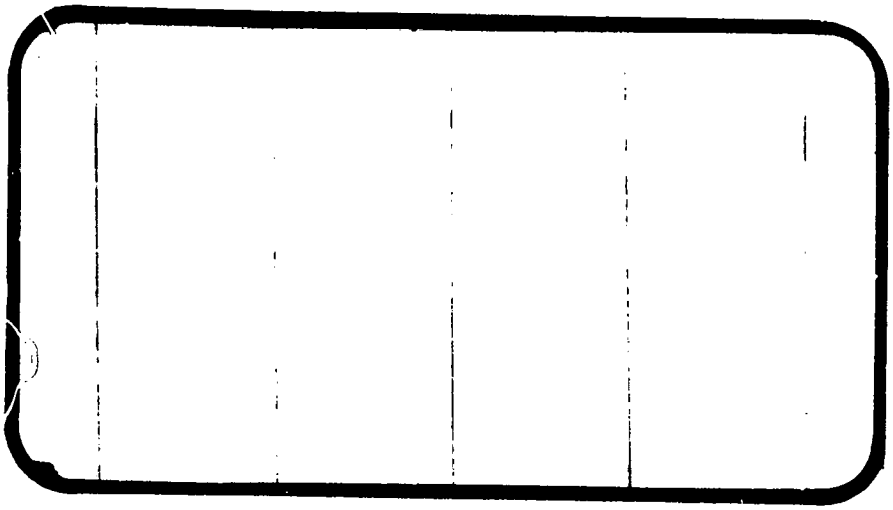
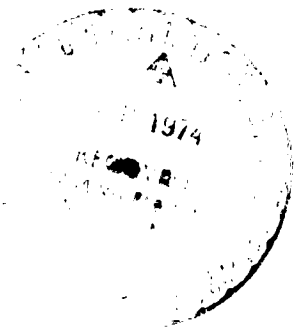
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA CR-134110





SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA MANagement services

SPACE DIVISION CHRYSLER CORPORATION

July, 1974

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RESULTS OF TESTS IN THE NASA/LaRC 31-INCH CFHT ON AN 0.010-SCALE MODEL (32-OT) OF THE SPACE SHUTTLE CONFIGURATION 3 TO OBTAIN HYPERSONIC AERODYNAMIC CHARACTERISTICS FOR SECOND STAGE OPERATION DURING NOMINAL BOOST AND THE ABORT RTLS MODE (IA58)

By

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Prepared under NASA Contract Number NAS9-13247

By

Data Management Services
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New Orleans, La. 70189

for

Engineering Analysis Division

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

WIND TUNNEL TEST SPECIFICS:

Test Number:	LaRC CFHT 107
NASA Series Number:	IA58
Model Number:	32-OTS
Test Dates:	11 through 13 February 1974
Occupancy Hours:	24

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

RESULTS OF TESTS IN THE NASA/LaRC 31-INCH CFHT ON AN 0.010-SCALE MODEL (32-OT) OF THE SPACE SHUTTLE CONFIGURATION 3 TO OBTAIN HYPERSONIC AERODYNAMIC CHARACTERISTICS FOR SECOND STAGE OPERATION DURING NOMINAL BOOST AND THE ABORT RTLS MODE (IA58)

By D. E. Thornton, Rockwell International Space Division

ABSTRACT

Tests were conducted in the NASA Langley Research Center 31-inch Continuous Flow Hypersonic Wind Tunnel from 11 February to 13 February 1974, to obtain hypersonic aerodynamic forces and moments on an 0.010-scale model of the Space Shuttle Vehicle Configuration 3. Hypersonic stability data were obtained from tests at Mach 10.3 and dynamic pressure of 150 psf for the integrated Orbiter and External Tank, Orbiter alone, and External Tank alone. The effects of solid plume simulation from the main propulsion system as well as elevon, aileron, and rudder deflections were also investigated.

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CY versus CYN
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NOMENCLATURE
General

SYMBOL	SADSAC 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	unit Reynolds number; per m, per ft
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

Ab		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	SADSAC 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	CRL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$

NOMENCLATURE (Concluded)
Additional Nomenclature

Symbol	SADSAC Symbol	Definition
RTLS		return to launch site
δ_a	AILRON	aileron deflection angle, degrees
δ_e	ELEVON	elevon deflection angle, degrees
δ_R	RUDDER	rudder deflection angle, degrees
δ_{SB}	SPDBRK	speedbrake deflection angle, degrees

CONFIGURATIONS INVESTIGATED

Three configurations were tested. These were the second stage ascent configuration consisting of Orbiter with External Tank attached, the RTLS configuration (Orbiter alone),and the External Tank alone. The model used for this test was an 0.010-scale replica of Configuration 3 of the Space Shuttle Orbiter and the External Tank.

The configuration nomenclature was abbreviated for convenience as follows: The symbols are defined in the Model Dimensional Data:

$O_1 = B_{19}\ C_7\ E_{23}\ F_5\ M_4\ N_8\ N_{24}\ R_5\ V_7\ W_{107}$	Orbiter without solid plume
$O_2 = B_{19}\ C_7\ E_{23}\ F_5\ M_4\ N_8\ N_{24}\ PL_2\ R_5\ V_7\ W_{107}$	Orbiter with solid plume
$T_1 = T_{10} + L + P + A + F$	External Tank with cross member between aft ET/Orbiter attach structures
$T_2 = T_{10} + L + P + A$	External Tank without cross member between aft ET/Orbiter attach structures
$L = FL_7 + FL_8$	LOX and LH_2 feedlines between ET and Orbiter
$P = PT_{16} + PT_{17} + PT_{18}$	LOX vent line fairing, LOX feedline fairing, and LH_2 vent line fairing.
$A = AT_{22} + AT_{23} + AT_{21}$	Attachment Structures
$F = FR_6$	Cross member between aft ET/Orbiter attachment structures

Control surface effectiveness was investigated with elevon deflections -40^{o}, -20^{o}, 0^{o}, and +15 degrees and an aileron deflection of -10^{o}. A rudder deflection of -20^{o} was also tested. A main Propulsion System engine, which simulated plume shape, was also tested. The solid plume shapes were attached to the sting and were non-metric.

INSTRUMENTATION

The LaRC 0.75-inch diameter 2019C six-component internal balance was used for this test program. Either the External Tank or Orbiter was mounted on the balance. For the integrated vehicle portion of the test the Orbiter was mounted on the balance.

No model base or balance chamber pressures were measured during this test.

TEST FACILITY DESCRIPTION

The Mach 10 nozzle of the Langley continuous flow hypersonic tunnel is designed to operate at stagnation pressures of 15 to 150 atmospheres at temperatures up to 1960°R. Air is preheated electrically by passing through a multi-tube heater. The nozzle has a 31-inch square test section which incorporates a moveable second minimum. Continuous operation is achieved by passing the air through a series of compressors. Additional information on this facility is given in NASA TM X-1130 entitled, "Characteristics of Major Active Wind Tunnels at the Langley Research Center," by William T. Schaefer, Jr.

DATA REDUCTION

Aerodynamic forces and moments were reduced to coefficient form using the following reference dimensions:

Reference Area (S_{Ref}) = 0.269 ft^2 (38.736 in^2)

Reference Length (L_{Ref}) = 12.90 in. = B_{REF}

The moments were reduced about a moment reference center located as follows:

External Tank only

ET Station 12.o0 (9.51 in aft of ET nose) on ET centerline

Orbiter Only

Orbiter station 10.767 (8.387 in aft of Orbiter nose) in the plane of symmetry (Y_o = 0.00) along the FRP (Z_o = 4.00)

Integrated Vehicle

ET station 9.890 on ET centerline (X_o = 2.38, Orbiter nose).

YMRP = 0

ZMRP = 3.33 in. below FRP

Standard LaRC data reduction techniques were used for reducing the data to coefficient form.

TABLE I.

TEST : IA58 DATE : FEB., 1974

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per unit length)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
10.3	1.0×10^6/ft.	1.04	1350

BALANCE UTILIZED: LaRC 2019C

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	70 lbs	0.35 lbs	
SF	25 lbs	0.125 lbs	
AF	15 lbs	0.075 lbs	
PM	70 in-lbs	0.35 in-lbs	
RM	15 in-lbs	0.075 in-lbs	
YM	25 in-lbs	0.125 in-lbs	

COMMENTS:

TABLE II.

TEST: IA58 — **DATA SET/RUN NUMBER COLLATION SUMMARY** — **DATE:** 13 FEB., 1974

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES δa	δe	δR	δSB	NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 10.3	TEST RUN NUMBERS
RQK001	T1	D	0	–	–	–	–		3	
02	01	D	0	0	0	0	0		6	
03	02 + T1	A	0			0			31	
04		0	B			0			32	
05		A	0			-20			33	
06		0	B			-20			34	
07	02 + T2	A	0			0			29	
08	02 + T2	0	B						30	
09	01 + T2	C	0						27	
10	01 + T2	0	B						28	
13		C	0			-20			12	
14		0	B			-20			13	
15		C	0	10		0			14	
16				0	-40	0			15	
17				0	-20	0			16	
18				0	15	0			17	

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CN CA CLM CBL C_Y N C_Y C_L CD L/D IDVAR (1) IDVAR (2) NDV

COEFFICENTS

α OR β SCHEDULES

αA: $-10^o \rightarrow 10^o$, $\Delta 2^o$

βB: -5^o, -2^o, 0^o, 2^o, 5^o

αC: αA + 15^o, 20^o, 22^o

αD: -22^o, -20^o, -15^o, + αA

TABLE II. (Continued)

TEST: IA58 — DATA SET/RUN NUMBER COLLATION SUMMARY — DATE: 13 FEB., 1974

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	δa	δe	δR	δSB	NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 10.3	TEST RUN NUMBERS
RQK019	01 + T2	C	0	0	15	0	0		18	
20			0		-40	0			19	
21			0		0	-20			20	
22			5			-20			21	
23			5			0			23	
24			0						22	
25		-10	B						24	
26		10	B						25	
27		20	B						26	

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CN CA CLM CBL CYN CY CL CD L/D

COEFFICENTS

IDVAR (1) IDVAR (2) NDV

α OR β SCHEDULES

αA: -10° → 10°, Δ2°

βB: -5°, -2°, 0°, 2°, 5°

αC: αA + 15°, 20°, 22°

αD: -22°, -20°, -15°, + αA

TABLE III. MODEL DIMENSIONAL DATA -

MODEL COMPONENT : BODY - B_{19}

GENERAL DESCRIPTION : Fuselage, Configuration 3, per Rockwell Lines VL70-000139B

NOTE: Identical to B_{17} except forebody.

MODEL SCALE: 0.010

DRAWING NUMBER : VL70-000139B

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length In.	1290.3	12.903
Max Width - In.	267.6	2.676
Max Depth - In.	244.5	2.445
Fineness Ratio	4.82175	4.82175
Area - Ft^2		
Max. Cross-Sectional	386.67	0.0387
Planform		
Wetted		
Base		

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : CANOPY - C_7

GENERAL DESCRIPTION : Configuration 3 per Rockwell Lines VL70-000139

MODEL SCALE: 0.010

DRAWING NUMBER : VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X_o=433 to X_o= 578) In.F.S.	145	1.45
Max Width		
Max Depth		
Fineness Ratio		
Area		
Max. Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ELEVON - E_{23}

GENERAL DESCRIPTION: Configuration 3 per W_{107} Rockwell Lines Drawing VL70-000139B data for (1) of (2) sides.

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Ft^2	205.52	0.0206
Span (equivalent) - In.	353.34	3.533
Inb'd equivalent chord - In.	114.78	1.148
Outb'd equivalent chord - In.	55.00	0.550
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	0.208	0.208
At Outb'd equiv. chord	0.400	0.400
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Trailing Edge	- 10.24	10.24
Hingeline	0.00	0.00
Area Moment (Normal to hinge line) Ft^3	1548.07	0.001548

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : BODY FLAP - F_5

GENERAL DESCRIPTION : 3 Configuration per Rockwell Lines VL70-000139

MODEL SCALE: 0.010

DRAWING NUMBER : VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length - In.	84.70	0.847
Max Width - In.	267.6	2.676
Max Depth		
Fineness Ratio		
Area - F^2		
Max. Cross-Sectional		
Planform	142.5	0.0143
Wetted		
Base	38.0958	0.00381

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT OMS POD - M_4

GENERAL DESCRIPTION Configuration 3 per Rockwell Lines VL70-000139

NOTE: M_4 identical to M_3, except intersection to fuselage.

MODEL SCALE: 0.010

DRAWING NUMBER VL70-000139

DIMENSIONS	FULL SCALE	MODEL SCALE
Length - In.	346.0	3.460
Max Width - In.	108.0	1.080
Max Depth - In.	113.0	1.130
Fineness Ratio		
Area		
Max. Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: OMS NOZZLES - N_8

GENERAL DESCRIPTION: Basic OMS Nozzle of Configuration 2A per Rockwell Lines VL70-008306 and VL70-000089"B". Intersection of nozzle exit plane and nozzle centerline at X_o = 1570.75, Y_o = ± 99.25, Z_o = 507.25

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-008306, VL70-000089"B", SS-A000092

DIMENSIONS:	FULL SCALE	MODEL SCALE
MACH NO.		
Length - In.		
Gimbal Point to Exit Plane		
Throat to Exit Plane		
Diameter - In.		
Exit	50.00	0.500
Throat	N/A	N/A
Inlet	28.00	0.280
Area - ft^2		
Exit	13.635	0.00136
Throat		
Gimbal Point (Station) - In.		
X	1518.0	15.180
Y	± 88.0	± 0.880
Z	492.0	4.920
Lower Nozzles		
X		
Y		
Z		
Null Position - Deg.		
Pitch	15°49'	15°49'
Yaw	±12°17'	± 12°17'
Lower Nozzle		
Pitch		
Yaw		

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: MPS NOZZLES - N 24

GENERAL DESCRIPTION: Configuration 3A MPS Nozzles

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000140A, VL70-005030A

DIMENSIONS:	FULL SCALE	MODEL SCALE
MACH NO.		
Length - In.		
Gimbal Point to Exit Plane	157.0	1.570
Throat to Exit Plane	99.2	0.992
Diameter - In.		
Exit		
Throat	91.000	0.910
Inlet		
Area - ft^2 Nozzle		
Exit		
Throat	45.16585	0.00452
Gimbal Point (Station) - In.		
Upper Nozzle		
X		
Y	1445.0	14.450
Z	0	0
	443.0	4.430
Lower Nozzles		
X		
Y	1468.16996	14.682
Z	± 53.00	± 0.530
	342.63988	3.426
Null Position - Deg.		
Upper Nozzle		
Pitch	16°	16°
Yaw	0°	0°
Lower Nozzle		
Pitch	10°	10°
Yaw	3.5°	3.5°

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: SOLID PLUME - PL_2

GENERAL DESCRIPTION: SSME simulated plumes from N_{24} nozzles to represent all 3 engines at M = 5.5 during exit trajectory. Used with N_{24} SSME nozzles with a 0.035 metric gap at the nozzle exit plane.

MODEL SCALE: 0.010

DRAWING NUMBER: _____

COORDINATES:

Ratio of local plume radius to nozzle exit plane internal radius	Ratio of local axial distance from nozzle exit plane to nozzle exit plane internal radius
1.053	0.057
1.943	1.122
2.772	2.250
3.497	3.341
4.450	4.912
5.421	6.642
5.905	7.566
6.389	8.529
7.321	10.496
7.861	11.699
8.136	12.330
8.672	13.602
8.937	14.307
9.204	14.912
9.464	15.569

DIMENSIONS:

	FULL SCALE	MODEL SCALE
Nozzle Exit Radius, In.	45.2	0.452

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: RUDDER - R_5

GENERAL DESCRIPTION: Configuration 140A/B Orbiter Rudder

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000146A MODEL DRAWING: SS-A00148, RELEASE 6

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area - Ft^2	106.38	0.0106
Span (equivalent) - In.	201.0	2.010
Inb'd equivalent chord - In.	91.585	0.916
Outb'd equivalent chord - In.	50.833	0.508
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
Trailing Edge	26.25	26.25
Hingeline	34.83	34.83
Area Moment (Normal to hinge line) - Ft^3	526.13	0.00053

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: VERTICAL - V_7

GENERAL DESCRIPTION: Centerline vertical tail, doublewedge airfoil with rounded leading edge.

NOTE: Same as V_5, but with manipulator housing removed.

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139

DIMENSIONS:	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - Ft^2	425.92	0.0426
Planform		
Span (Theo) - In.	315.72	3.157
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	0.404	0.404
Sweep-Back Angles, Degrees.		
Leading Edge	45.000	45.000
Trailing Edge	26.249	26.249
0.25 Element Line	41.130	41.130
Chords:		
Root (Theo) WP	268.50	2.685
Tip (Theo) WP	108.47	1.085
MAC	199.81	1.998
Fus. Sta. of .25 MAC	1463.50	14.635
W.P. of .25 MAC	635.522	6.355
B.L. of .25 MAC	0.00	0.00
Airfoil Section		
Leading Wedge Angle - Deg.	10.000	10.000
Trailing Wedge Angle - Deg.	14.920	14.920
Leading Edge Radius	2.0	0.020
Void Area - Ft^2	13.17	0.0013
Blanketed Area	0.00	0.00

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: WING-W 107

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL70-000139B

NOTE: Same as W 107, except cuff, airfoil and incidence angle.

MODEL SCALE: 0.010

TEST NO.

DWG. NO. VL70-000139B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo.) Ft^2		
Planform	2690.00	0.2690
Span (Theo In.	936.68	9.367
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	45.000	45.000
Trailing Edge	- 10.24	- 10.24
0.25 Element Line	35.209	35.209
Chords:		
Root (Theo) B.P.0.0.	689.24	6.892
Tip, (Theo) B.P.	137.85	1.379
MAC	474.81	4.748
Fus. Sta. of .25 MAC	1136.89	11.369
W.P. of .25 MAC	299.20	2.992
B.L. of .25 MAC	182.13	1.821
EXPOSED DATA		
Area (Theo) - Ft^2	1752.29	0.1752
Span, (Theo) - In. BP108	720.68	7.207
Aspect Ratio	2.058	2.058
Taper Ratio	0.2451	0.2451
Chords		
Root BP108	562.40	5.624
Tip 1.00 $\frac{b}{2}$	137.85	1.379
MAC	393.03	3.930
Fus. Sta. of .25 MAC	1185.31	11.853
W.P. of .25 MAC	300.20	3.002
B.L. of .25 MAC	251.76	2.518
Airfoil Section (Rockwell Mod NASA) XXXX-64		
Root $\frac{b}{2}$ =	0.10	0.10
Tip $\frac{b}{2}$ =	0.12	0.12
Data for (1) of (2) Sides		
Leading Edge Cuff Planform Area Ft^2	118.333	0.0118
Leading Edge Intersects Fus M. L. @ Sta	500.	5.00
Leading Edge Intersects Wing @ Sta	1083.4	10.834

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : EXTERNAL TANK - T_{10}

GENERAL DESCRIPTION : External Oxygen-Hydrogen Tank, 3 Configuration, per Rockwell Lines VL78-000041 and VL72-000088

MODEL SCALE: 0.010

DRAWING NUMBER : VL72-000088, VL78-000041

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length - In. (Nose @ X_o = 309)	1865	18.650
Max Width (Dia. - In.)	324	3.240
Max Depth		
Fineness Ratio	5.75617	5.75617
Area - Ft^2		
Max. Cross-Sectional	572.555	0.0573
Planform		
Wetted		
Base		
W.P. of Tank Centerline (X_T) In.	400.00	4.00

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: FEEDLINE - FL-7

GENERAL DESCRIPTION: LOX feedline between ET and Orbiter

MODEL SCALE: 0.010

DRAWING NO.: VL78-000050

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Centerline at:	X_T	2081.0	20.810
	Y_T	70.0	0.70
	X_o	1330.0	13.300
	Y_o	70.0	0.700
Diameter		18.5	0.185

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: FEEDLINE - FL_8

GENERAL DESCRIPTION: LH_2 feedline between ET and Orbiter

MODEL SCALE: 0.010

DRAWING NUMBER: VL78-000050

DIMENSIONS:		FULL SCALE	MODEL SCALE
Centerline at:	X_T	2081.0	20.810
	Y_T	- 70.0	- 0.700
	X_O	1330.0	13.300
	Y_O	- 70.0	- 0.700
Diameter		18.5	0.185

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE - PT_{16}

GENERAL DESCRIPTION: LOX vent line fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

DIMENSIONS:	FULL SCALE	MODEL SCALE
Leading edge at X_T	322.0	3.210
Y_T	0.0	0.0
Trailing edge at X_T	955.0	9.55
Y_T	70.0	0.70

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE- PT_{17}

GENERAL DESCRIPTION: LOX feedline fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

DIMENSIONS:		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	955.0	9.55
	Y_T	70.0	0.70
Trailing edge at:	X_T	2058.0	20.58
	Y_T	70.0	0.70

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE - PT_{18}

GENERAL DESCRIPTION: LH_2 vent line fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

DIMENSIONS:

		FULL SCALE	MODEL SCALE
Leading edge at:	X_T	947.0	9.47
	Y_T	- 70.0	- 0.70
Trailing edge at:	X_T	2058.0	20.58
	Y_T	- 70.0	- 0.700

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT_{22}

GENERAL DESCRIPTION: Right rear, Orbiter to External Tank

MODEL SCALE: 0.010

DRAWING NO.: VL72-000088B + VL72-000089 NOTE: Use first drawing for location and second drawing for detail of struts

DIMENSIONS:	FULL SCALE	MODEL SCALE
First strut		
Diameter - In. (Approx.)	8.0	0.08
Aft Location, In. (Attach to Orbiter)		
X_o	1307.0	13.070
X_T	2058.0	20.580
Fwd Location - In. (Approx.) (Attach to Orbiter)		
X_o	1108.0	11.080
X_T	1859	18.59
NOTE: This strut is the mirror image strut AT_{23}		
Second Strut		
Diameter, In. (Approx.)	8.0	0.08
Location - In.		
X_o	1307.0	13.070
X_T	2058	20.580
NOTE: This is a cross brace strut.		

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT_{23}

GENERAL DESCRIPTION: Left rear, Orbiter to External Tank

MODEL SCALE: 0.010

DRAWING NO.: VL72-000088B & VL72-000089

NOTE: Use first drawing for location and second drawing for detail of struts

DIMENSIONS:	FULL SCALE	MODEL SCALE
Forward attach points:		
Orbiter to Tank		
No. of struts	1	1
Diameter - In. (Approx)	8.0	0.08
Location - In.		
X_O	1307	13.070
X_T	2058	20.580
Aft attach points:		
Location - In. (Approx.)		
X_O	1108	11.080
X_T	1859	18.590

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT_{21}

GENERAL DESCRIPTION: Attach structure, same as AT_{11} except only the forward attach structure.

MODEL SCALE: 0.010

DRAWING NO.: VL72-000089

DIMENSIONS:	FULL SCALE	MODEL SCALE
Orbiter to Tank		
Location- In.		
X_T	382.000	3.820
X_T	1133.000	11.330

TABLE III. - MODEL DIMENSIONAL DATA - Concluded.

MODEL COMPONENT: FAIRING - FR_6

GENERAL DESCRIPTION: Cross member between aft ET/Orbiter attach structures.

MODEL SCALE: 0.010

DRAWING NO.: VL78-000062B, VL78-000050 MODEL DRAWING: SS-A00117

DIMENSIONS:

	FULL SCALE	MODEL SCALE
Leading edge at X_T	2035.50	20.355
Length	15.00	0.150
Width	193.00	1.930

Notes:

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

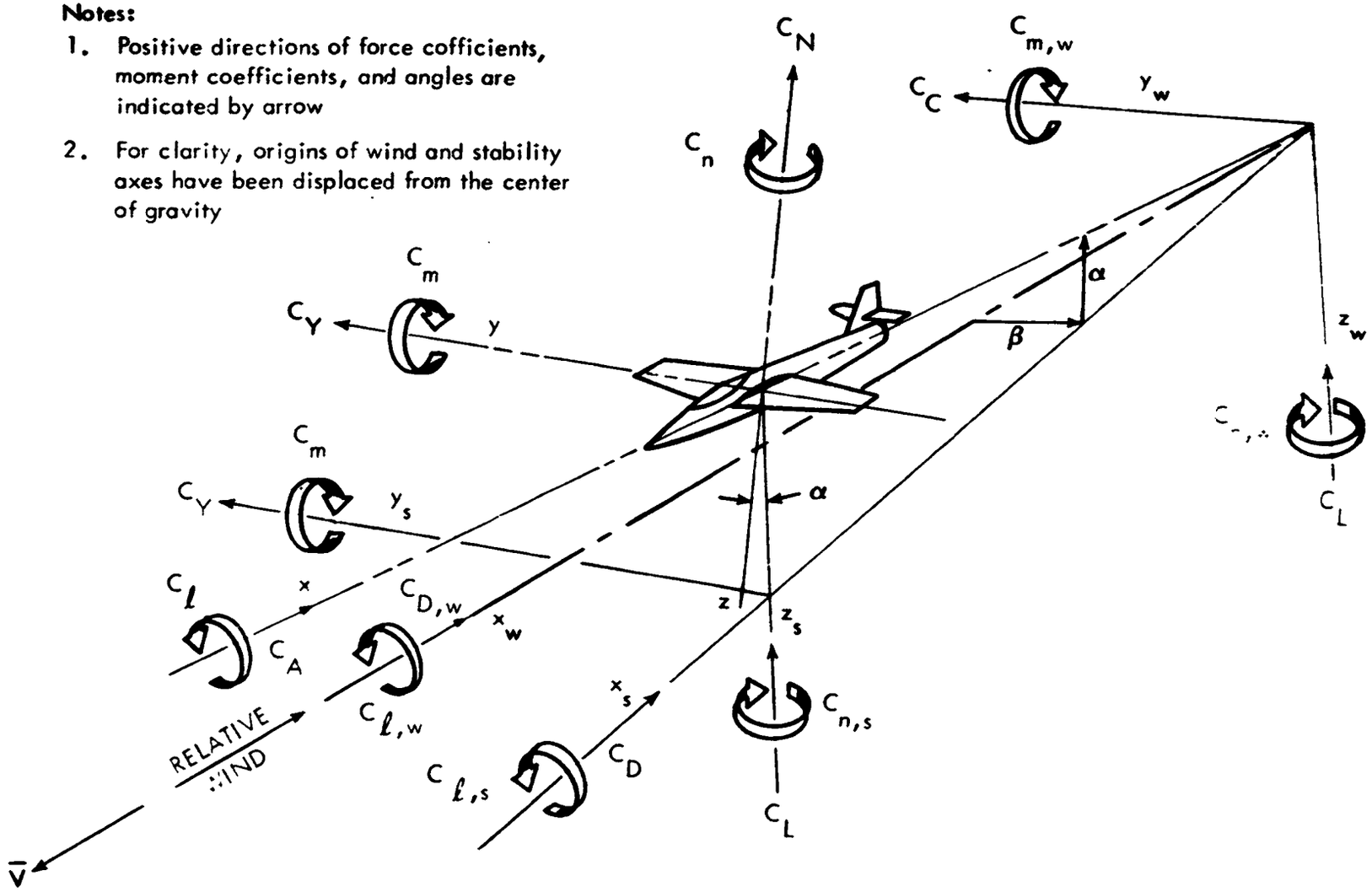


Figure 1. - Axis systems.

