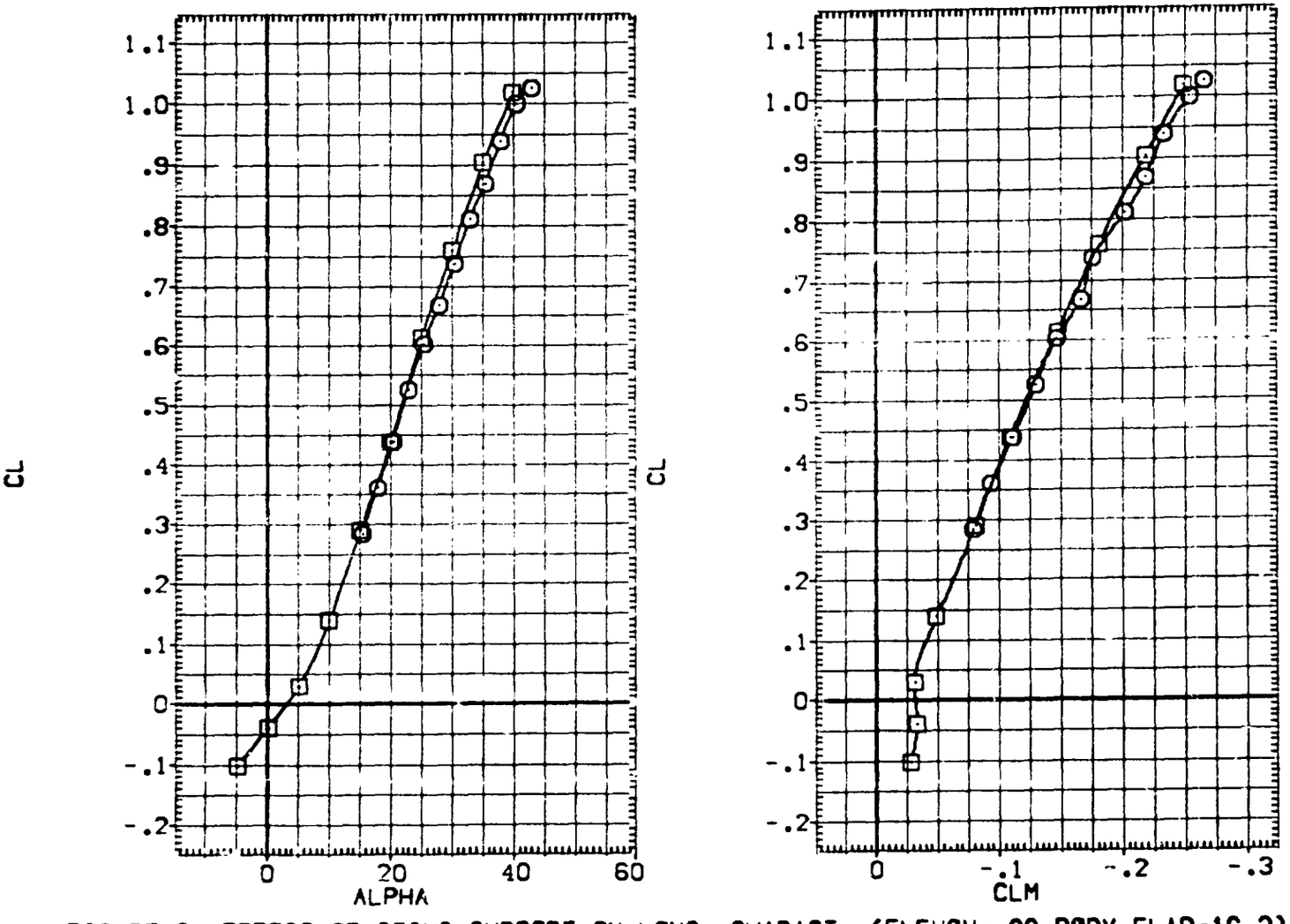


FIGURE 9 EFFECT OF STING SUPPORT ON LONG. CHARACT. (ELEVON= 20,BODY FLAP=16.3)

(A)MACH = 19.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BDFLAP	SPOBRK	STING
{RQ00002}	MIS N.T.-30(OA-69) (B62C12F10M14)(V127E43)(VBR5)	20.000	16.300	55.000	45.000
{RQ00009}	MIS N.T.-31(OA-69) (B62C12F10M14)(V127E43)(VBR5)	20.000	16.300	55.000	25.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	474.0100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

