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SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA MANagement services

SPACE DIVISION CHRYSLER CORPORATION

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EFFECT OF EXTERNAL TANK NOSE SHAPE ON THE ROCKWELL INTERNATIONAL SPACE SHUTTLE VEHICLE 3, (INTEGRATED CONFIGURATION) (IA37B)

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Prepared under NASA Contract Number NAS9-13247

by

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for

Engineering Analysis Division

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

WIND TUNNEL TEST SPECIFICS

Test Number: MSFC TWT 585
NASA Series No.: IA37B
Date: October 15-16, 1973 (22 Occ. Hrs.)

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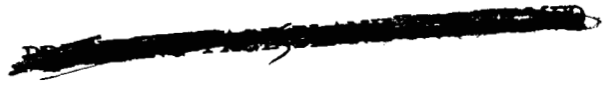

EFFECT OF EXTERNAL TANK NOSE SHAPE ON THE ROCKWELL INTERNATIONAL SPACE SHUTTLE VEHICLE 3, (INTEGRATED CONFIGURATION) (IA37B)

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ABSTRACT

Tests of several tank nose shapes have been conducted as a part of the investigation of configuration changes to reduce drag for the integrated vehicle. The primary objective of this test was to investigate the effect on the integrated vehicle aerodynamic characteristics of several tank nose shapes. The tank nose shapes investigated were the 600 inch (baseline) and 1204 inch radius ogives, and the 600 inch ogive plus a spike 360 inches long and 12.0 inches in diameter. Data were obtained over a Mach number range of 0.6 through 4.96 and for angles-of-attack and sideslip from -10 through +10 degrees. The model used for this test was the 0.004-scale integrated vehicle model number 34-OTS.

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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
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	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	CBL	rolling-moment coefficient; $\frac{\text{rolling moment}}{qSb}$

NOMENCLATURE (Continued)

ADDITIONS TO STANDARD LIST

SYMBOL	PLOT SYMBOL	DEFINITION
$C_{N_{BO}}$	CNBO	normal force coefficient component of orbiter base drag
$C_{A_{BO}}$	CABO	orbiter base axial force coefficient
$C_{A_{BS}}$	CABS	solid rocket booster base axial force coefficient
$C_{A_{BT}}$	CABT	external tank base axial force coefficient
$C_{A_{F(\alpha=o)}}$	CAFAFO	forebody axial force coefficient at zero degrees angle of attack
$C_{A_{BO(\alpha=o)}}$	CABOAO	orbiter base axial force coefficient at zero degrees angle of attack
$C_{A_{BS(\alpha=o)}}$	CABSAO	solid rocket booster base axial force coefficient at zero degrees angle of attack
$C_{A_{BT(\alpha=o)}}$	CABTAO	external tank base axial force coefficient at zero degrees angle of attack
$C_{m(\alpha=o)}$	CLMAFO	pitching moment coefficient at zero degrees angle of attack
$C_{N(\alpha=o)}$	CNAFO	normal force coefficient at zero degrees angle of attack
X_{AC}	XAC	longitudinal location of aerodynamic center with respect to reference c.g. $X_{AC} = -(dC_m/d\alpha)/(dC_N/d\alpha)$; positive X when a.c. aft of c.g.
Y_{AC}	YAC	longitudinal location of aerodynamic center with respect to reference c.g. $Y_{AC} = -(dC_n/d\beta)/(dC_Y/d\beta)$; positive X when a.c. aft of c.g.
C_{N_α}	CNALFA	derivative of normal force coefficient with respect to alpha, per degree
C_{m_α}	CLMALF	derivative of pitching moment coefficient with respect to alpha, per degree

NOMENCLATURE (Concluded)

ADDITIONS TO STANDARD LIST

SYMBOL	PLOT SYMBOL	DEFINITION
C_{Y_β}	CYBETA	derivative of side force coefficient with respect to beta, per degree
C_{n_β}	CYNBET	derivative of yawing moment coefficient with respect to beta, per degree, body axis system
C_{ℓ_β}	CBLBET	derivative of rolling moment coefficient with respect to beta, per degree, body axis system
i_o	ORBINC	angle between the orbiter water plane 400 line and the external tank centerline, degrees
Z_o	DELTAZ	minimum vertical separation distance between the orbiter and external tank, inches
$p_{B_{O_{avg}}}$		orbiter average base pressure
$p_{B_{T_{avg}}}$		external tank average base pressure
p_{B_s}		solid rocket booster base pressure

CONFIGURATIONS INVESTIGATED

For the integrated vehicle tested, the external tank was mounted on the 232 balance which was supported by the number 3 balance adapter and sting. The orbiter was mounted to the tank at three points simulating the forward attach point and the two main fuel lines at the rear attach point. The SRB's were also rigidly attached to the tank. (See figure 2.)

Base pressures were monitored at the six locations shown in figure 3. Since only three data channels were available for pressure measurements, the three tubes monitoring the orbiter were "teed" together, as were the two tubes at the base of the external tank. Thus, three base pressures were recorded; an averaged pressure for the orbiter, an averaged pressure for the external tank, and the base pressure of one SRB.

The orbiter model Vehicle 3 configuration consists of the following components:

B19	Body
C7	Canopy
F5	Body Flap
M4	OMS Pods
W107	Wing
E23	Elevon
V7	Vertical Tail
R5	Rudder

The external tank and solid rocket motors were not broken into sub-assemblies and carried the following designations:

T9	External tank with 600 inch radius ogive nose
T11	External tank with 1204 inch radius ogive nose
T15	External tank with 600 inch radius ogive nose plus a spike 360 inches long and 12 inches in diameter
S12	Solid Rocket Motor

Pertinent dimensions for all the model components are given in Table III.

The speed brake and rudder deflections were zero degrees for both tests.

The tunnel conditions existing during the test are delineated in Table I. Table II summarizes the model configurations tested and identifies the run number grouping for data set formation.

TEST FACILITY DESCRIPTION

The Marshall Space Flight Center 14" x 14" Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from .2 to 5.85 is covered by utilizing two interchangeable test sections. The transonic section permits testing at Mach 2.74 through 5.85. Mach numbers between .2 and .9 are obtained by using a controllable diffuser. The range from .95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.44, 1.93 and 2.50 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.50 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in .25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately -40°F dewpoint and 500 psi. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

The tunnel flow is established and controlled with a servo actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately 180°F. The air then passes through the test section which contains the nozzle blocks and test region.

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20° ($\pm$10°). Sting offsets are available for obtaining various maximum angles of attack up to 90°.

DATA REDUCTION

All model forces and moments were resolved in the body axis system and presented in the form of nondimensional coefficients. The following reference dimensions were used in the reduction of the coefficients.

PARAMETER	FULL SCALE	MODEL SCALE
Reference Area (S_{ref})	2690 ft.^{2}	6.198 in.^{2}
Reference Length ($l_{ref} = b_{ref}$)	1290 in.	5.160 in.
Moment Reference Center, from tank nose on tank C_L	680 in.	2.720 in.

PARAMETER	FULL SCALE	MODEL SCALE
Base Areas		
Orbiter	427.8 ft.^{2}	.9857 in.^{2}
Tank	572.55 ft.^{2}	1.319 in.^{2}
SRB (2)	402.12 ft.^{2}	.9265 in.^{2}

Base pressures were measured on all three vehicle components (orbiter, external tank, and solid rocket booster) and were utilized to correct the balance-measured axial force to an axial force that assumed freestream static pressure acting on the respective base areas. Due to a slanted base the normal force was also corrected. The appropriate equations and base areas are:

$$CAF = CA - CABO - CABT - CABS$$

$$CN = CNU - CNBO$$

where:

CAF = forebody axial force coefficient

CA = balance measured axial force coefficient

$$CABO = -C_{P_{B_O}} (A_{B_O}/S_{REF}) \cos i_B$$

$$CABT = -C_{P_{B_T}} (A_{B_T}/S_{REF})$$

$$CABS = -C_{P_{B_S}} (A_{B_S}/S_{REF})$$

CNU = balance measured normal force coefficient

$$CNBO = -C_{P_{B_O}} (A_{B_O}/S_{REF}) \sin i_B$$

where

$C_{P_{B_O}}$ = orbiter average base pressure coefficient $[(p_{B_{O_{avg}}} - p_\infty)/(q)]$

$C_{P_{B_T}}$ = external tank average base pressure coefficient $[(pB_{T_{avg}} - p_\infty)/(q)]$

$C_{P_{B_S}}$ = solid rocket booster pressure coefficient $[(p_{B_s} - p_\infty)/(q)]$

A_{B_O} = orbiter base area = 0.9857 in.^{2}

A_{B_T} = external tank base area = 1.319 in.^{2}

A_{B_S} = solid rocket booster base area (2) = 0.9265 in.^{2}

i_B = orbiter base slant angle = 12°

Data were corrected for weight tares and sting deflections.

TABLE I.

TEST: IA37B (TWT-585) DATE: 10/5/73

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per ft.)	DYNAMIC PRESSURE (pounds/sq.inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)	STAGNATION PRESSURE (pounds/sq.inch)
0.6	5.0×10^6	4.35	100	22
0.8	5.9	6.47	100	22
0.9	6.2	7.37	100	22
1.10	6.6	8.73	100	22
1.46	6.5	9.47	100	22
1.96	7.0	10.24	100	28
4.96	4.8	3.07	140	90

BALANCE UTILIZED: MSFC 232

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	300 lbs.	±1.50 lbs.	±0.024
SF	143 lbs.	±0.72 lbs.	±0.012
AF	50 lbs.	±0.25 lbs.	±0.004
PM	400 in.-lbs.	±2.00 in.-lbs.	±0.006
RM	100 in.-lbs.	±0.50 in.-lbs.	±0.002
YM	192 in.-lbs.	±0.96 in.-lbs.	±0.003

COMMENTS: Accuracy based on ±0.5% of balance capacity.

MSFC - Form 263-1 (Rev. April 1973)

TABLE II.

TEST : TWT585 (IA37B) — DATA SET/RUN NUMBER COLLATION SUMMARY — DATE : 17 OCT 73

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	PARAMETERS/VALUES ΔO	PARAMETERS/VALUES ΔO			NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE) 0.6	0.9	1.1	1.46	1.96	4.96					TEST RUN NUMBERS
R93001	034 S12 T9	A	O	O	30"			4	X	018/1	019/1	024/0	X	001/1					
↓ 002	↓	O	B	↓	↓			1	X	017/0	X	X	X	X					
R93 003	034 S12 T15	A	O					6	016/1	015/1	014/1	023/0	025/0	003/1					
↓ 004	↓	O	B					3	X	012/0	013/0	020/0	X	X					
R93 005	034 S12 T11	A	O					6	007/1	008/1	009/1	022/0	026/0	005/1					
↓ 006	↓	O	B					3	X	011/0	010/0	021/0	X	X					
R93 007	034 S12 T15	D	O	↓	↓			1	X	X	X	X	X	032/0					

1 7 13 19 25 31 37 43 49 55 61 67 73 79

CN CLM CY CYN CBL CAF CNBΦ CABΦ CABT CABS V1A-GH 1-0

α OR β SCHEDULES: α A = -10° TO 10° (Δα = 2°); β B = -10° TO 10° (Δβ = 2°) — COEFFICENTS — α D = 10° TO -10° — IDVAR (1) IDVAR (2) IDV

MSFC - Form 263-3 (Rev. May 1973)

T9 - 600" OGIVE

T15 - 600" OGIVE + S[illegible]

T11 - 1.04" OGIVE

TABLE III. MODEL DIMENSIONAL DATA SHEETS

MODEL COMPONENT: BODY B19

GENERAL DESCRIPTION: Fuselage, 3 configuration, Lightweight Orbiter per VL70-000139B

NOTE: Identical to B17 except forebody

Model Scale = 0.004

DRAWING NUMBER VL70-000139B

DIMENSION:	FULL SCALE	MODEL SCALE
Length ~ IN.	1290.3	5.16120
Max Width ~ IN.	267.6	1.07040
Max Depth ~ IN.	244.5	0.9780
Fineness Ratio	4.82175	4.82175
Area ~ Ft^2		
Max Cross-Sectional	386.67	0.00619
Planform		
Wetted		
Base		

TABLE III. (Continued)

MODEL COMPONENT: Canopy - C7

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VL 70-000139

Model Scale = .004

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length (x_o = 433 to x_o = 670) in.FS	237	0.9480
Max Width		
Max Depth (z_o = to z_o = 501) in.FS		
Fineness Ratio		
Area		
Max Cross-Sectional		
Planform		
Wetted		
Base		

TABLE III. (Continued)

MODEL COMPONENT: F5 Body Flap

GENERAL DESCRIPTION: 3 configuration per Rockwell lines VL70-000139

Scale Model = 0.004

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length ~ IN.	84.70	0.33880
Max Width ~ IN.	267.6	1.07040
Max Depth		
Fineness Ratio		
Area ~ Ft^2		
Max Cross-Sectional		
Planform	142.5195	0.00228
Wetted		
Base	38.0958	0.15238

TABLE III. (Continued)

MODEL COMPONENT: OMS Pod - M4

GENERAL DESCRIPTION: 3 Lightweight configuration per Rockwell Lines VL70-000139

Scale Model = 0.004

DRAWING NUMBER VL70-000139

DIMENSION:	FULL SCALE	MODEL SCALE
Length ~ IN.	346.0	1.3840
Max Width ~ IN.	108.0	0.4320
Max Depth ~ IN.	113.0	113.0
Fineness Ratio		
Area		
Max Cross-Sectional		
Planform		
Wetted		
Base		

D of OMS Pod

WP = 463.9 INFS: WP400 + 63.9 = 463.9

BP = 80.0 INFS

Length 1214.0 to 1560.0 = 346.0 INFS

NOTE: M4 identical to M3 of 2A configuration except intersection to body

TABLE III. (Continued)

MODEL COMPONENT: WING-W 107 New Lightweight Orbiter

GENERAL DESCRIPTION: Orbiter 3 configuration per lines VL70-000139.