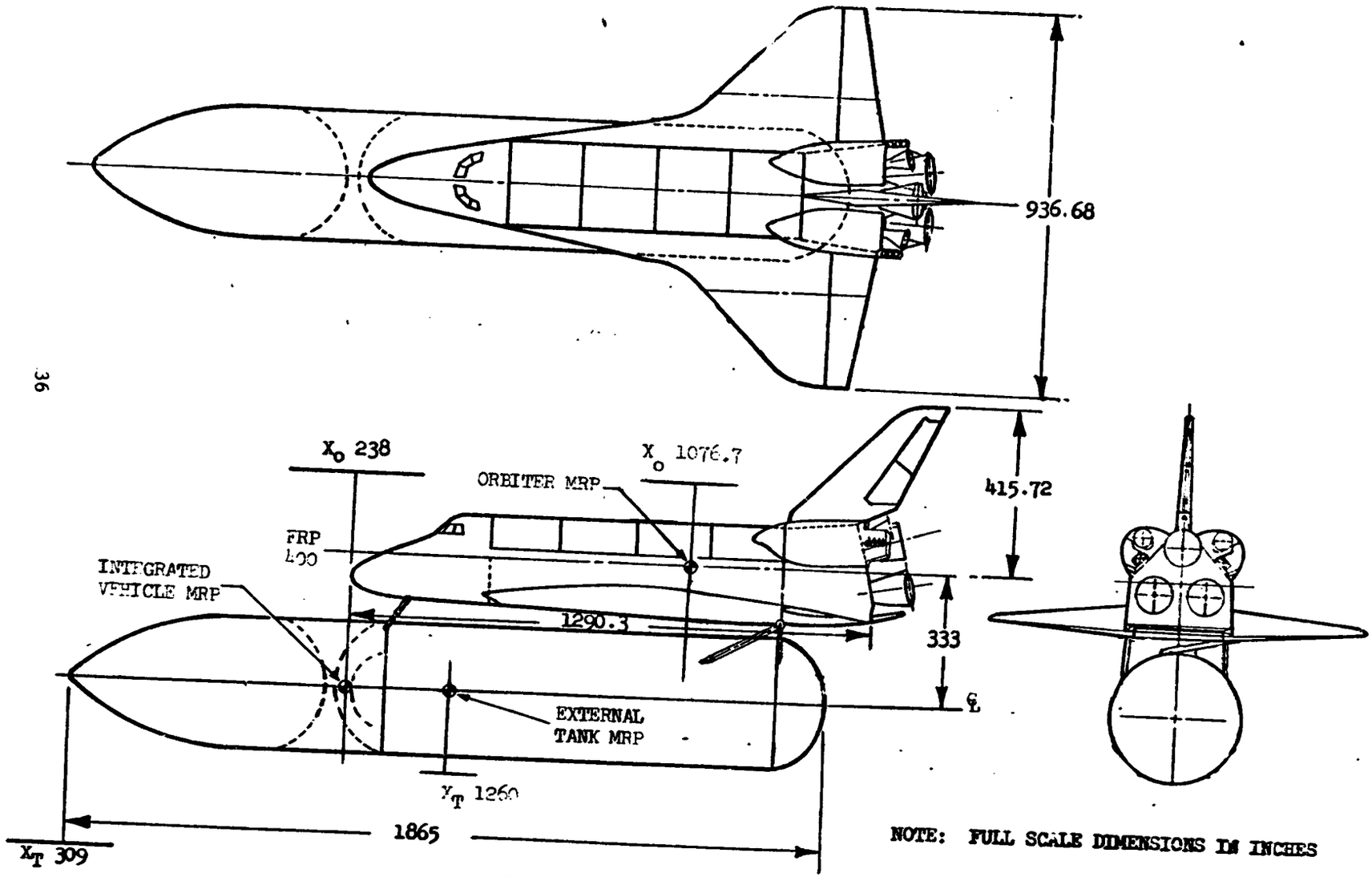
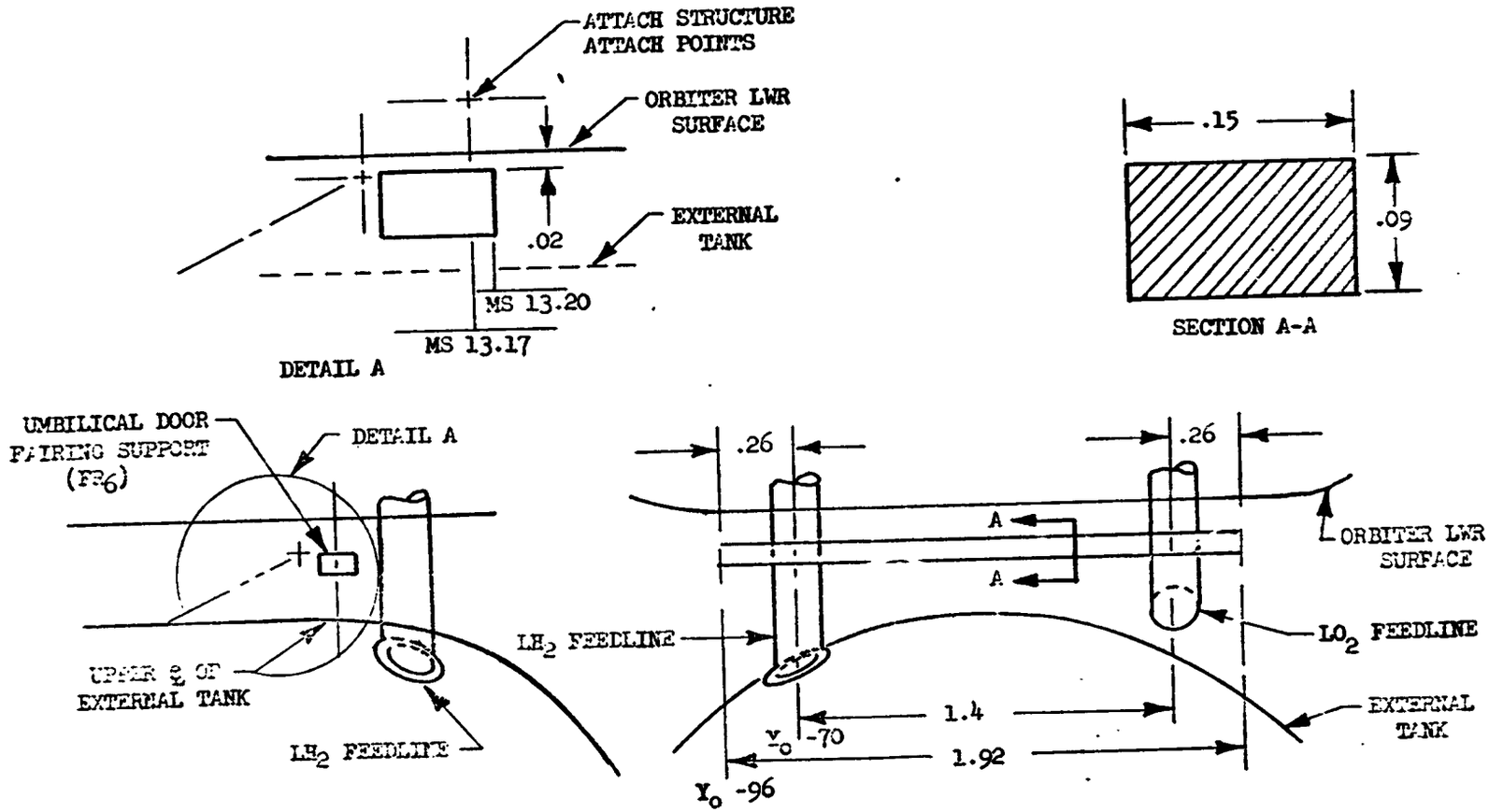


Figure 2.a. Integrated Vehicle Configuration 3



NOTE: ALL DIMENSIONS ARE APPROXIMATE AND IN INCHES

Figure 2.b. Orbiter Umbilical Door Fairing Support (FR_6) and $LO_2(FL_7)$ and $LH_2(FL_8)$ Feedlines

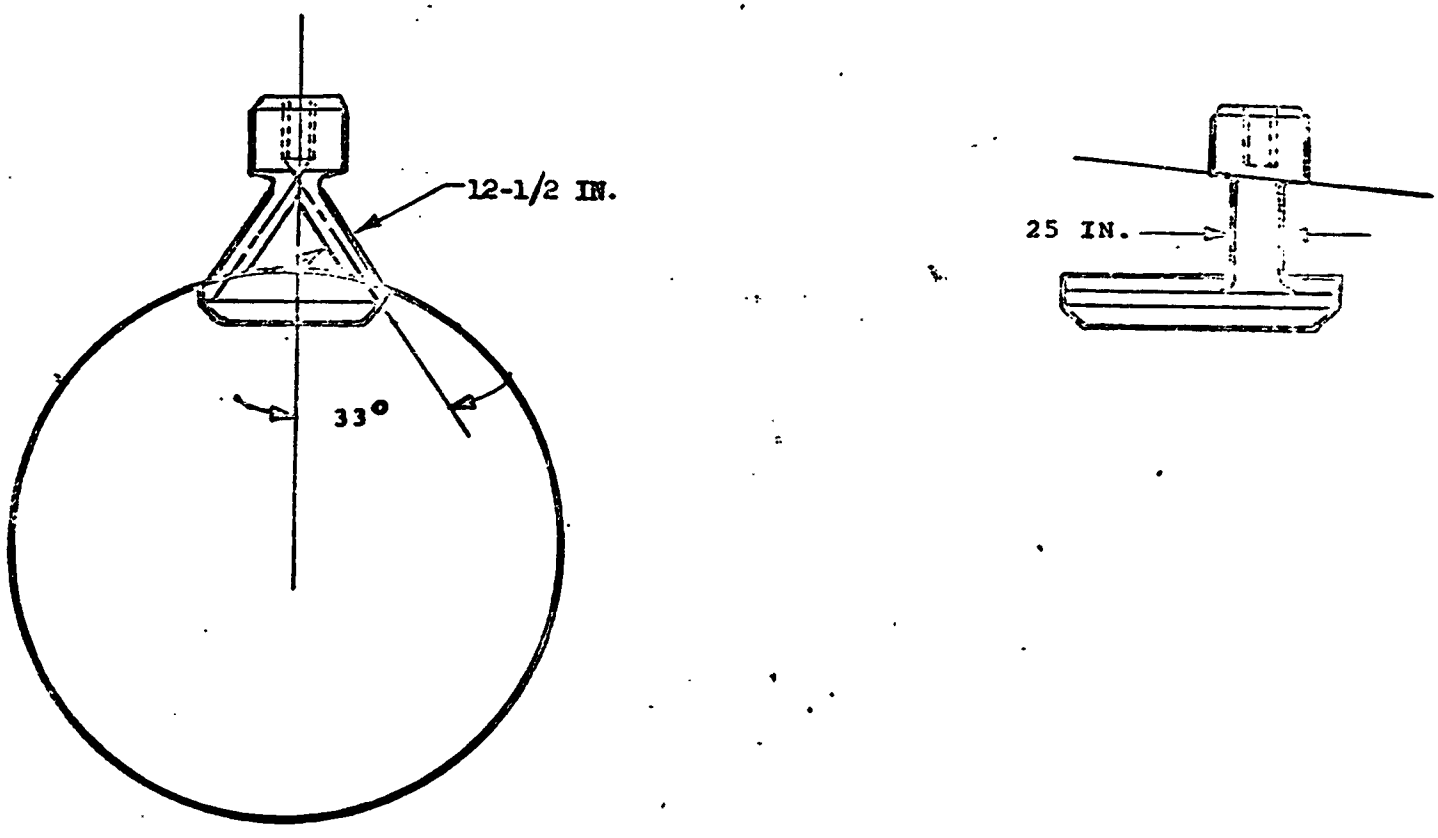


Figure 2.c. Forward Attachment of the External Tank to the Orbiter (AT_{21})

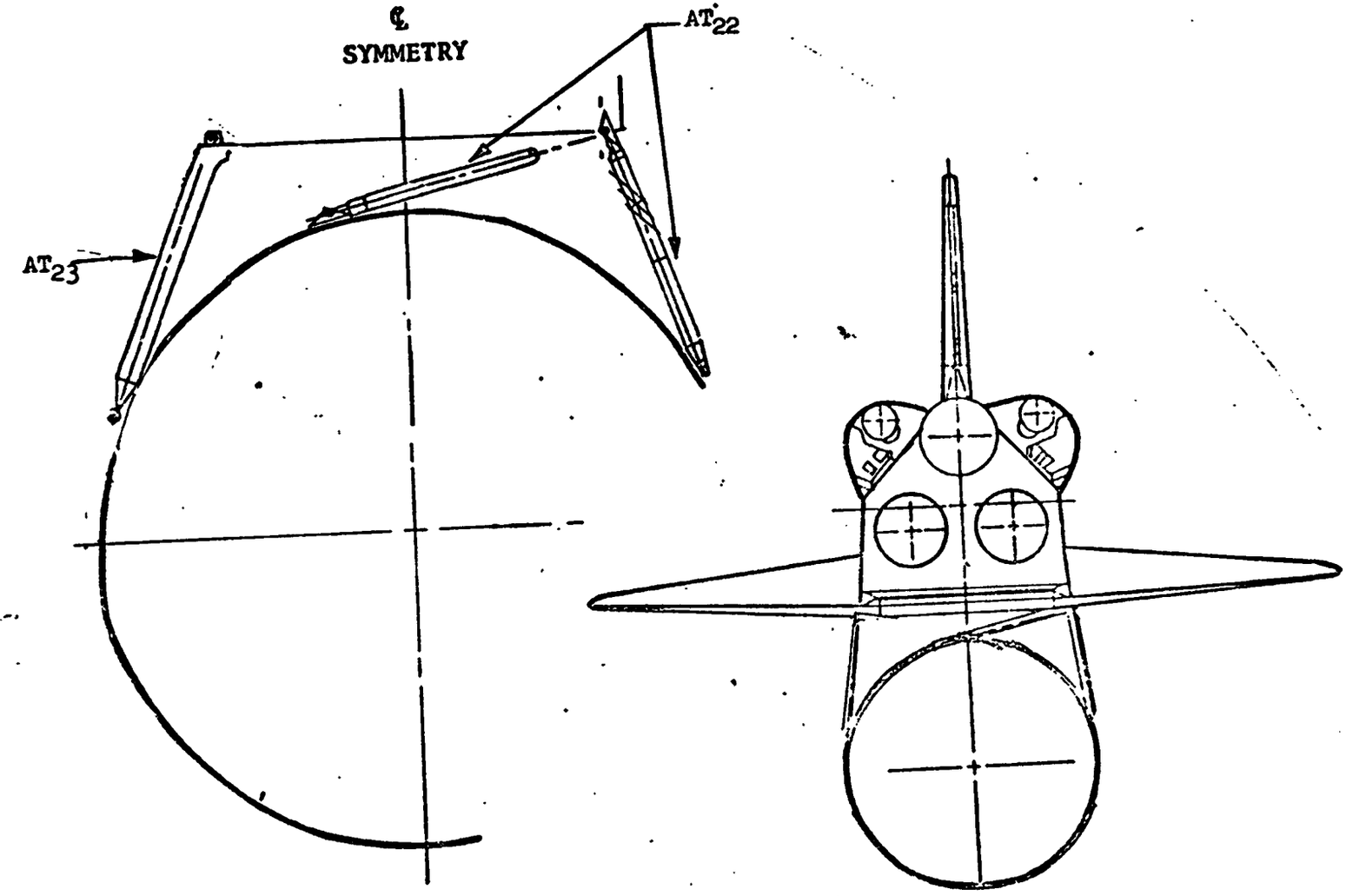


Figure 2.d. Aft Attachment of External Tank to Orbiter (AT_{22}, AT_{23})

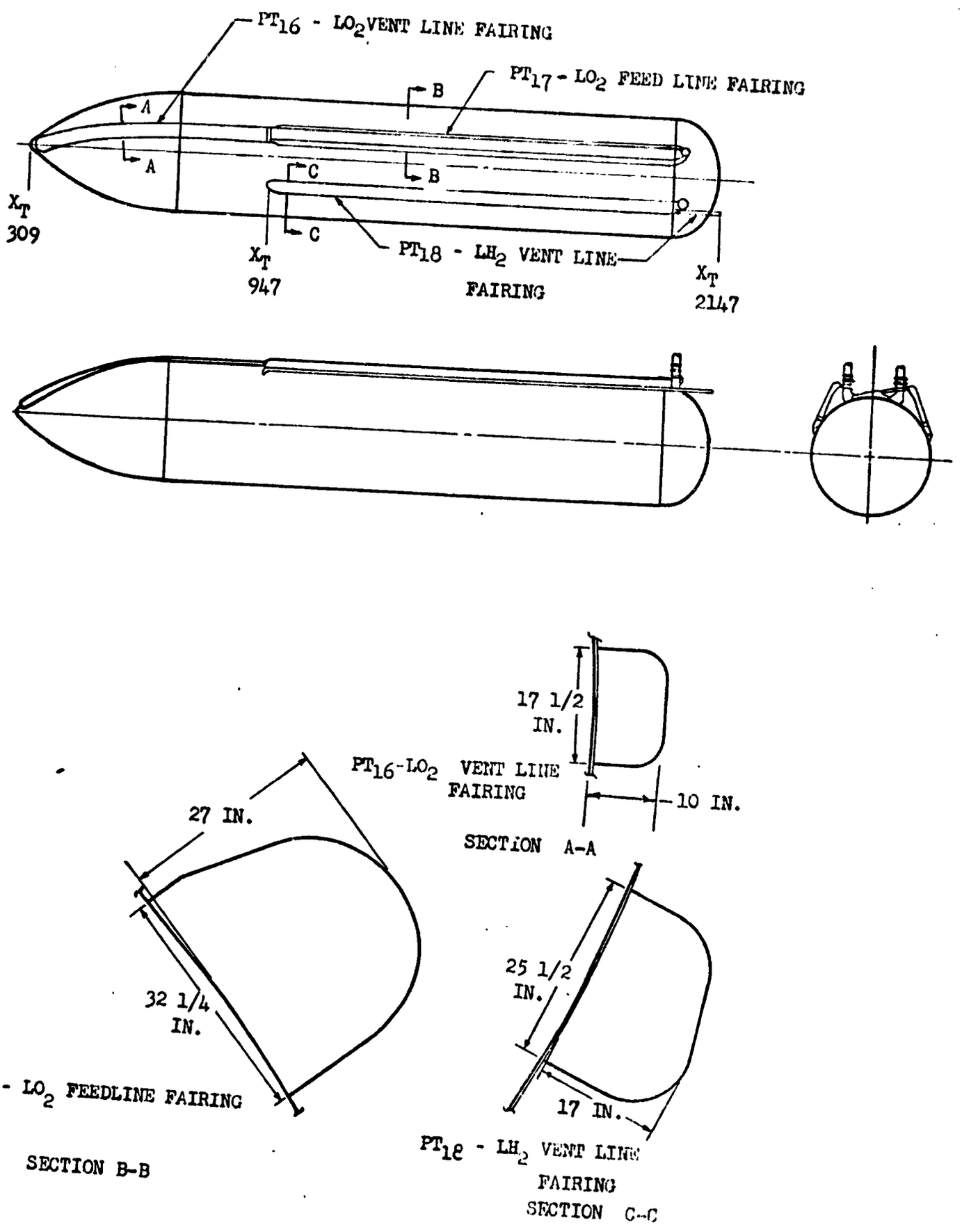
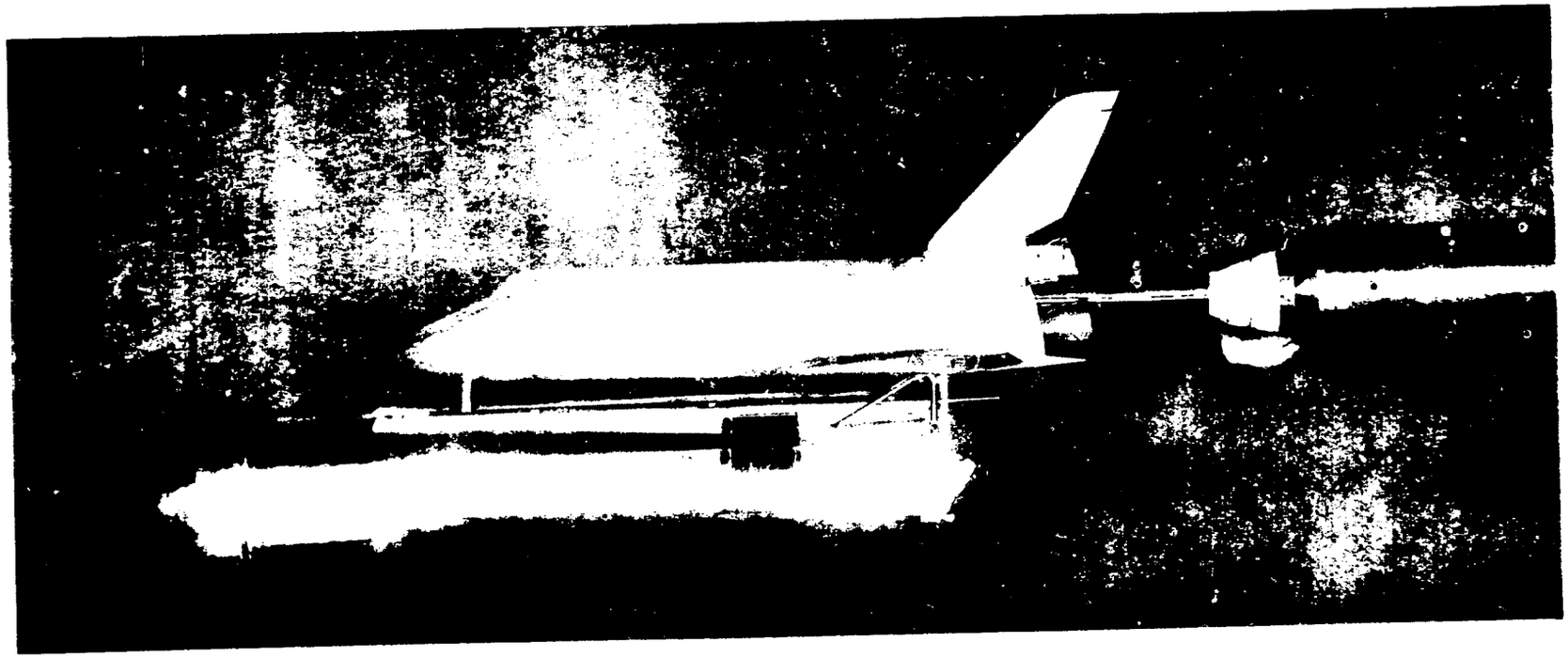
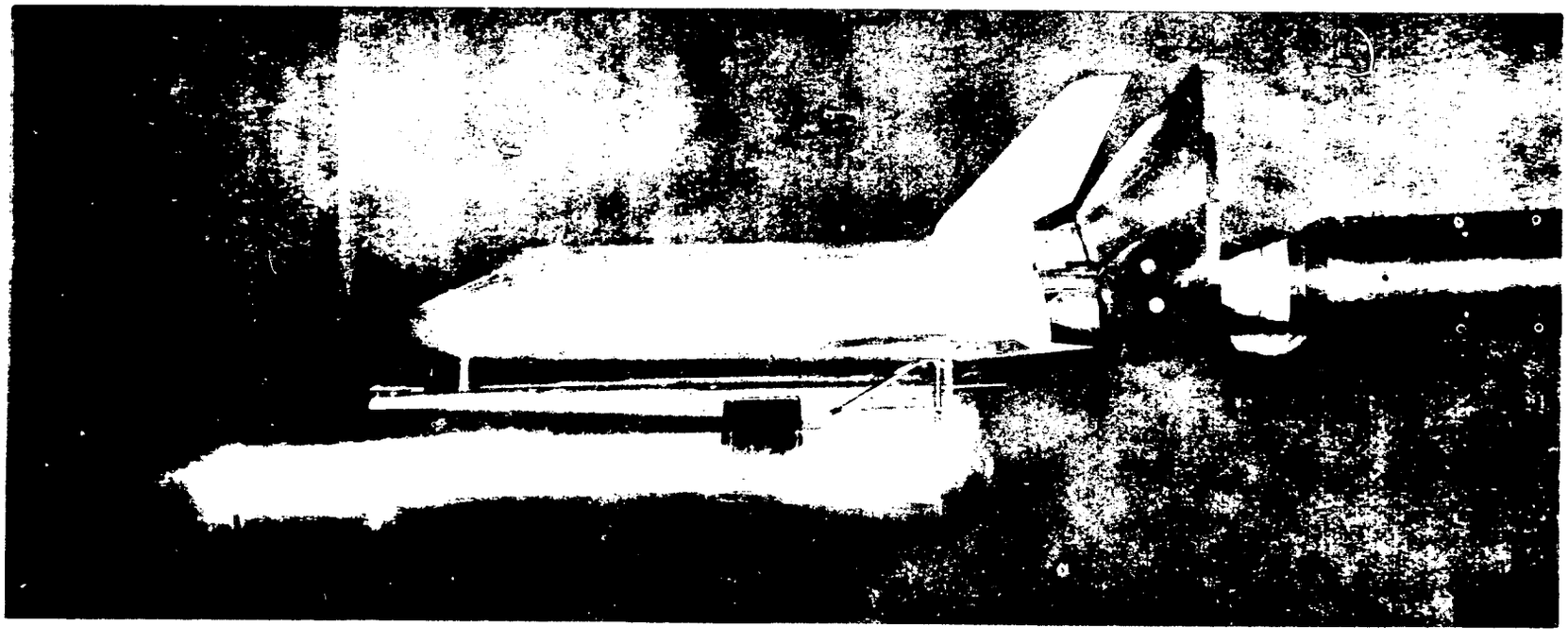


Figure 2.e. External Tank Protuberances (PT_{16}, PT_{17}, PT_{18})



a. Model 32-OT in the LaRC CFHT
Figure 3. - Model Installation photographs.



b. Model 32-OT with Orbiter solid plumes
Figure 3. - Concluded

DATA FIGURES

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RDK001)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (T1)	.000	.000	.000	.000
(RDK002)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01)	.000	.000	.000	.000
(ADK009)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)				

DATASETS WITH DISSIMILAR REFERENCE CHARACTERISTICS HAVE BEEN PLOTTED-CHECK INPUT FOR POSSIBLE ERROR

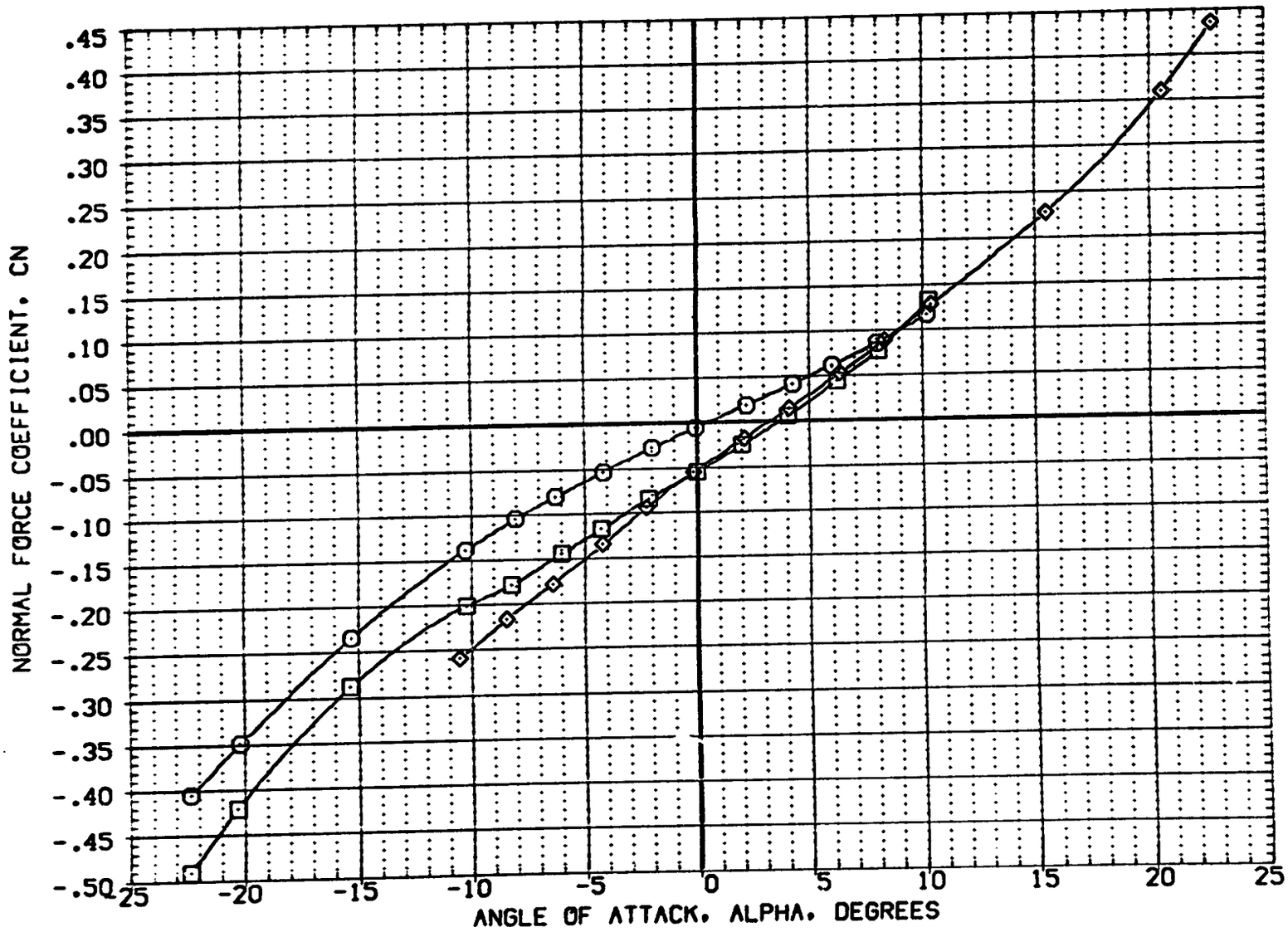


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33

DATA SET SYMBOL		CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK001)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (T1)				
(ROK002)	◻	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01)	.000	.000	.000	.000
(AOK009)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