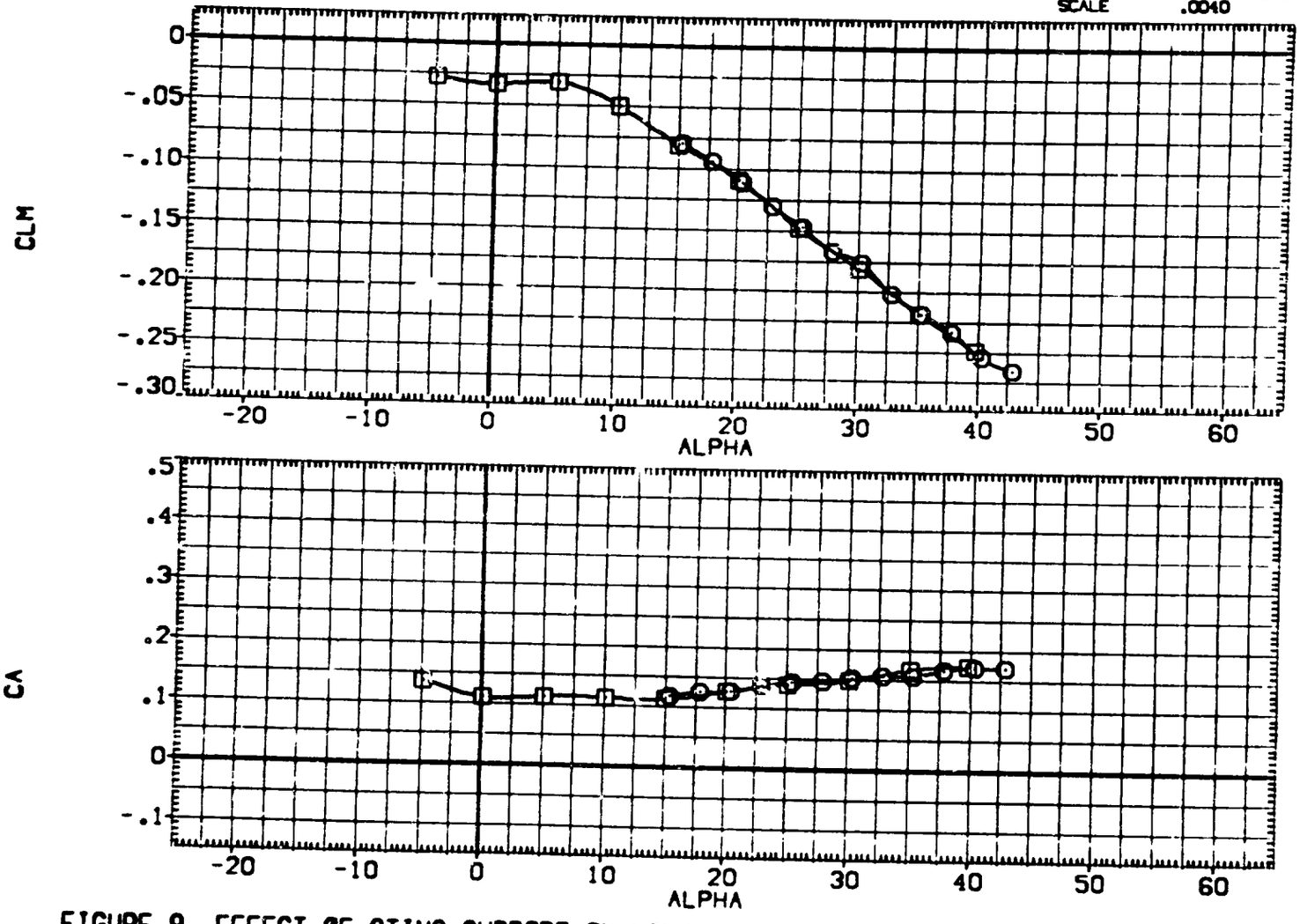


FIGURE 9 EFFECT OF STING SUPPORT ON LONG. CHARACT. (ELEVON= 20,BODY FLAP=16.3)

(A)MACH = 19.80

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ELEVTR	BOFLAP	SPOBRK	STING
[R00002]		M19 N.T.-30[0A-69] [B62C12F1DM14][V127E43][VBR5]	20.000	16.300	55.000	45.000
[R00008]		M19 N.T.-31[0A-69] [B62C12F1DM14][V127E43][VBR]	20.000	16.300	55.000	25.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. F
LREF	474.8100	INCHES
BREF	936.6800	INCHES
XMRP	1076.7000	IN. XB
YMRP	.0000	IN. YB
ZMRP	375.0000	IN. ZB
SCALE	.0040	