NOTE: Same as W103 except cuff, airfoil, and angle of incidence

Scale Model = 0.004

TEST NO. DWG. NO. VL70-000139

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo.) Ft^2 Planform	2690.00	0.04304
Span (Theo In.	936.68	3.74672
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	2.75696
Tip, (Theo) B.P.	137.85	0.55140
MAC	474.81	1.89924
Fus. Sta. of .25 MAC	1136.89	4.54756
W.P. of .25 MAC	299.20	1.19680
B.L. of .25 MAC	182.13	0.72852
EXPOSED DATA		
Area (Theo) Ft^2	1752.29	0.02804
Span, (Theo) In. BP108	720.62	2.88248
Aspect Ratio	2.058	2.058
Taper Ratio	0.2451	0.2451
Chords		
Root BP108	562.40	2.2496
Tip 1.00 $\frac{b}{2}$	137.85	0.55140
MAC	393.03	1.57212
Fus. Sta. of .25 MAC	1185.31	4.74124
W.P. of .25 MAC	300.20	1.20080
B.L. of .25 MAC	251.76	1.00704
Airfoil Section (Rockwell Mod NASA) XXXX-64		
Root $\frac{b}{2}$ =	.10	.10
Tip $\frac{b}{2}$ =	.12	.12
Data for (1) of (2) Sides		
Leading Edge Cuff Planform Area Ft^2	118.333	0.00189
Leading Edge Intersects Fus M. L. @ Sta	500	2.0
Leading Edge Intersects Wing @ Sta	1083.4	4.3336

TABLE III. (Continued)

MODEL COMPONENT: Elevon E-23

GENERAL DESCRIPTION: 3 configuration per W107 Rockwell lines

VL70-000139B data for (1) of (2) sides

Scale Model = 0.004

DRAWING NUMBER: VL70-000139B

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area ~ FT^2	205.52	0.003288
Span (equivalent) ~ IN.	353.34	1.41336
Inb'd equivalent chord	114.78	0.45912
Outb'd equivalent chord	55.00	0.220
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	.208	.208
At Outb'd equiv. chord	.400	.400
Sweep Back Angles, degrees		
Leading Edge	0.00	0.00
Tailing Edge	-10.24	-10.24
Hingeline	0.00	0.00
Area Moment (Normal to hinge line) ~ FT^3	1548.07	0.00010
Product of Area Moment		

TABLE III. (Continued)

MODEL COMPONENT: VERTICAL - V 7 (Lightweight orbiter configuration)

GENERAL DESCRIPTION: Centerline vertical tail, double wedge airfoil with rounded leading edge

Scale Model = .004

DRAWING NUMBER: VL70-0000139, VL70-000095

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) ~ Ft^2	425.92	0.00682
Planform		
Span (Theo) ~ In.	315.72	1.26288
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	.404	.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	1.0740
Tip (Theo) WP	108.47	0.43388
MAC	199.81	0.79924
Fus. Sta. of .25 MAC	1463.50	5.8540
W. P. of .25 MAC	635.522	2.542088
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 ~IN.	2.00	0.0080
Void Area	13.17	0.00021
Blanketed Area		

TABLE III. (Continued)

MODEL COMPONENT: R5 - Rudder

GENERAL DESCRIPTION: 2A and 3 configuration per Rockwell lines VL70-000095 and VL70-000139

Scale Model = .004

DRAWING NUMBER: VL70-000139 VL70-000095

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area ~ Ft^2	106.38	0.00170
Span (equivalent) ~ IN.	201.0	0.8040
Inb'd equivalent chord	91.585	0.36634
Outb'd equivalent chord	50.833	0.20333
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 (Normal to hinge line) Ft^3 Product of area and mean chord	526.13	0.00003

TABLE III. (Continued)

MODEL COMPONENT: External Tank T9

GENERAL DESCRIPTION: 2A Configuration Per NR Lines VL78-000018 and VL72-000018; Body of Revolution

Scale Model = .004

DRAWING NUMBER: VL78-000018

DIMENSIONS:	THEORETICAL FULL-SCALE	THEORETICAL MODEL SCALE	ACTUAL MEASURED MODEL SCALE
Length	1826.00	7.304	
Max. Width	324.00	1.296	
Max. Depth			
Fineness Ratio	6.13889	6.13889	
Area			
Max. Cross-Sectional	572.555	0.00916	
Planform			
Wetted			
Base	572.555	0.00916	

REF

FS (Orbiter) 0.00 = TANK Station 635.0 INFS

WP (ET) = 400 - 344.413 = 55.587 INFS

BP (Orbiter) 0.00 = 0.00 ET

TABLE III. (Continued)

MODEL COMPONENT: BODY - External Tank T_{11}

GENERAL DESCRIPTION: Body of revolution with 1204" radius ogive nose

DRAWING NUMBER:

DIMENSIONS:	THEORETICAL FULL-SCALE	THEORETICAL MODEL SCALE	ACTUAL MEASURED MODEL SCALE
Length	1970	7.872	
Max. Width	324.	1.296	
Max. Depth			
Fineness Ratio	6.080		
Area			
Max. Cross-Sectional	572.555	0.00916	
Planform			
Wetted			
Base			

TABLE III. (Continued)

MODEL COMPONENT: External Tank T15

GENERAL DESCRIPTION: 2A Configuration Per NR Lines VL78-000018 and VL72-000061B; Body of Revolution + Spike

Scale Model = .004

DRAWING NUMBER VL78-000018

DIMENSION:	FULL SCALE	MODEL SCALE
Length	1826.00	7.304
Max Width	324.00	1.296
Max Depth		
Fineness Ratio	6.13889	6.13889
Area		
Max Cross-Sectional	572.555	0.00916
Planform		
Wetted		
Base	572.555	0.00916

REF

FS (Orbiter) 0.00 = TANK Station 635.0 INFS

WP (ET) = 400 - 344.413 = 55.587 INFS

BP (Orbiter) 0.00 = 0.00 ET

SPIKE

Length	360.00	1.440
Diameter	12.00	0.048

TABLE III. (Concluded)

MODEL COMPONENT: BOOSTER SOLID ROCKET MOTOR - S12

GENERAL DESCRIPTION: Configuration 3A, Data for (1) of (2) sides, per Rockwell Lines VL77-000036A

Model Scale = 0.004

DRAWING NUMBER: VL72-000088A, VL77-000036A

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Length (Includes Nozzle) - IN.	1741.0	6.9640
Max. Width (Tank Dia) - IN.	142.3	0.5692
Max. Depth (Aft Shroud) - IN.	192.0	0.7680
Fineness Ratio	9.06771	9.06771
Area - FT^2		
Max. Cross-Sectional	201.06193	0.00322
Planform		
Wetted		
Base		
WP of BSRM Centerline (Z_T)- IN.	400	1.6000
FS of BSRM Nose (X_T) - IN.	200	0.8000

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

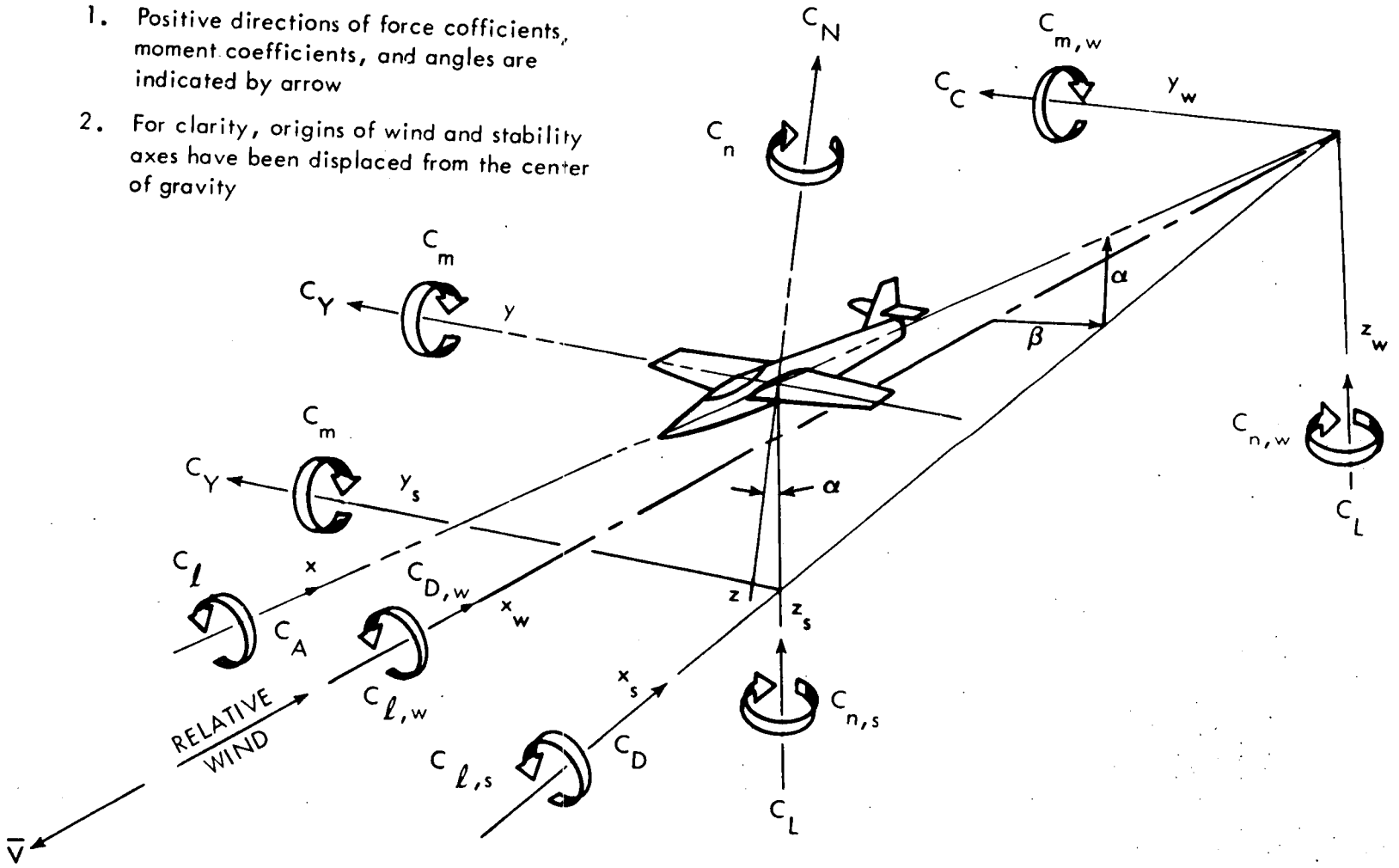


Figure 1. - Axis Systems.

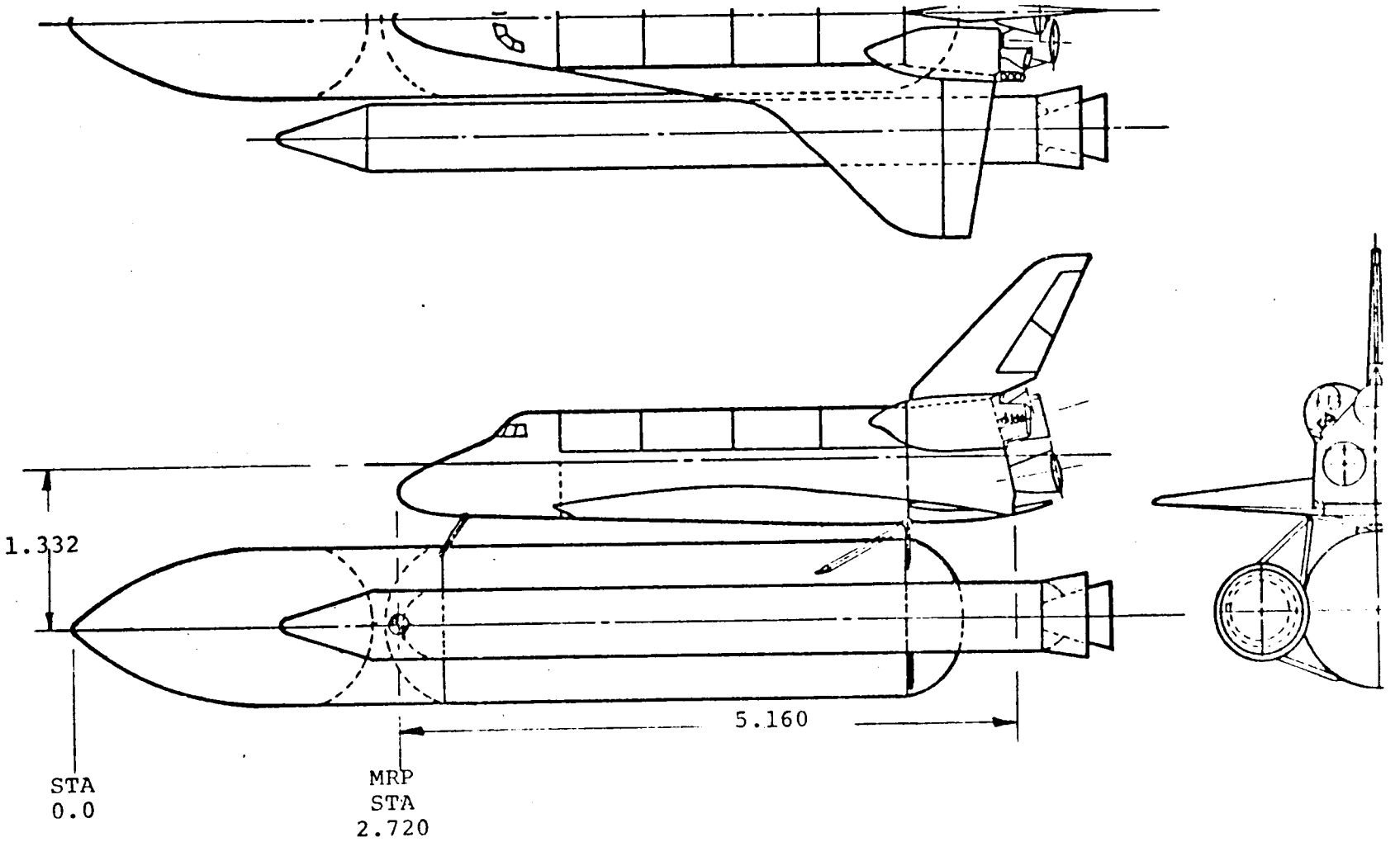


Figure 2. - General Arrangement of the Integrated Vehicle Model.

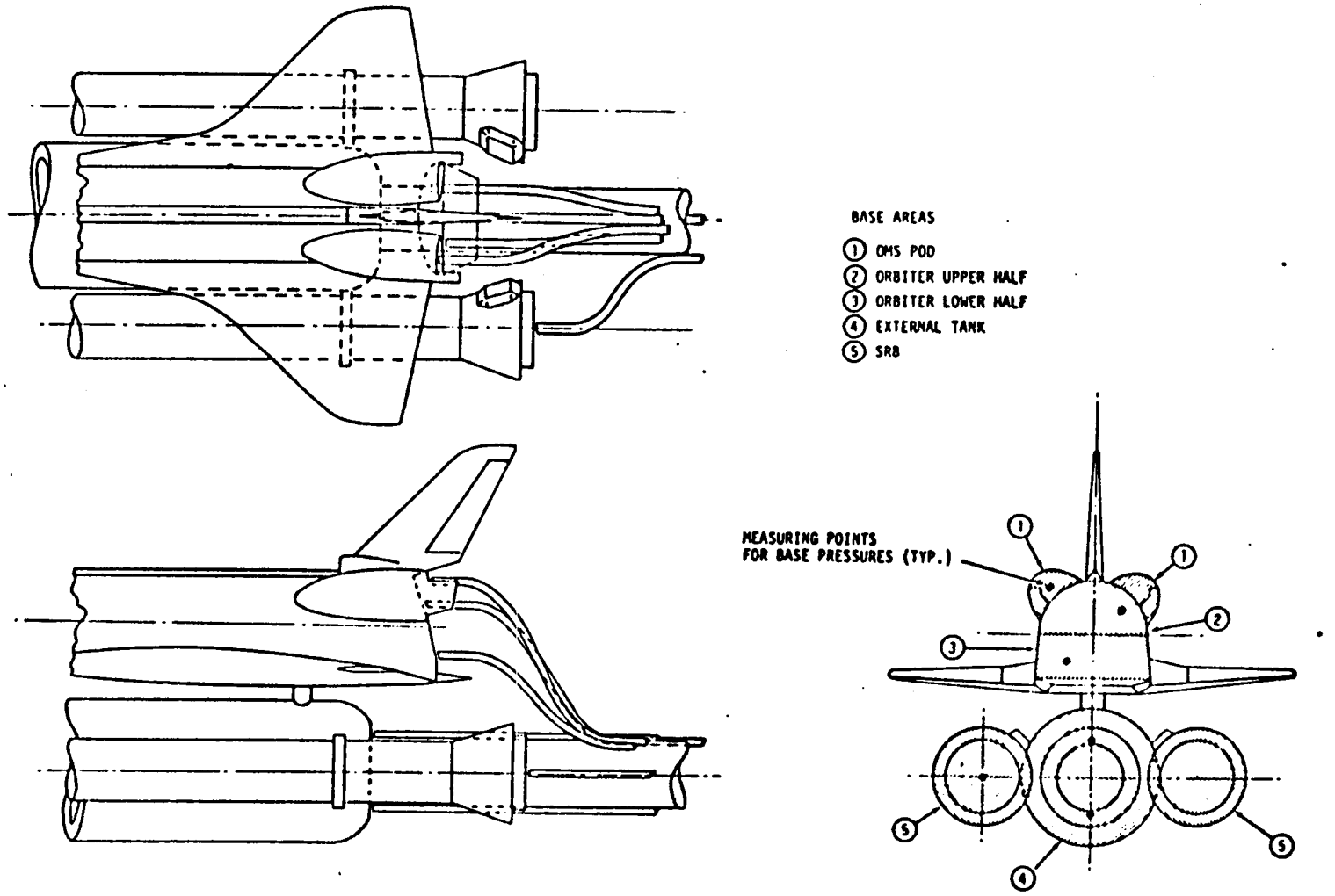


Figure 3. - Base Pressure Measuring Tube Locations.