DATASETS WITH DISSIMILAR REFERENCE CHARACTERISTICS HAVE BEEN PLOTTED-CHECK INPUT FOR POSSIBLE ERROR

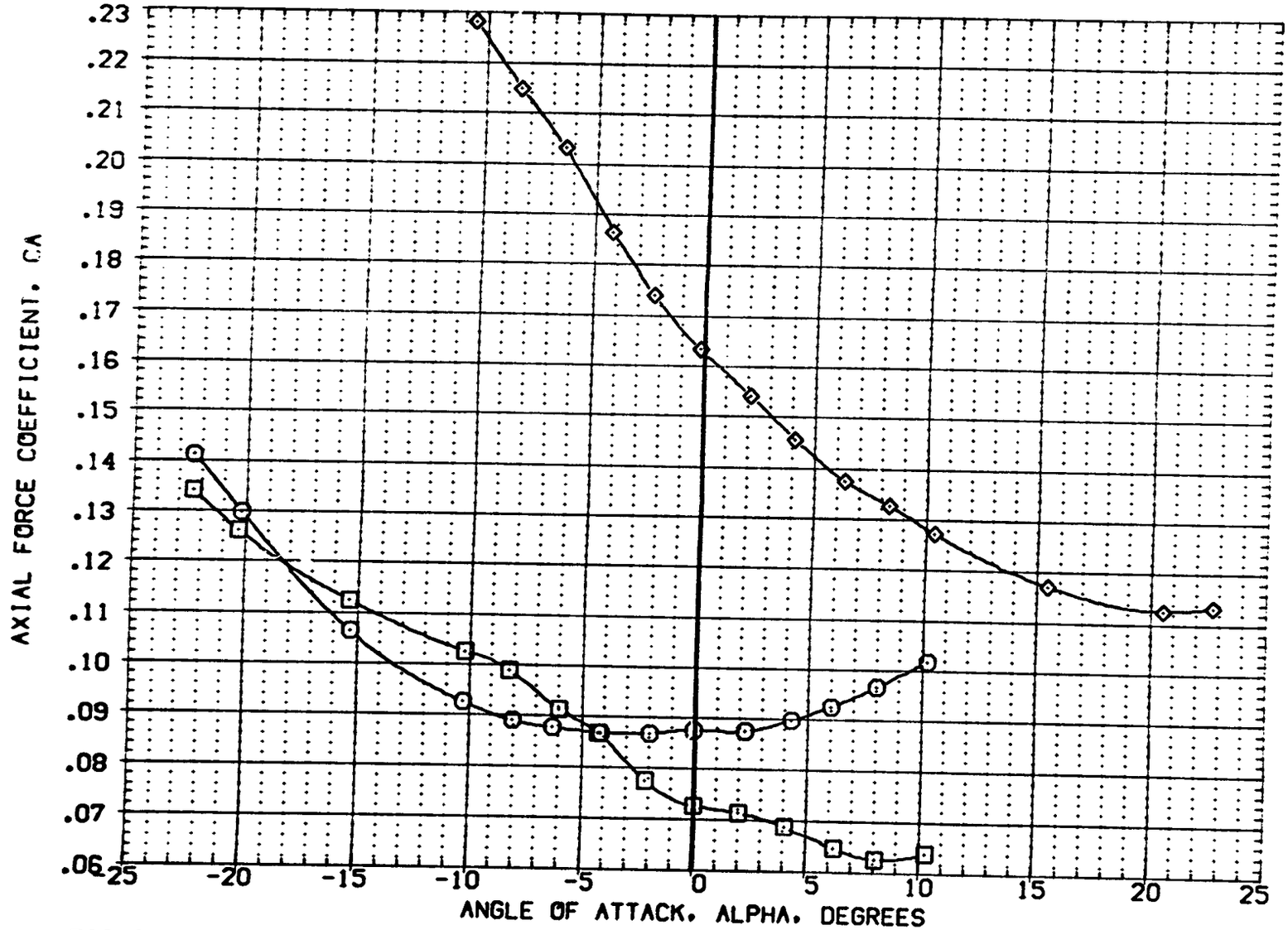


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK001) ○	IA-58 CFHT-107 RI-1398 MODEL 32-DT (T1)	.000	.000	.000	.000
(ROK002) □	IA-58 CFHT-107 RI-1398 MODEL 32-DT (01)	.000	.000	.000	.000
(ADK009) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-DT (01 + T2)				

DATASETS WITH DISSIMILAR REFERENCE CHARACTERISTICS HAVE BEEN PLOTTED-CHECK INPUT FOR POSSIBLE ERROR

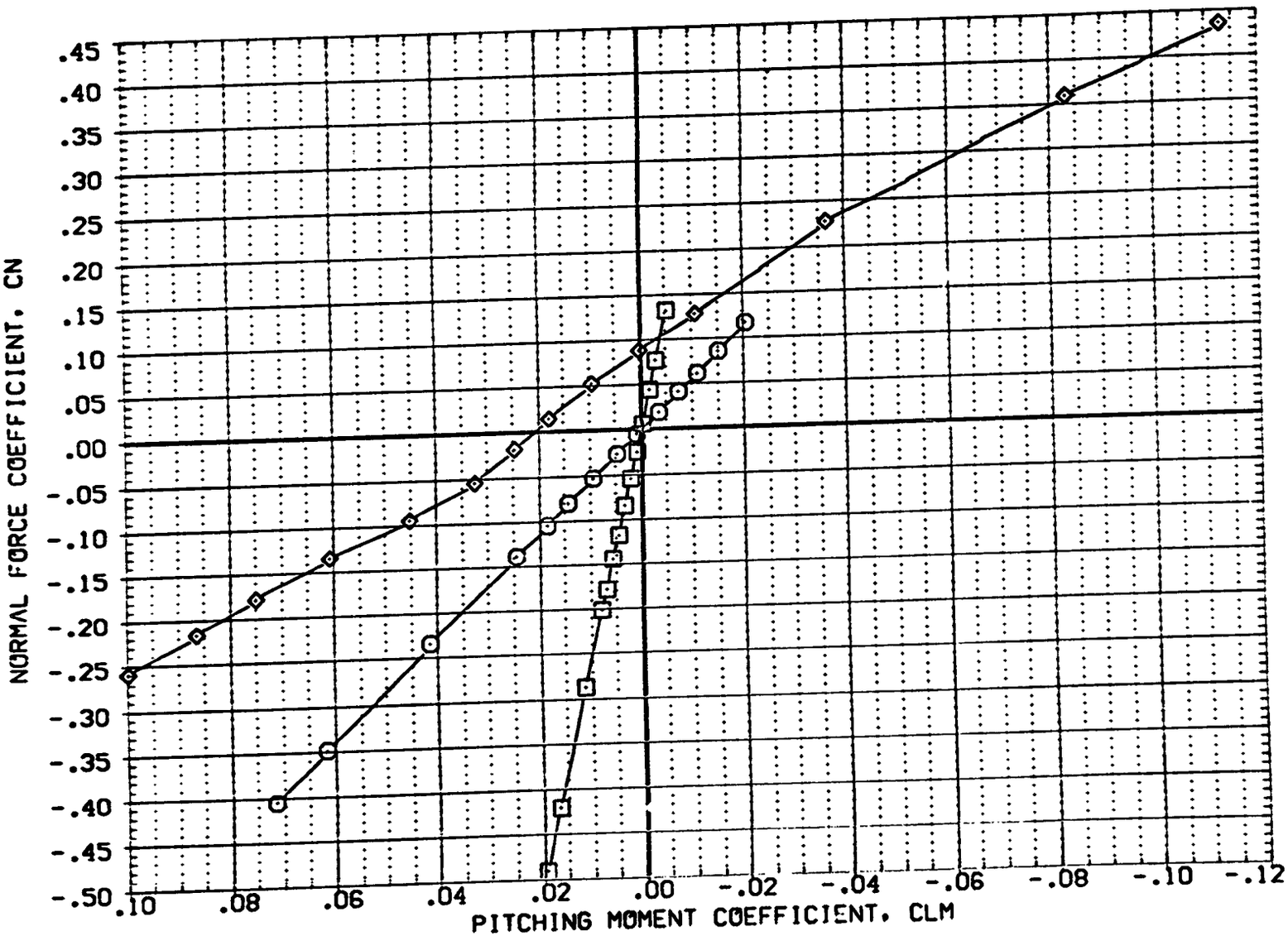


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(RQK003)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(RQK007)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(AQK009)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

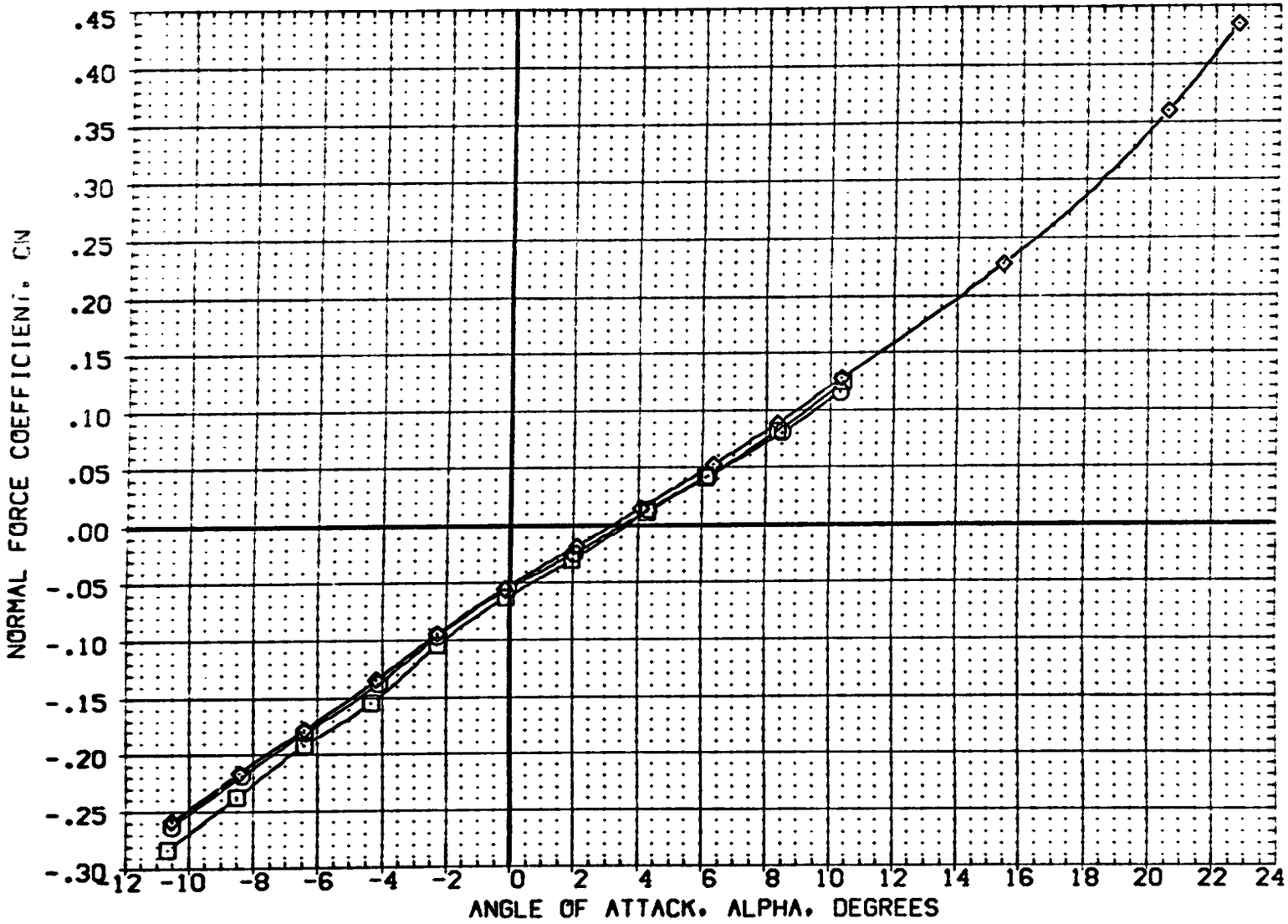


FIG 05 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - ALPHA SWEEP

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RDK003)		IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(RDK007)		IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(ADK009)		IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	1.0000	IN.
YMRP	1.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

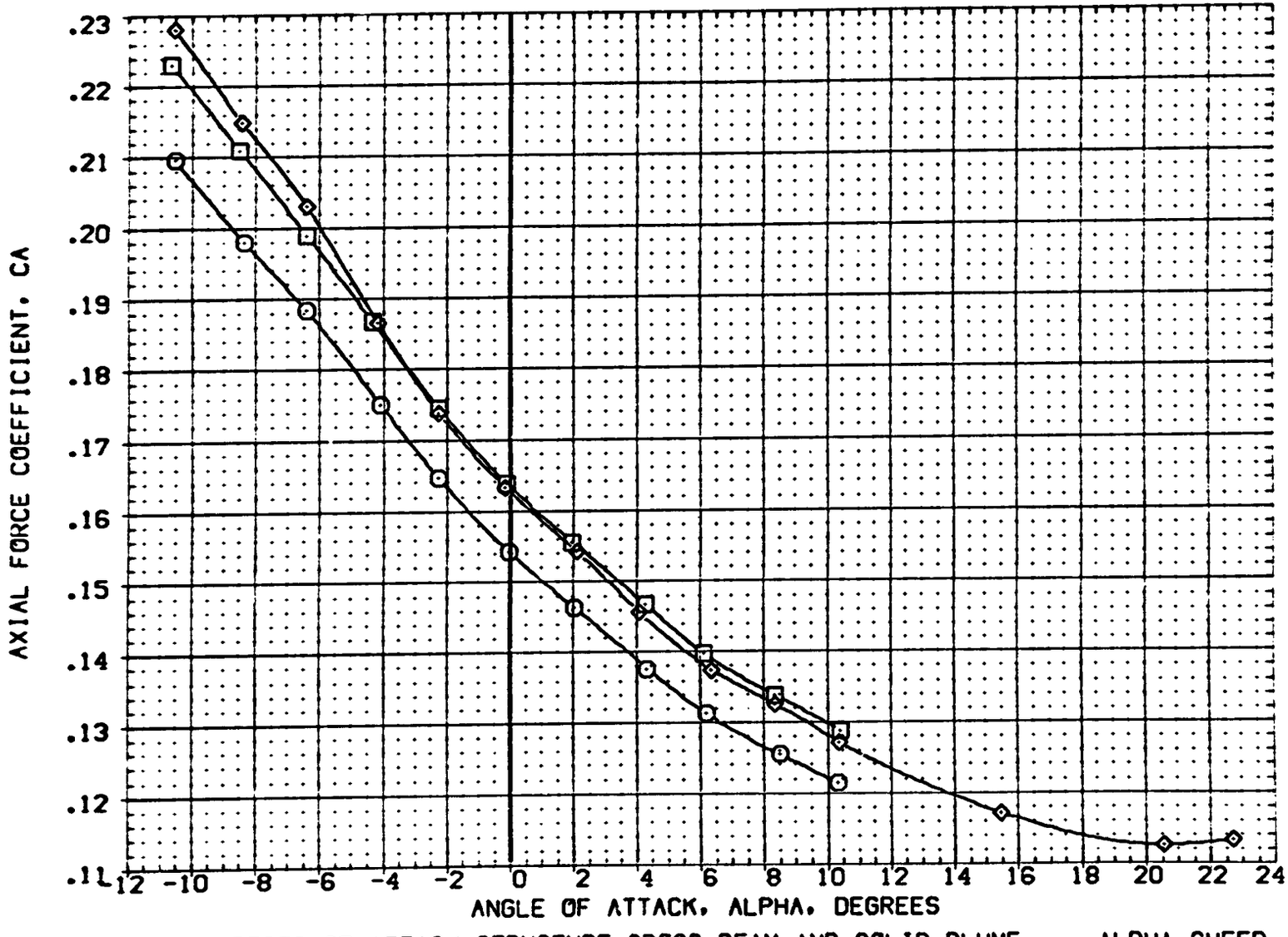


FIG 05 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - ALPHA SWEEP

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(R0K003)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(R0K007)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(A0K009)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

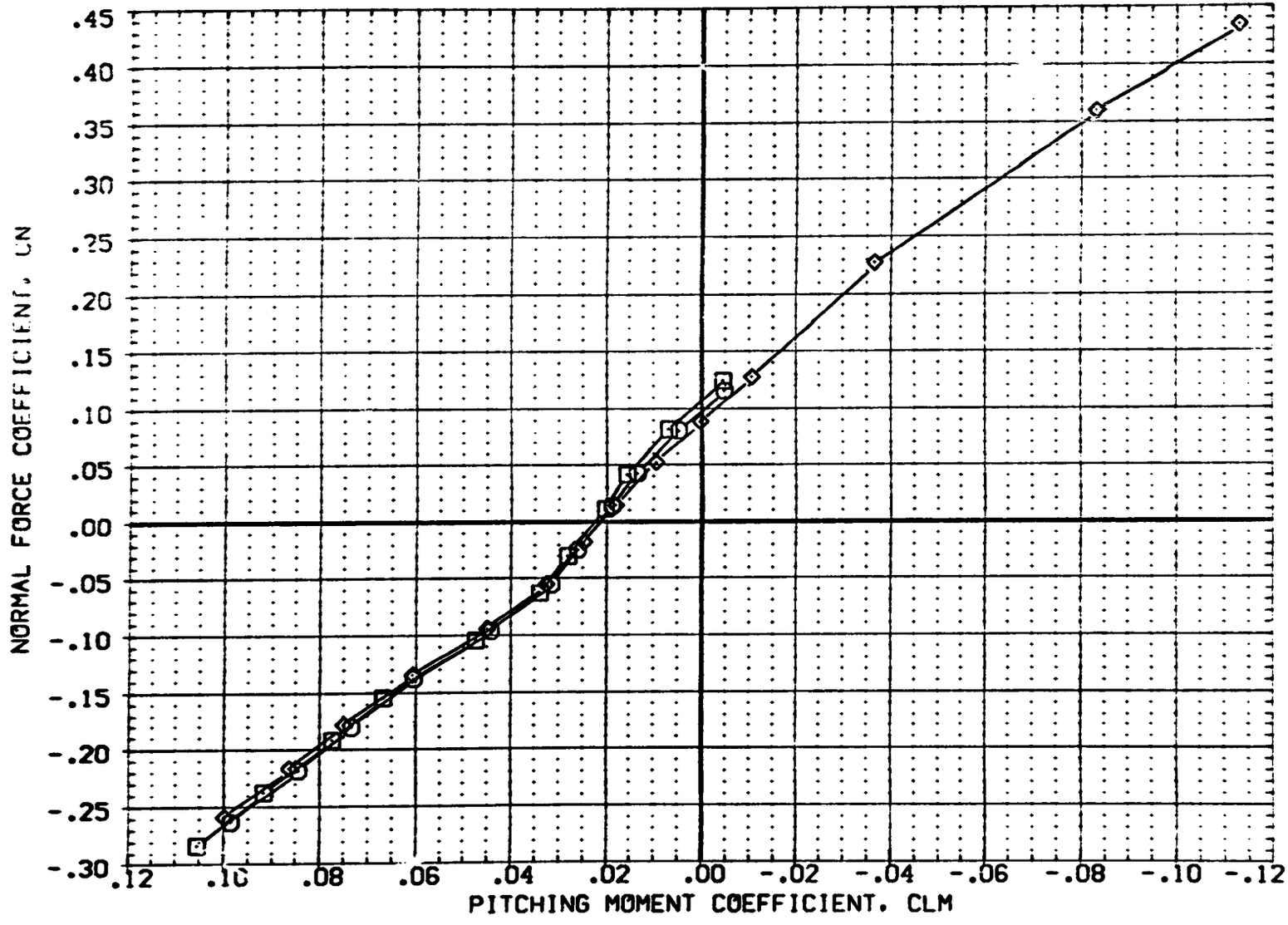


FIG 05 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - ALPHA SWEEP

(*)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(ROK008) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(ROK004) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(ROK010) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

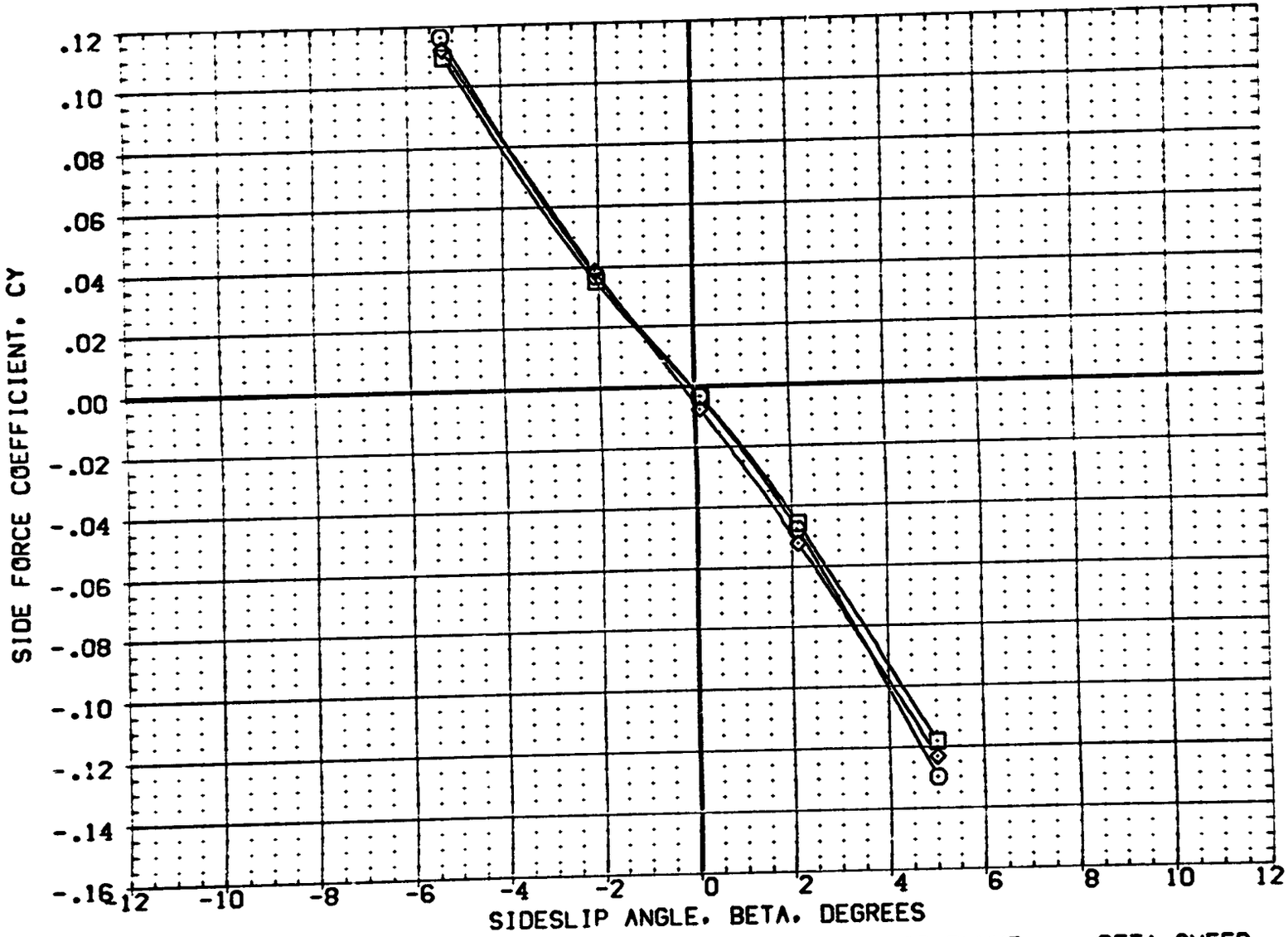


FIG 06 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - BETA SWEEP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RQK008) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(RQK004) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(RQK010) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

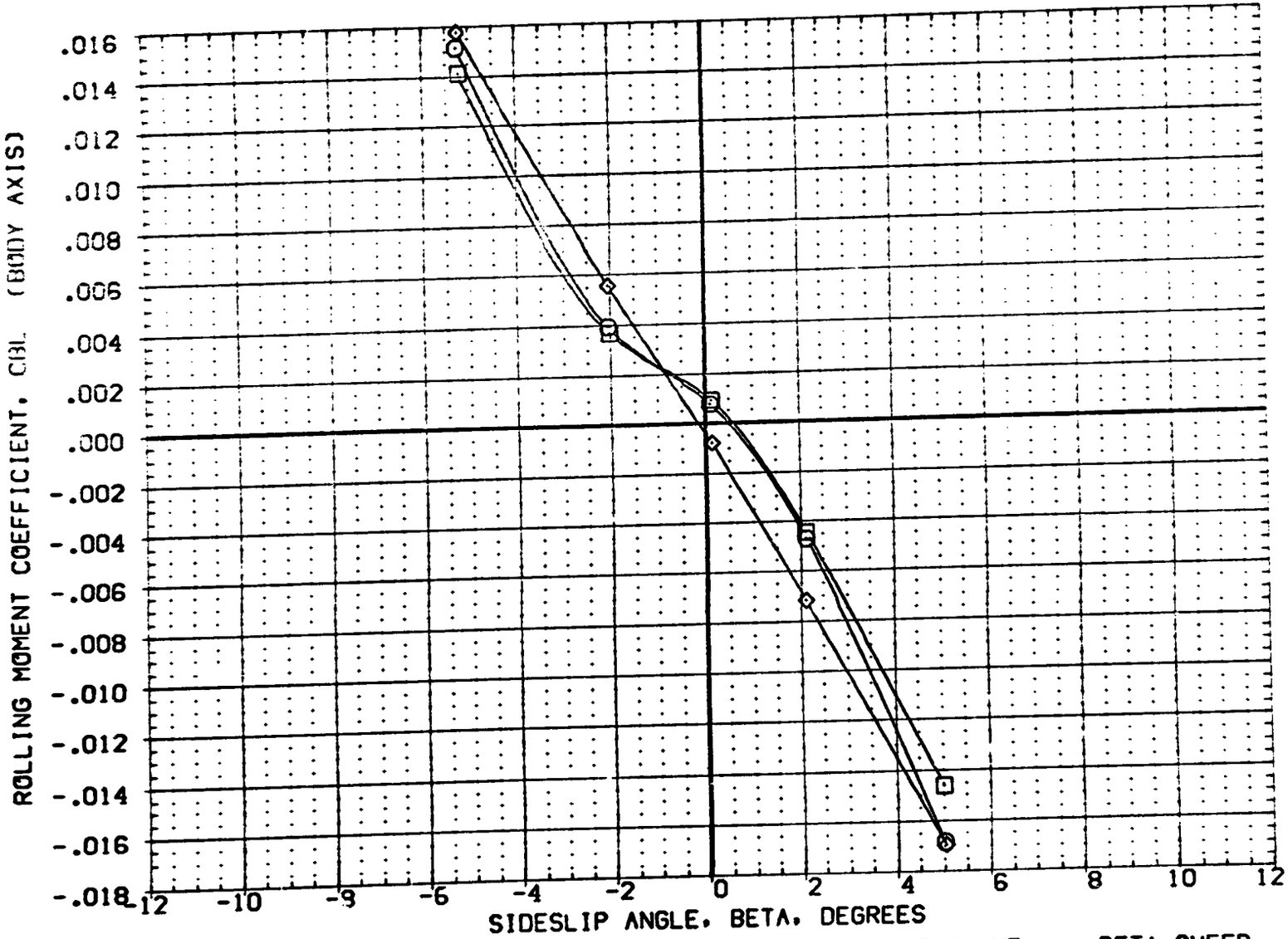


FIG 06 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - BETA SWEEP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(R2K008)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2)	.000	.000	.000	.000
(R2K004)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(R2K010)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