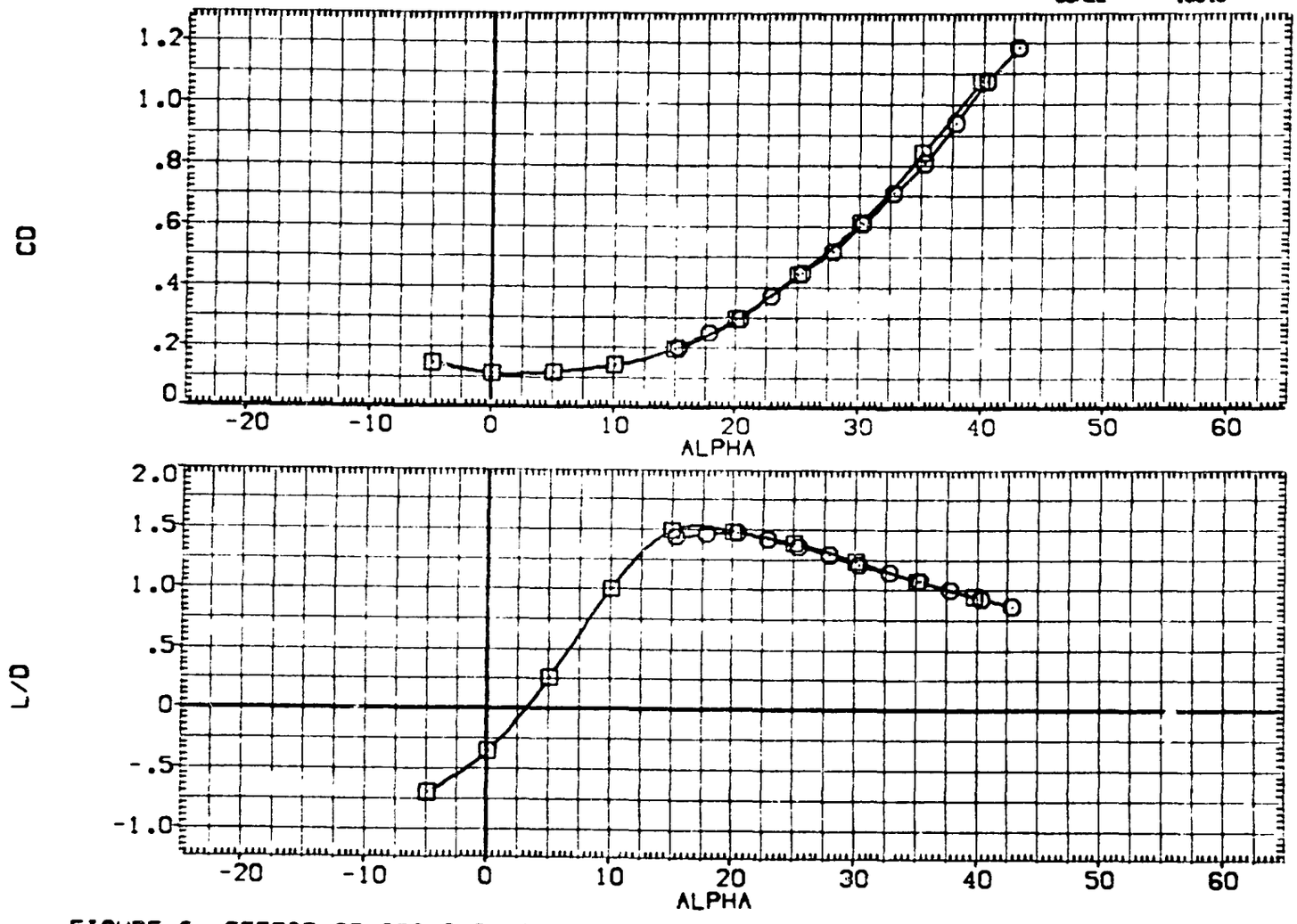


FIGURE 9 EFFECT OF STING SUPPORT ON LONG. CHARACT. (ELEVON= 20,BODY FLAP=16.3)

(A)MACH = 19.80

APPENDIX

TABULATED SOURCE DATA

Tabulations of plotted data are available on request from Data Management Services.

M19 N.T.-30(OA-99) (B62C12F10M14) (W127E43) (V8R5) (R00001) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.5800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	BDFLAP =	.000
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 23/ 0 RN/L = .26 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.800	15.322	.25337	.09338	-.02355	-.00121	.00388	.21969	.15702	1.39913	.68421
19.800	17.827	.31795	.09662	-.02702	-.00078	.00383	.27311	.18932	1.44259	.68128
19.800	20.333	.39853	.09895	-.02676	-.00234	.00336	.33931	.23126	1.46723	.67471
19.800	22.838	.47697	.09753	-.03294	-.00280	.00357	.40173	.27501	1.46080	.67542
19.800	25.345	.57764	.09902	-.03586	-.00107	.00337	.47966	.33675	1.42436	.67285
19.800	27.852	.69092	.10239	-.04455	-.00644	.00514	.56304	.41332	1.36223	.67373
19.800	30.360	.80573	.10318	-.05236	-.00462	.00449	.64309	.49627	1.29584	.67392
19.800	32.865	.88252	.09369	-.05484	-.01015	.00583	.69043	.55761	1.23820	.67287
19.800	35.376	1.04387	.09955	-.06317	-.01216	.00643	.79351	.68551	1.15754	.67227
19.800	37.883	1.18011	.09670	-.07741	-.01765	.00827	.87204	.80197	1.08872	.67414
19.800	40.391	1.29704	.08742	-.08562	-.02316	.00881	.93123	.90706	1.02664	.67430
19.800	42.898	1.39812	.08322	-.09231	-.02633	.00883	.96758	1.01266	.95548	.67430
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