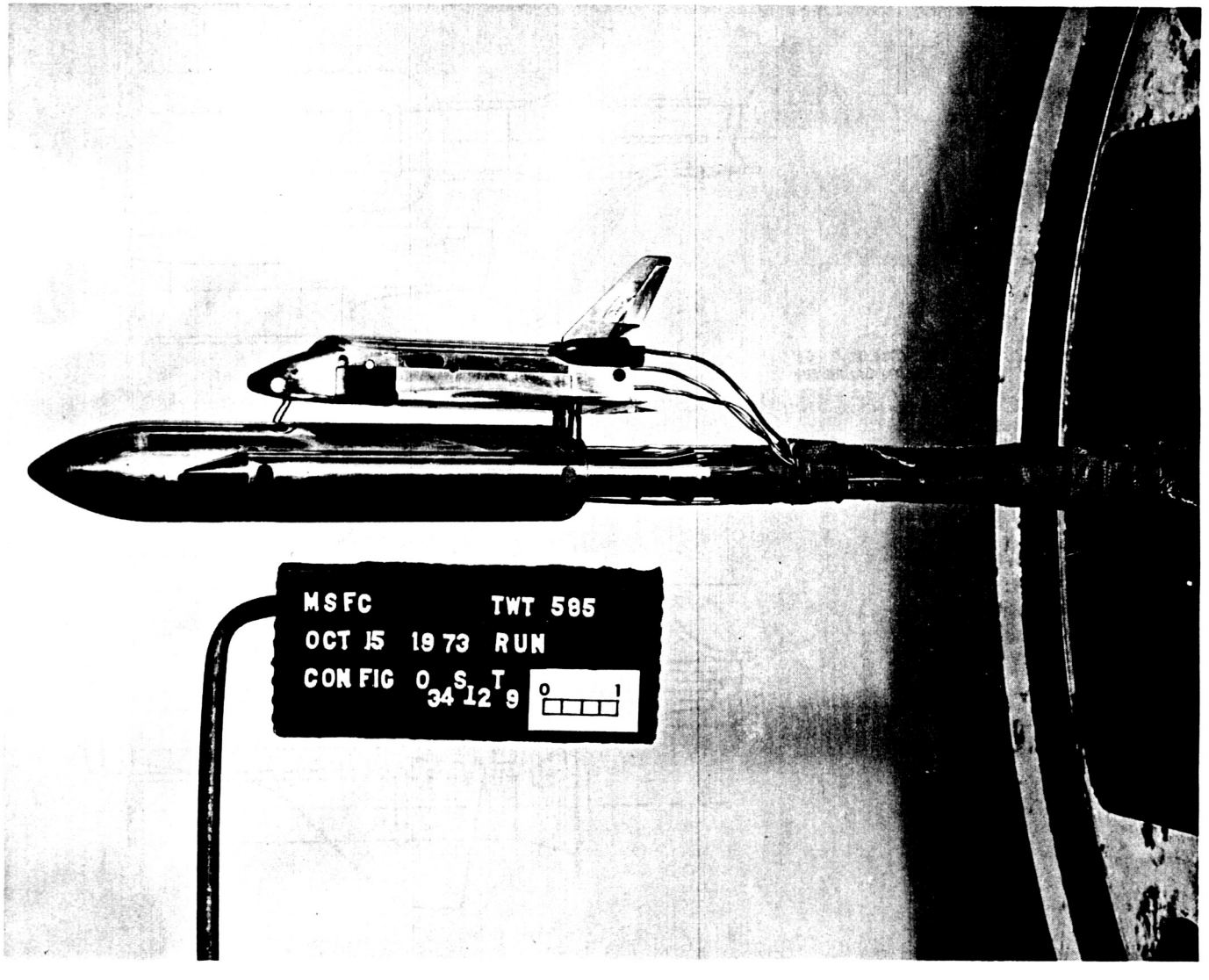


FIGURE 4. PHOTOGRAPH OF TUNNEL INSTALLATION WITH EXTERNAL TANK NOSE T_9

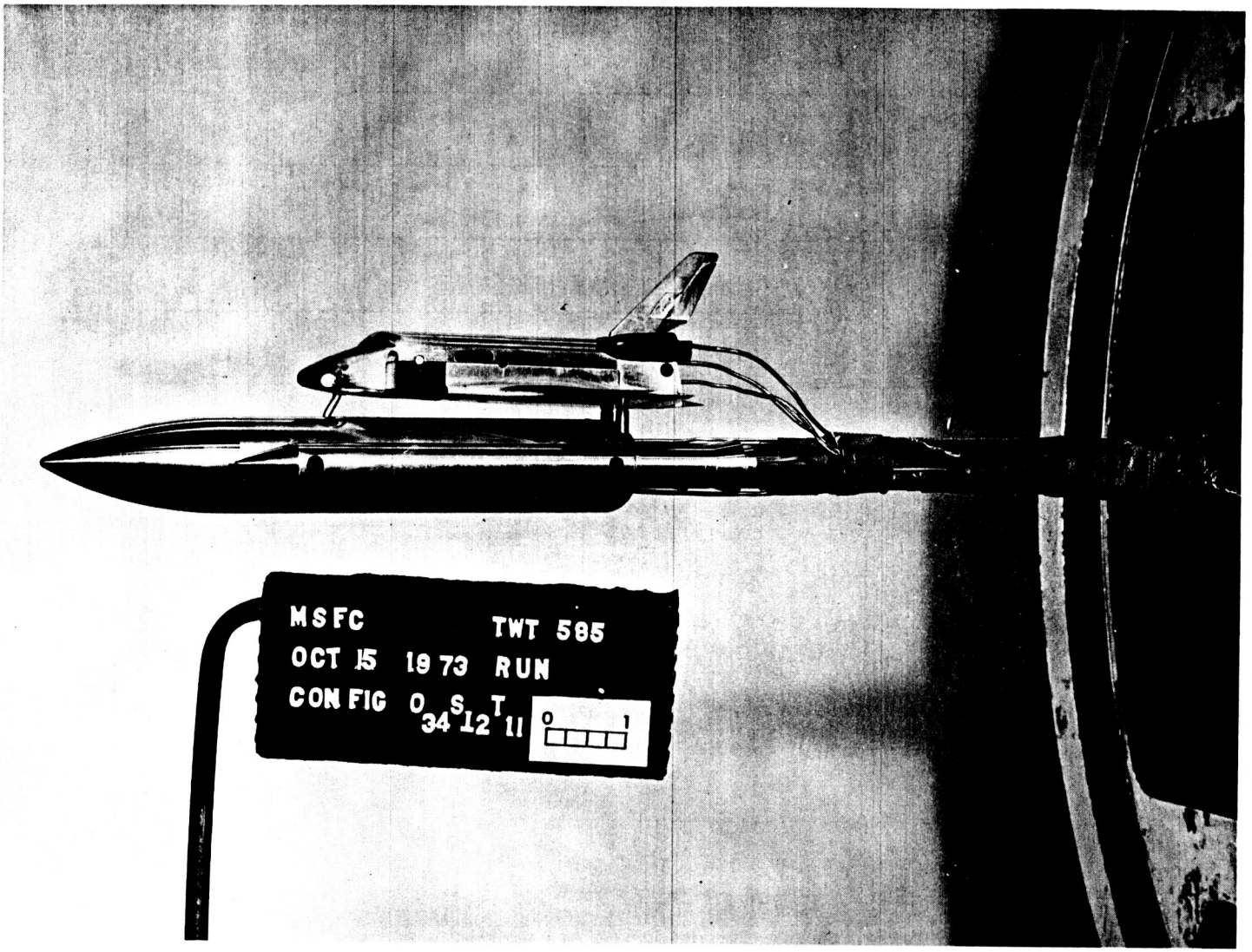


FIGURE 5. PHOTOGRAPH OF TUNNEL INSTALLATION WITH EXTERNAL TANK NOSE T_{11}

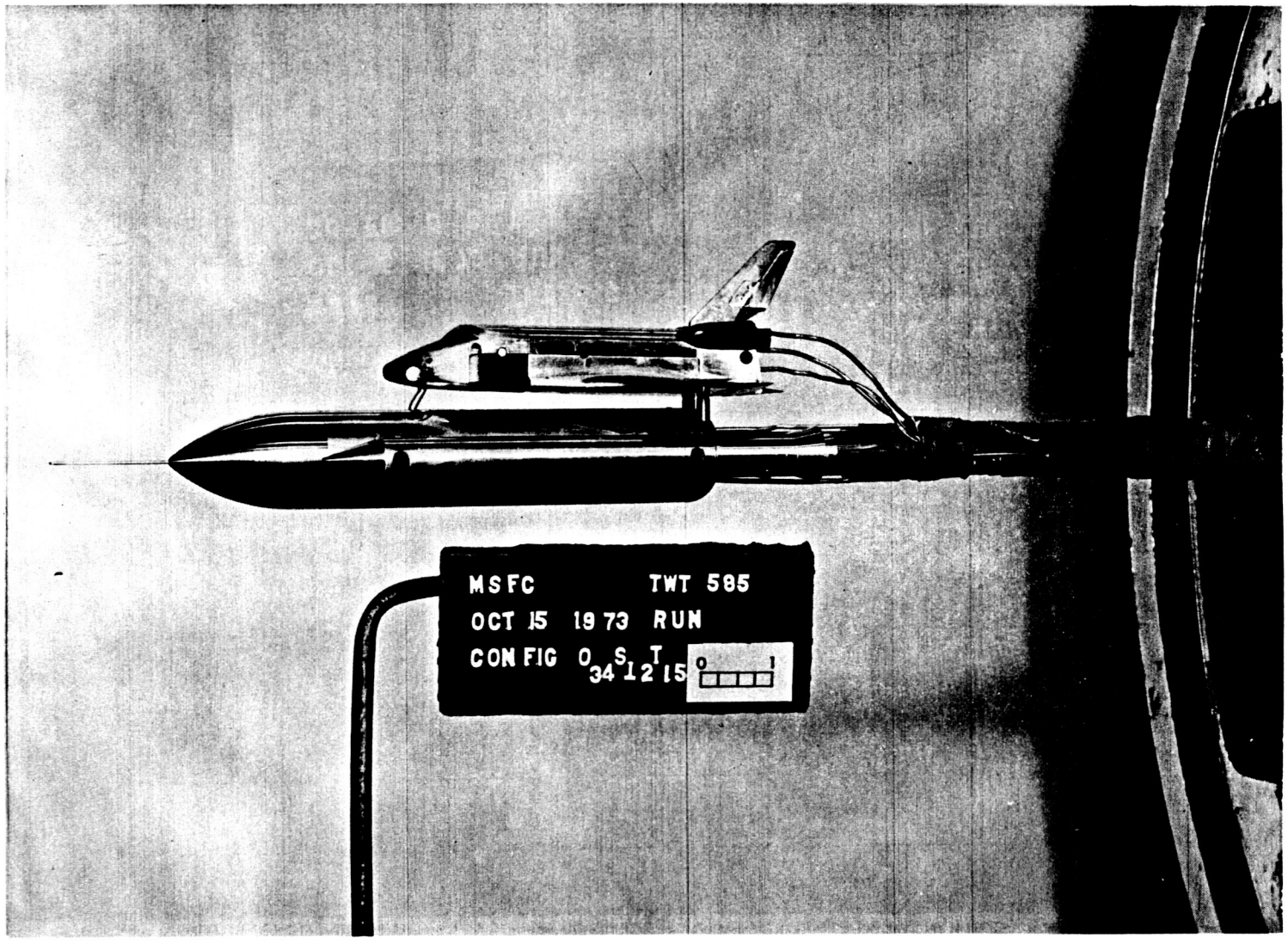


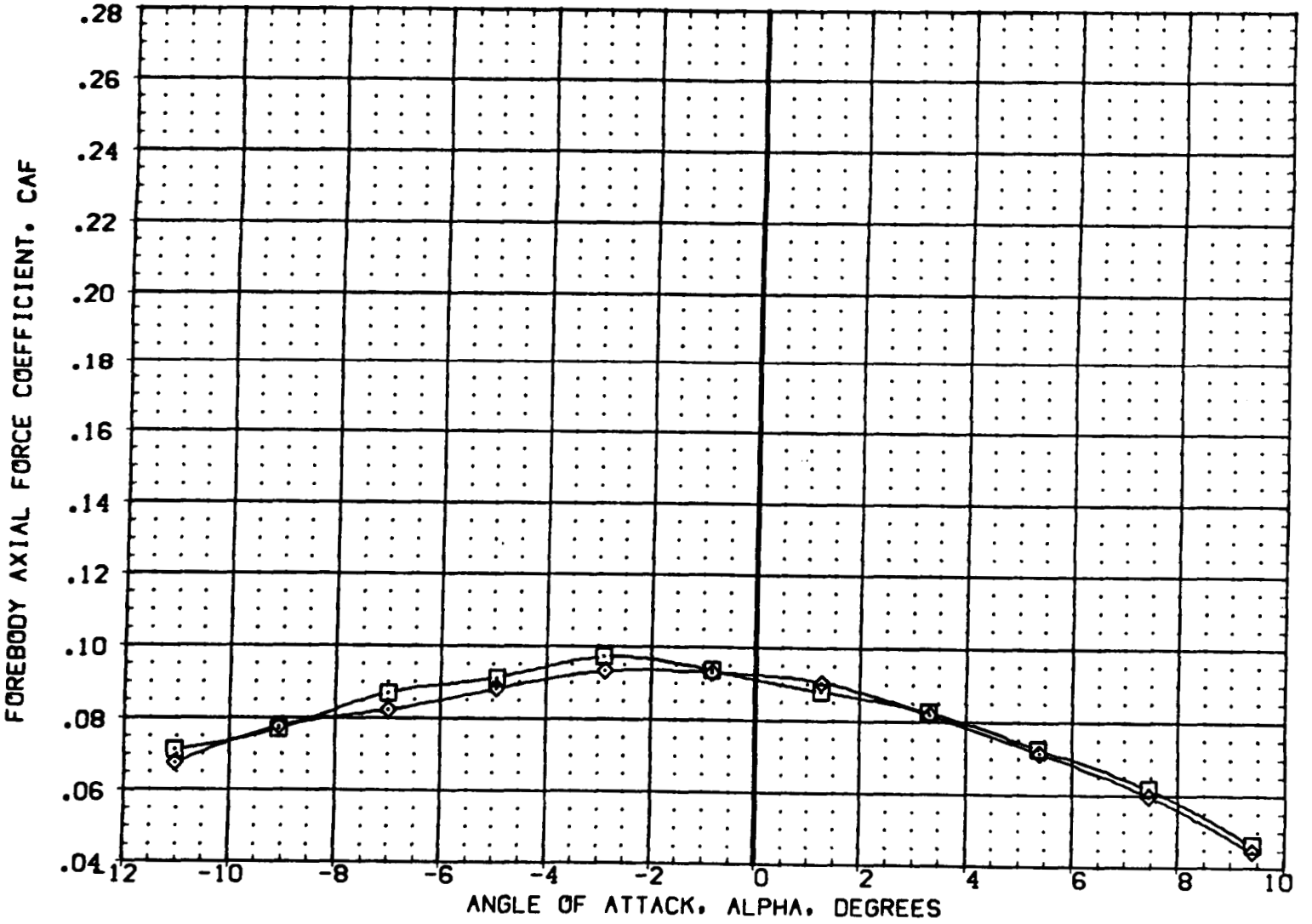
FIGURE 6. PHOTOGRAPH OF TUNNEL INSTALLATION WITH EXTERNAL TANK NOSE T_{15}

DATA FIGURES

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	□	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊗	MSFC 585(IA37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