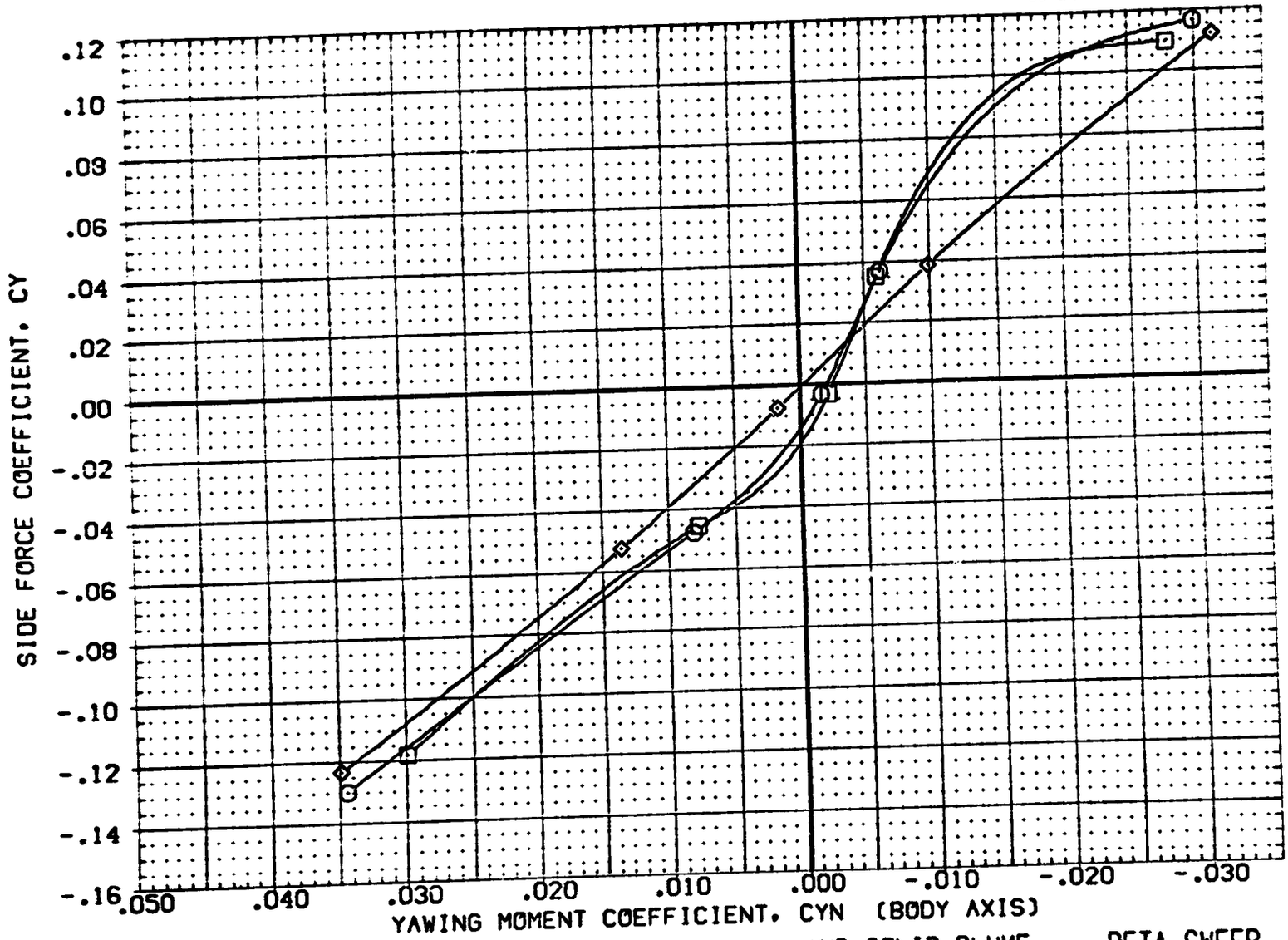


FIG 06 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - BETA SWEEP

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(ROK021)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(ROK024)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ROK013)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

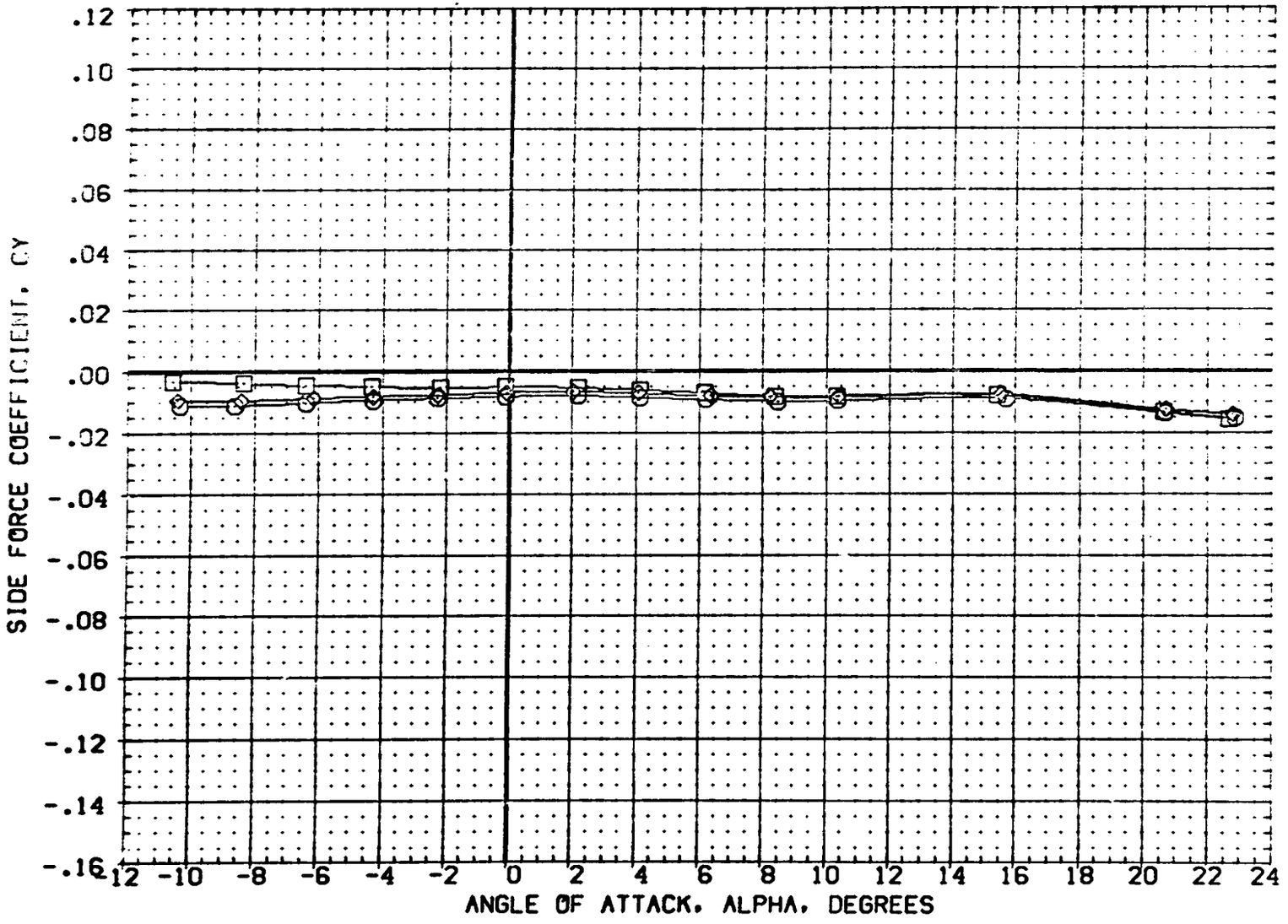


FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK021) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(ROK024) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ROK013) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK021) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(ROK024) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ROK013) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

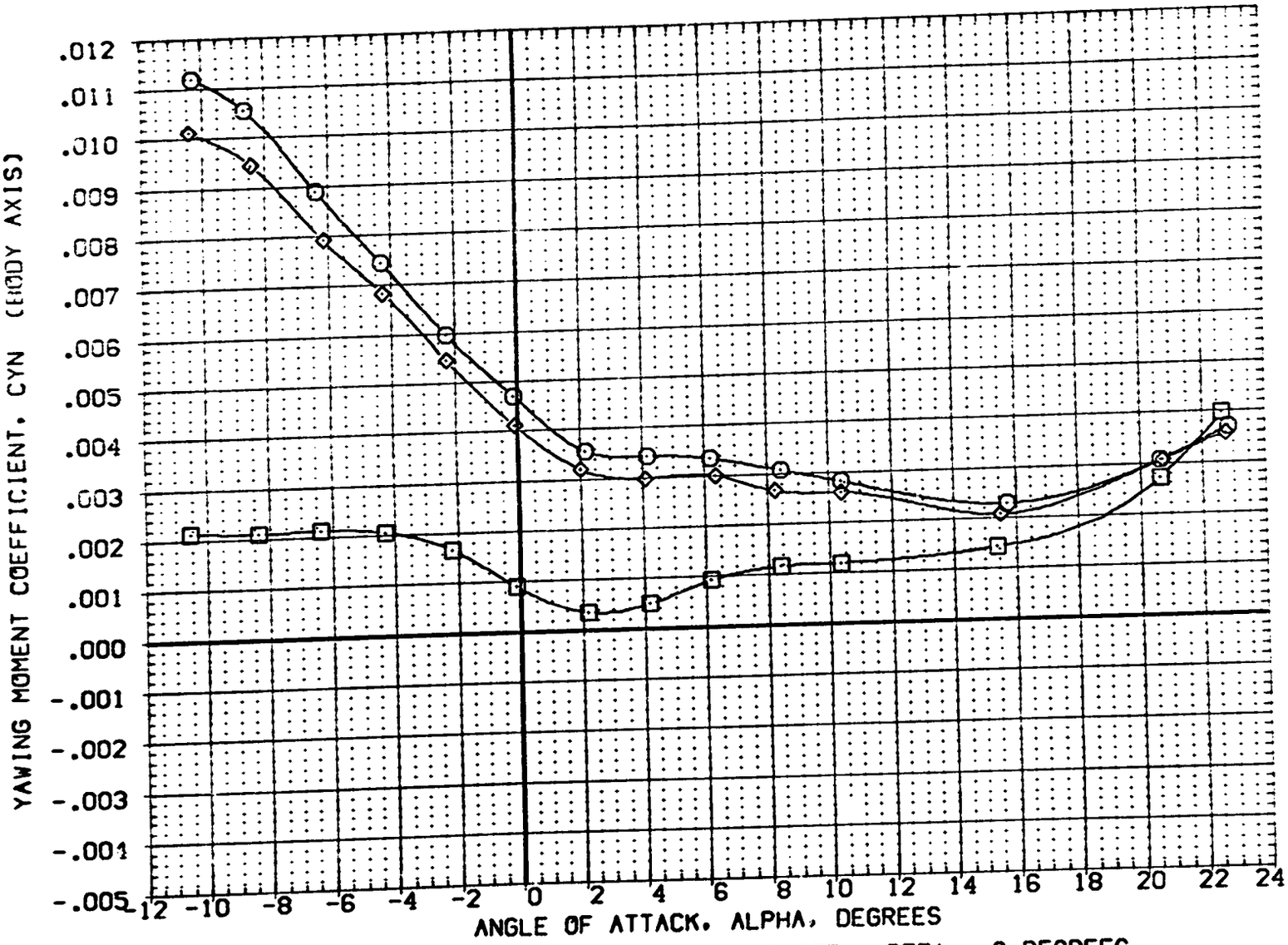


FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RDK005)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(RDK003)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

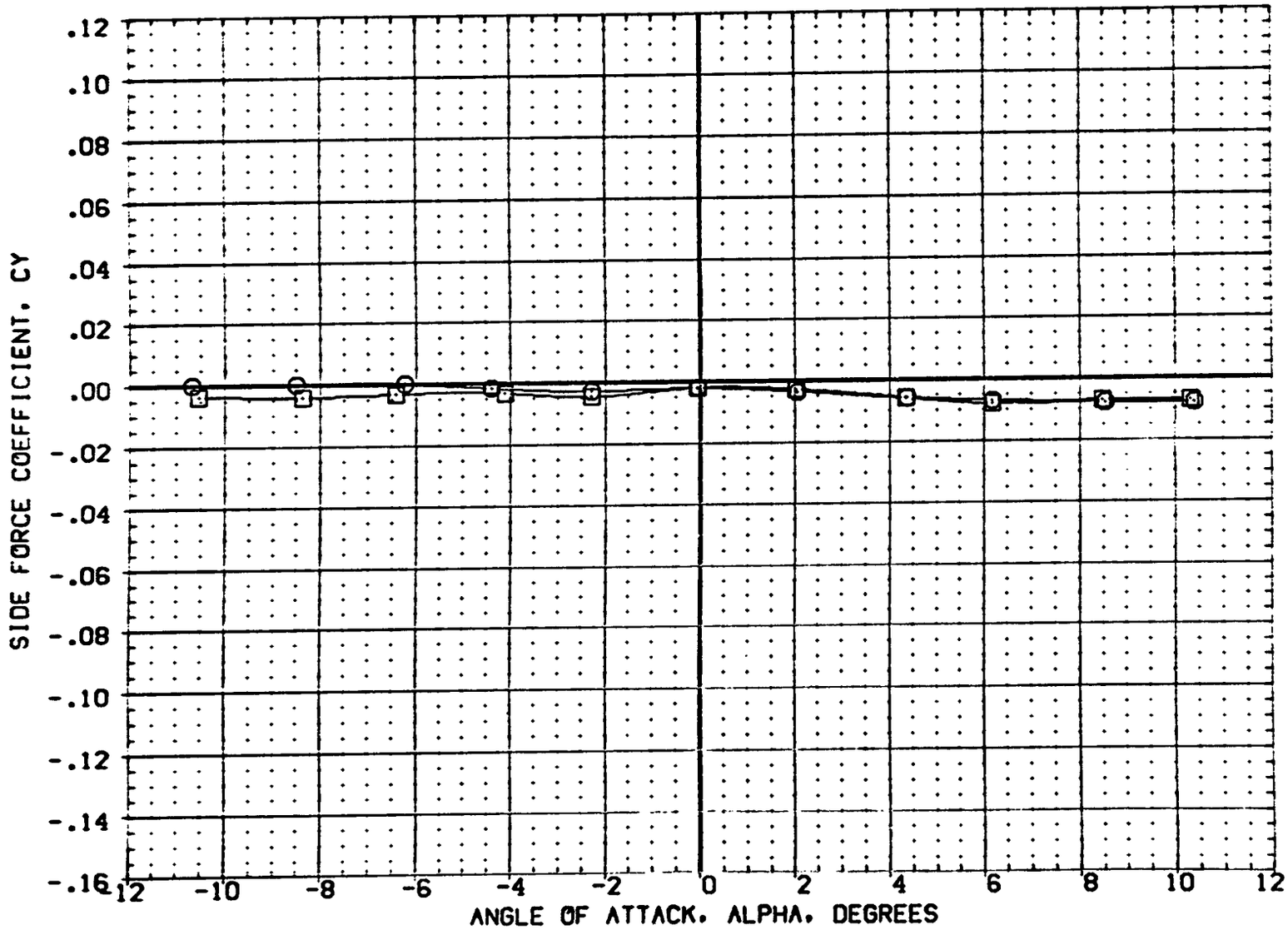


FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(ROK005)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(ROK003)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000

REFERENCE INFORMATION

SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

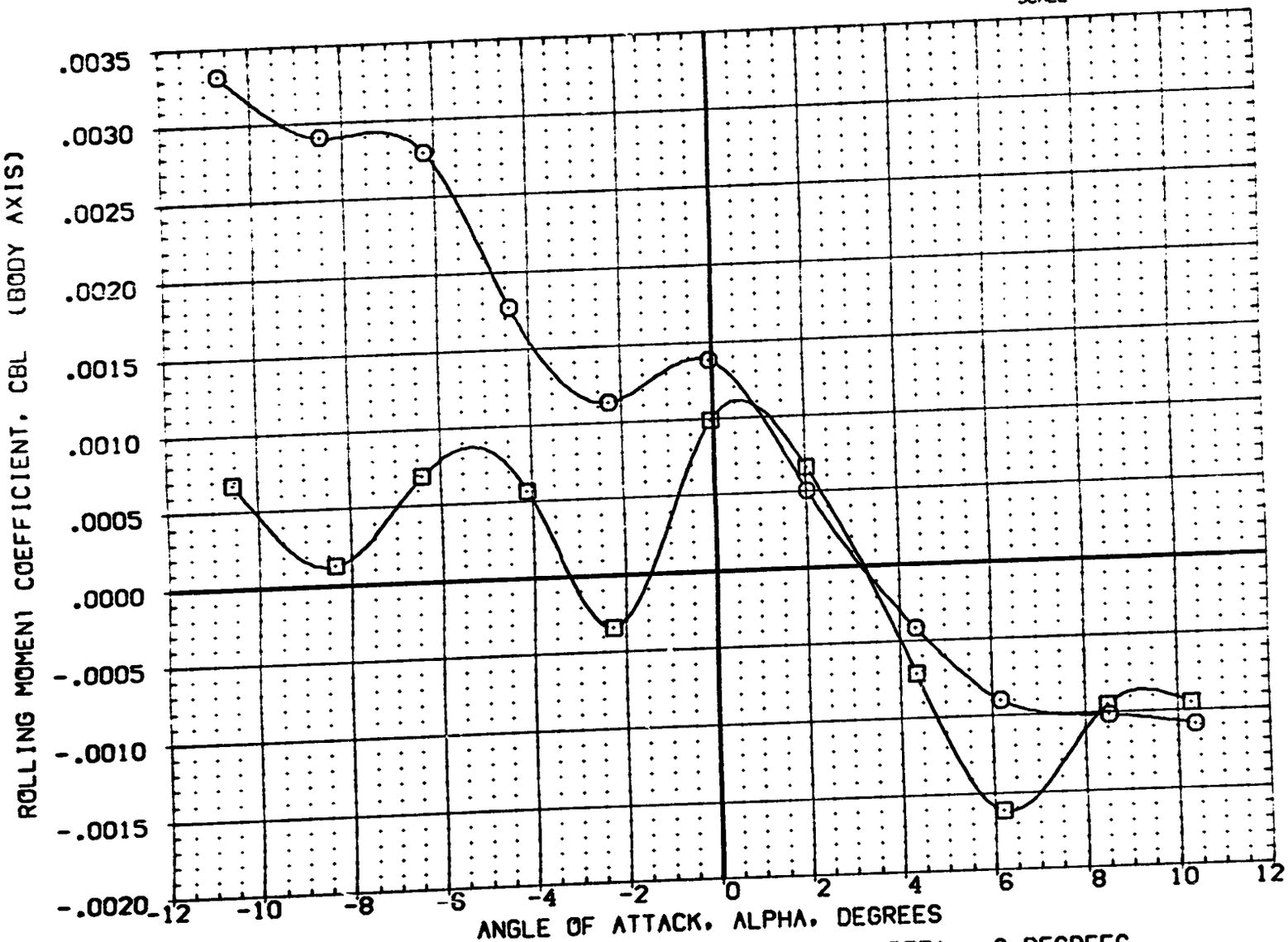


FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RQX005) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(RQX003) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

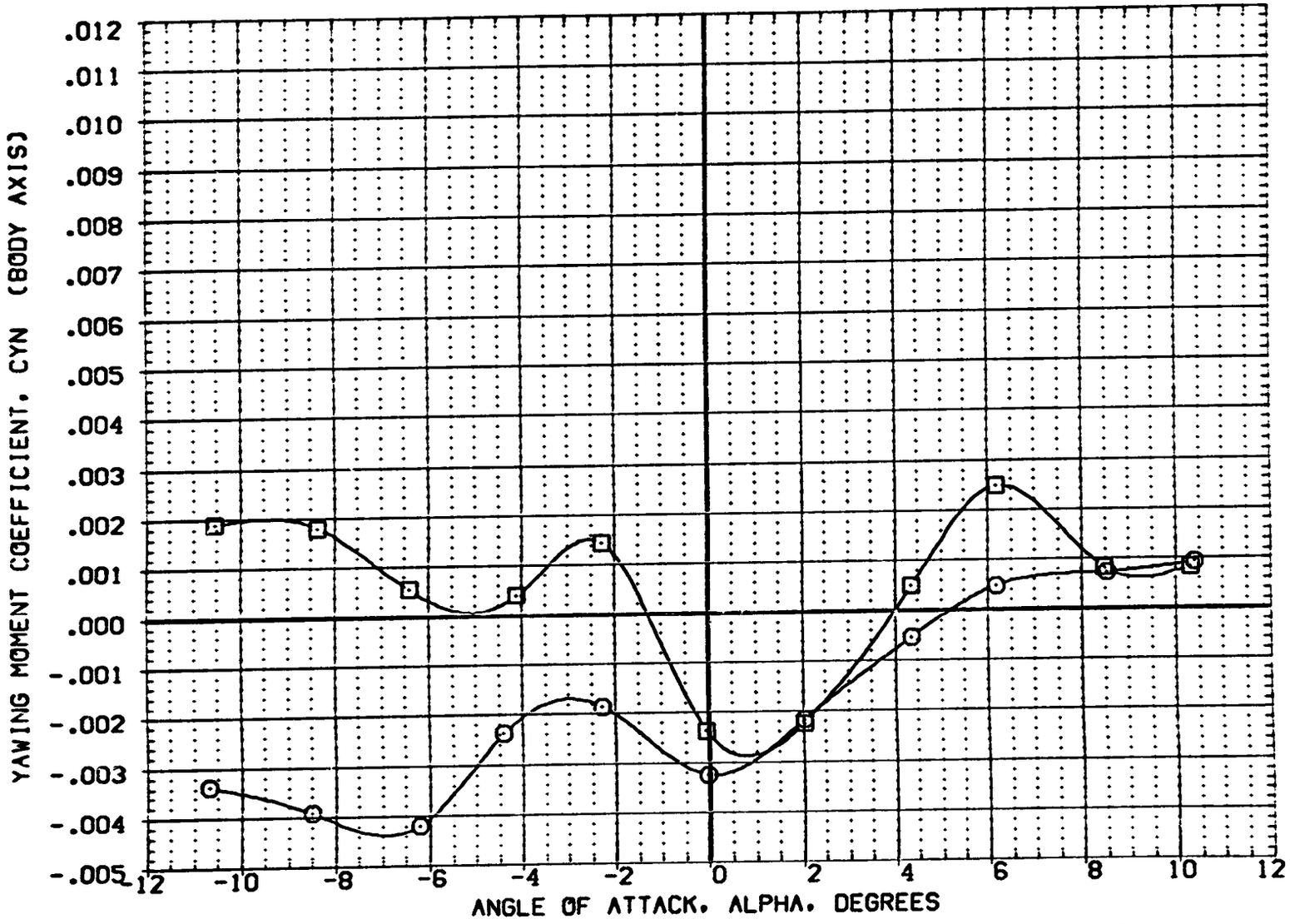


FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(RO*021)	1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(RO*023)	1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

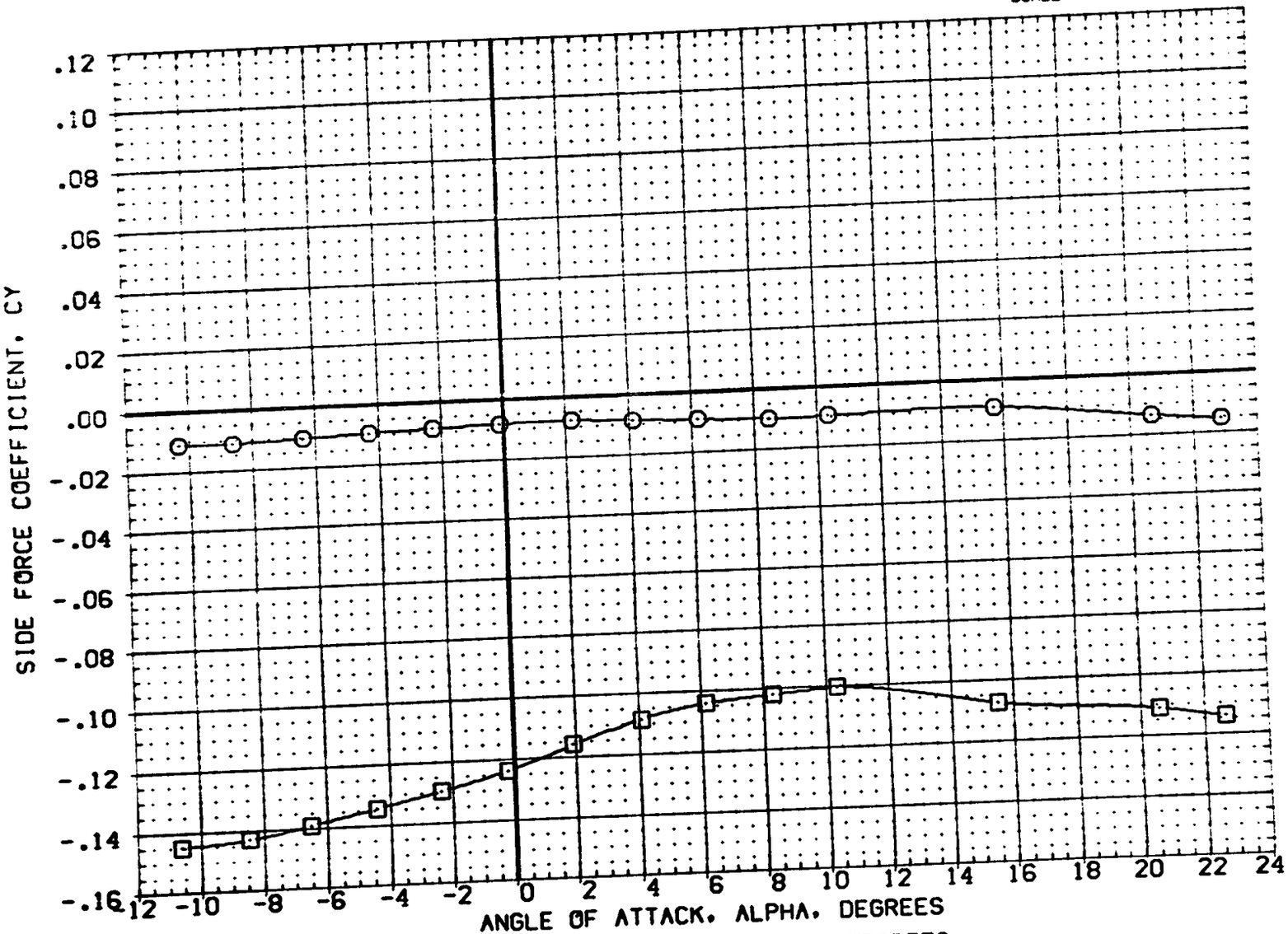


FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK021)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(ROK023)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

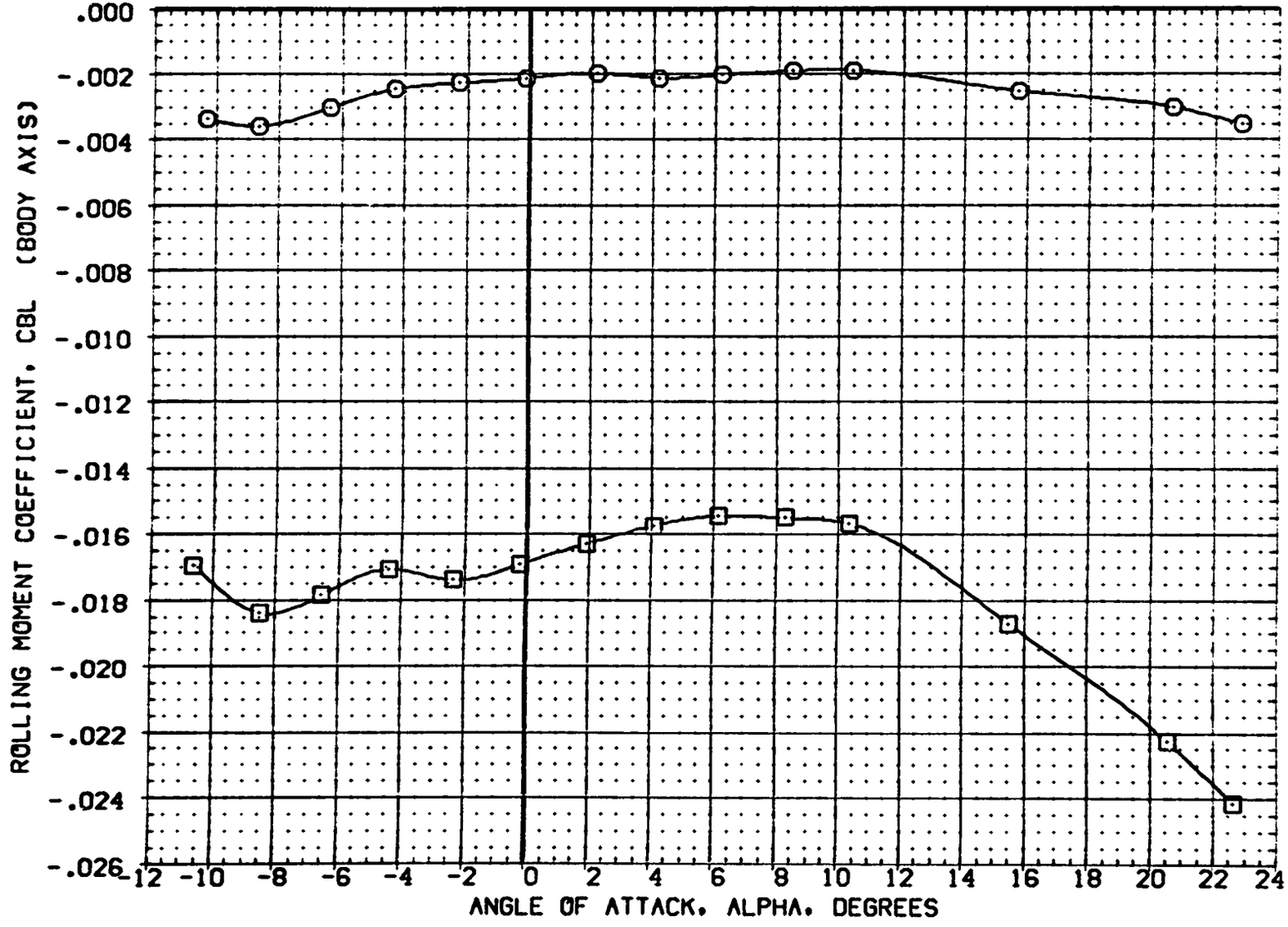


FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(RUN021)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	-20.000	.000
(RUN023)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7300	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