M19 N.T.-30 (OA-89) (B62C12F10H14) (W127E43) (V8R5) (R8D002) (18 MAR 75)

REFERENCE DATA

SREF =	2090.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6870 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0140				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	20.000
AILRON =	.000	BOFLAP =	16.300
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 2[illegible]0 RN/L = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.800	15.323	.32546	.11544	-.07457	.00339	.00328	.28338	.19734	1.43602	.73884
19.800	17.828	.41779	.12485	-.09366	.00193	.00318	.35950	.24677	1.45682	.73250
19.800	20.334	.51255	.12640	-.11089	.00357	.00233	.43609	.29663	1.47215	.72962
19.800	22.840	.62700	.13645	-.13019	.00131	.00354	.52487	.36913	1.42191	.72641
19.800	25.346	.73530	.14276	-.14702	-.00108	.00395	.60341	.44379	1.35966	.72358
19.800	27.852	.83265	.14490	-.16655	-.00140	.00387	.66848	.51711	1.29272	.72361
19.800	30.359	.94255	.15258	-.17619	-.00170	.00344	.73619	.60804	1.21075	.71879
19.800	32.865	1.06532	.15565	-.20270	-.00904	.00434	.81036	.70883	1.14324	.72002
19.800	35.371	1.17704	.15716	-.21890	-.00436	.00381	.86881	.80951	1.07325	.71844
19.800	37.880	1.32023	.16666	-.23406	-.00948	.00552	.93972	.94218	.99739	.71524
19.800	40.388	1.45914	.17105	-.25499	-.01056	.00554	1.00055	1.07575	.93010	.71431
19.800	42.894	1.55872	.17002	-.26623	-.01094	.00553	1.02622	1.18548	.86566	.71286
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

M19 N.T.-3(OA-89) (B62C12F10H14)(W12?E43)(V8R5) (R80003) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1078.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6870 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0140				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	-35.000
AILRON =	.000	BOFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 29/ 0 R?YL = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.870	15.321	.21040	.08762	-.00325	.00249	.00152	.17977	.14011	1.28312	.65369
19.870	17.826	.27826	.09311	-.00686	.00388	.00188	.23734	.17098	1.38812	.65908
19.870	20.331	.34318	.09769	-.00791	.00236	.00151	.28786	.21084	1.36530	.65098
19.870	22.837	.42665	.09720	-.00613	.00191	.00225	.35549	.25517	1.39314	.65329
19.870	25.343	.51478	.09556	-.00678	-.00363	.00299	.42435	.30671	1.38352	.65485
19.870	27.849	.59968	.10520	-.00579	-.00917	.00344	.48108	.37316	1.28921	.65356
19.870	30.356	.69118	.10407	-.00531	-.00540	.00428	.54383	.43911	1.23849	.65283
19.870	32.864	.80217	.10758	-.00969	-.00977	.00512	.61541	.52565	1.17077	.65445
19.870	35.572	.91235	.10766	-.00697	-.01302	.00719	.68162	.61595	1.10686	.65282
19.870	37.888	1.01590	.09354	-.01409	-.01747	.00835	.74431	.69771	1.06679	.65511
19.870	40.387	1.14110	.09918	-.01414	-.02159	.00987	.81491	.81493	.98775	.65458
19.870	42.894	1.25563	.09249	-.01936	-.02385	.01141	.85693	.92240	.92902	.65568
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

M19 N.T.-30(OA-89) (B62C12F10M14)(W127E43)(V0R5) UR00004 (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1078.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.8800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	10.000	BOFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 30/ 0 RN/L = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLN	CY	CYN	CL	CD	L/D	XCP/L
19.800	15.320	.26239	.09548	-.02802	.00686	-.00087	.22784	.18141	1.41153	.68930
19.800	17.825	.32886	.09974	-.03247	.00723	-.00196	.28256	.19563	1.44438	.68633
19.800	20.331	.41823	.10606	-.03753	.00580	-.00185	.35532	.24478	1.45173	.68363
19.800	22.835	.47946	.09937	-.03934	.00618	-.00211	.40332	.27765	1.45281	.68080
19.800	25.340	.56580	.10331	-.04765	.00461	-.00302	.46714	.33353	1.38224	.68099
19.800	[illegible] 847	.67102	.10745	-.05420	.00639	-.00347	.54312	.40845	1.32970	.67973
19.800	[illegible] 335	.79192	.10981	-.06155	.00198	-.00326	.62786	.49496	1.26852	.67880
19.800	[illegible] 061	.87872	.11090	-.07028	-.00237	-.00334	.67795	.56995	1.18948	.67844
19.800	35.369	1.00310	.11368	-.07998	-.00369	-.00325	.75217	.67333	1.11709	.67834
19.800	37.879	1.15922	.11264	-.09109	-.00669	-.00321	.84582	.80056	1.05640	.67892
19.800	40.384	1.21985	.10624	-.09199	-.01001	.00218	.88035	.87127	.98747	.67775
19.800	42.892	1.35674	.10244	-.10643	-.01118	.00264	.92428	.99847	.92569	.67887
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