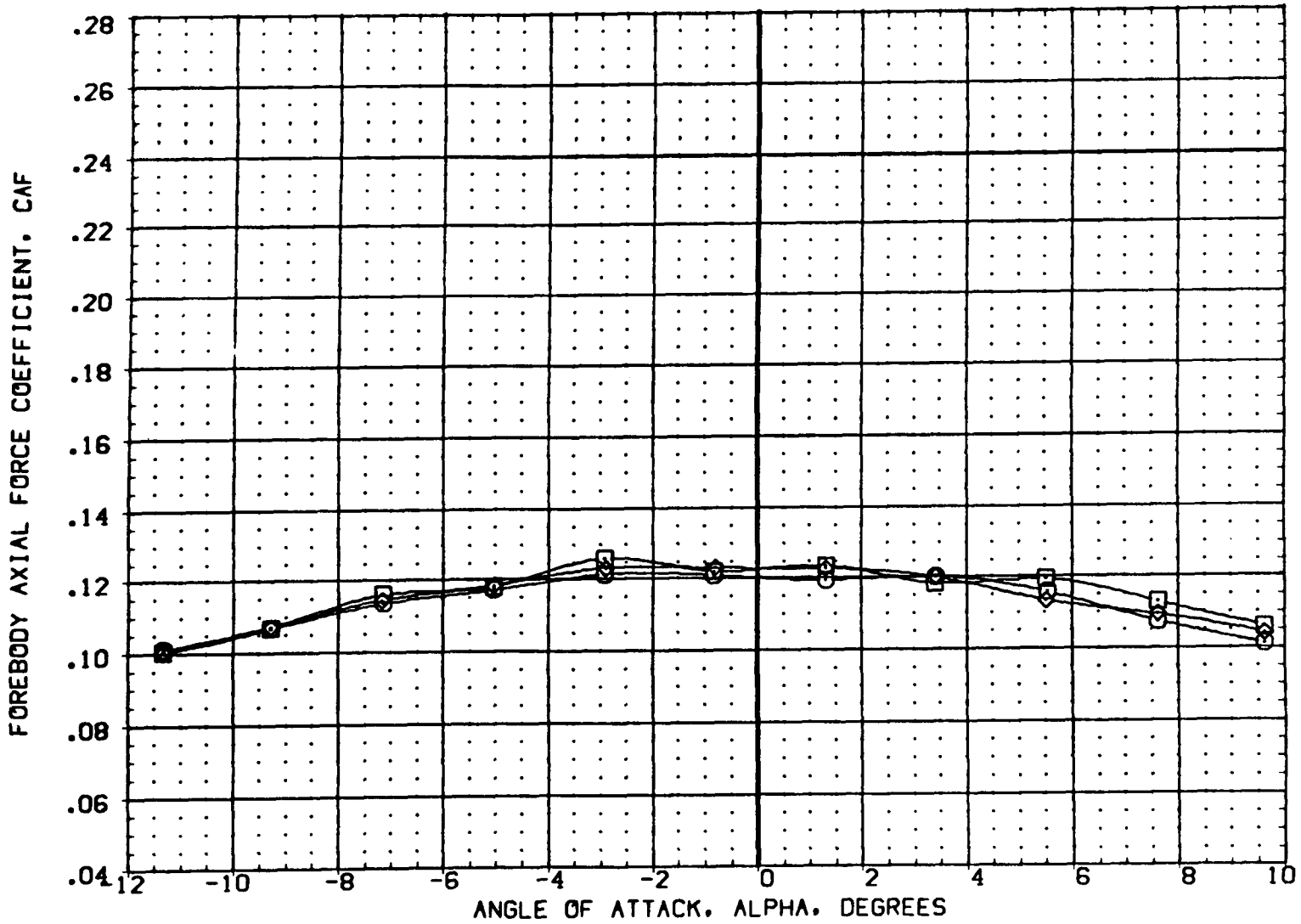


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(A)MACH = .60

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(1A378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE			

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

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(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
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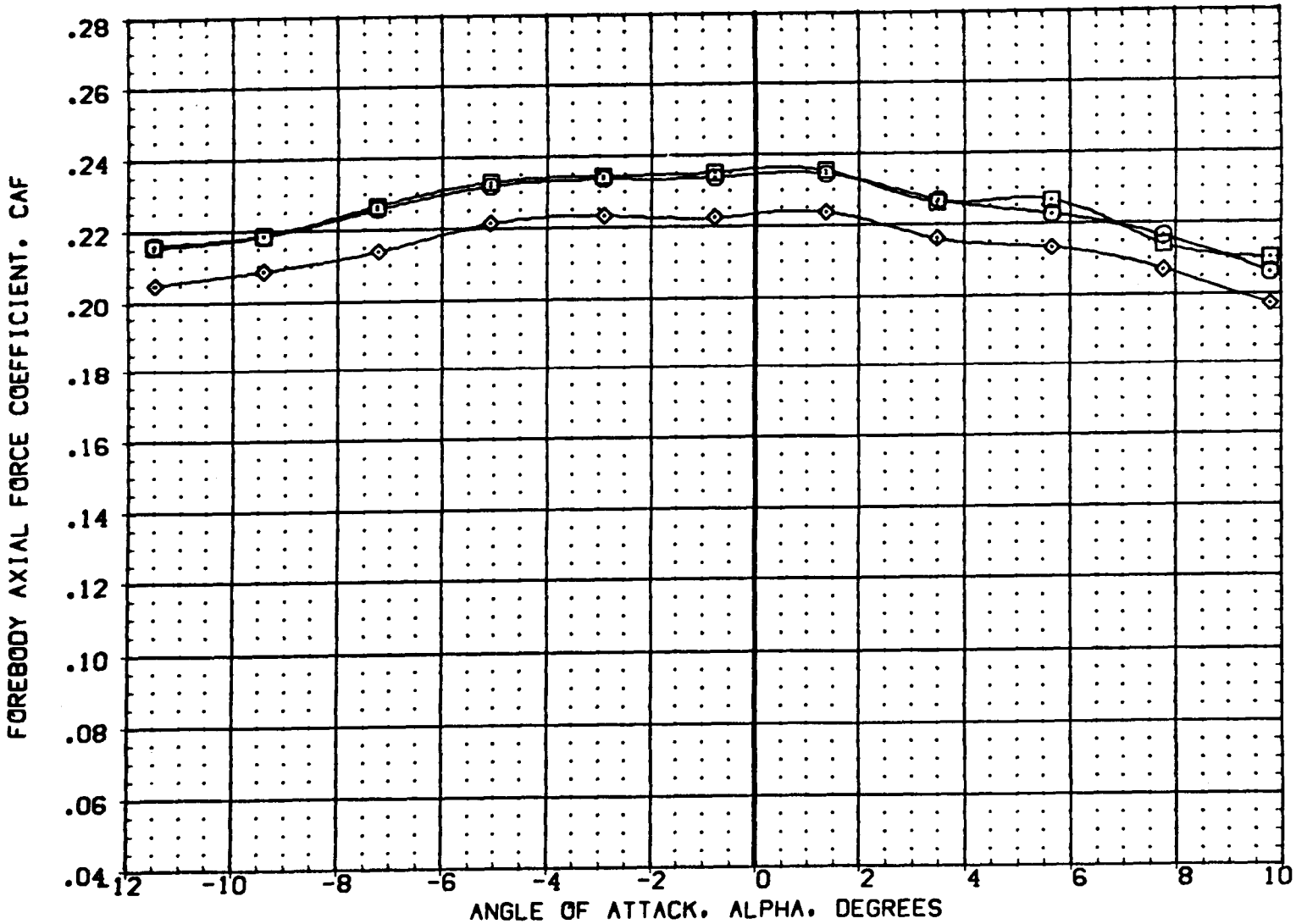

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(C)MACH = 1.10

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(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
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YMRP	.0000	IN.
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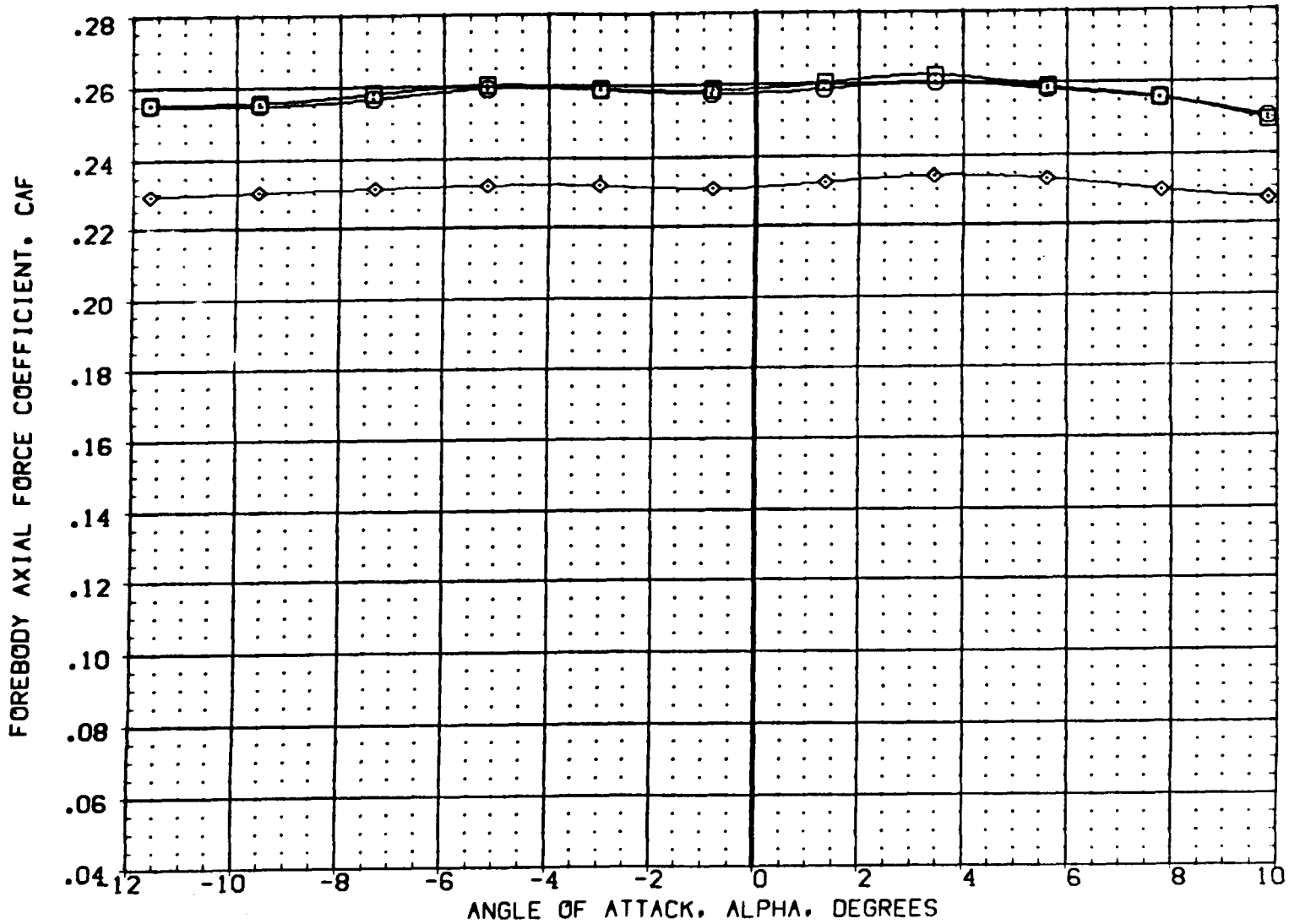
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

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(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
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YMRP	.0000	IN.
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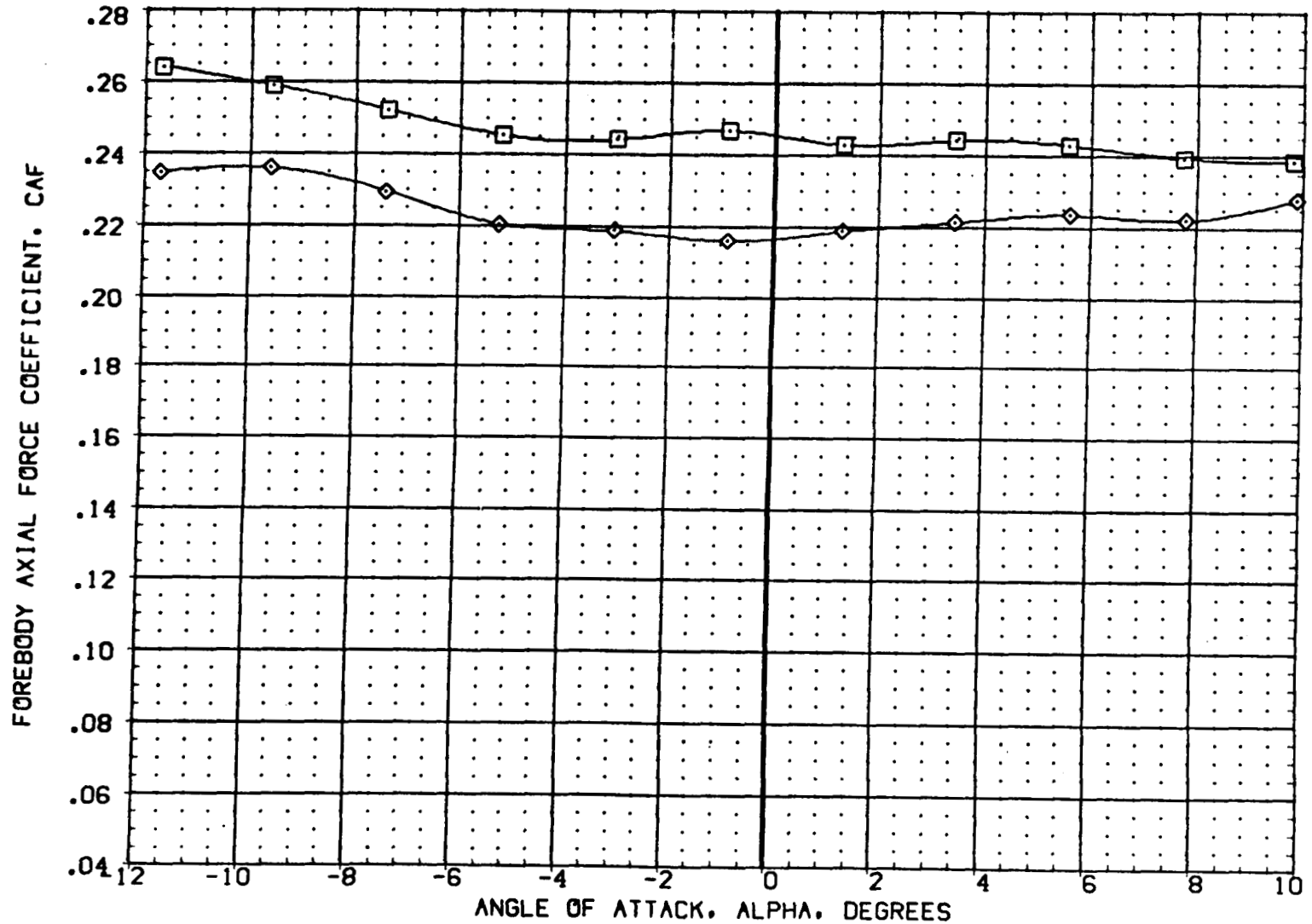
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(E)MACH = 1.96