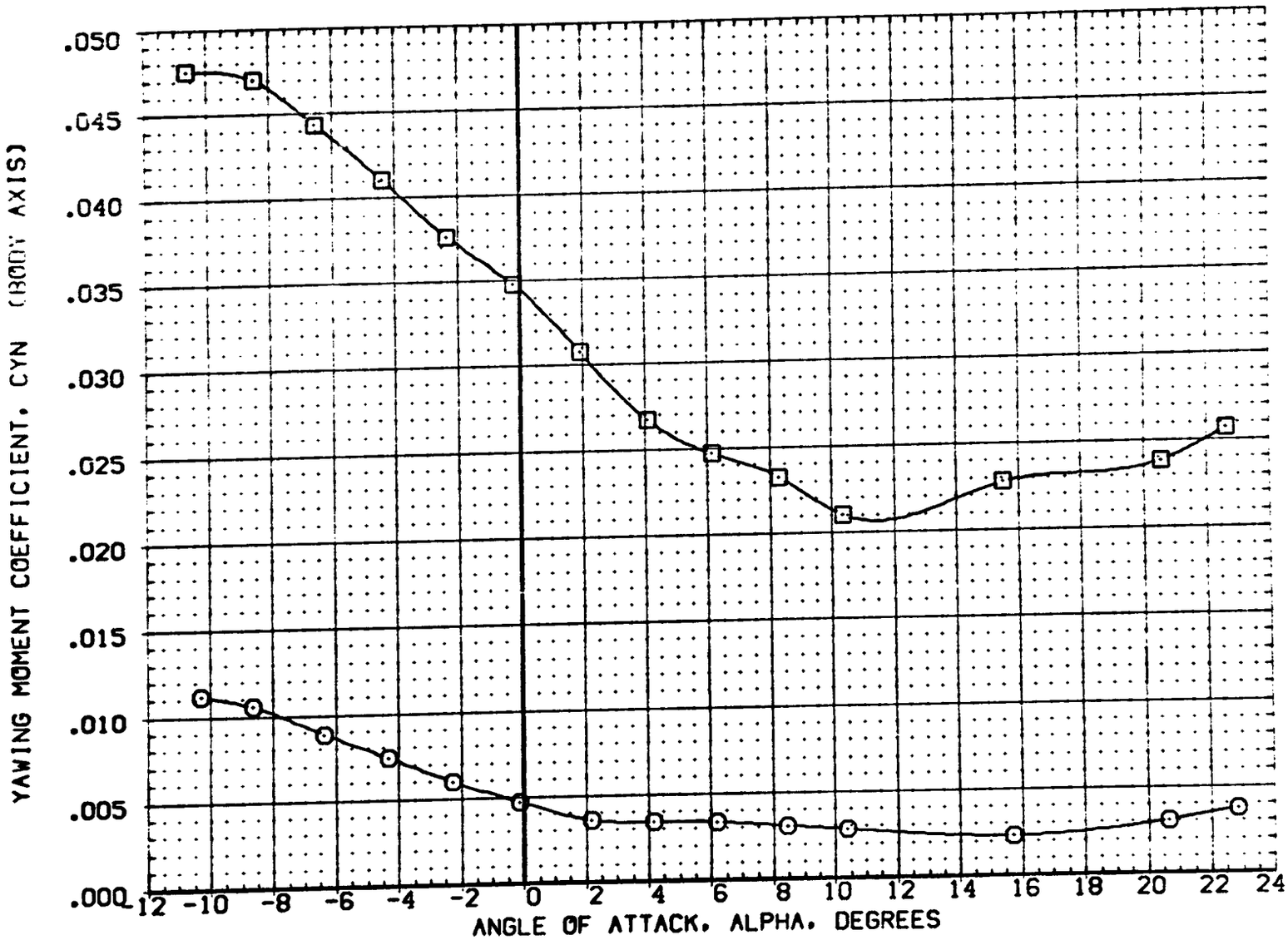


FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(ROK006) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(ROK004) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(ROK014) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

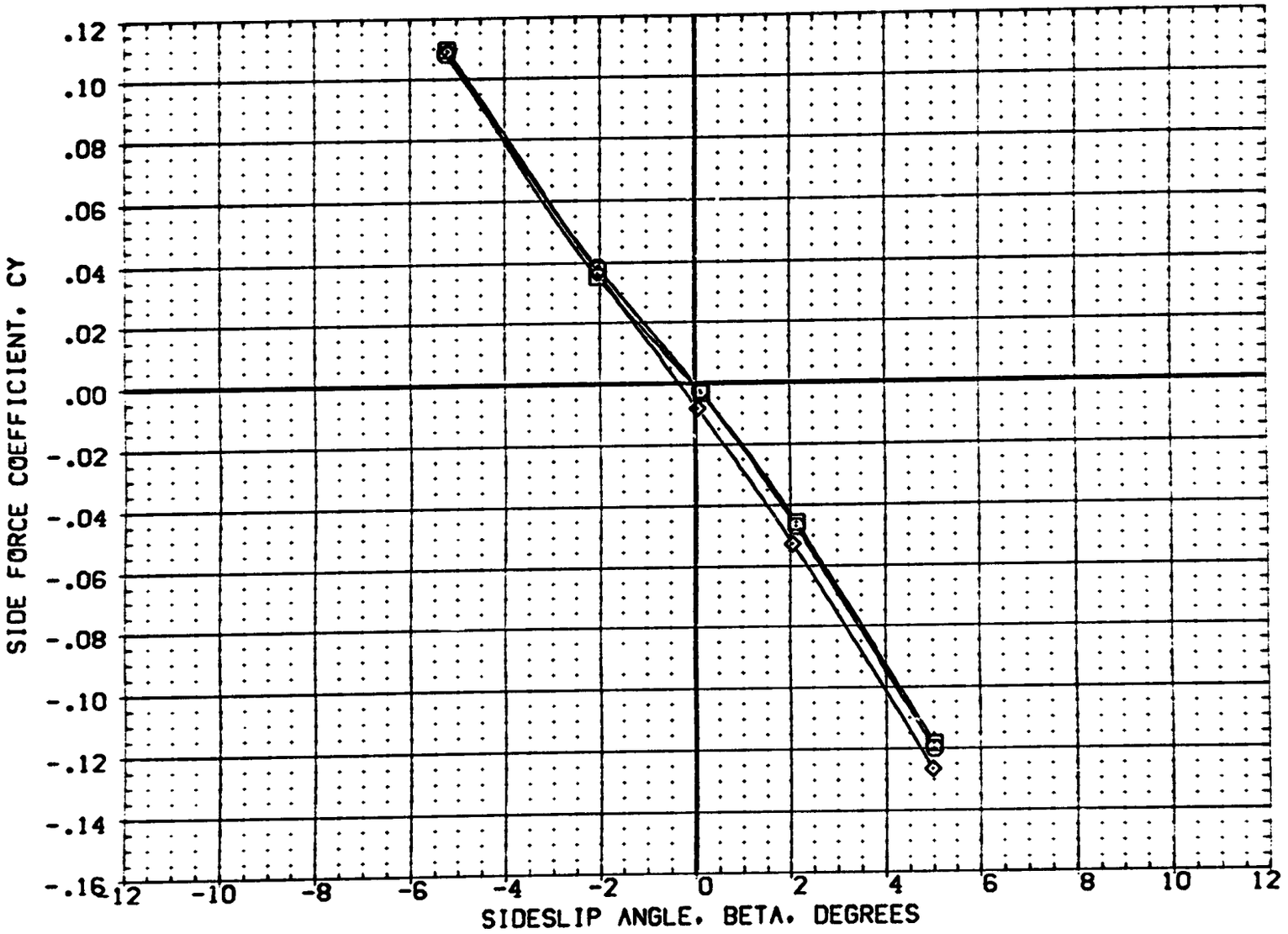


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK006) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(ROK004) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(ROK014) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

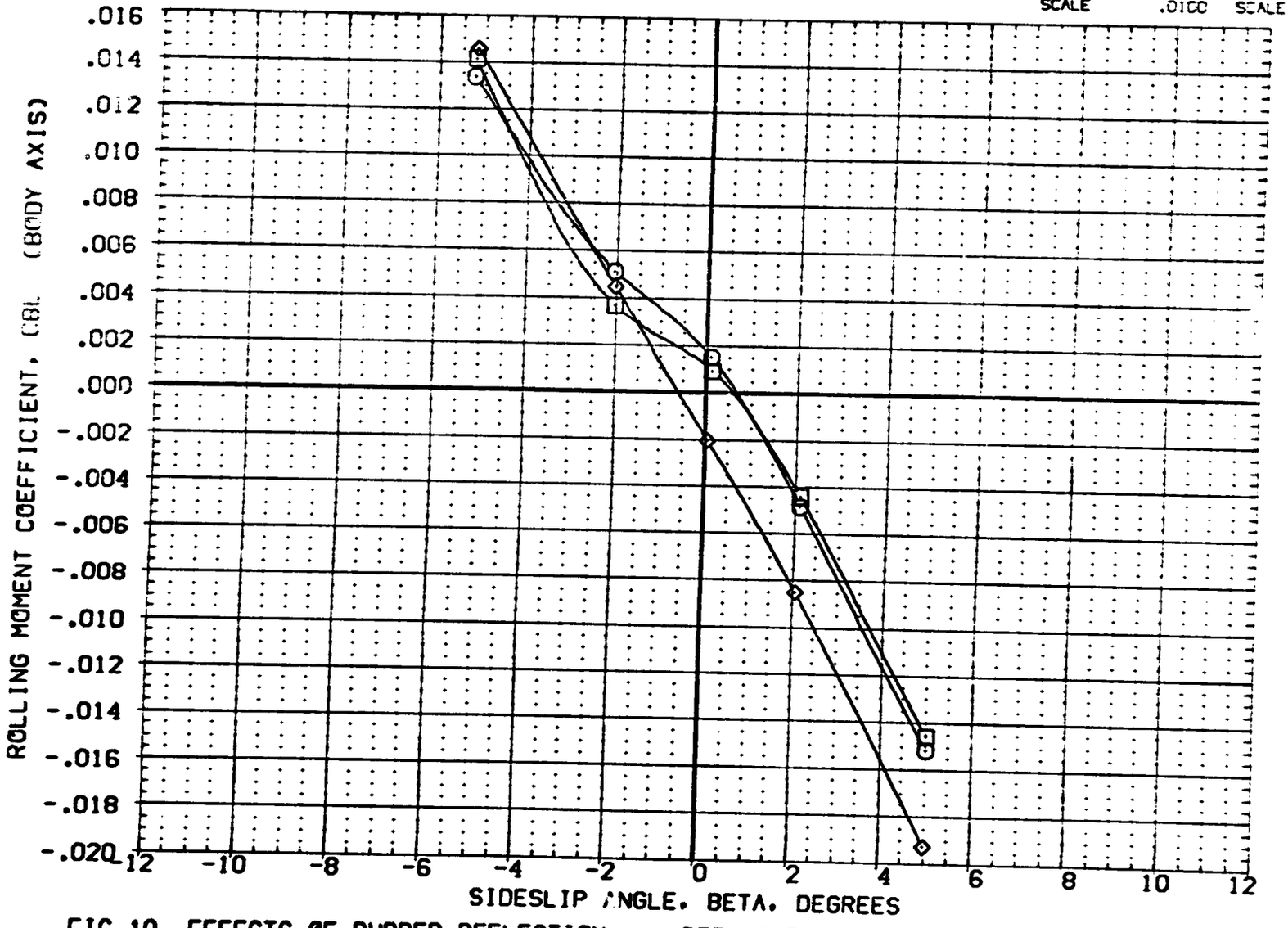


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ROK006)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	-20.000	.000
(ROK004)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1)	.000	.000	.000	.000
(ROK014)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	.000	-20.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

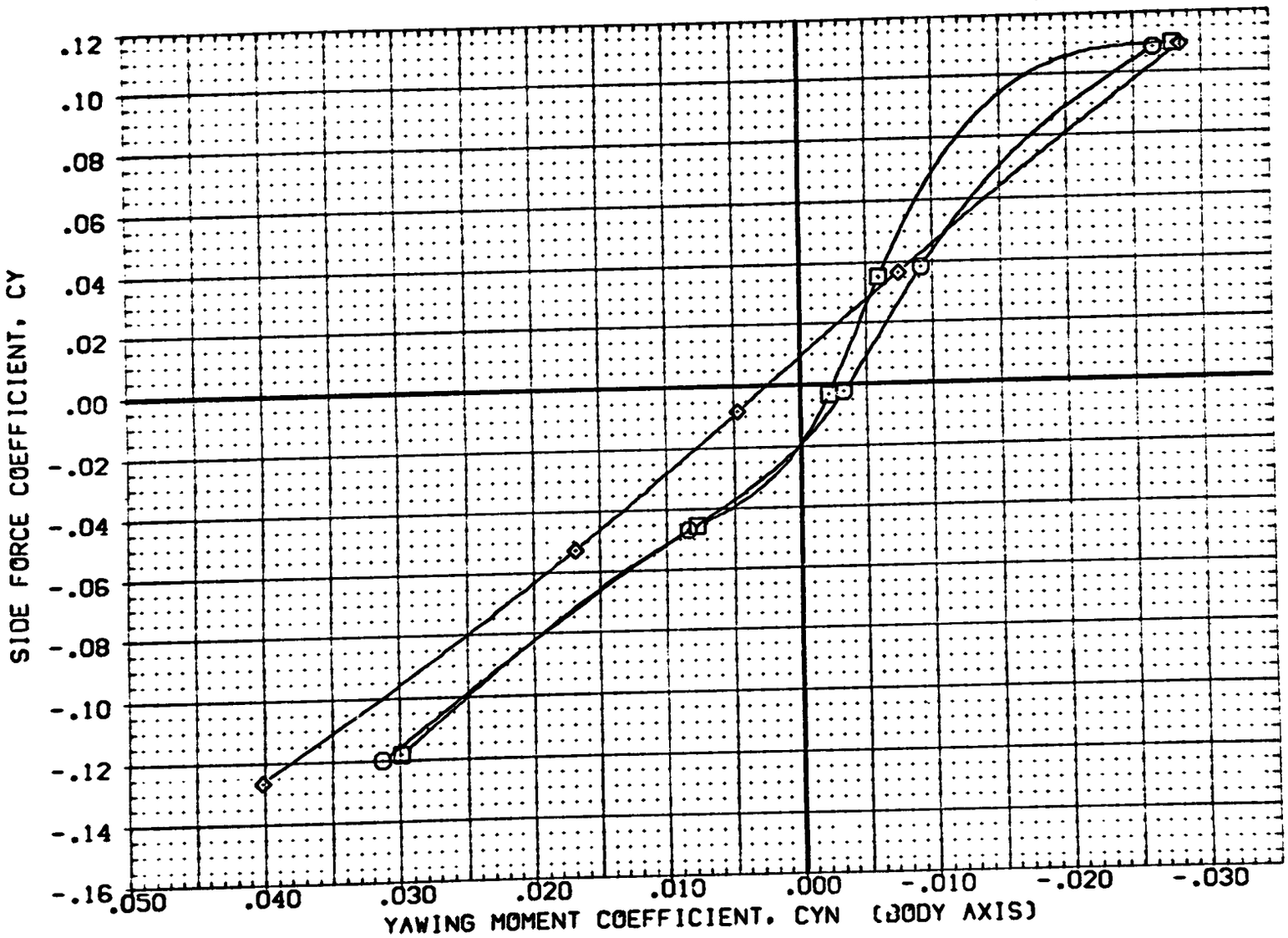


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(A0X009)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (0) + T2)	.000	.000	.000	.000
(R0X015)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (0) + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL		CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(A0K009)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(A0K015)	□	IA-38 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

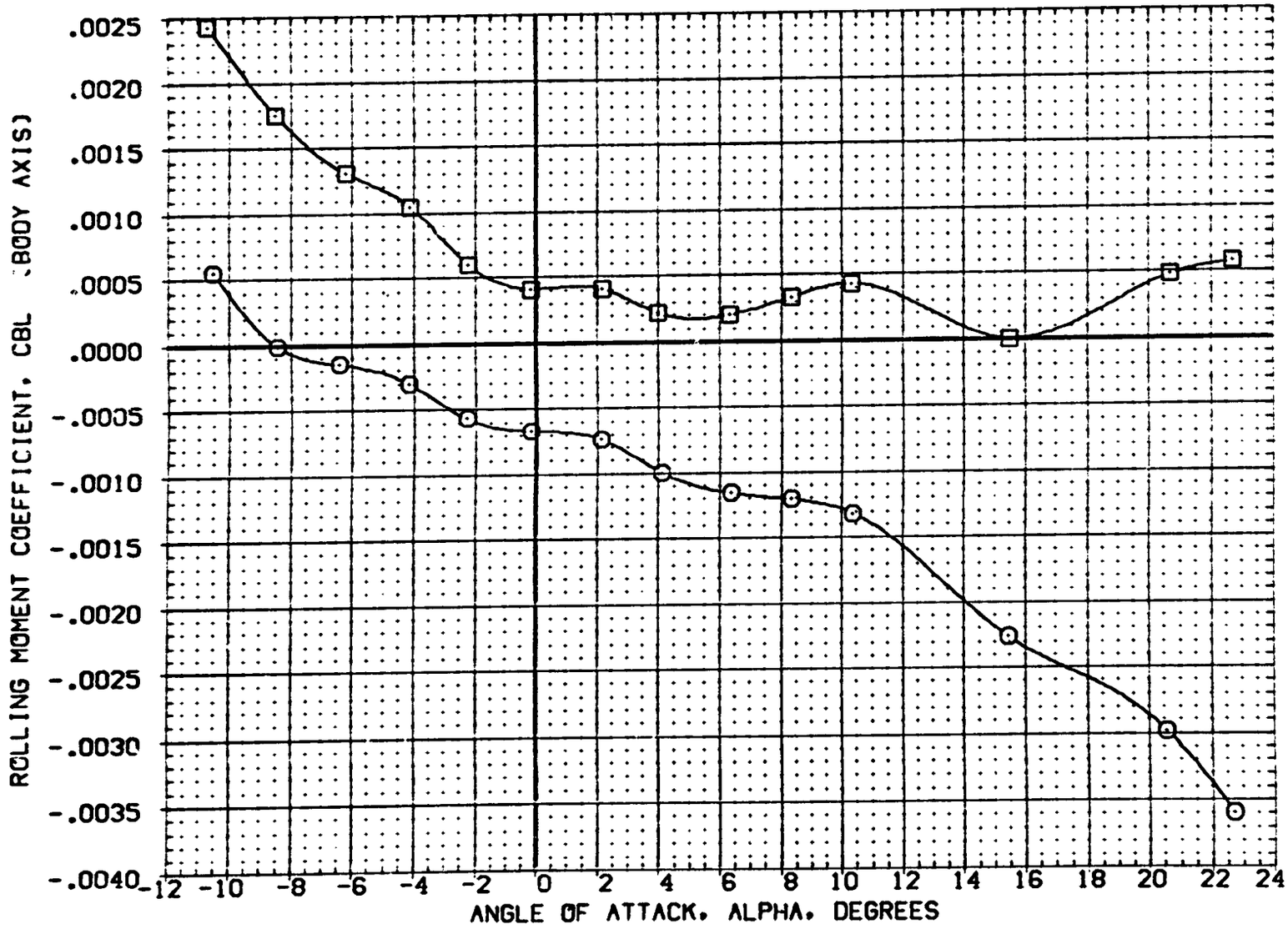


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPOBRK
(A0K009) ○	1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(R0K015) □	1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

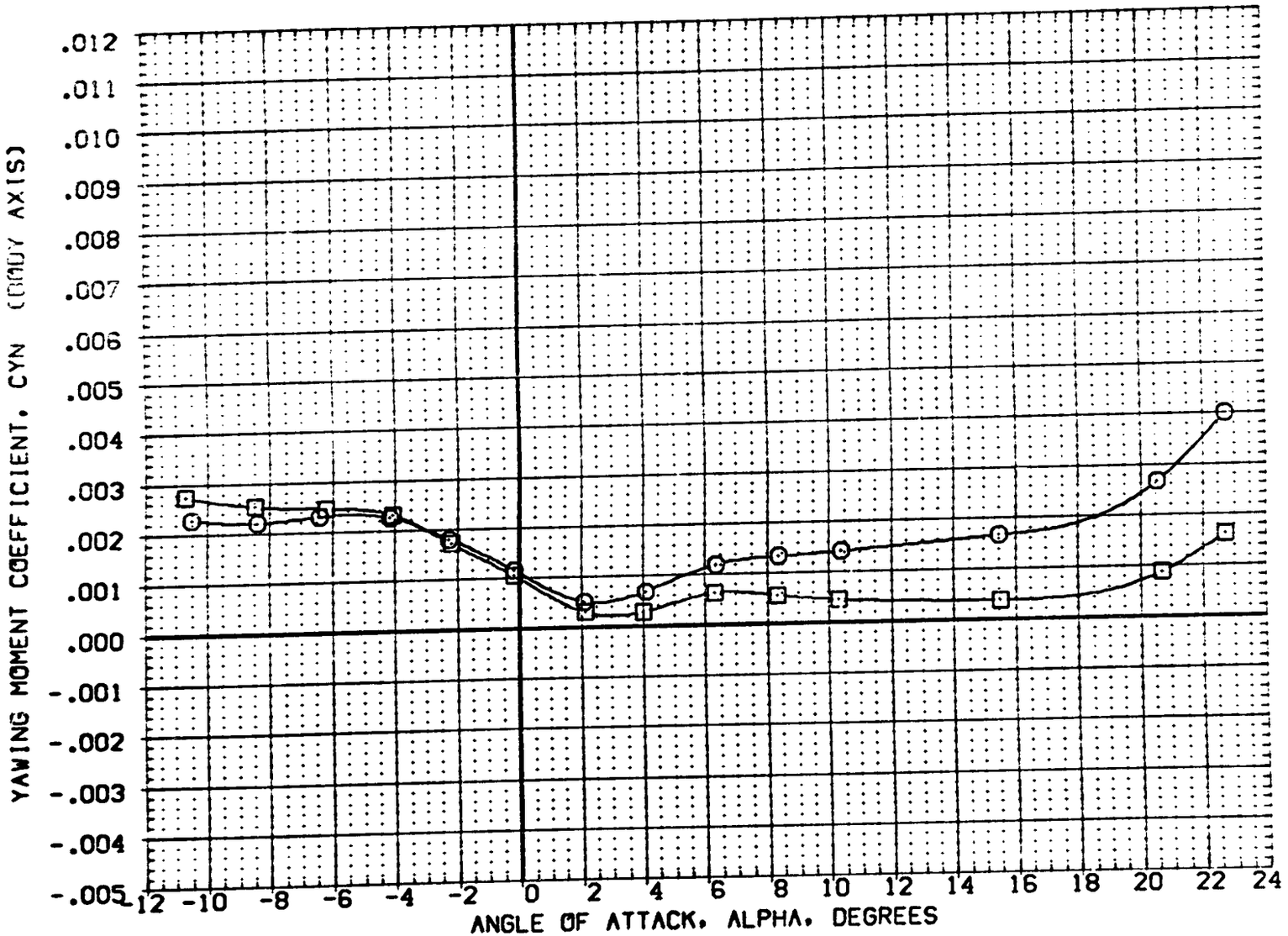


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(A0F009)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(R0K015)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMPP	-3.3300	IN.
SCALE	.0100	SCALE

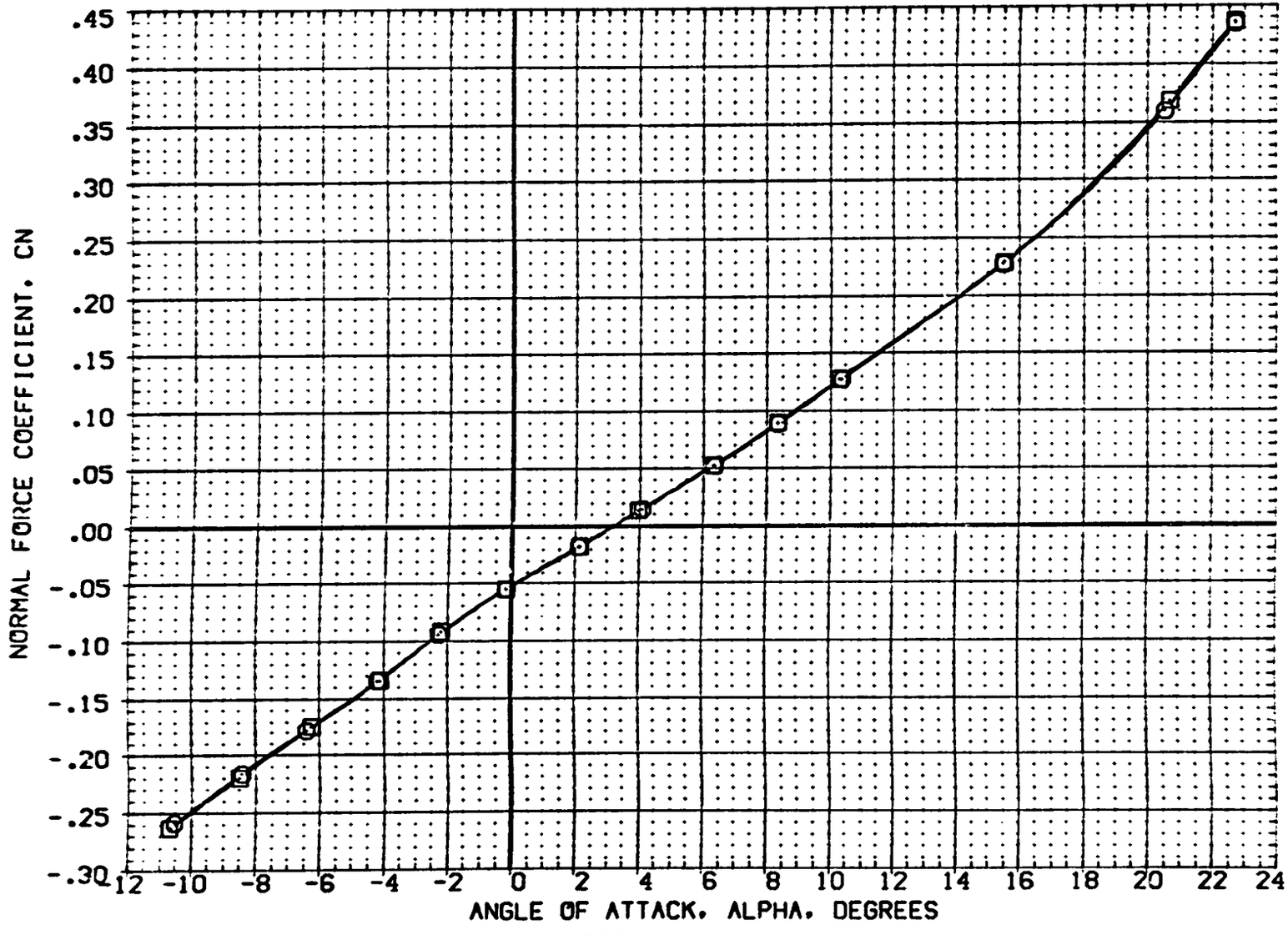


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ADK009) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(RDK015) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