M19 N.T.-30 (OA-89) (B62C12 M14) ( ) (V8R5) (RQ0005) (18 MAR 75)

REFERENCE DATA

SREF = 2690.0000 SQ. FT XMRP = 1076.7000 IN. XO
LREF = 474.8100 INCHES YMRP = .0000 IN. YO
BREF = 936.6800 INCHES ZMRP = 375.0000 IN. ZO
SCALE = .0140

PARAMETRIC DATA

BETA = .000 SPOBRK = 55.000
BALNCE = 1.000 STING = 45.000

RUN NO. 32/ 0 RN/L = .28 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.800	15.300	.07152	.03835	.04271	-.01236	.00574	.05887	.05588	1.05389	.49025
19.800	17.804	.12527	.03452	.04642	.00027	.00130	.10261	.09021	1.13739	.51364
19.800	20.306	.19024	.03168	.05498	-.00557	.00292	.12332	.09967	1.23731	.51534
19.800	22.810	.19363	.03056	.06629	-.00328	.00291	.15888	.12168	1.30579	.52402
19.800	25.314	.23997	.03395	.06892	-.00300	.00215	.19386	.15138	1.28063	.54432
19.800	27.818	.27980	.03603	.08323	-.00780	.00319	.22114	.18004	1.22830	.54146
19.800	30.321	.31657	.03394	.09199	-.01376	.00529	.24604	.20638	1.19217	.54317
19.800	32.826	.36604	.03868	.11171	-.01932	.00737	.27367	.24791	1.11200	.53701
19.800	35.330	.41349	.03707	.12458	-.02534	.00944	.30433	.28567	1.06532	.53915
19.800	37.836	.48009	.03896	.13993	-.03386	.01467	.34391	.34116	1.00769	.54275
19.800	40.341	.53776	.03883	.15504	-.04362	.01923	.37180	.39295	.94619	.54391
19.800	42.846	.59860	.03520	.16949	-.04799	.02491	.40134	.44754	.89677	.54581
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

M19 N.T.-31 (OA-89) (B62C12F10M14) (W12/E43) (V8R5) (RQ0006) (18 MAR 75)

REFERENCE DATA

SREF = 2690.0000 SQ. FT XMRP = 1076.7000 IN. XO
LREF = 474.8100 INCHES YMRP = .0000 IN. YO
BREF = 936.6800 INCHES ZMRP = 375.0000 IN. ZO
SCALE = .0140

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 BDFLAP = .000
SPOBRK = 55.000 BALNCE = 1.000
STING = 25.000

RUN NO. 0/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.800	-4.756	-.11435	.12633	-.02327	.00613	.00055	-.10348	.13538	-.76436	.57512
19.800	.049	-.05557	.12060	-.02652	.00451	.00070	-.05367	.12058	-.44521	.46783
19.800	5.056	.02344	.10601	-.02195	.00306	.00186	.01401	.11746	.11911	.97891
19.800	10.064	.12330	.09835	-.01931	.00371	-.00006	.10421	.11838	.88030	.03765
19.800	15.074	.25131	.09122	-.02203	-.00352	.00230	.21894	.15344	1.42686	.68226
19.800	20.084	.39227	.09492	-.02446	.00151	.00190	.33582	.22386	1.50013	.67295
19.800	25.098	.58943	.10066	-.03272	.00495	.00106	.49108	.34117	1.43938	.68143
19.800	30.112	.79862	.10115	-.04947	.00279	.00147	.64027	.48825	1.31135	.67279
19.800	35.125	1.00192	.09931	-.05975	.00579	.00121	.76152	.65711	1.15889	.67197
19.800	39.789	1.23361	.09921	-.08028	.00135	.00180	.88442	.86570	1.02163	.67395
	GRADIENT	.01265	-.01119	-.00168	-.00134	.00013	.01037	-.00318	.06642	-.02233

M19 N.T.-31 (OA-89) (B02C12F10N14) (W127E43) (V0R5) (R00007) (17 MAR 75)