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(A9305)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
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REFERENCE INFORMATION

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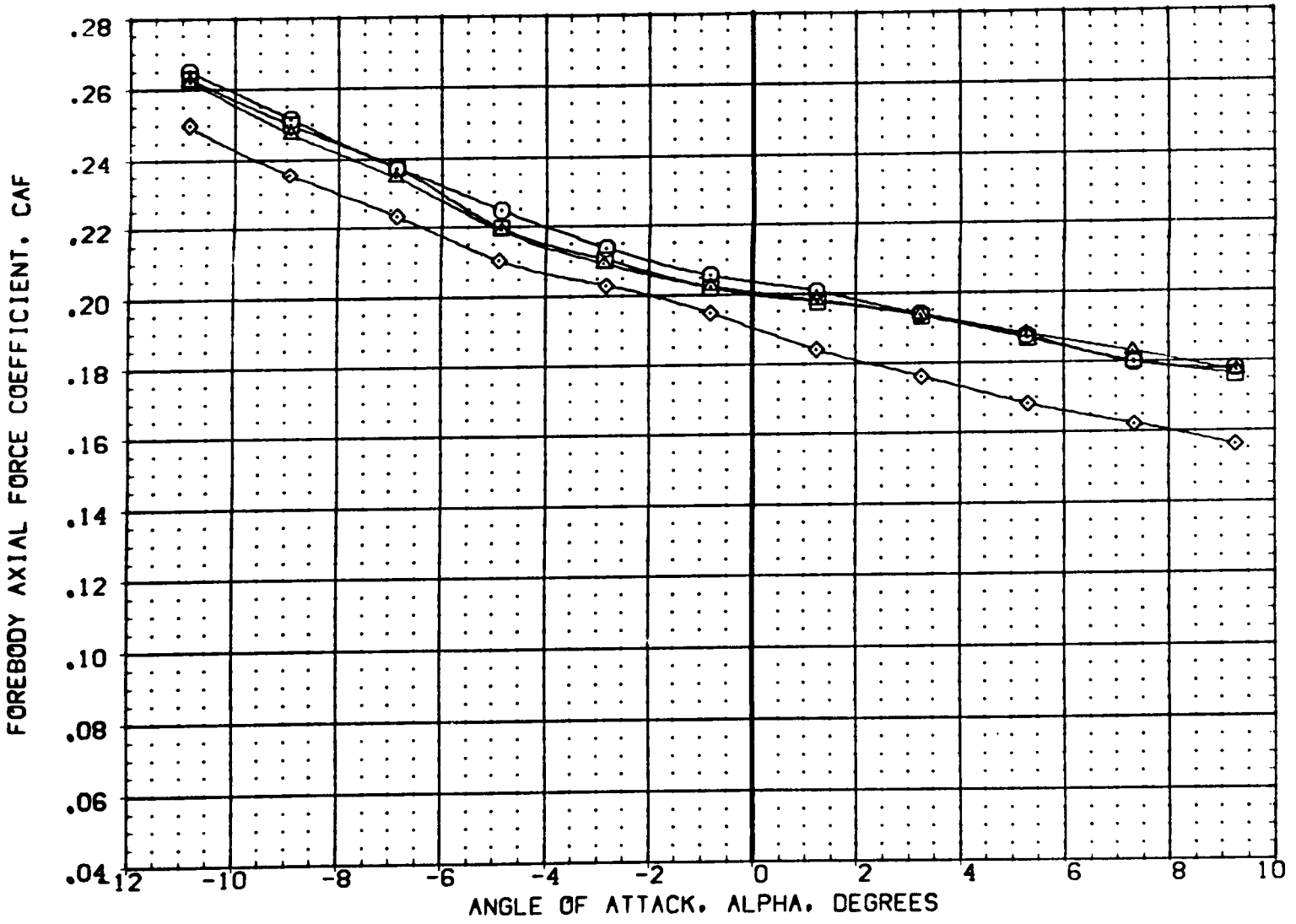

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(F)MACH = 4.96

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(A93005)	△	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	⊠	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
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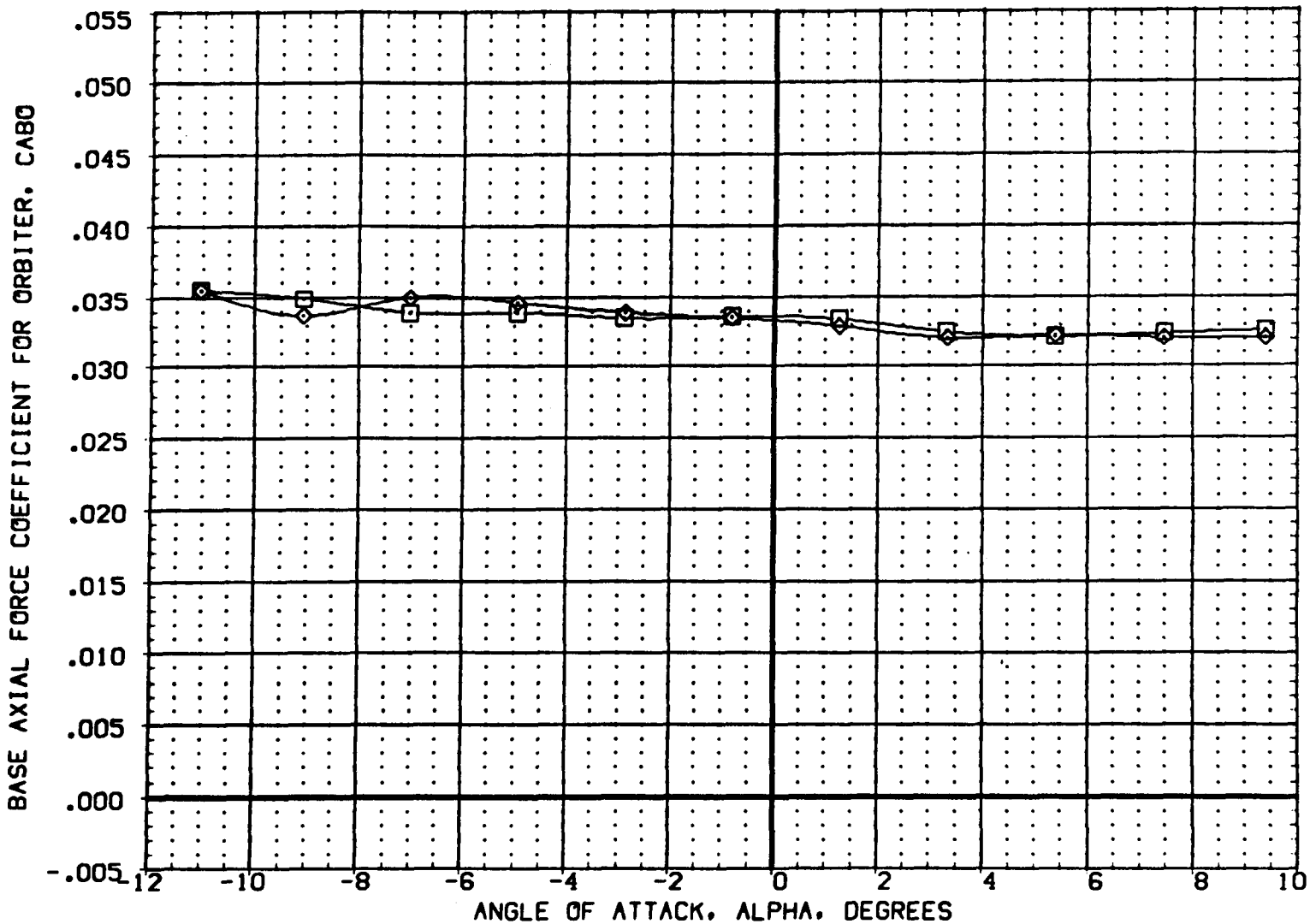

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(A)MACH = .60

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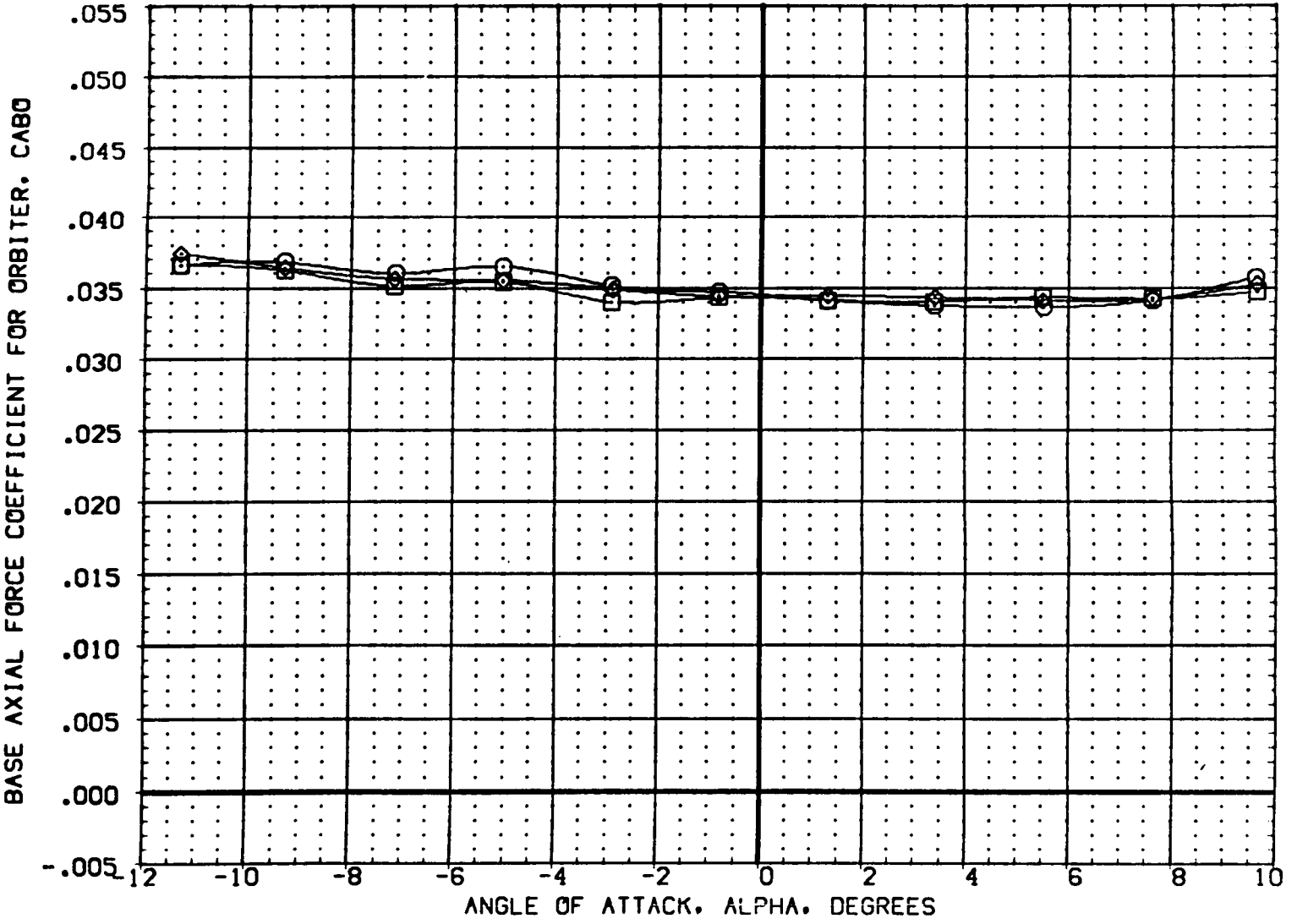
(A93001)	○	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	□	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