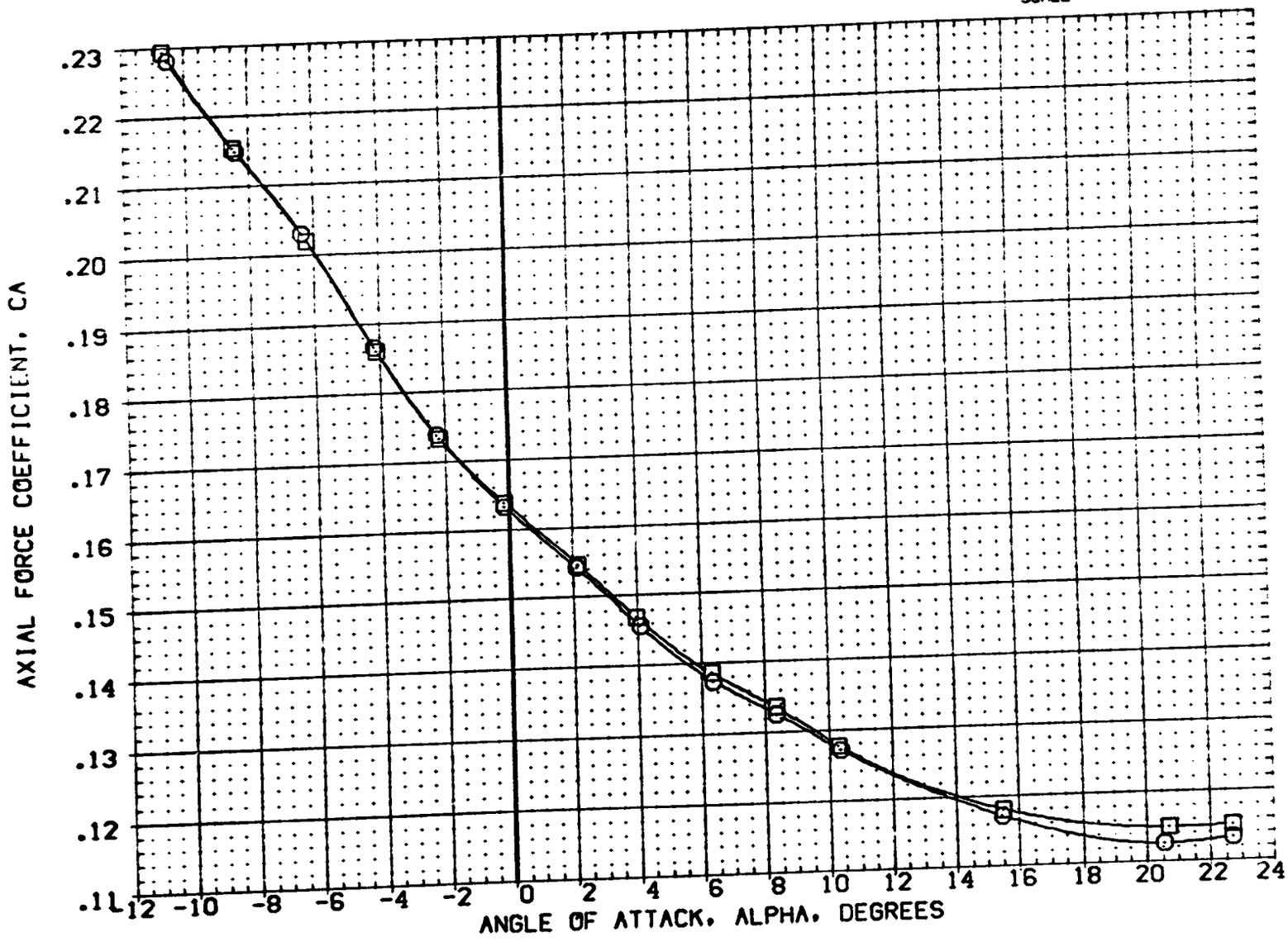


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(A0K009) ○	1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(R0K015) □	1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T1)	10.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

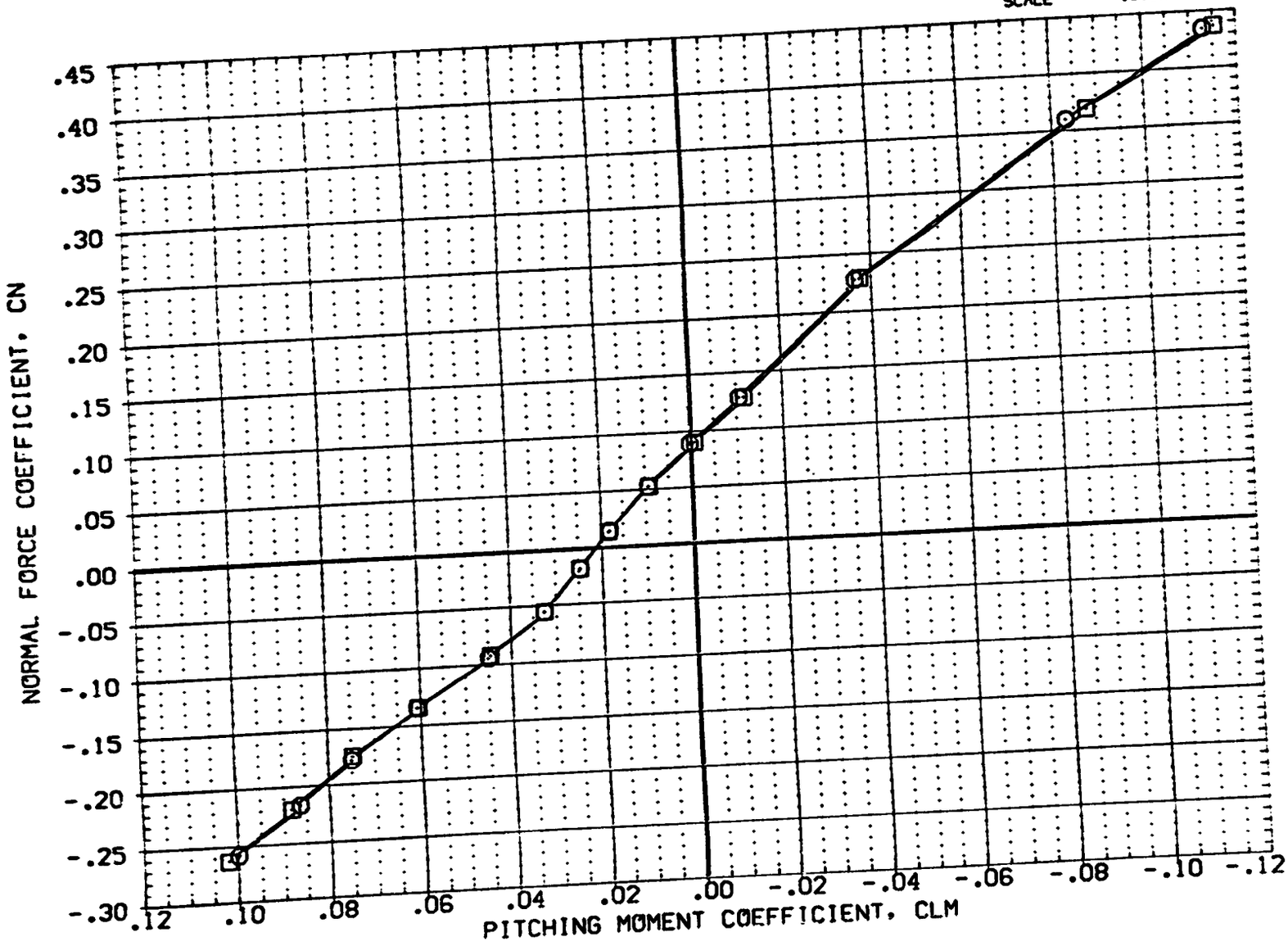


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(AOK016)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-40.000	.000	.000
(AOK017)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-20.000	.000	.000
(AOK018)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

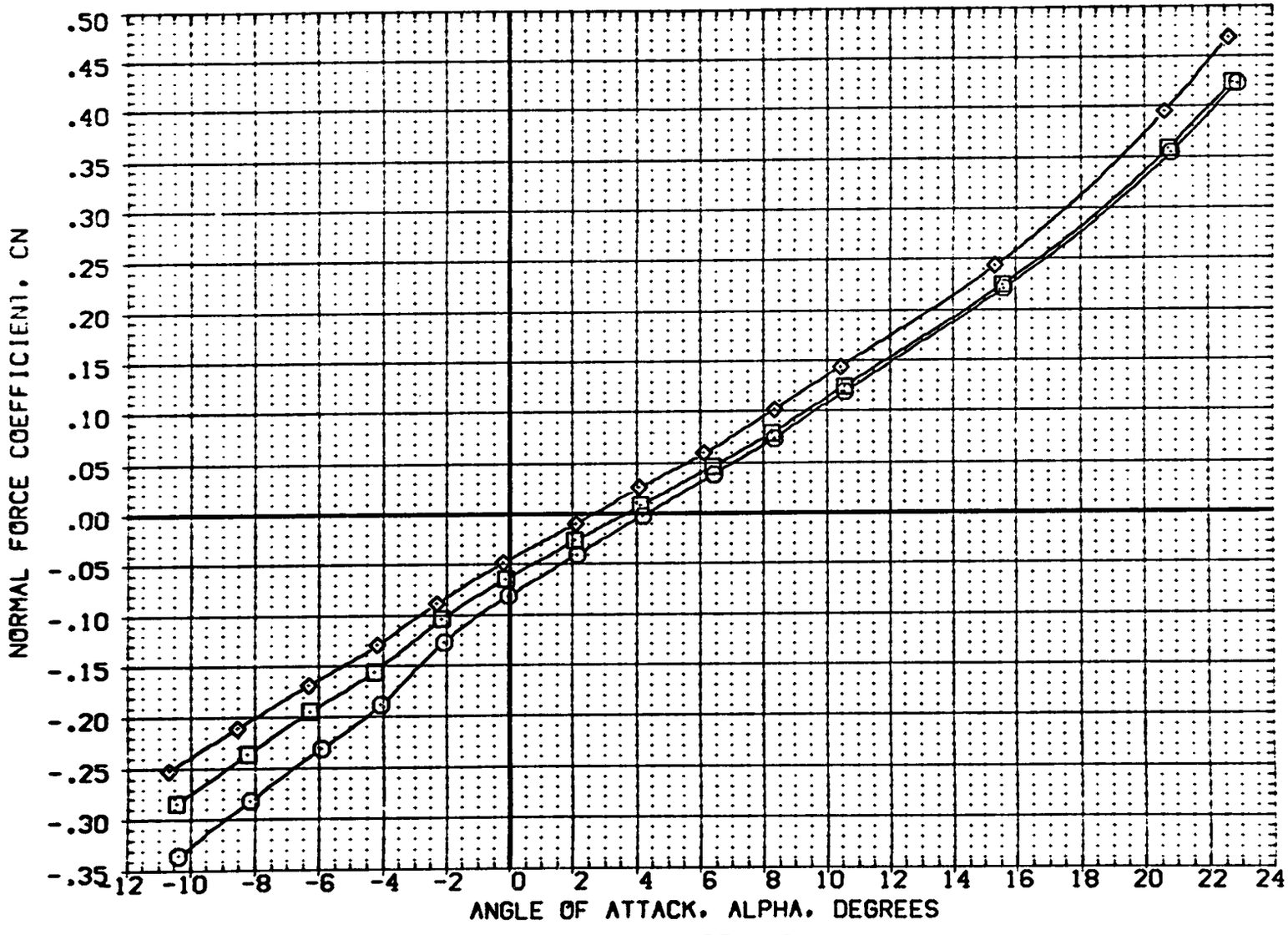


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(AOK016)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-40.000	.000	.000
(AOK017)	◁□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-20.000	.000	.000
(AOK018)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

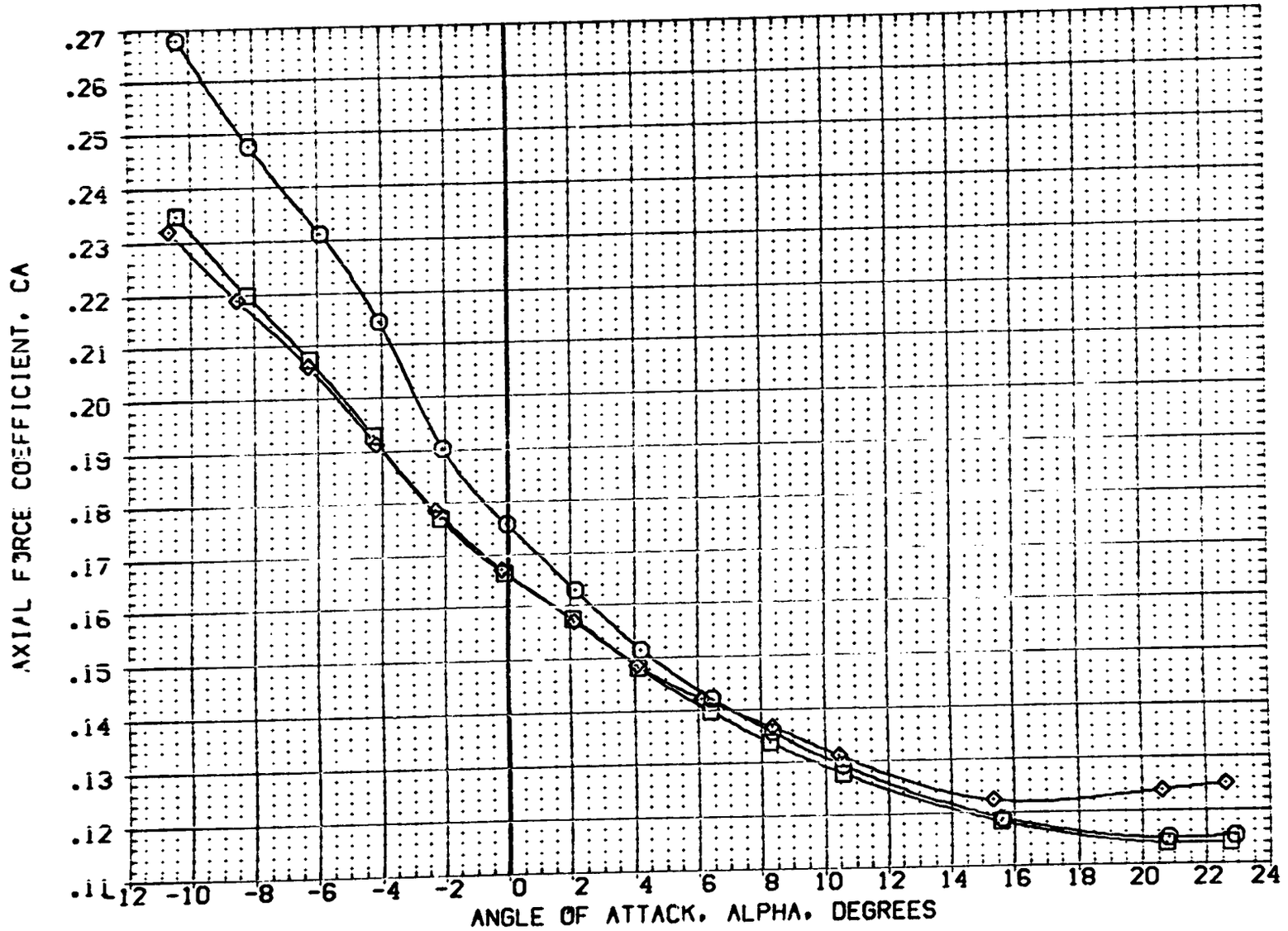


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(AOK016)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-40.000	.000	.000
(AOK017)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	-20.000	.000	.000
(AOK018)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

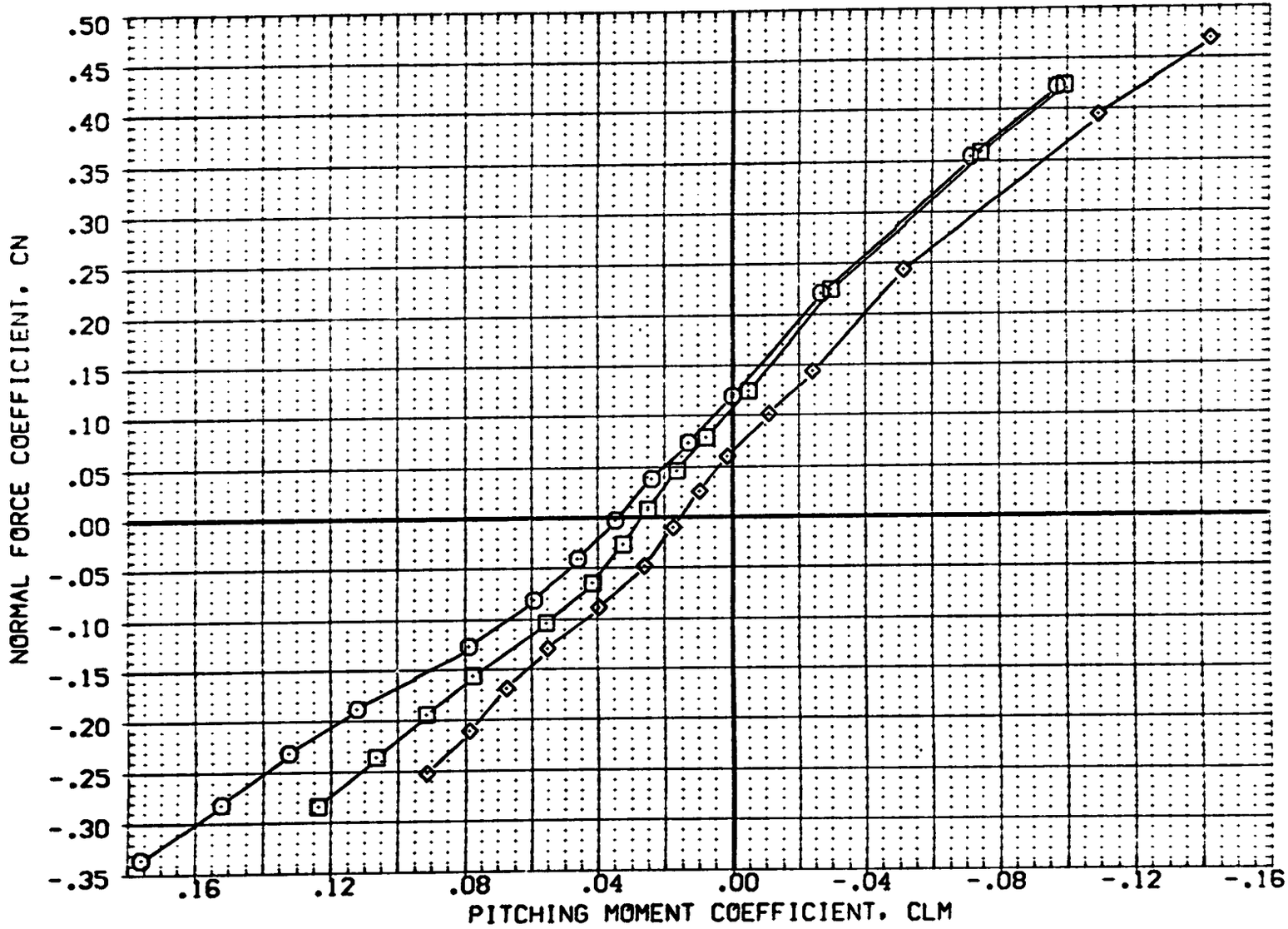


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(A)320)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	-40.000	.000	.000
(A)309)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(A)0:9)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

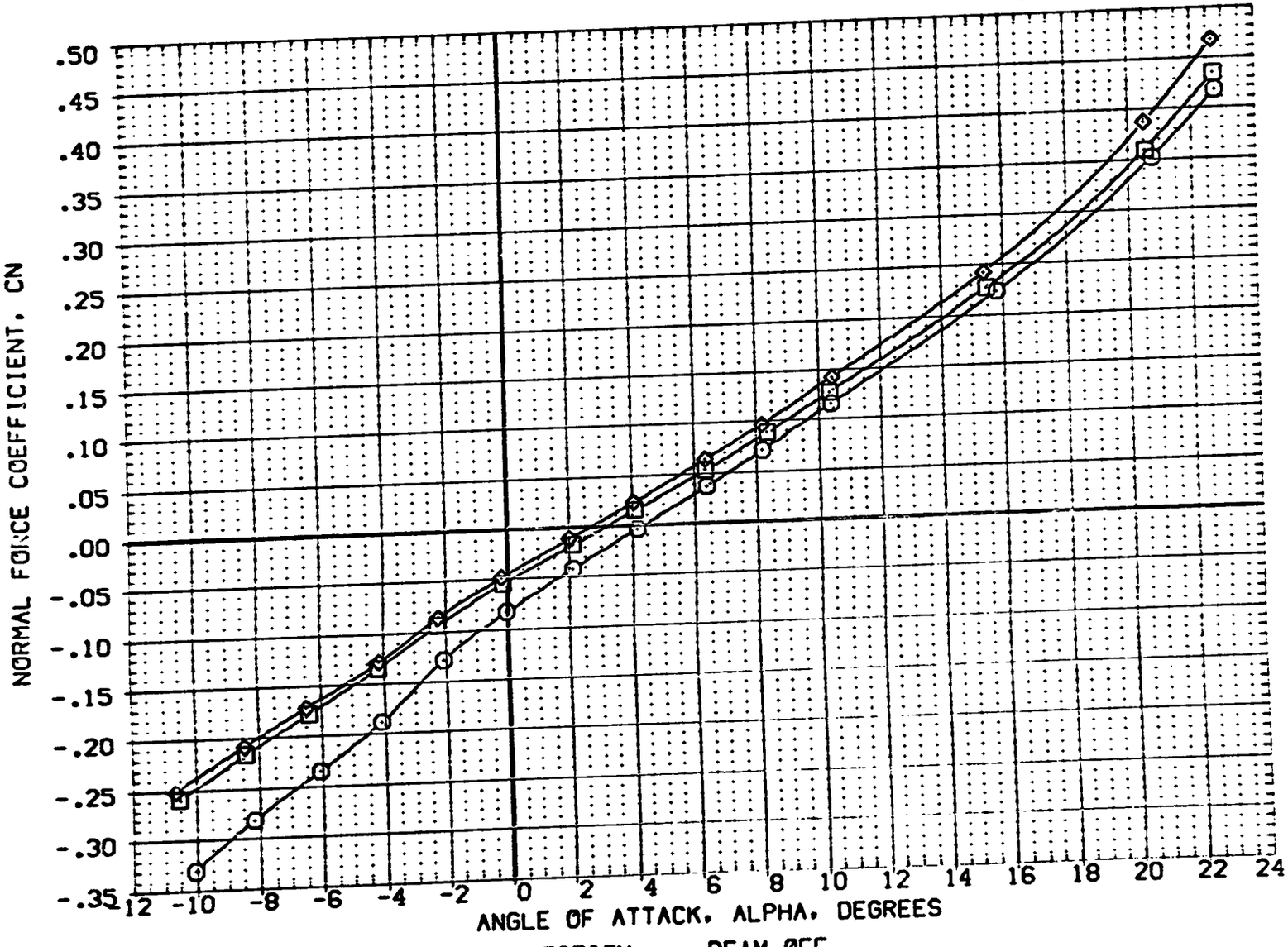


FIG 13 EFFECTS OF ELEVON DEFLECTION - BEAM OFF

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(AOK020)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	-40.000	.000	.000
(AOK009)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(AOK019)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

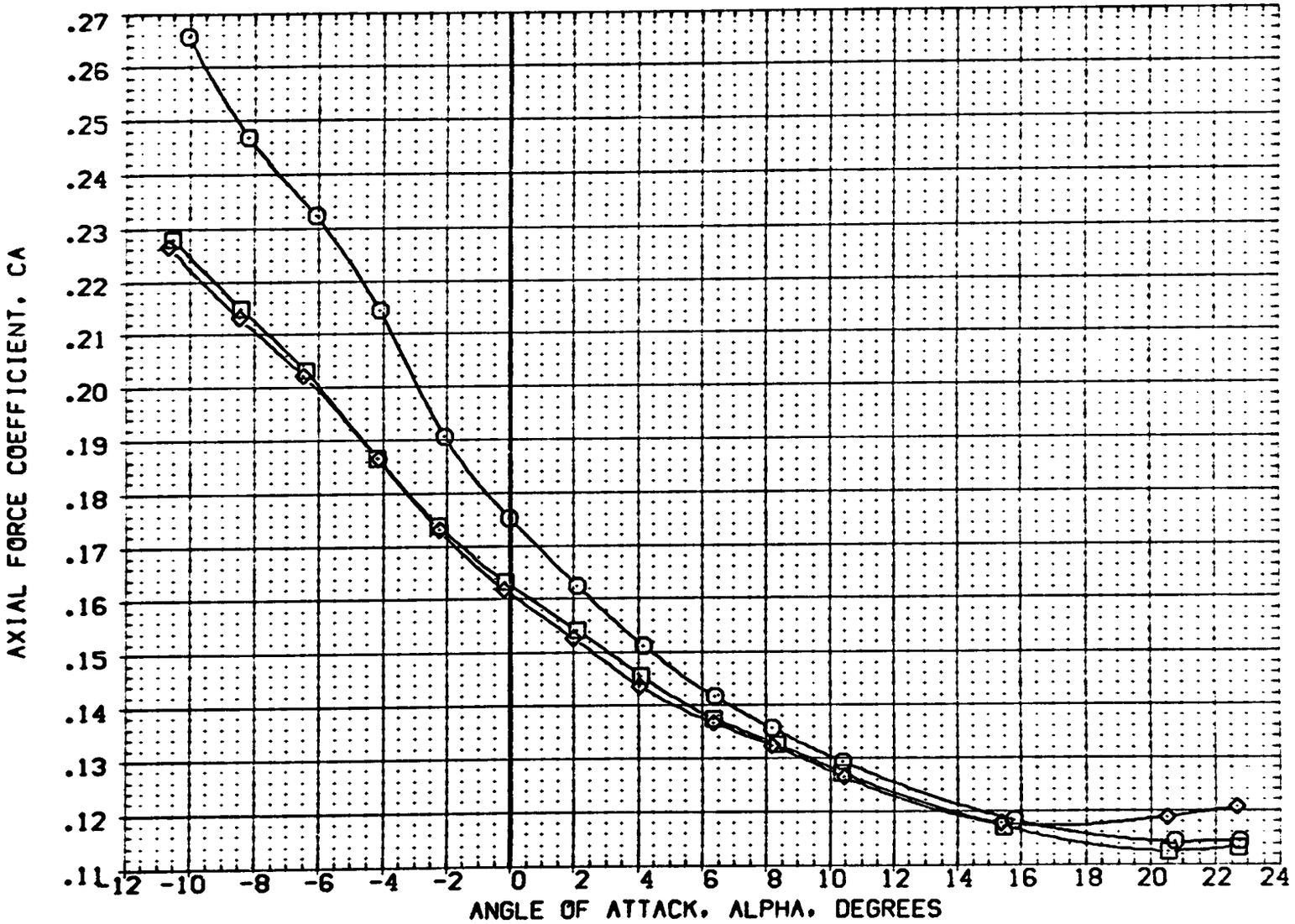


FIG 13 EFFECTS OF ELEVON DEFLECTION - BEAM OFF

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	AILRON	ELEVTR	RUDDER	SPDBRK
(ADK020)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	-40.000	.000	.000
(ADK009)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ADK019)	◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	15.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

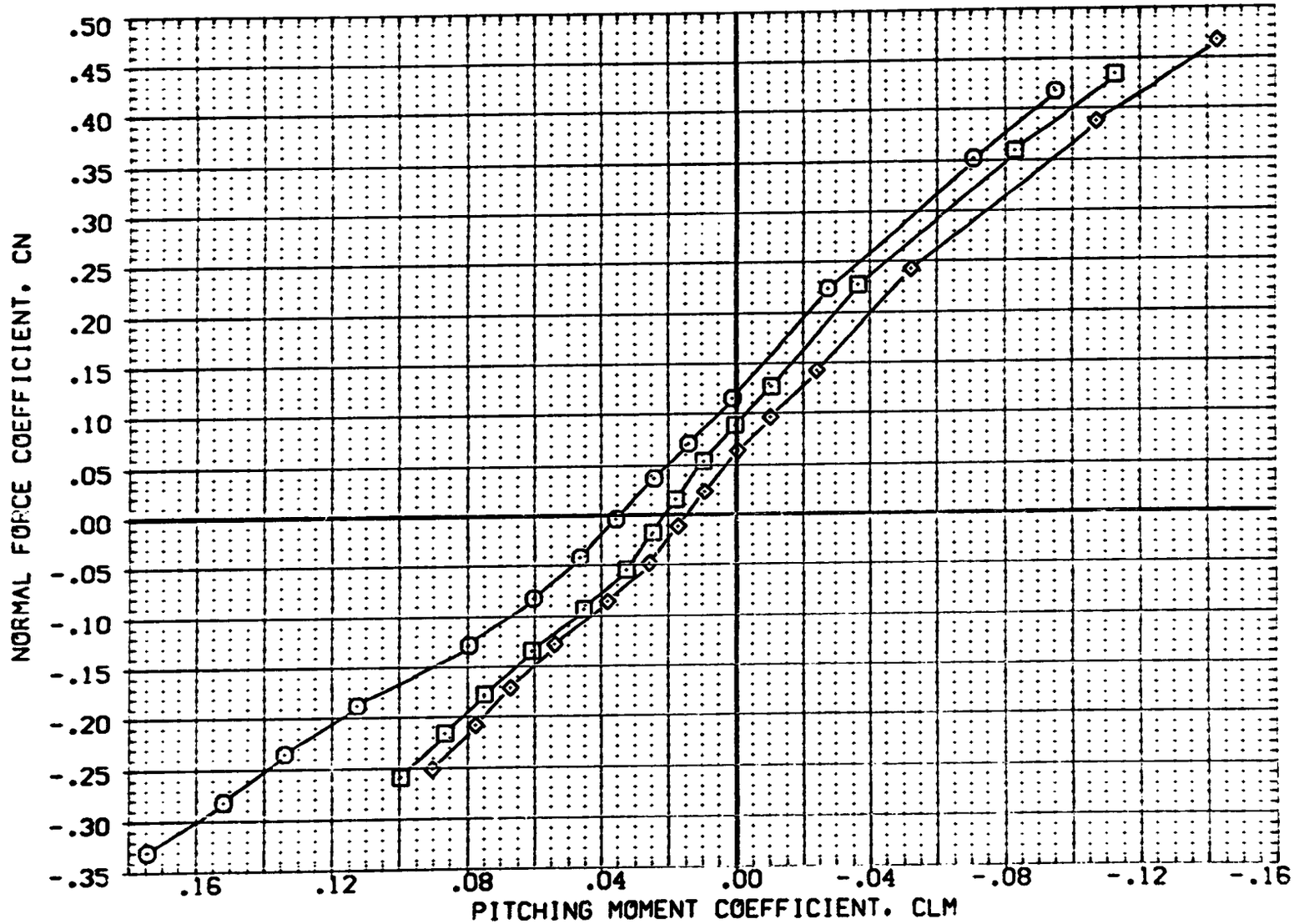


FIG 13 EFFECTS OF ELEVON DEFLECTION - BEAM OFF

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVTR	RUDDER
(ROK025)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	-10.000	.000	.000	.000
(ROK010)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ROK026)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	10.000	.000	.000	.000
(ROK027)	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