REFERENCE DATA

SREF = 2690.0000 SQ. FT XMRP = 1076.7000 IN. XO
LREF = 474.8100 INCHES YMRP = .0000 IN. YO
BREF = 936.6800 INCHES ZMRP = 375.0000 IN. ZO
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ELEVTR = 10.000
AILRON = .000 BDFLAP = 16.300
SPOBRK = 55.000 BALNCE = 1.000
STING = 25.000

RUN NO. 3/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLN	CY	CYN	CL	CD	L/D	XCP/L
19.800	-4.755	-.11106	.12540	-.02682	.00003	.00161	-.10028	.13418	-.74734	.58114
19.800	.090	-.09070	.11445	-.02730	.00448	-.00052	-.09080	.11440	-.44409	.45186
19.800	5.057	.02174	.10805	-.02243	.00097	.00108	.0121*	.10955	.11075	1.02967
19.800	10.065	.12758	.09979	-.02678	.00161	-.00026	.10 98	.12052	.89593	.72737
19.800	15.075	.27906	.10322	-.04293	.00057	-.00022	.23075	.17121	1.39449	.70746
19.800	20.086	.43927	.11252	-.06295	.00186	-.00046	.39209	.26341	1.49082	.70044
19.800	25.100	.66593	.11965	-.08291	.00339	-.00093	.55229	.39083	1.41312	.69582
19.800	30.095	.91596	.13237	-.11598	.00310	.00040	.72611	.57382	1.26542	.69680
19.800	35.126	1.11025	.12820	-.14766	.00439	-.00027	.83428	.74365	1.12188	.69895
19.800	39.741	1.36296	.13685	-.17384	.00825	-.00081	.98054	.97680	.98556	.69894
	GRADIENT	.01256	-.00228	-.00310	.00093	-.00044	.01030	-.00412	.08311	-.02274

M19 N.T.-31 (OA-89) (B02C12F10N14) (W127E43) (V0R5) (R00008) (18 MAR 75)

REFERENCE DATA

SREF = 2690.0000 SQ. FT XMRP = 1076.7000 IN. XO
LREF = 474.8100 INCHES YMRP = .0000 IN. YO
BREF = 936.6800 INCHES ZMRP = 375.0000 IN. ZO
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ELEVTR = 20.000
AILRON = .000 BDFLAP = 16.300
SPOBRK = 55.000 BALNCE = 1.000
STING = 25.000

RUN NO. 8/ 0 RN/L = .20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLN	CY	CYN	CL	CD	L/D	XCP/L
19.800	-4.874	-.11425	.13821	-.02755	-.00206	.00184	-.10226	.14547	-.70321	.56191
19.800	.052	-.03938	.11002	-.03310	-.00365	.00156	-.03948	.109**	-.35899	.34070
19.800	5.059	.03984	.11268	-.03092	.00104	.00023	.02975	.11575	.25705	.93580
19.800	10.067	.18188	.11243	-.04921	-.00224	.00133	.13974	.13907	1.00532	.76187
19.800	15.077	.32897	.11152	-.06061	.00092	.00006	.28864	.19325	1.49383	.74017
19.800	20.087	.51217	.12610	-.10886	.00218	-.00019	.43771	.29434	1.48709	.72822
19.800	25.101	.74399	.14023	-.14795	.00383	-.00010	.61424	.44280	1.38781	.72318
19.800	30.113	.96308	.14722	-.18090	.00326	.00025	.75924	.61053	1.24357	.71912
19.800	35.127	1.22299	.16702	-.21885	.00302	.00054	.90414	.84031	1.07597	.71579
19.800	39.842	1.47180	.17274	-.24907	.00479	.00163	1 01925	1.07544	.94775	.71229
	GRADIENT	.01520	-.00332	-.00117	-.00132	-.00006	.01274	-.00719	.06988	-.04491

M19 N.T.-31 (OA-89) (B62C12F10M14) (W127E43) (V8R5) (R0D009) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	-40.000
AILRON =	.000	BOFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	25.000		

RUN NO. 2/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CA	CLM	CY	CYN	CL	CD	L/D	XCP/L
19.800	-4.758	-.15707	.15322	.00131	.00386	.00046	-.14382	.16572	-.86787	.65507
19.800	.048	-.07419	.12053	-.01395	.00644	-.00069	-.07429	.12047	-.61666	.58081
19.800	5.055	.00109	.11671	-.00804	.00284	-.00032	-.00902	.11436	-.07891	3.38431
19.800	10.063	.10344	.10027	-.00524	.00152	.00021	.08328	.12271	.67864	.66865
19.800	15.074	.23872	.10373	-.01420	.00249	.00007	.20353	.16224	1.25453	.69648
19.800	20.086	.39732	.10863	-.00210	.00361	-.00049	.33585	.23847	1.40832	.64808
19.800	25.100	.57130	.11076	-.00690	.00490	-.00025	.47057	.34264	1.37277	.64556
19.800	30.116	.79397	.11376	-.00603	.00454	-.00054	.62972	.49678	1.26758	.64721
19.800	35.132	1.00857	.11280	-.00831	.00204	-.00115	.75993	.67264	1.12976	.64697
19.800	39.793	1.15953	.10805	-.02120	-.01496	.00433	.82179	.82513	.99595	.64328
	GRADIENT	.01725	-.00680	-.00318	.00054	-.00124	.01447	-.00942	.03227	-.01914