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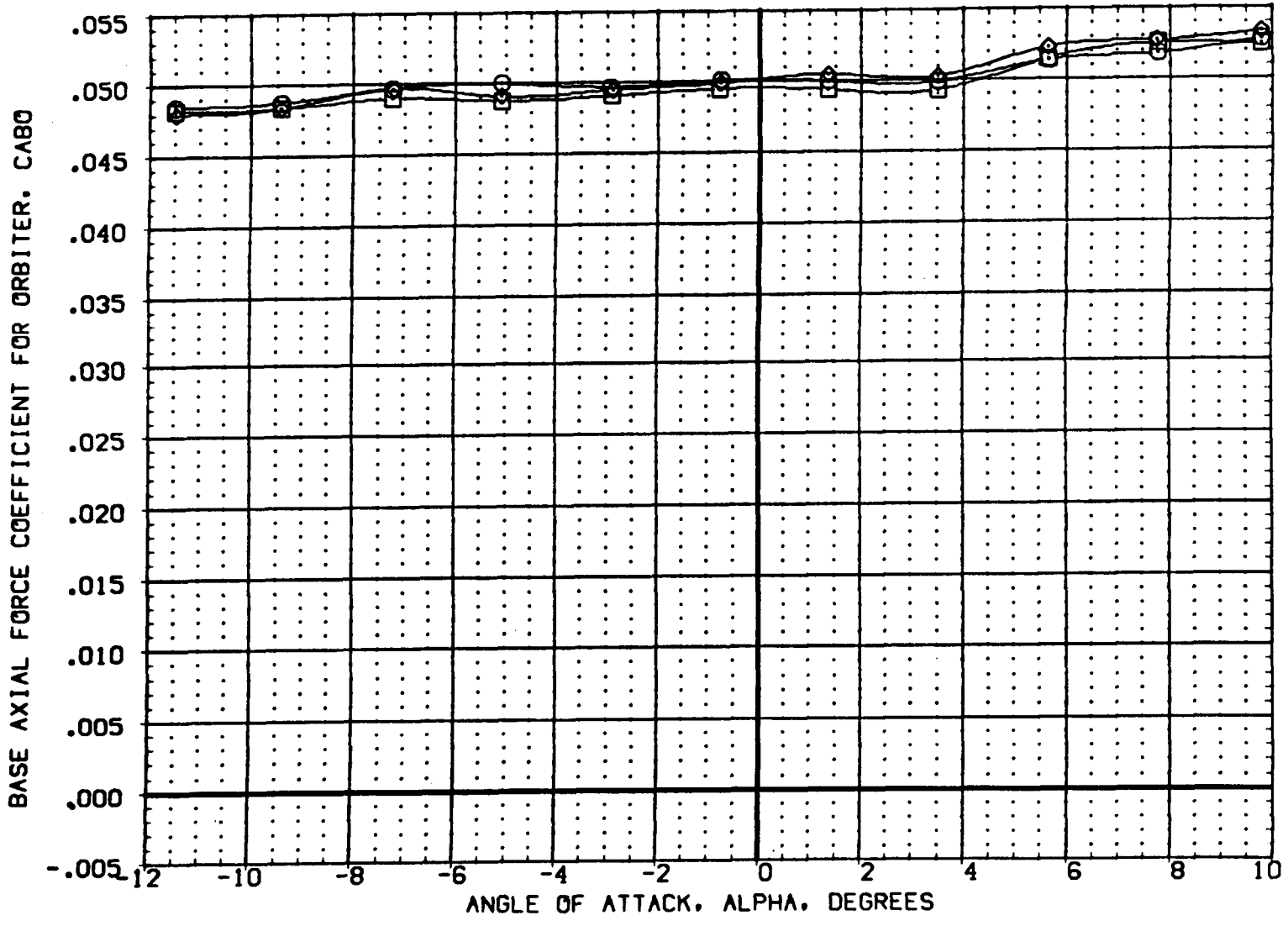
(A93003)	□	MSFC 585((A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585((A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	□	MSFC 585(1A37B) (034)(S12)(T9)	.000	.000	30.000
(A93003)	◇	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
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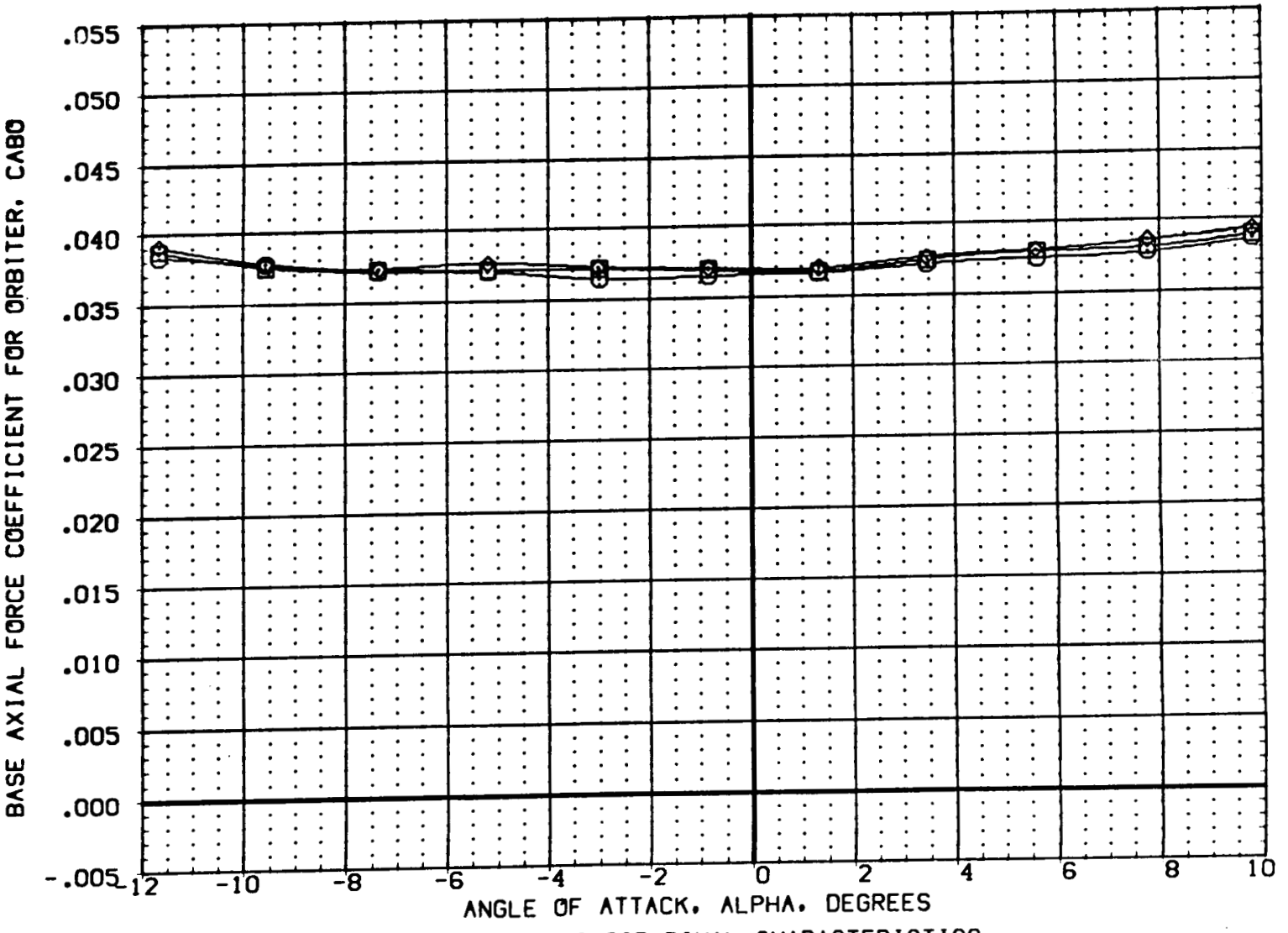

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

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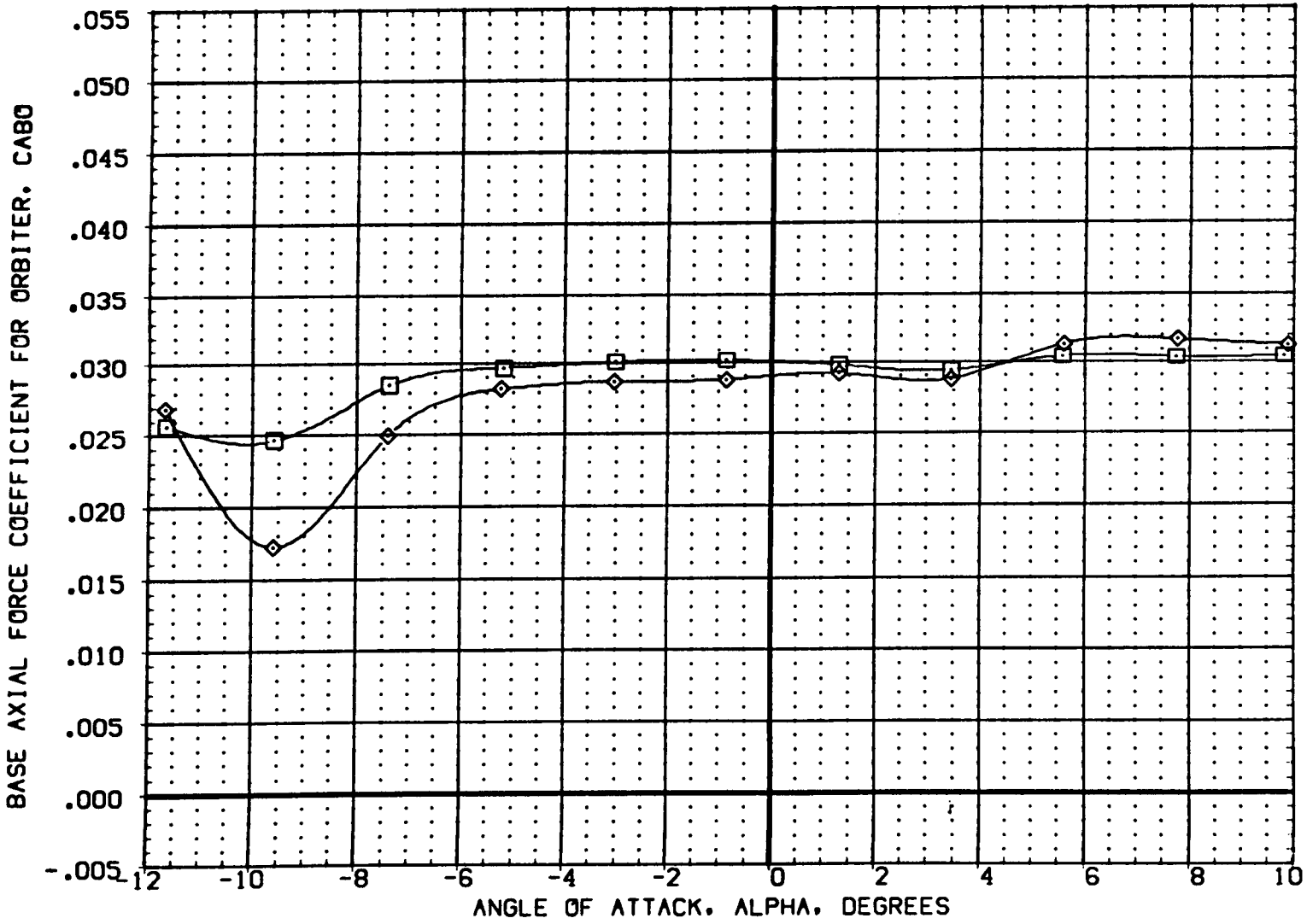
(A93005)	◇	MSFC S85(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(E)MACH = 1.96

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(A93CC1)	○	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
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(A93CC5)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93CC7)	△	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION

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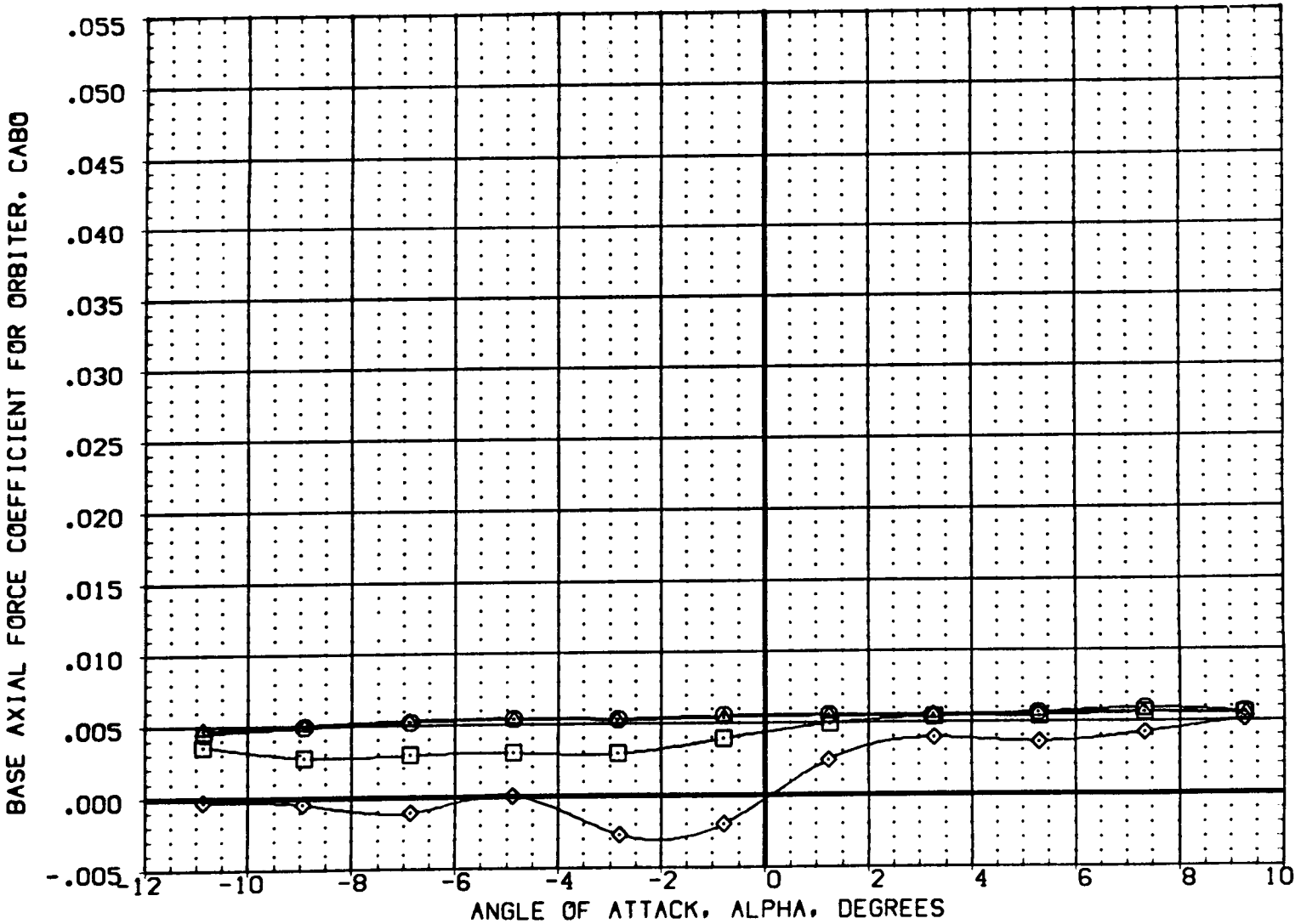
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(F)MACH = 4.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
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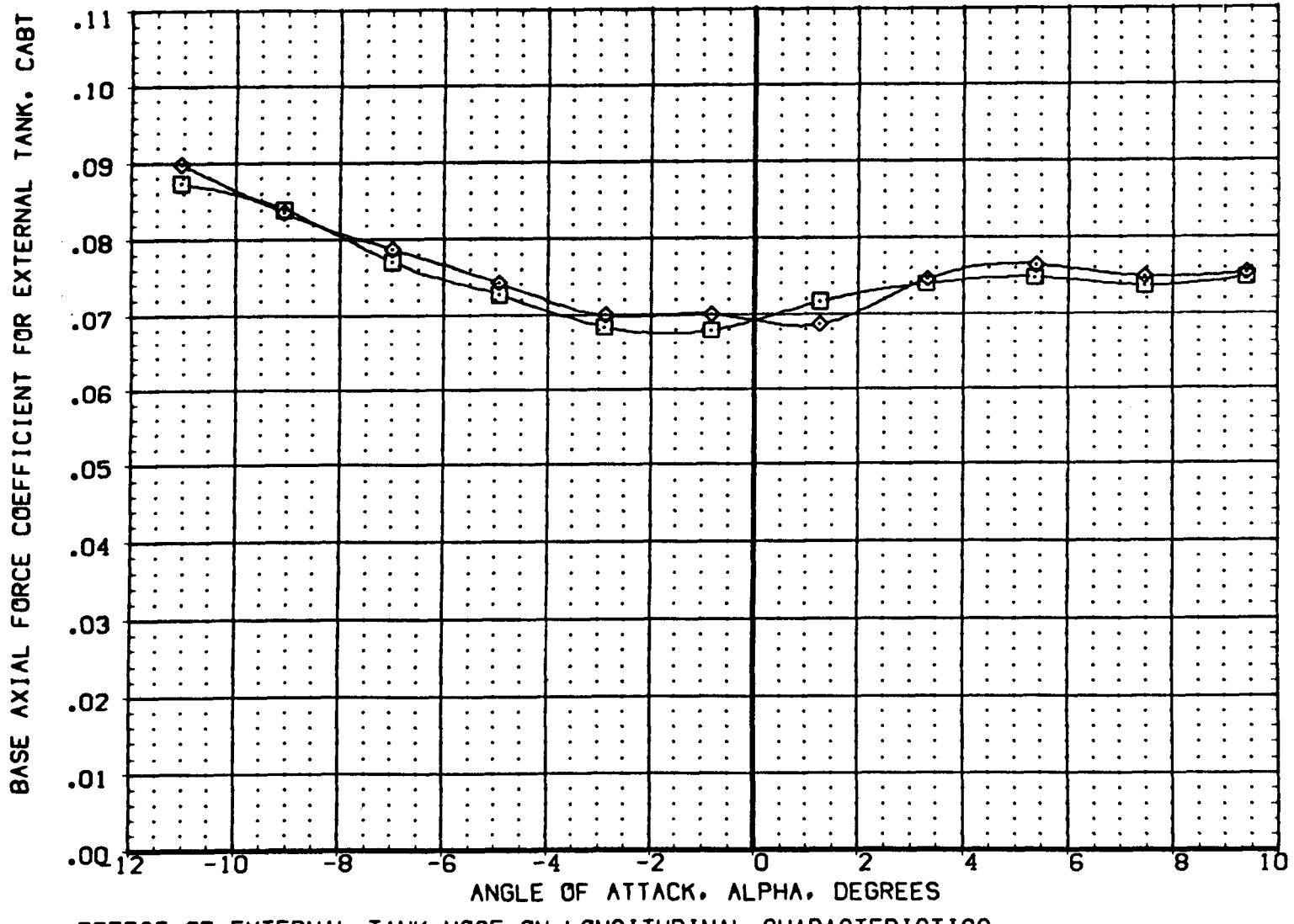
(A93003)	⊠	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(A)MACH = .60