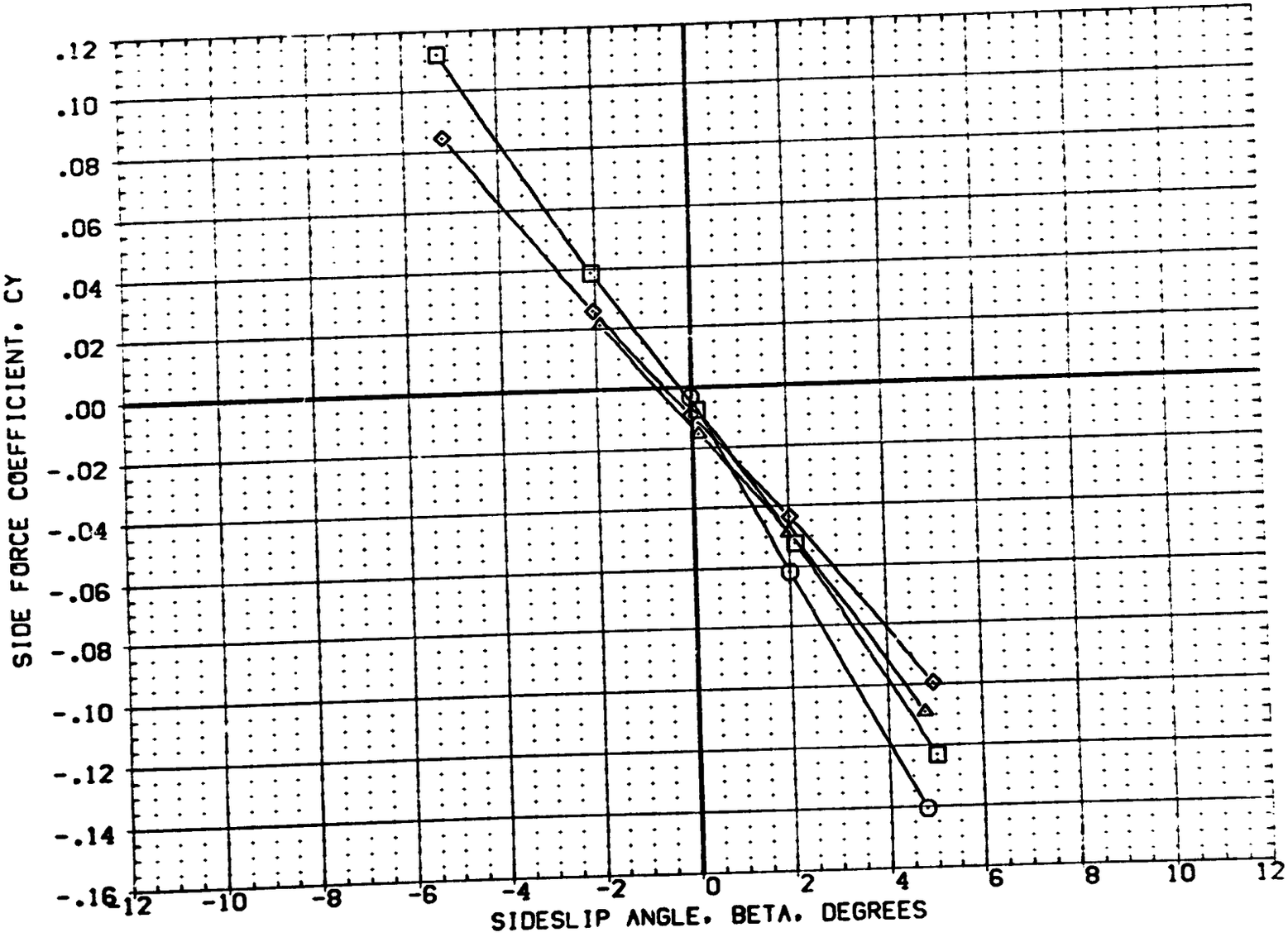


FIG 14 EFFECTS OF ALPHA

(A)MACH = 10.33

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVTR	RUDDER
(ROK025) ○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	-10.000	.000	.000	.000
(ROK010) □	IA-58 CFHT-107 RI-1398 MODEL 32-0T (C: + T2)	.000	.000	.000	.000
(ROK026) ◇	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	10.000	.000	.000	.000
(ROK027) △	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

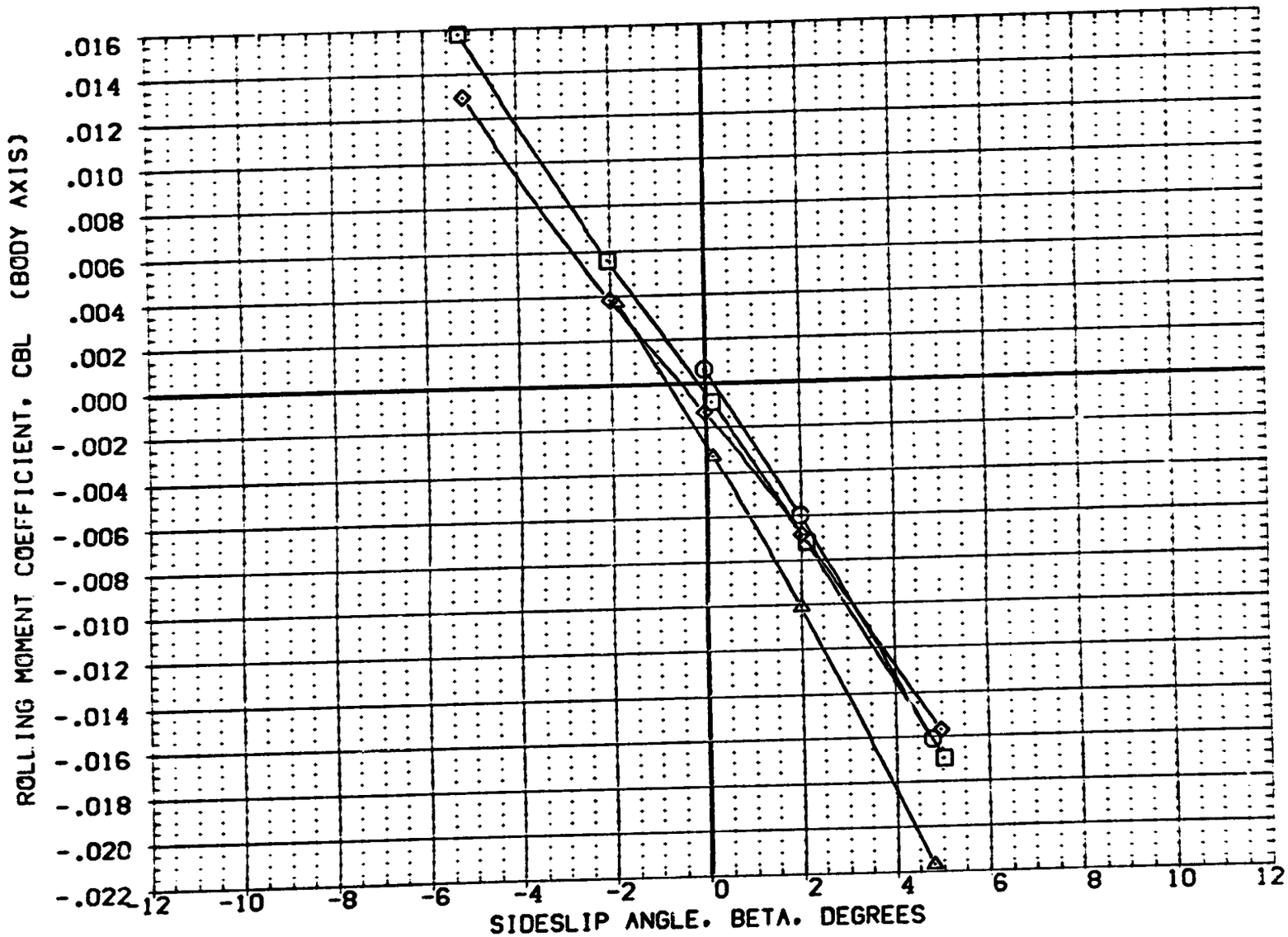


FIG 14 EFFECTS OF ALPHA

(A)MACH = 10.33

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	AILRON	ELEVTR	RUDDER
(ROX025)	○	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	-10.000	.000	.000	.000
(ROX010)	□	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	.000	.000	.000	.000
(ROX026)	⋈	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	10.000	.000	.000	.000
(ROX027)	△	IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)	20.000	.000	.000	.000

REFERENCE INFORMATION		
SREF	38.7360	SQ.IN.
LREF	12.9000	IN.
BREF	12.9000	IN.
XMRP	.0000	IN.
YMRP	.0000	IN.
ZMRP	-3.3300	IN.
SCALE	.0100	SCALE

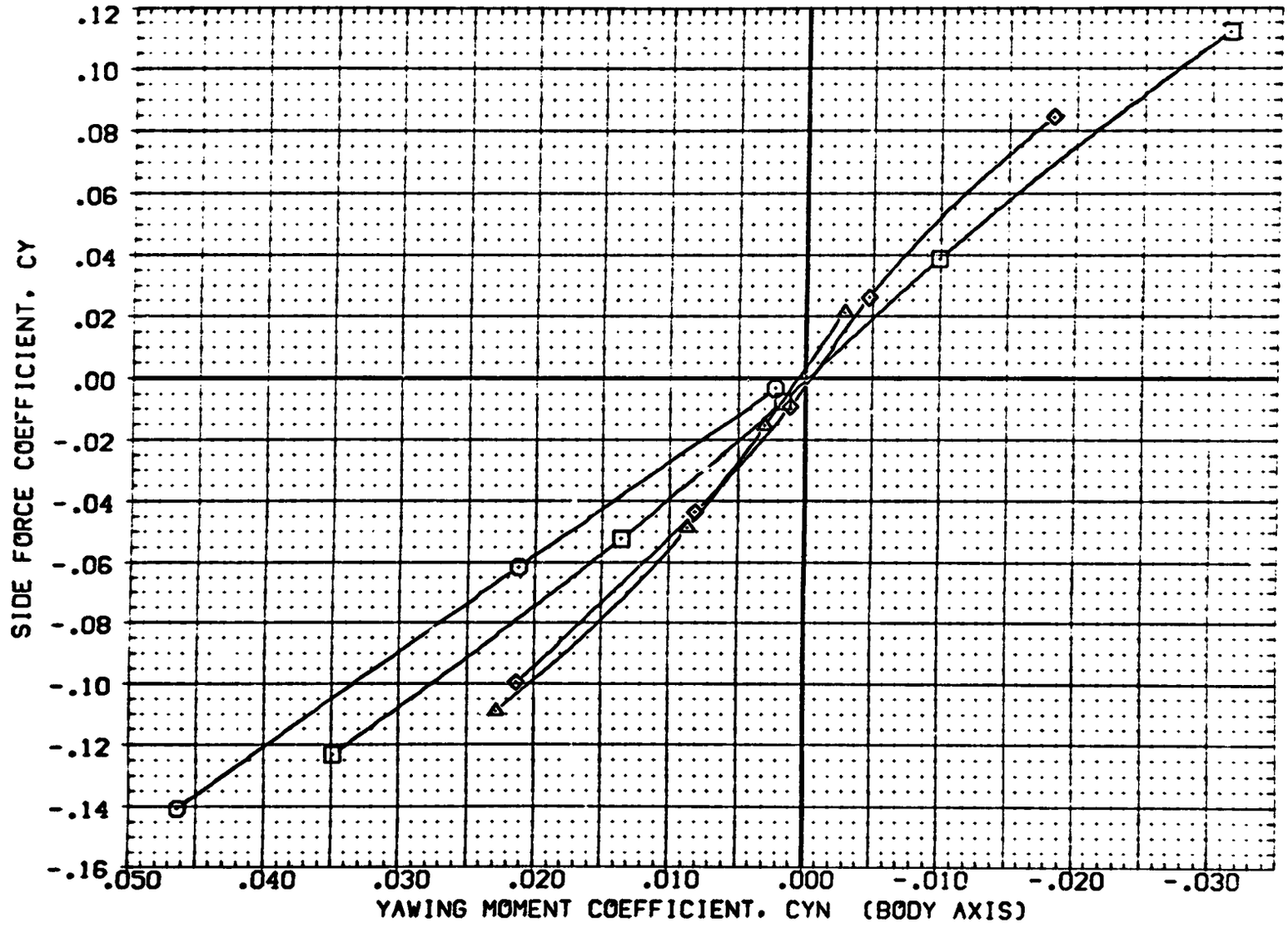


FIG 14 EFFECTS OF ALPHA

(A)MACH = 10.33

APPENDIX

TABULATED SOURCE DATA

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

DATE 11 JUN 74

TABULATED SOURCE DATA, LARC CFNT 107

(R0R9B1) (13 MAR 74)

IA-58 CFNT-107 R1-139B MODEL 32-07 (T1)

PARAMETRIC DATA

BETA = .000

REFERENCE DATA

SREF =	58.7360 SQ.IN.	XMRP =	9.5100 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN
BREF =	12.9000 IN	ZMRP =	.0000 IN
SCALE =	.0100 SCALE		

RUN NO. 3/ 0 RN/L = 1.07 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-22.377	-.02445	-.40566	.14119	.07173	.00046	.00180	.00177	-.32137	.28499	-1.12765
10.330	-20.210	-.01943	-.34916	.12967	.06174	.00032	.00174	.00016	-.28287	.24230	-1.16743
10.330	-15.326	-.01202	-.23437	.10634	.04144	.00018	.00165	-.00203	-.19793	.16459	-1.20323
10.330	-10.261	-.00448	-.13823	.09257	.02444	.00003	.00104	-.00270	-.11950	.11571	-1.03279
10.330	-8.045	.00089	-.10474	.08902	.01854	.00004	.00042	-.00229	-.09125	.10281	-.88760
10.330	-6.304	.00367	-.08060	.08771	.01427	.00005	.00019	-.00245	-.07048	.09603	-.73390
10.330	-4.155	.00829	-.05305	.08689	.00941	.00001	-.00013	-.00294	-.04662	.09051	-.51504
10.330	-1.987	.01439	-.02685	.08685	.00478	.00000	-.00069	-.00305	-.02382	.08773	-.27148
10.330	-.059	.01978	-.00559	.08763	.00103	.00004	-.00118	-.00317	-.00550	.08784	-.06274
10.330	2.213	.02588	.01951	.08757	-.00340	.00001	-.00173	-.00331	.01612	.08825	.18268
10.330	4.274	.03119	.04227	.08997	-.00741	.00001	-.00212	-.00389	.03545	.09287	.38167
10.330	6.001	.03660	.06211	.09260	-.01091	.00003	-.00266	-.00380	.05209	.09859	.52836
10.330	8.018	.04139	.08619	.09679	-.01517	.00004	-.00297	-.00464	.07185	.10787	.66612
10.330	10.221	.04759	.11638	.10172	-.02050	.00005	-.00349	-.00498	.09648	.12075	.79899
	GRADIENT	.00272	.01125	.00033	-.00199	.00000	-.00024	-.00010	.00969	.00025	.10673

IA-58 CFNT-107 RI-139B MODEL 32-07 (01) (R8K002) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = 0.3870 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN ZMRP = .0000 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 RUDDER = .000
SPDBRK = .000

RUN NO. 6/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-22.393	-.00879	-.49090	.13405	.01932	.00068	.00058	-.00405	-.48282	.31095	-1.29542
10.330	-20.328	-.00633	-.42127	.12609	.01675	.00061	.00067	-.00465	-.35123	.26459	-1.32745
10.330	-15.345	-.00342	-.28816	.11236	.01145	.00064	.00069	-.00509	-.24815	.18461	-1.34421
10.330	-10.242	-.00329	-.20066	.10260	.00797	.00049	.00055	-.00427	-.17922	.13685	-1.31158
10.330	-8.255	-.00150	-.17859	.09910	.00710	.00040	.00039	-.00387	-.16251	.12372	-1.31358
10.330	-6.038	.00047	-.14446	.09138	.00575	.00026	.00023	-.00360	-.13405	.10607	-1.26375
10.330	-4.257	.00134	-.11790	.08677	.00469	.00023	.00014	-.00329	-.11114	.09529	-1.16633
10.330	-2.174	.00186	-.08491	.07743	.00338	.00019	.00013	-.00352	-.08191	.08080	-1.01631
10.330	.006	.00236	-.05459	.07259	.00218	.00011	.00007	-.00332	-.05460	.07259	-.75219
10.330	1.980	.00340	-.02563	.07133	.00103	.00008	-.00006	-.00298	-.02308	.07040	-.39885
10.330	4.011	.00421	.00581	.06870	-.00022	.00007	-.00012	-.00312	.00099	.06894	.01433
10.330	6.250	.00569	.04465	.06474	-.00177	.00003	-.00026	-.00312	.03734	.06921	.53949
10.330	8.047	.00748	.07748	.06265	-.00307	-.00001	-.00041	-.00351	.06794	.07288	.93232
10.330	10.297	.00938	.13236	.06387	-.00525	-.00003	-.00057	-.00393	.11881	.08650	1.37359
	GRADIENT	.00035	.01482	-.00205	-.00059	-.00002	-.00003	.00004	.01344	-.00306	.14362

IA-58 CFNT-107 RI-139B MODEL 32-07 (02 + T1) (R8K003) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -5.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 RUDDER = .000
SPDBRK = .000

RUN NO. 31/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.980	-.02983	-.26372	.20967	.09863	.00068	.00190	-.00331	-.22083	.25445	-.86784
10.330	-8.370	-.02390	-.21878	.19805	.08459	.00013	.00181	-.00307	-.18762	.22778	-.82368
10.330	-6.417	-.01432	-.18100	.18831	.07336	.00069	.00094	-.00330	-.15882	.20736	-.76592
10.330	-4.105	-.01271	-.13812	.17507	.06051	.00057	.00039	-.00331	-.12523	.18451	-.67870
10.330	-2.273	-.01581	-.09649	.16457	.04428	-.00034	.00143	-.00463	-.08989	.16827	-.53428
10.330	-.057	.01310	-.05493	.15427	.03165	.00099	-.00237	-.00197	-.05478	.15432	-.35497
10.330	2.023	.01418	-.02438	.14638	.02593	.00066	-.00224	-.00273	-.02953	.14543	-.20309
10.330	4.349	.00024	.01354	.13761	.01878	-.00071	.00050	-.00585	.00356	.13824	.02216
10.330	6.192	-.00952	.04229	.13123	.01355	-.00182	.00248	-.00793	.02789	.13503	.20654
10.330	8.494	.00542	.06032	.12546	.00479	-.00095	.00082	-.00708	.06091	.13393	.44802
10.330	10.318	.00385	.11482	.12139	-.00475	-.00095	.00084	-.00707	.09123	.13999	.65166
	GRADIENT	.00288	.01768	-.00438	-.00478	-.00007	-.00018	-.00015	.01491	-.00340	.08182

1A-58 CFNT-107 R1-139B MODEL 32-0T (02 + T1) (R0K004) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000
AILRON = .000 RUDDER = .000
SPDBRK = .000

RUN NO. 32/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.231	-.22475	-.05978	.16213	.03446	.01412	-.02793	.10965	-.05914	.16236	-.36424
10.330	-2.044	-.19538	-.06038	.15804	.03402	.00367	-.00590	.03504	-.05984	.15625	-.38301
10.330	.122	-.20294	-.05891	.15550	.03265	.00093	-.00215	-.00341	-.05836	.15571	-.37469
10.330	2.112	-.20125	-.05964	.15585	.03371	-.00444	.00774	-.04599	-.05909	.15806	-.37384
10.330	5.004	-.24367	-.06183	.16259	.03478	-.01461	.02993	-.11828	-.06113	.16285	-.37540
	GRADIENT	-.00144	.00019	-.00005	-.00008	-.00194	.00326	-.01947	.00019	-.00005	.00109

1A-58 CFNT-107 R1-139B MODEL 32-0T (02 + T1) (R0K005) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 RUDDER = -20.000
SPDBRK = .000

RUN NO. 33/ 0 RN/L = .97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.888	.00173	-.26703	.21174	.09931	.00332	-.00338	.00020	-.22314	.25758	-.86629
10.330	-8.306	.01353	-.22319	.19947	.08569	.00291	-.00392	.00007	-.19123	.23029	-.83036
10.330	-6.219	.01798	-.17881	.18797	.07272	.00279	-.00419	.00015	-.15739	.20624	-.76316
10.330	-4.404	.00796	-.14508	.17711	.06308	.00177	-.00237	-.00160	-.13103	.18773	-.69799
10.330	-2.271	.01178	-.09572	.16508	.04411	.00113	-.00186	-.00286	-.08910	.16874	-.52814
10.330	-.093	.02482	-.05423	.15441	.03152	.00138	-.00325	-.00209	-.05409	.15446	-.35018
10.330	2.039	.02277	-.02369	.14673	.02597	.00050	-.00217	-.00356	-.02890	.14579	-.19823
10.330	4.366	.01365	.01444	.13787	.01863	-.00042	-.00053	-.00580	.00390	.13857	.02816
10.330	6.190	.00870	.04254	.13116	.01363	-.00090	.00048	-.00688	.02815	.13498	.20856
10.330	8.328	.01049	.08091	.12560	.00477	-.00102	.00074	-.00768	.06139	.13621	.45067
10.330	10.387	.01030	.11744	.12145	-.00562	-.00109	.00093	-.00775	.09362	.14064	.66566
	GRADIENT	.00101	.01789	-.00443	-.00489	-.00023	.00016	-.00042	.01510	-.00554	.08162

DATE 11 JUN 74

TABULATED SOURCE DATA, LARC CFNT 107

(R0K006) (13 MAR 74)

1A-58 CFNT-107 RI-1398 MODEL 32-07 (02 + T1)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

ALPHA =	.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	-20.000
SPDBRK =	.000		

RUN NO. 34/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.238	-.30042	-.06012	.18293	.03493	.01341	-.02650	.18834	-.05927	.16284	-.36394
10.330	-2.053	-.27360	-.06020	.15616	.03374	.00513	-.00914	.03826	-.05945	.15644	-.38002
10.330	.101	-.27456	-.05935	.15605	.03290	.00149	-.00326	-.00247	-.05860	.15633	-.37483
10.330	2.111	-.27775	-.06012	.15525	.03399	-.00484	.00046	-.04732	-.05937	.15654	-.37925
10.330	5.007	-.30798	-.06254	.16408	.03567	-.01520	.03136	-.12004	-.06165	.16441	-.37500
	GRADIENT	-.00099	.00002	.00002	.00005	-.00239	.00421	-.02033	.00002	.00002	.00021

(R0K007) (13 MAR 74)

1A-58 CFNT-107 RI-1398 MODEL 32-07 (02 + T2)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 29/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.673	-.01749	-.28357	.22316	.10567	.00139	.00109	-.00323	-.23734	.27102	-.87515
10.330	-8.507	-.01308	-.23736	.21098	.09163	.00066	.00129	-.00400	-.20354	.24377	-.83496
10.330	-6.404	-.01090	-.19174	.19891	.07739	.00064	.00088	-.00349	-.16036	.21905	-.76860
10.330	-4.336	-.00597	-.15508	.18666	.06692	.00081	.00058	-.00331	-.14052	.19785	-.71025
10.330	-2.287	-.00842	-.10490	.17455	.04734	-.00025	.00139	-.00458	-.09785	.17860	-.54787
10.330	-.118	.01364	-.06248	.16374	.03397	.00049	-.00110	-.00286	-.06214	.16387	-.37920
10.330	1.936	.01217	-.02997	.15593	.02806	.00002	-.00070	-.00374	-.03526	.15441	-.22837
10.330	4.300	.00612	.01134	.14662	.02023	-.00078	.00062	-.00569	.00052	.14705	.00215
10.330	6.111	-.00706	.04133	.13971	.01555	-.00177	.00284	-.00790	.02622	.14332	.18294
10.330	8.358	.01092	.08148	.13385	.00689	-.00107	.00106	-.00718	.06116	.14427	.42391
10.330	10.434	.01134	.12414	.12874	-.00439	-.00103	.00088	-.00690	.09877	.14910	.66247
	GRADIENT	.00206	.01893	-.00460	-.00521	-.00013	-.00009	-.00019	.01598	-.00582	.08117

IA-58 CFNT-107 RI-139B MODEL 32-0T (02 + T2) (RQK008) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000
AILRON = .000 RUDDER = .000
SPDBRK = .000

RUN NO. 30/ 0 RN/L = .97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.282	-.13126	-.06315	.17103	.03586	.01517	-.02990	.11651	-.06270	.17110	-.36665
10.330	-2.090	-.10050	-.06413	.16414	.03540	.00392	-.00622	.03709	-.06304	.16429	-.38371
10.330	.098	-.10902	-.06314	.16400	.03418	.00077	-.00161	-.00323	-.06203	.16412	.38285
10.330	2.107	-.10221	-.06390	.16412	.03527	-.00470	.00020	-.04800	-.06361	.16423	-.38731
10.330	5.004	-.14307	-.06531	.17144	.03639	-.01688	.03450	-.13005	-.06488	.17161	-.37809
	GRADIENT	-.00045	.00006	-.00001	-.00004	-.00207	.00345	-.02045	.00006	-.00001	.00036

IA-58 CFNT-107 RI-139B MODEL 32-0T (01 + T2) (RQK009) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 RUDDER = .000
SPDBRK = .000

RUN NO. 27/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.931	-.03289	-.25946	.22807	.09985	.00055	.00227	-.00361	-.21340	.27185	-.78538
10.330	-8.434	-.02724	-.21606	.21491	.08651	-.00001	.00220	-.00432	-.18220	.24427	-.74589
10.330	-6.429	-.02651	-.17805	.20308	.07499	-.00015	.00230	-.00502	-.15419	.22174	-.69538
10.330	-4.175	-.02101	-.13479	.18649	.06062	-.00030	.00225	-.00559	-.12085	.19581	-.61720
10.330	-2.270	-.01544	-.09432	.17385	.04516	-.00057	.00181	-.00591	-.08736	.17745	-.49229
10.330	-.169	-.00602	-.05467	.16323	.03264	-.00067	.00116	-.00582	-.05420	.16338	-.33173
10.330	.169	-.02123	.00059	.00018	-.00021	-.00002	.00081	-.00017	.00059	.00018	3.32637
10.330	2.115	-.00017	-.01775	.15416	.02467	-.00074	.00050	-.00587	-.02343	.15340	-.15275
10.330	4.095	.00225	.01486	.14561	.01794	-.00100	.00069	-.00678	.00442	.14630	.03023
10.330	8.363	.00363	.05299	.13744	.00948	-.00116	.00120	-.00797	.03743	.14246	.26272
10.330	8.348	.00877	.08856	.13260	.00031	-.00121	.00133	-.00877	.06837	.14405	.47465
10.330	10.379	.00877	.12767	.12719	-.01064	-.00132	.00141	-.00891	.10266	.14811	.69316
10.330	15.481	.00095	.22802	.11715	-.03657	-.00227	.00166	-.00874	.18848	.17376	1.08470
10.330	20.555	.01438	.36018	.11259	-.06318	-.00298	.00266	-.01357	.29772	.23184	1.28393
10.330	22.719	.01302	.43481	.11331	-.11295	-.00360	.00402	-.01618	.35751	.27245	1.31147
	GRADIENT	.00289	.01819	-.00560	-.00520	-.00007	-.00022	-.00008	.01526	-.00663	.09500

1A-58 CFNT-197 R1-139B MODEL 32-OT (01 + T2) (R0X010) (13 MAR 74)

REFERENCE DATA

SREF =	30.7360 SQ.IN.	XMRP =	.0000 IN.		
LREF =	12.9000 IN.	YMRP =	.0000 IN.		
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.		
SCALE =	.0100 SCALE				

PARAMETRIC DATA

ALPHA =	.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 28/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.244	-.20842	-.04992	.17059	.03033	.01578	-.03127	.11231	-.04930	.17077	-.28870
10.330	-2.058	-.17180	-.05341	.16512	.03213	.00557	-.00992	.03057	-.05291	.16528	-.32013
10.330	.109	-.16446	-.05489	.16449	.03307	-.00082	.00165	-.00758	-.05442	.16465	-.33051
10.330	2.125	-.17089	-.05373	.16479	.03242	-.00722	.01362	-.05253	-.05323	.16493	-.32272
10.330	5.019	-.21355	-.05585	.17500	.03373	-.01696	.03489	-.12349	-.05519	.17521	-.31501
	GRADIENT	.00026	-.00008	-.00008	.00007	-.00306	.00562	-.02177	-.00008	-.00008	-.00067