M19 N.T.-30 (OA-89) (B62C12F10M14) (W127E43) (V8R5) (A0D001) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	BOFLAP =	.000
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 23/ 0 RN/L = .26 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	15.322	-.00086	.27990	40.66197
19.800	17.827	-.00087	.27840	40.50217
19.800	20.333	-.00059	.27820	40.41900
19.800	22.838	-.00059	.26267	40.61838
19.800	25.345	-.00069	.26135	40.41500
19.800	27.852	-.00059	.26079	40.32784
19.800	30.360	-.00059	.26060	40.29878
19.800	32.865	-.00039	.26304	40.67649
19.800	35.375	-.00033	.26116	40.38595
19.800	37.883	-.00025	.25925	39.93560
19.800	40.391	.00019	.25816	39.92107
19.800	42.898	.00032	.26089	40.31331
	GRADIENT	.00000	.00000	.00000

M19 N.T.-3G(OA-89) (B62C12F10H14) (W12/E43) (V6R5) (A800312) (18 MAR /8)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8170 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	20.000
AILRON =	.000	BOFLAP =	10.300
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 26/ 0 RN/L = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	15.323	-.00116	.26869	40.31331
19.800	17.828	-.00098	.26840	40.24067
19.800	20.334	-.00091	.26802	40.18256
19.800	22.840	-.00097	.26792	40.16804
19.800	25.346	-.00082	.26724	40.06634
19.800	27.852	-.00076	.27015	40.50217
19.800	30.359	-.00082	.26986	40.45858
19.800	32.865	-.00051	.26879	40.29878
19.800	35.371	-.00044	.26782	40.15351
19.800	37.980	-.00035	.26 1	40.22615
19.800	40.388	-.00026	.26869	40.28426
19.800	42.894	-.00022	.26879	40.29878
	GRADIENT	.00000	.00000	.00000

M19 N.T.-30(CA-89) (B62C12F10H14) (M127E43) (V8R5) (A80003) (18 MAR 75)

REFERENCE DATA

SREF =	2693.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6000 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	-35.000
AILRON =	.000	BDFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 28/ 0 RN/L = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	15.321	-.00063	.26792	40.16804
19.800	17.826	-.00055	.26792	40.16804
19.800	20.331	-.00055	.26821	40.21162
19.800	22.837	-.00062	.26840	40.24067
19.800	25.343	-.00034	.26995	40.47311
19.800	27.849	-.00055	.27015	40.50217
19.800	30.356	-.00048	.27005	40.48764
19.800	32.864	-.00027	.27005	40.48764
19.800	35.372	-.00040	.26986	40.45858
19.800	37.880	-.00028	.26966	40.42953
19.800	40.387	-.00033	.26995	40.47311
19.800	42.894	-.00036	.26995	40.47311
	GRADIENT	.00000	.00000	.00000

M19 N.T.-3)(OA-89) (B62C12F10H14)(W127E43)(V8R5) (A80004) (18 MAR 75)

REFERENCE DATA

SREF =	2691.7000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0140				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	10.000	BDFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	45.000		

RUN NO. 30/ 0 RN/L = .27 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	15.320	-.00052	.26962	40.70555
19.800	17.825	-.00023	.26924	40.61838
19.800	20.331	-.00012	.26856	40.51669
19.800	22.835	-.00009	.26828	40.47311
19.800	25.340	.00028	.26731	40.32784
19.800	27.847	.00021	.26606	40.13898
19.800	30.355	.00055	.26491	39.96465
19.800	32.861	.00028	.26685	40.56028
19.800	35.369	.00054	.26618	40.45858
19.800	37.879	.00059	.26693	40.26973
19.800	40.384	.00037	.27155	40.96704
19.800	42.892	.00035	.27030	40.77619
	GRADIENT	.00000	.00000	.00000

M19 N.T.-30 (OA-89) (B62C12 M14) ( ) (V8R5) (AQD003) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000	IN. XO	
LREF =	474.8100 INCHES	YMRP =	.0000	IN. YO	
BREF =	936.6800 INCHES	ZMRP =	375.0000	IN. ZO	
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	SPOBRK =	55.000
BALNCE =	1.000	STING =	45.000