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(1A37B) (034)(S12)(T9)	.000	.000	30.000
(A93003)	□	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

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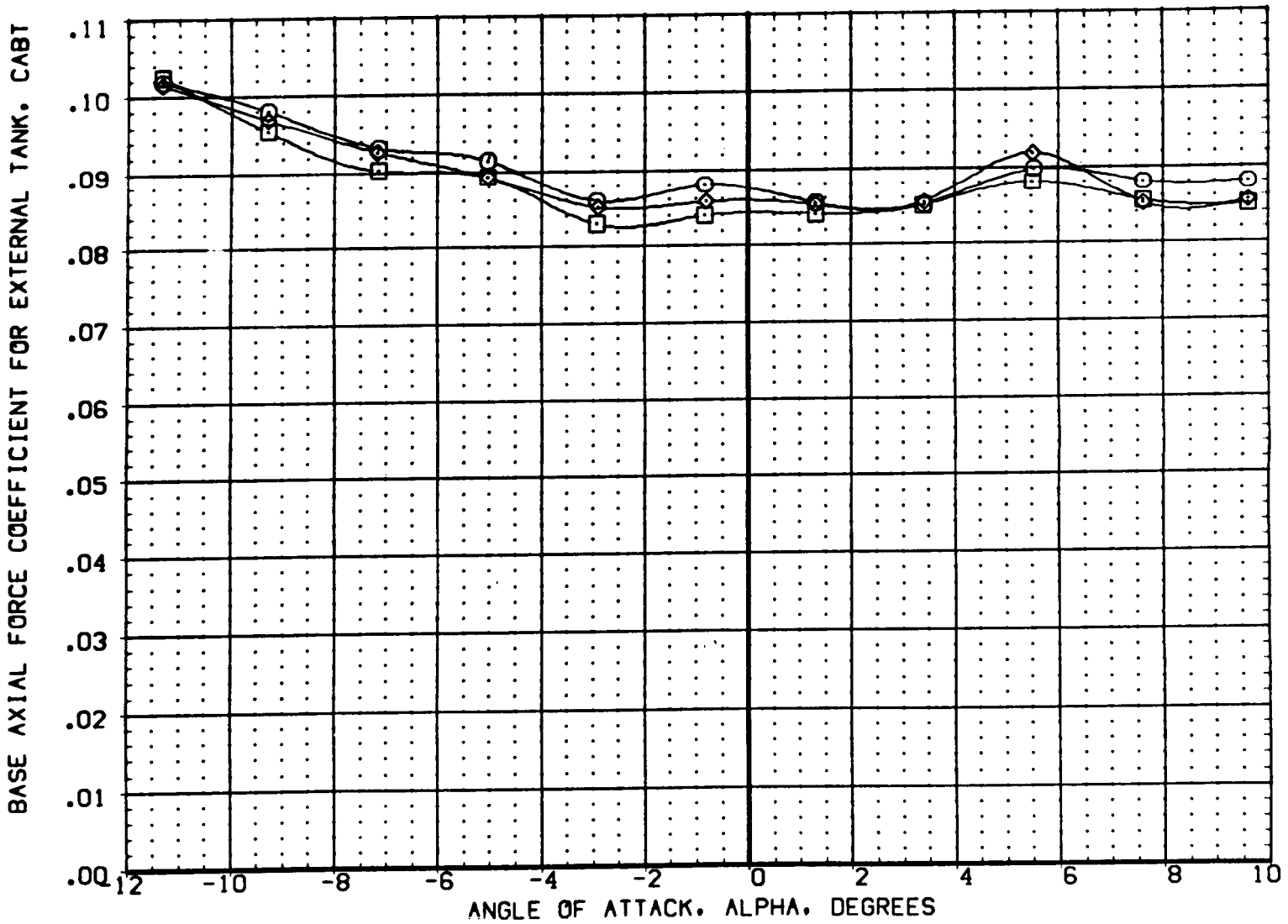

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
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(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)
(A93005)	⊠	MSFC 585(1A378) (034)(S12)(T11)
(A93007)	△	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
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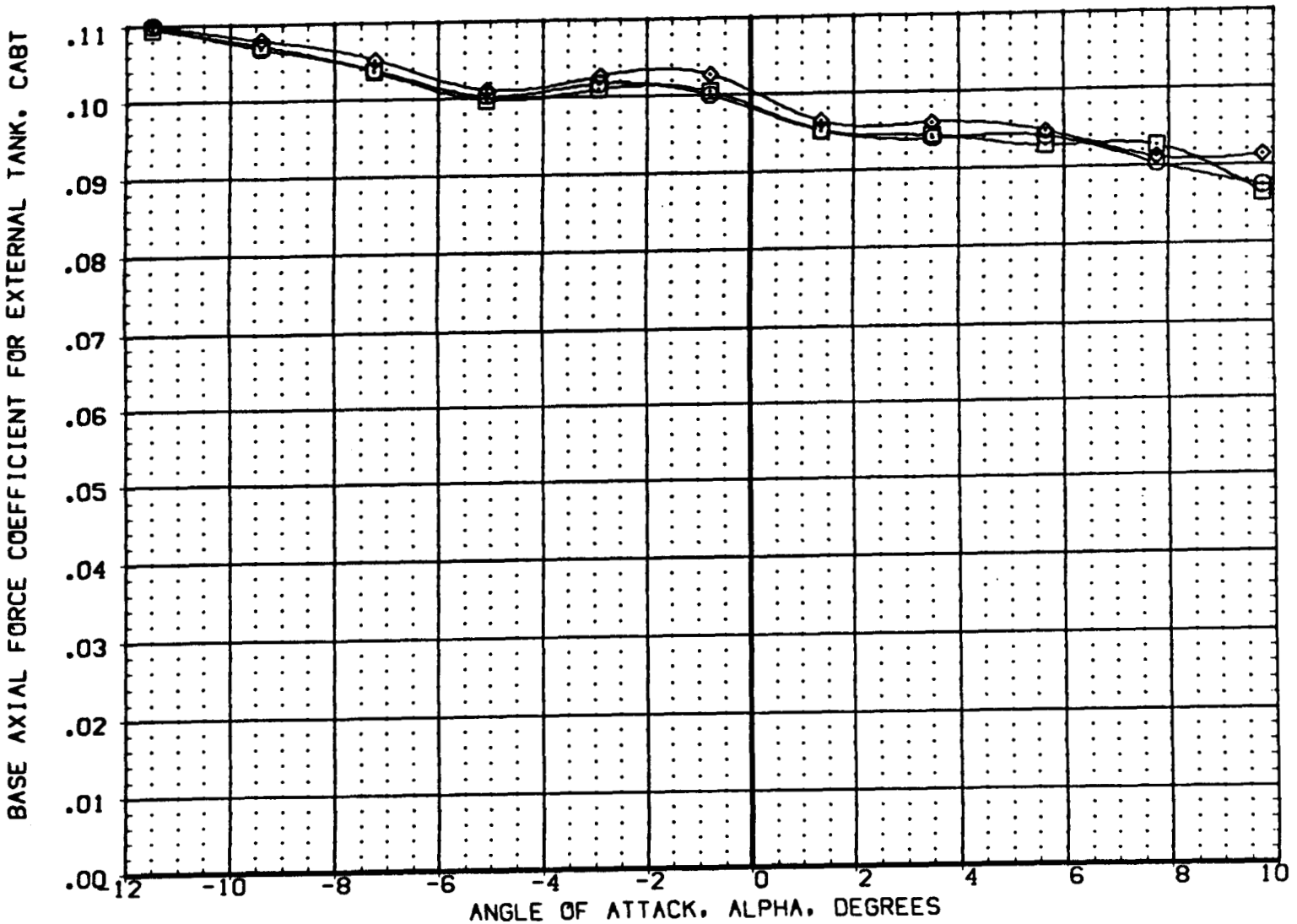
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(C)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
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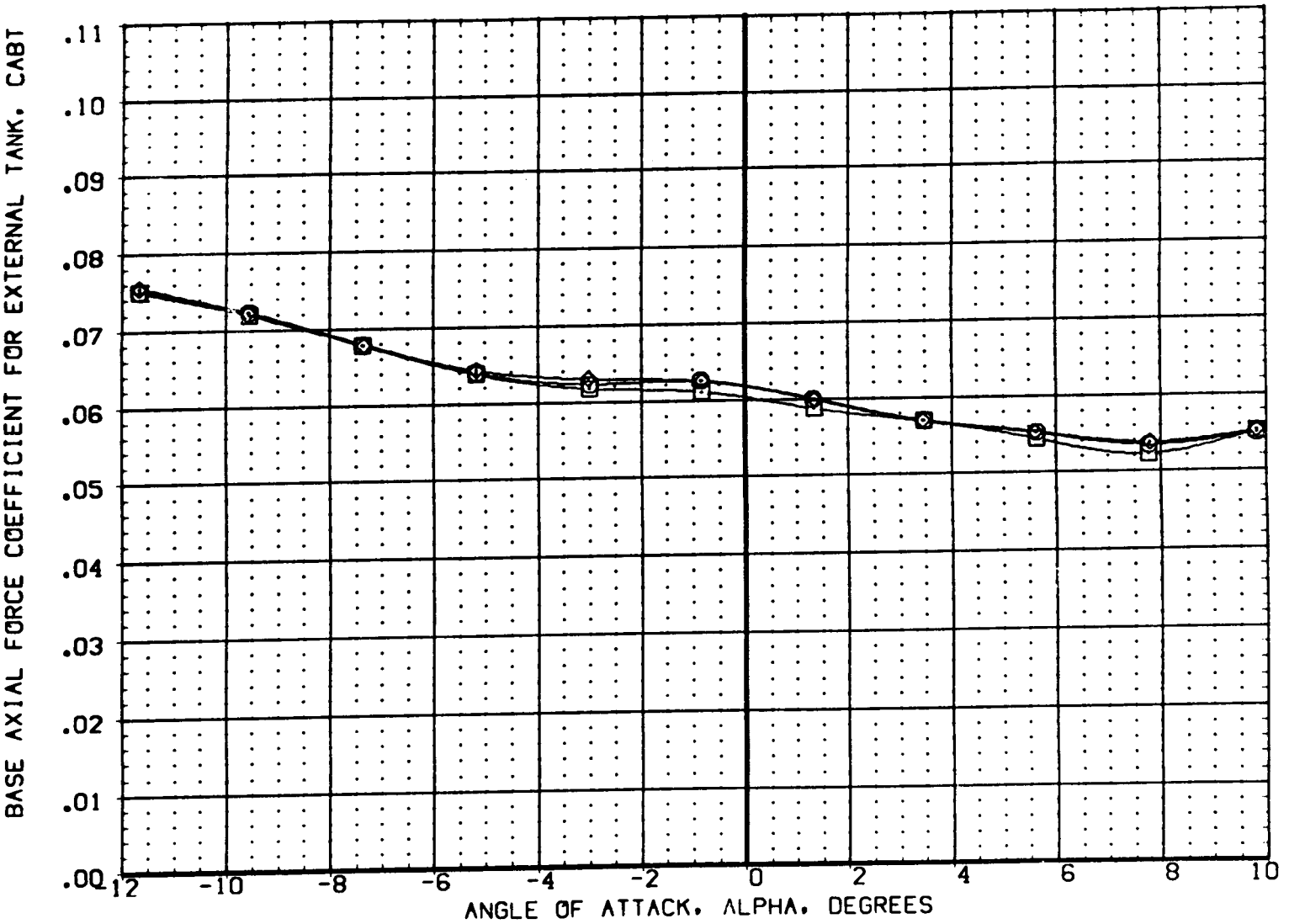
(A93003)	◇	MSFC 585[(A378) (034)(S12)(T15)
(A93005)	△	MSFC 585[(A378) (034)(S12)(T11)
(A93007)	⊠	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