IA-58 CFNT-107 R1-139B MODEL 32-OT (01 + T1) (R0K013) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = .000 RUDDER = -20.000
SPDBRK = .000

RUN NO. 12/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.433	-.08059	-.23766	.22897	.10071	-.00299	.01012	-.00940	-.21205	.27126	-.78172
10.330	-8.458	-.07447	-.21809	.21558	.08820	-.00319	.00945	-.00943	-.18401	.24531	-.75011
10.330	-6.189	-.06348	-.17428	.20238	.07494	-.00268	.00792	-.00870	-.15152	.21994	-.68893
10.330	-4.298	-.05501	-.13905	.18847	.06296	-.00224	.00684	-.00814	-.12454	.19836	-.62788
10.330	-2.256	-.04111	-.09374	.17446	.04551	-.00207	.00545	-.00766	-.08680	.17601	-.48761
10.330	-.068	-.03135	-.05284	.16355	.03262	-.00183	.00410	-.00684	-.05265	.16361	-.32178
10.330	2.024	-.02352	-.02037	.15481	.02551	-.00169	.00319	-.00662	-.02582	.15399	-.16769
10.330	4.079	-.01871	.01322	.14603	.01874	-.00181	.00297	-.00717	.00281	.14669	.01914
10.330	6.357	-.01632	.05140	.13606	.01039	-.00178	.00299	-.00804	.03579	.14290	.25048
10.330	8.246	-.00851	.08536	.13282	.00159	-.00164	.00265	-.00841	.06543	.14379	.45535
10.330	10.402	-.00783	.12751	.12725	-.01028	-.00167	.00259	-.00849	.1024[illegible]	.14818	.69132
10.330	15.531	-.01123	.22693	.11642	-.03625	-.00225	.00207	-.00757	.[illegible]8747	.17293	1.58409
10.330	20.736	.00521	.36558	.11335	-.08530	-.00280	.00308	-.01257	.30177	.23544	1.28171
10.330	22.767	.00648	.43372	.[illegible]1314	-.11276	-.00313	.00358	-.01396	.35614	.27217	1.30853
	GRADIENT	.00429	.01798	-.00497	-.00516	.00006	-.00048	.00014	.01502	-.00697	.07676

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TABULATED SOURCE DATA, LARC CFNT 107

IA-58 CFNT-107 RI-139B MODEL 32-07 (01 + T1) (R0K014) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000
AILRON = .000 RUDDER = -20.000
SPDBRK = .000

RUN NO. 13/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.185	-.20583	-.04955	.17078	.03061	.01458	-.02845	.10925	-.04893	.17096	-.28623
10.330	-2.043	-.16337	-.05287	.16521	.03239	.00446	-.00740	.03670	-.05239	.16536	-.31684
10.330	.045	-.16102	-.05453	.16454	.03335	-.00203	.00464	-.00821	-.05407	.16469	-.32832
10.330	2.055	-.16337	-.05334	.16541	.03316	-.00852	.01686	-.05296	-.05287	.16556	-.31934
10.330	4.974	-.20080	-.05544	.17624	.03499	-.01925	.04019	-.12652	-.05482	.17643	-.31072
	GRADIENT	-.00530	-.00030	.00157	.00034	-.00338	.00677	-.02326	-.00028	.00157	.00129

IA-58 CFNT-107 RI-139B MODEL 32-07 (01 + T1) (R0K015) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = .000
AILRON = 10.000 RUDDER = .000
SPDBRK = .000

RUN NO. 14/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.706	-.04626	-.28587	.22943	.10215	.00243	.00273	-.00417	-.21685	.27445	-.78940
10.330	-8.515	-.03762	-.21958	.21543	.08838	.00176	.00253	-.00457	-.16526	.24557	-.75449
10.330	-6.234	-.03165	-.17535	.20189	.07479	.00131	.00247	-.00518	-.13239	.21974	-.69351
10.330	-4.112	-.02603	-.13441	.18601	.06054	.00105	.00231	-.00567	-.12073	.19517	-.61859
10.330	-2.211	-.01700	-.09247	.17329	.04451	.00060	.00172	-.00578	-.08572	.17673	-.48502
10.330	-.167	-.01028	-.05492	.16378	.03261	.00041	.00106	-.00560	-.05445	.16394	-.33212
10.330	2.156	-.00066	-.01806	.15461	.02459	.00041	.00029	-.00552	-.02386	.15383	-.15511
10.330	3.983	.00401	.01294	.14684	.01830	.00022	.00028	-.00617	.00271	.14738	.01841
10.330	6.311	.00530	.05252	.13853	.00926	.00020	.00063	-.00717	.03697	.14346	.25772
10.330	8.328	.01271	.08939	.13351	-.00070	.00033	.00056	-.00806	.06911	.14505	.47642
10.330	10.316	.01494	.12822	.12779	-.01180	.00043	.00045	-.00780	.10327	.14864	.69474
10.330	15.511	.01922	.22643	.11804	-.03776	.00000	.00038	-.00763	.18854	.17483	1.07841
10.330	20.701	.04303	.36659	.11491	-.08776	.00048	.00088	-.01233	.30418	.23778	1.27924
10.330	22.716	.05204	.43759	.11510	-.11545	.00058	.00162	-.01451	.35919	.27515	1.30544
	GRADIENT	.00372	.01793	-.00471	-.00506	-.00009	-.00027	-.00003	.01500	-.00375	.07799

IA-58 CFNT-197 RI-1398 MODEL 32-OT (01 + T1) (R&RD16) (13 MAR 74)

REFERENCE DATA

SREF = 38.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9500 IN. YMRP = .0050 IN.
BREF = 12.9500 IN. ZMRP = -9.3300 IN.
SCALE = .5100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = -40.000
AILRON = 10.000 RUDDER = .000
SPDBRK = .000

RUN NO. 19/ 0 RN/L = .98 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
19.330	-10.380	-.04991	-.33597	.26800	.17597	.00221	.00267	-.00197	-.28213	.32419	-.87026
19.330	-8.180	-.04528	-.28202	.24771	.15225	.00170	.00255	-.00257	-.24391	.28532	-.85487
19.330	-5.910	-.03552	-.23136	.23116	.13252	.00160	.00219	-.00337	-.20629	.25378	-.81289
19.330	-4.072	-.03545	-.18792	.21435	.11226	.00116	.00262	-.00418	-.17223	.22716	-.75819
19.330	-2.560	-.02561	-.12693	.19019	.07862	.00023	.00147	-.00453	-.11999	.19465	-.61644
19.330	-.551	-.01340	-.08161	.17556	.05923	-.00004	.00114	-.00477	-.08146	.17563	-.46381
19.330	2.133	-.00277	-.04064	.16294	.04592	-.00026	.00037	-.00506	-.04668	.16132	-.28937
19.330	4.204	-.00109	-.00222	.15161	.03492	-.00053	.00045	-.00564	-.01332	.15104	-.08821
19.330	6.456	.00139	.03872	.14217	.02383	-.00074	.00099	-.00697	.02249	.14563	.15444
19.330	8.334	.00175	.07426	.13568	.01304	-.00085	.00119	-.00789	.05381	.14551	.37108
19.330	10.572	.00419	.11927	.12916	-.00031	-.00097	.00107	-.00792	.09355	.14885	.62847
19.330	15.645	.00945	.22166	.11884	-.02674	-.00177	.00129	-.00795	.18140	.17421	1.04126
19.330	20.826	.01283	.35433	.11486	-.07149	-.00253	.00256	-.01308	.29034	.23333	1.24434
19.330	22.992	.01162	.42329	.11518	-.09691	-.00297	.00330	-.01493	.34510	.27083	1.27425
	GRADIENT	.00416	.02202	-.00734	-.00900	-.00019	-.00026	-.00017	.01882	-.00891	.08537

IA-50 CFNT-107 RI-1398 MODEL 32-OT (01 + T1) (ROR017) (13 MAR 74)

REFERENCE DATA

SREF = 38.7385 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = -20.000
AILRON = 10.000 RUDDER = .000
SPDBRK = .000

RUN NO. 10/ 0 RN/L = 1.00 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.455	-.03506	-.28503	.27498	.12383	.00118	.00177	-.00227	-.23765	.28280	-.84036
10.330	-8.237	-.02941	-.23657	.21984	.10638	.00053	.00172	-.00309	-.20264	.25146	-.80583
10.330	-6.277	-.02338	-.19456	.20744	.09158	.00038	.00166	-.00360	-.17072	.22747	-.75051
10.330	-4.286	-.02156	-.15585	.19282	.07768	.00027	.00168	-.00418	-.14102	.20391	-.69156
10.330	-2.166	-.01333	-.10424	.17680	.05531	-.00012	.00124	-.00463	-.09748	.18061	-.53972
10.330	-.128	-.00644	-.06434	.16637	.04152	-.00033	.00075	-.00473	-.06397	.16651	-.38416
10.330	2.069	.00296	-.02705	.15757	.03267	-.00040	.00011	-.00482	-.03272	.15649	-.20910
10.330	4.133	.00279	.00747	.14825	.02514	-.00065	.00023	-.00551	-.00323	.14840	-.02178
10.330	6.396	.00363	.04638	.13976	.01639	-.00087	.00077	-.00680	.03052	.14456	.21105
10.330	8.265	.00552	.07919	.13378	.00757	-.00092	.00092	-.00765	.05913	.14377	.41131
10.330	10.575	.00635	.12475	.12764	-.00500	-.00108	.00101	-.00794	.09921	.14837	.66869
10.330	13.574	.00115	.22442	.11824	-.02971	-.00193	.00122	-.00799	.18443	.17415	1.05905
10.330	20.742	.01606	.35801	.11397	-.07451	-.00268	.00238	-.01302	.29445	.23337	1.26171
10.330	22.752	.01135	.42389	.11386	-.09929	-.00316	.00369	-.01536	.34687	.26894	1.28989
	GRADIENT	.00309	.01917	-.00514	-.00606	-.00010	-.00019	-.00014	.01616	-.00641	.07931

1A-58 CFNT-107 RI-1398 MODEL 32-07 (01 + 71) (R6K010) (13 MAR 74)

REFERENCE DATA

SREF = 58.7369 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = 10.000
AILRON = 10.000 RUDDER = .000
SPOBRK = .000

RUN NO. 17/ 0 RN/L = .99 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.758	-.03304	-.25275	.23219	.09148	.00046	.00219	-.00326	-.20920	.27511	-.76005
10.330	-8.578	-.02482	-.21040	.21894	.07892	-.00057	.00211	-.00387	-.17539	.24787	-.70759
10.330	-6.312	-.02050	-.16845	.20622	.06732	-.00023	.00209	-.00455	-.14471	.22348	-.64752
10.330	-4.189	-.01940	-.12989	.19129	.05494	-.00038	.00202	-.00506	-.11557	.20026	-.57707
10.330	-2.325	-.00972	-.08896	.17853	.03959	-.00060	.00157	-.00523	-.08164	.18199	-.44869
10.330	-.212	-.00488	-.04822	.16715	.02616	-.00073	.00106	-.00542	-.04760	.16728	-.28458
10.330	2.099	.00187	-.00970	.15711	.01741	-.00086	.00047	-.00558	-.01544	.15665	-.09859
10.330	4.099	.00244	.02489	.14855	.00957	-.00109	.00072	-.00663	.01420	.14995	.09472
10.330	6.114	.00329	.05923	.14216	.00151	-.00122	.00122	-.00747	.04375	.14766	.29639
10.330	8.340	.00916	.10202	.13662	-.01121	-.00135	.00137	-.00855	.08112	.14997	.54094
10.330	10.447	.00393	.14408	.13111	-.02409	-.00152	.00153	-.00867	.11791	.15506	.76044
10.330	12.353	-.00272	.24377	.12224	-.05159	-.00254	.00183	-.00850	.20270	.18242	1.11118
10.330	20.622	.00834	.39512	.12304	-.10937	-.00347	.00332	-.01387	.32619	.25507	1.27883
10.330	22.644	.00531	.46926	.12488	-.14251	-.00393	.00416	-.01557	.38591	.29393	1.39152
	GRADIENT	.00262	.01849	-.00508	-.00535	-.00008	-.00018	-.00017	.01549	-.00597	.08571

IA-58 CFNT-107 RI-1398 MODEL 32-07 (01 + T2) (R8K019) (13 MAR 74)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.		
LREF =	12.9000 IN.	YMRP =	.0000 IN.		
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.		
SCALE =	.0150 SCALE				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	15.000
AILRON =	10.000	RUDDER =	.000
SPOBRK =	.000		

4UM NO. 18/ 0 RM/L = .93 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.673	-.03065	-.25097	.22658	.09041	.00047	.00233	-.00345	-.20467	.26914	-.76043
10.330	-8.491	-.02726	-.20787	.21312	.07770	-.00014	.00235	-.00432	-.17412	.24147	-.72109
10.330	-6.477	-.02348	-.17098	.20218	.06721	-.00023	.00235	-.00480	-.14708	.22918	-.66799
10.330	-4.154	-.02114	-.12646	.18635	.05385	-.00041	.00229	-.00546	-.11462	.19517	-.58731
10.330	-2.252	-.01367	-.08615	.17291	.03850	-.00063	.00182	-.00561	-.07928	.17617	-.45009
10.330	-.202	-.00758	-.04830	.16185	.02566	-.00073	.00120	-.00556	-.04773	.16202	-.29459
10.330	1.286	.00034	-.01188	.15271	.01732	-.00079	.00061	-.00573	-.01717	.15229	-.11278
10.330	4.051	.00109	.02263	.14367	.00943	-.00112	.00085	-.00679	.01242	.14491	.08572
10.330	6.342	.00171	.06328	.13670	-.00043	-.00127	.00133	-.00778	.04779	.14286	.33453
10.330	8.171	.00598	.09712	.13242	-.01031	-.00136	.00143	-.00855	.07732	.14448	.53369
10.330	10.455	.00488	.14281	.12631	-.02437	-.00158	.00169	-.00900	.11752	.15913	.78276
10.330	15.380	-.00310	.24332	.11776	-.05253	-.00258	.00197	-.00875	.20337	.17858	1.14253
10.330	20.508	.00751	.38727	.11881	-.10719	-.00340	.00307	-.01343	.32111	.24695	1.30026
10.330	22.669	.00599	.46786	.12557	-.14292	-.00402	.00437	-.01606	.38525	.29158	1.32127
	GRADIENT	.00283	.01821	-.00310	-.00528	-.00008	-.00020	-.00014	.01529	-.00650	.08169

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TABULATED SOURCE DATA, LARC CFNT 107

1A-58 CFNT-107 RI-1398 MODEL 32-07 (01 + T2)

(R0R02O) (13 MAR 74)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

BETA =	.000	ELEVTR =	-40.000
AILRON =	10.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 19/ 0 RN/L = .98 GRADIENT INTERVAL = -9.00/ 9.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.086	-.04785	-.32998	.26571	.17460	.00209	.00340	-.00299	-.27035	.31940	-.87147
10.330	-8.207	-.03737	-.28199	.24696	.15199	.00150	.00258	-.00286	-.24385	.28468	-.85658
10.330	-6.106	-.03158	-.23444	.23225	.13381	.00165	.00233	-.00342	-.25849	.25587	-.81449
10.330	-4.120	-.02945	-.18809	.21428	.11250	.00119	.00205	-.00446	-.17221	.22724	-.75784
10.330	-2.078	-.01299	-.12775	.19050	.07952	.00030	.00161	-.00468	-.12071	.19500	-.61902
10.330	-.545	-.00944	-.08269	.17525	.06022	-.00001	.00128	-.00533	-.08275	.17532	-.47202
10.330	2.101	.00127	-.04133	.16245	.04645	-.00019	.00044	-.00518	-.04725	.16083	-.29382
10.330	4.154	.00322	-.00387	.15126	.03560	-.00054	.00059	-.00597	-.01482	.15058	-.09845
10.330	6.459	.00549	.03677	.14165	.02445	-.00077	.00103	-.00721	.02973	.14467	.14311
10.330	8.181	.00796	.07120	.13566	.01421	-.00093	.00137	-.00835	.05117	.14441	.35432
10.330	10.459	.00973	.11573	.12925	.00592	-.00102	.00124	-.00833	.09547	.14653	.51120
10.330	13.794	.00442	.22375	.11826	-.02761	-.00188	.00136	-.00840	.18311	.17479	1.04813
10.330	20.770	.01893	.35238	.11432	-.07066	-.00263	.00236	-.01324	.28893	.23185	1.24619
10.330	22.757	.01588	.41758	.11452	-.09511	-.00318	.00375	-.01589	.34977	.26714	1.27565
	GRADIENT	.00304	.02193	-.00743	-.00900	-.00019	-.00027	-.00017	.01872	-.00903	.07935

IA-58 CFMT-107 RI-1398 MODEL 32-07 (01 + 72) (R6K021) (15 MAR 74)

REFERENCE DATA

SREF =	30.7360 SQ.IN.	XMRP =	.0000 IN.		
LREF =	12.9000 IN.	YMRP =	.0000 IN.		
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.		
SCALE =	.0100 SCALE				

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	-20.000
SPOBRK =	.000		

RUN NO. 207 0 RN/L = .96 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.338	-.08300	-.25715	.22861	.10154	-.00337	.01120	-.01104	-.21195	.27164	-.78199
10.330	-8.647	-.07914	-.22187	.21762	.09028	-.00358	.01056	-.01110	-.18661	.24870	-.75033
10.330	-6.413	-.06504	-.17937	.20486	.07707	-.00301	.00889	-.01026	-.15536	.22361	-.69478
10.330	-4.317	-.05598	-.14006	.18940	.06404	-.00244	.00744	-.00939	-.12540	.19940	-.62889
10.330	-2.288	-.04160	-.09505	.17525	.04666	-.00225	.00597	-.00880	-.08797	.17895	-.49174
10.330	-.130	-.03120	-.05411	.16417	.03365	-.00211	.00470	-.00818	-.05373	.16429	-.32706
10.330	2.189	-.01972	-.01732	.15470	.02563	-.00195	.00355	-.00791	-.02321	.15392	-.15082
10.330	4.144	-.01331	.01535	.14625	.01872	-.00210	.00343	-.00861	.00474	.14698	.03223
10.330	6.185	-.01188	.04878	.13887	.01130	-.00201	.00334	-.00917	.03353	.14332	.23397
10.330	8.449	-.00465	.08901	.13246	.00561	-.00188	.00306	-.00978	.06859	.14419	.47597
10.330	10.371	-.00348	.12742	.12734	-.01016	-.00187	.00281	-.00966	.10241	.14820	.69105
10.330	15.714	-.00432	.23237	.11663	-.03780	-.00250	.00228	-.00900	.19210	.17521	1.09642
10.330	20.677	.01163	.36395	.11218	-.08474	-.00301	.00306	-.01359	.30089	.23347	1.28880
10.330	22.857	.01229	.43995	.11320	-.11500	-.00352	.00370	-.01551	.36144	.27529	1.31334
	GRADIENT	.00483	.01815	-.00499	-.00521	.00005	-.00049	.00012	.01518	-.00696	.07779

IA-58 CFNT-107 RI-1398 MODEL 32-07 (01 + T2) (R0K022) (13 MAR 74)

REFERENCE DATA

SREF = 30.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9000 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = 5.000 ELEVTR = .000
AILRON = .000 RUDDER = -20.000
SPDBRK = .000

RUN NO. 21/ 0 RN/L = .96 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CLL	CYN	CY	CL	CD	L/D
10.330	-10.632	4.71982	-.27055	.24170	.10894	-.02220	.05952	-.15484	-.22131	.28747	-.76986
10.330	-8.643	4.76359	-.22516	.22840	.09358	-.02341	.05849	-.15276	-.18628	.25964	-.72515
10.330	-6.477	4.82138	-.18000	.21484	.07834	-.02224	.05410	-.14892	-.15462	.23378	-.66138
10.330	-4.330	4.87775	-.14054	.20260	.06639	-.02052	.04869	-.14059	-.12484	.21263	-.58711
10.330	-2.273	4.91832	-.09637	.18814	.04957	-.02041	.04435	-.13475	-.08884	.19182	-.46313
10.330	-.179	4.93601	-.05499	.17672	.03558	-.01989	.04151	-.12903	-.05444	.17689	-.30776
10.330	1.983	4.95266	-.01633	.16718	.02545	-.01908	.03710	-.12106	-.02211	.16652	-.13276
10.330	4.059	4.96309	.02034	.15753	.01711	-.01825	.03250	-.11315	.00913	.15857	.05760
10.330	6.141	4.96258	.05894	.14825	.00724	-.01751	.02940	-.10788	.04274	.15370	.27809
10.330	8.246	4.95972	.09968	.14047	-.00434	-.01700	.02675	-.10482	.07850	.15332	.51201
10.330	10.315	4.95847	.14177	.13332	-.01737	-.01658	.02291	-.10115	.11560	.15655	.73842
10.330	15.554	4.89086	.25209	.12577	-.04965	-.01885	.02302	-.10658	.20913	.18876	1.10791
10.330	20.585	4.76134	.38989	.12327	-.09910	-.02192	.02324	-.10951	.32165	.25248	1.27398
10.330	22.866	4.67543	.46849	.12431	-.13132	-.02444	.02620	-.11451	.38337	.29659	1.29262
	GRADIENT	.00973	.01910	-.00528	-.00583	.00028	-.00188	.00326	.01591	-.00634	.07703

IA-58 CFNT-107 RI-139B MODEL 32-07 (01 + 12) (R0K023) (13 MAR 74)

REFERENCE DATA

SREF = 30.7360 SQ.IN. XMRP = .0000 IN.
LREF = 12.9500 IN. YMRP = .0000 IN.
BREF = 12.9000 IN. ZMRP = -3.3300 IN.
SCALE = .9100 SCALE

PARAMETRIC DATA

BETA = 5.000 ELEVIR = .000
AILRON = .000 RUDDER = .000
SPOBRK = .000

RUN NO. 23/ 0 RN/L = .97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.628	4.81592	-.28909	.23847	.10545	-.01695	.04755	-.14505	-.22046	.28399	-.77629
10.330	-8.499	4.86107	-.21925	.22427	.08861	-.01840	.04703	-.14316	-.18370	.25421	-.72262
10.330	-6.548	4.90686	-.16044	.21258	.07592	-.01786	.04436	-.13914	-.15502	.23177	-.66883
10.330	-4.458	4.95066	-.14112	.20109	.06456	-.01707	.04109	-.13455	-.12525	.21134	-.59263
10.330	-2.356	4.98859	-.09681	.18630	.04799	-.01741	.03765	-.12960	-.08997	.19012	-.46848
10.330	-.212	5.00924	-.05571	.17468	.03398	-.01691	.03481	-.12373	-.05506	.17489	-.31483
10.330	1.918	5.02136	-.01670	.16532	.02383	-.01630	.03077	-.11603	-.02222	.16467	-.13494
10.330	4.082	5.02902	.02141	.15567	.01526	-.01574	.02672	-.10855	.01027	.15680	.06552
10.330	6.146	5.01994	.06064	.14665	.00542	-.01544	.02470	-.10409	.04459	.15230	.29278
10.330	8.352	5.01084	.10181	.13911	-.00603	-.01550	.02323	-.10212	.08065	.15235	.52941
10.330	10.357	5.00366	.14336	.13208	-.01885	-.01568	.02098	-.10049	.11728	.15571	.75323
10.330	15.508	4.92250	.25189	.12521	-.05013	-.01871	.02273	-.10747	.20924	.18890	1.11299
10.330	20.602	4.78488	.39364	.12323	-.10093	-.02226	.02384	-.11108	.32510	.25386	1.28063
10.330	22.664	4.71038	.46161	.12407	-.12874	-.02417	.02568	-.11437	.37815	.29236	1.29343
	GRADIENT	.00889	.01906	-.00526	-.00577	.00018	-.00168	.00309	.01589	-.00632	.07769

DATE 11 JUN 74

TABULATED SOURCE DATA, LARC CFNT 107

(R0K024) (13 MAR 74)

IA-58 CFNT-107 RI-139B MODEL 32-0T (01 + T2)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

BETA =	.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 22/ 0 RN/L = .97 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	BETA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-10.579	-.03644	-.25963	.22782	.09998	.00070	.00214	-.00306	-.21339	.27161	-.78565
10.330	-8.378	-.03037	-.21611	.21411	.08649	.00013	.00210	-.00377	-.18262	.24331	-.75056
10.330	-6.419	-.02593	-.17882	.20267	.07537	.00003	.00213	-.00451	-.15504	.22158	-.69970
10.330	-4.342	-.02277	-.14062	.18790	.06302	-.00007	.00208	-.00469	-.12599	.19801	-.63626
10.330	-2.210	-.01482	-.09395	.17323	.04508	-.00040	.00167	-.00543	-.08720	.17772	-.49346
10.330	-.134	-.00966	-.05440	.16302	.03272	-.00048	.00090	-.00504	-.05402	.16314	-.33112
10.330	2.171	-.00208	-.01733	.15347	.02461	-.00057	.00035	-.00532	-.02314	.15270	-.15151
10.330	4.144	-.00029	.01549	.14500	.01786	-.00081	.00049	-.00611	.00497	.14574	.03413
10.330	6.153	.00126	.04839	.13779	.01068	-.00092	.00093	-.00704	.03334	.14219	.23450
10.330	8.397	.00329	.08881	.13193	.00030	-.00104	.00116	-.00820	.06859	.14348	.47894
10.330	10.330	.00462	.12656	.12690	-.01033	-.00111	.00120	-.00811	.10175	.14754	.68966
10.330	15.422	-.00259	.22606	.11669	-.03598	-.00205	.00144	-.00802	.16689	.17260	1.08279
10.330	20.645	.01095	.36326	.11188	-.08455	-.00286	.00271	-.01327	.30048	.23277	1.29092
10.330	22.663	.00586	.43237	.11290	-.11211	-.00345	.00398	-.01572	.35549	.27078	1.31285
	GRADIENT	.00271	.01821	-.00494	-.00519	-.00008	-.00021	-.00011	.01526	-.00602	.07877

(R0K025) (13 MAR 74)

IA-58 CFNT-107 RI-139B MODEL 32-0T (01 + T2)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

ALPHA =	-10.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 24/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-.028	-10.99993	-.25920	.22769	.08974	.00062	.00220	-.00336	-.21314	.27134	-.78568
10.330	1.995	-10.98919	-.26320	.23058	.10218	-.00603	.02119	-.06172	-.21636	.27500	-.78676
10.330	4.796	-10.85072	-.26559	.23412	.10366	-.01613	.04636	-.14079	-.21738	.28114	-.77319
	GRADIENT	-.01002	-.00120	.00177	.00080	-.00349	.00916	-.02853	-.00084	.00205	.00273

TABULATED SOURCE DATA, LARC CFNT 107

IA-58 CFNT-107 RI-139B MODEL 32-07 (01 + 72)

(R0K026) (13 MAR 74)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

ALPHA =	10.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 25/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-5.172	10.47852	.14479	.13193	-.01931	.01290	-.01035	.08468	.11838	.15606	.75850
10.330	-2.041	10.47516	.13326	.12781	-.01320	.00360	-.00474	.02612	.10775	.14990	.71881
10.330	-.029	10.48036	.12931	.12628	-.01134	-.00129	.00114	-.00898	.10418	.14769	.70536
10.330	2.015	10.48056	.13169	.12754	-.01260	-.00684	.00810	-.04394	.10621	.14935	.71114
10.330	4.970	10.46487	.14311	.13065	-.01957	-.01573	.02133	-.09971	.11700	.15447	.75747
	GRADIENT	-.00153	.00151	.00046	-.00096	-.00279	.00373	-.01791	.00141	.00072	.00578

IA-58 CFNT-107 RI-139B MODEL 32-07 (01 + 72)

(R0K027) (13 MAR 74)

REFERENCE DATA

SREF =	38.7360 SQ.IN.	XMRP =	.0000 IN.
LREF =	12.9000 IN.	YMRP =	.0000 IN.
BREF =	12.9000 IN.	ZMRP =	-3.3300 IN.
SCALE =	.0100 SCALE		

PARAMETRIC DATA

ALPHA =	20.000	ELEVTR =	.000
AILRON =	.000	RUDDER =	.000
SPDBRK =	.000		

RUN NO. 26/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	ALPHA	CN	CA	CLN	CBL	CYN	CY	CL	CD	L/D
10.330	-1.914	20.64203	.36672	.11392	-.08606	.00372	-.00294	.02155	.30302	.23588	1.28480
10.330	.128	20.64918	.36386	.11232	-.08454	-.00328	.00296	-.01524	.30088	.23341	1.28903
10.330	1.998	20.65451	.36726	.11683	-.08509	-.01012	.00869	-.04906	.30245	.23687	1.26615
10.330	4.775	20.63780	.39154	.12302	-.10019	-.02171	.02283	-.10910	.32306	.25313	1.27625
	GRADIENT	-.00056	.00376	.00149	-.00219	-.00381	.00384	-.01950	.00300	.00272	-.00199