RUN NO. 32/ 0 RN/L = .20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	15.300	-.00020	.27870	40.48764
19.800	17.804	-.00035	.27840	40.44406
19.800	20.306	-.00037	.28190	40.95251
19.800	22.810	-.00029	.28180	40.93799
19.800	25.314	-.00020	.28180	40.93799
19.800	27.818	-.00002	.28190	40.95251
19.800	30.321	.00005	.27930	40.57480
19.800	32.826	.00010	.27890	40.51669
19.800	35.330	.00015	.27860	40.47311
19.800	37.836	-.00024	.27860	40.47311
19.800	40.341	-.00036	.27830	40.42953
19.800	42.846	-.00092	.27860	40.47311
	GRADIENT	.00000	.00000	.00000

M19 N.T.-31 (OA-89) (B62C12F10M14) (W127E43) (V8R5) (AQD006) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000	IN. XO	
LREF =	474.8100 INCHES	YMRP =	.0000	IN. YO	
BREF =	936.6800 INCHES	ZMRP =	375.0000	IN. ZO	
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	BDFLAP =	.000
SPOBRK =	55.000	BALNCE =	1.000
STING =	25.000		

RUN NO. 0/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	-4.756	-.00079	.20851	40.63155
19.800	.049	-.00066	.21000	40.92147
19.800	5.056	-.00054	.20688	40.31265
19.800	10.064	-.00037	.20673	40.28366
19.800	15.074	-.00023	.20888	40.70403
19.800	20.084	-.00037	.20888	40.70403
19.800	25.098	-.00049	.20896	40.71853
19.800	30.112	-.00055	.20844	40.61756
19.800	35.125	-.00054	.20835	40.60256
19.800	39.789	-.00047	.20821	40.57357
	GRADIENT	.00005	.00031	.06034

M19 N.T.-31 (OA-89) (B62C12F10M14) (W127E43) (V8R5) (AQ0007) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	10.000
AILRON =	.000	BOFLAP =	15.300
SPOBRK =	55.000	BALNCE =	1.000
STING =	25.000		

RUN NO. 3/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	-4.755	-.00042	.20836	40.80256
19.800	.090	-.00035	.20807	40.54458
19.800	5.057	-.00038	.20777	40.48660
19.800	10.065	-.00010	.20762	40.45761
19.800	15.075	.00000	.20747	40.42861
19.800	20.086	-.00007	.20702	40.34164
19.800	25.100	-.00029	.20702	40.34164
19.800	30.095	-.00037	.20717	40.37063
19.800	35.126	-.00032	.20926	40.77651
19.800	39.741	-.00090	.20911	40.74752
	GRADIENT	.00002	-.00006	-.01207

M19 N.T.-31 (OA-89) (B62C12F10M14) (W127E43) (V8R5) (AQ0008) (18 MAR 75)

REFERENCE DATA

SREF =	2690.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	20.000
AILRON =	.000	BOFLAP =	15.300
SPOBRK =	55.000	BALNCE =	1.000
STING =	25.000		

RUN NO. 8/ 0 RN/L = .20 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	-4.874	-.00026	.20512	40.19668
19.800	.052	-.00003	.20586	40.34164
19.800	5.059	-.00017	.20490	40.15319
19.800	10.067	-.00011	.20430	40.03723
19.800	15.077	-.00011	.20408	39.99374
19.800	20.087	-.00017	.20393	39.96475
19.800	25.101	-.00034	.20386	39.95025
19.800	30.113	-.00035	.20364	39.90677
19.800	35.127	-.00037	.20371	39.92126
19.800	39.842	-.00050	.20364	39.90677
	GRADIENT	.00005	.00015	.02943

M19 N.T.-31 (OA-89) (B62C12F10H1C) (W127E43) (V0R5) (A80009) (18 MAR /5)

REFERENCE DATA

SREF =	2890.0000 SQ. FT	XMRP =	1076.7000 IN. XO		
LREF =	474.8100 INCHES	YMRP =	.0000 IN. YO		
BREF =	936.6800 INCHES	ZMRP =	375.0000 IN. ZO		
SCALE =	.0040				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	-40.000
AILRON =	.000	BDFLAP =	-11.700
SPOBRK =	55.000	BALNCE =	1.000
STING =	25.000		

RUN NO. 2/ 0 RN/L = .21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	RN	Q(PSF)
19.800	-4.756	-.00152	.20747	40.42861
19.800	.048	-.00049	.20695	40.32714
19.800	5.055	-.00121	.20695	40.32714
19.800	10.063	- 00121	.20680	40.29815
19.800	15.074	-.00027	.20710	40.35613
19.800	20.086	-.00024	.20777	40.48660
19.800	25.100	-.00041	.20851	40.63155
19.800	30.116	-.00054	.20926	40.77651
19.800	35.132	-.00045	.21007	40.93597
19.800	39.793	-.00047	.20918	40.76202
	GRADIENT	.00001	-.00011	-.02111