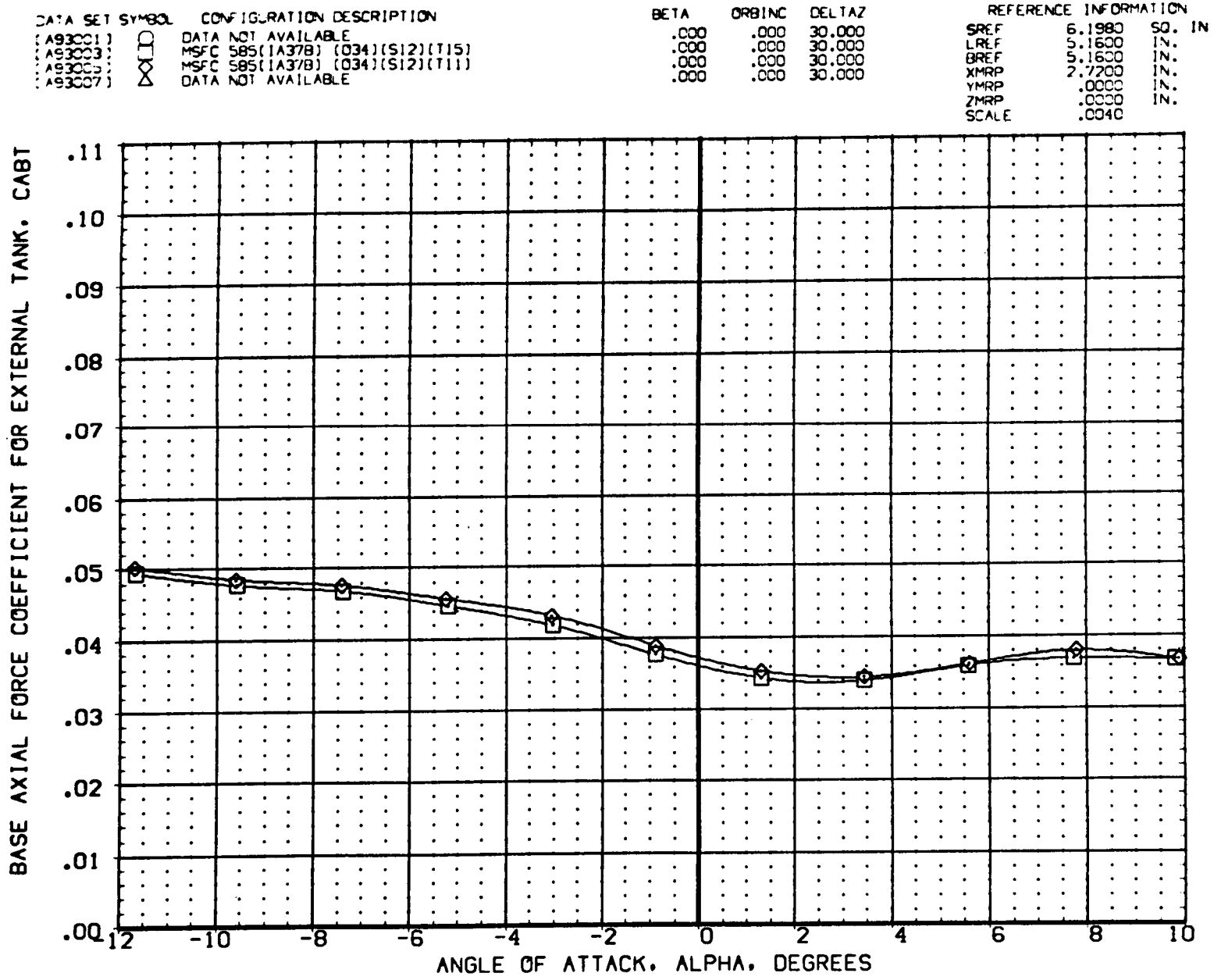
REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
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(A93003)	□	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
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YMRP	.0000	IN.
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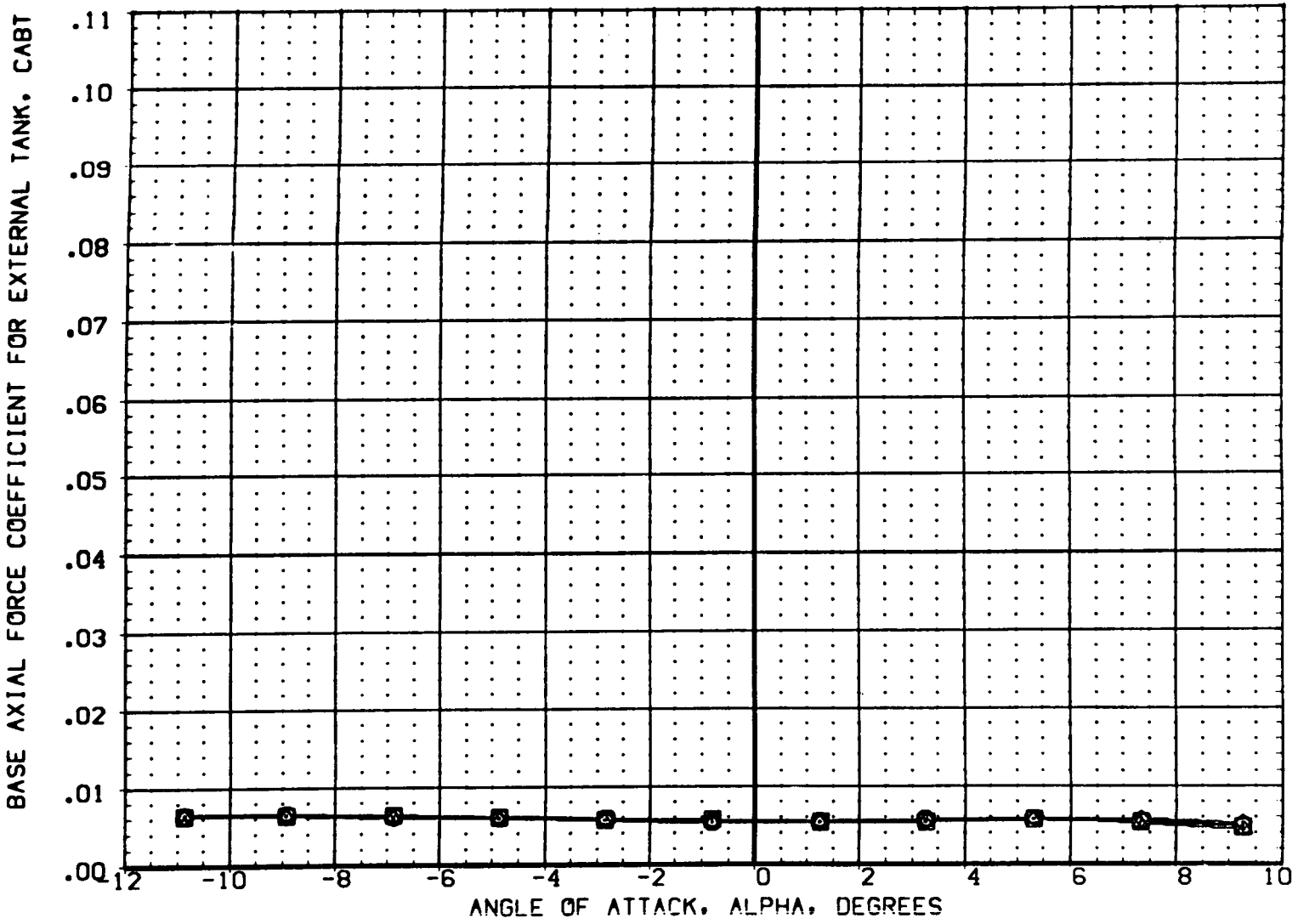


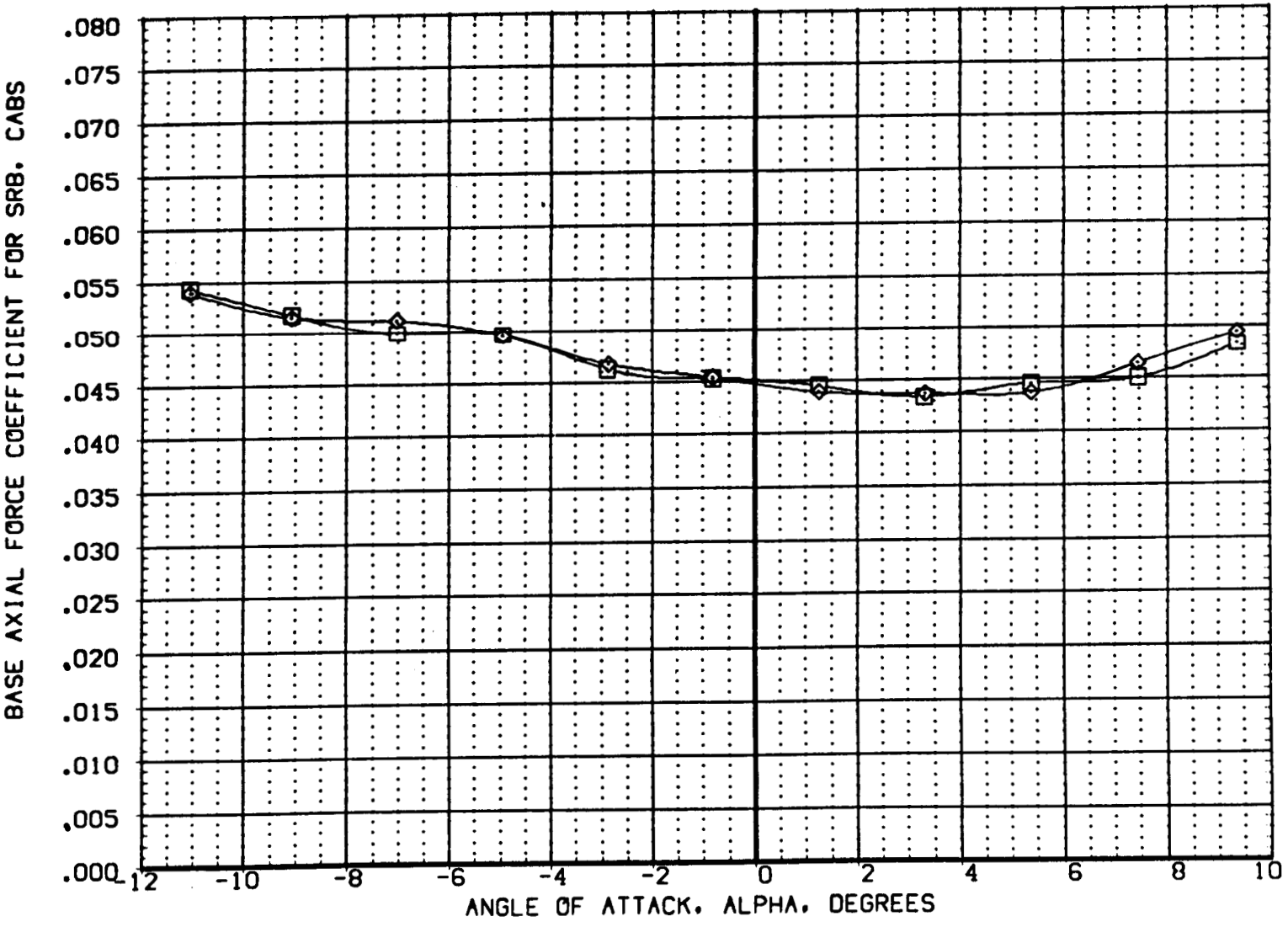
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(F)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

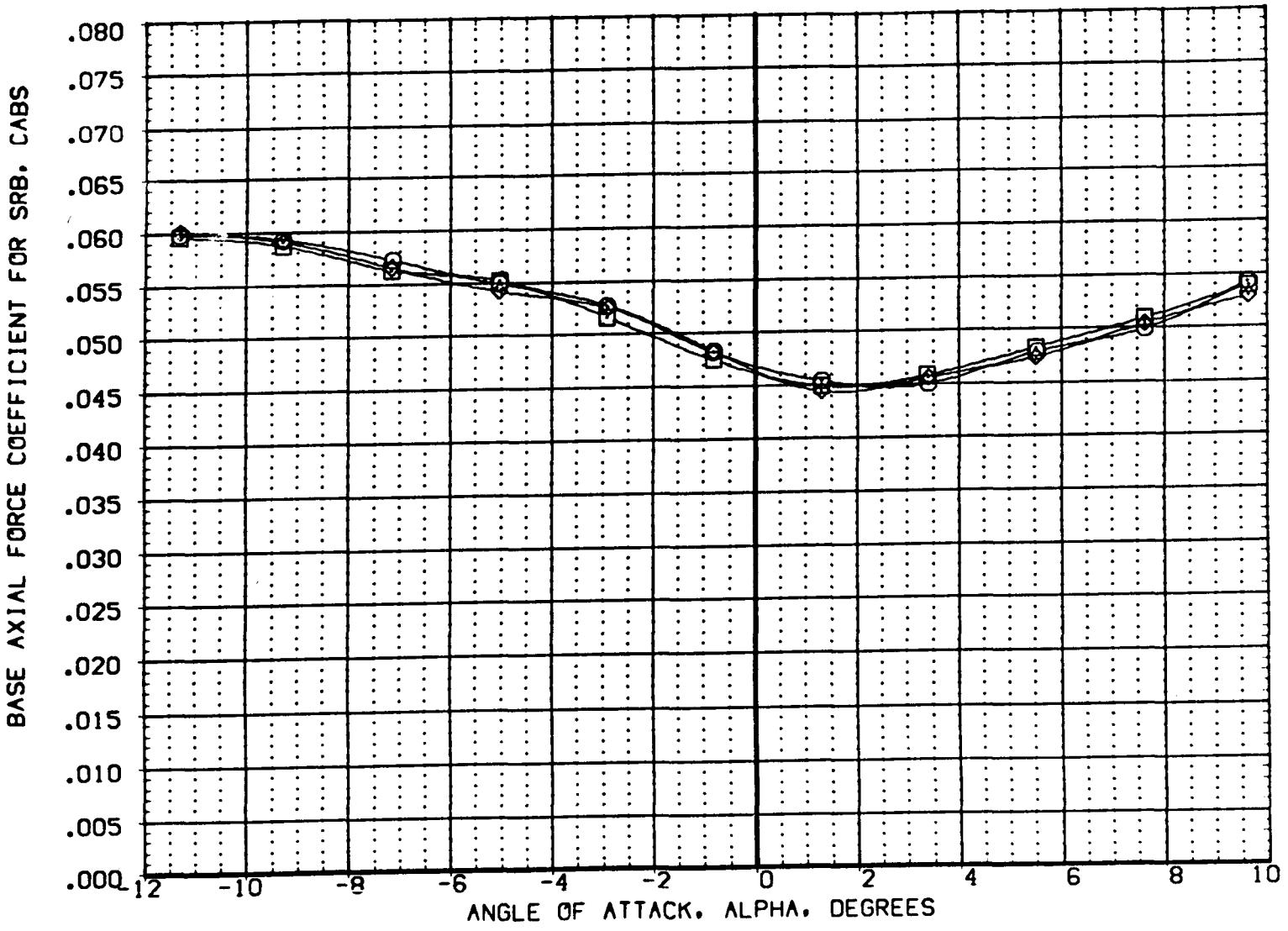
(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A93001)	MSFC 585(1A378) (034)(S12)(T9)
(A93003)	MSFC 585(1A378) (034)(S12)(T15)
(A93005)	MSFC 585(1A378) (034)(S12)(T11)
(A93007)	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

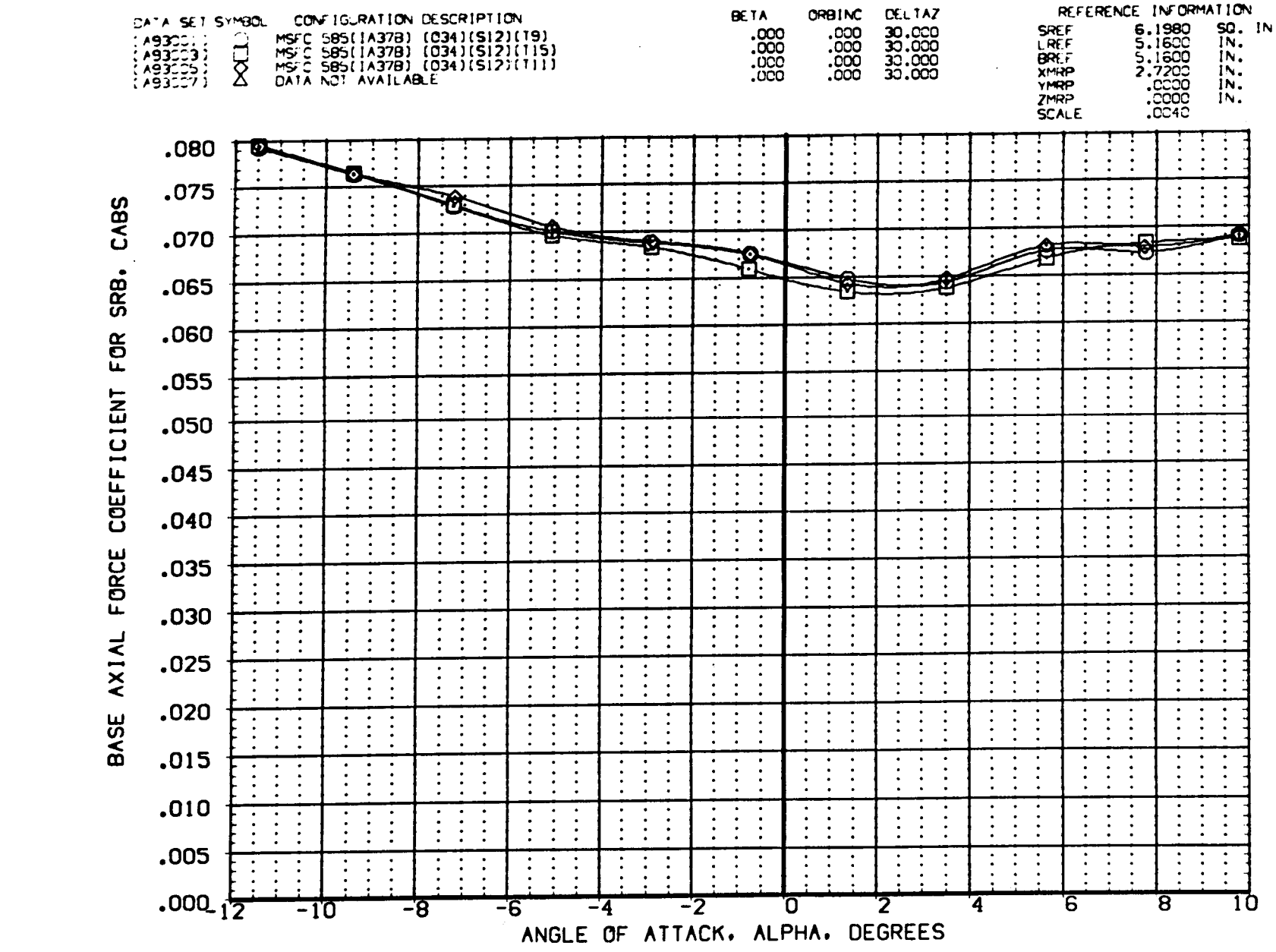
REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

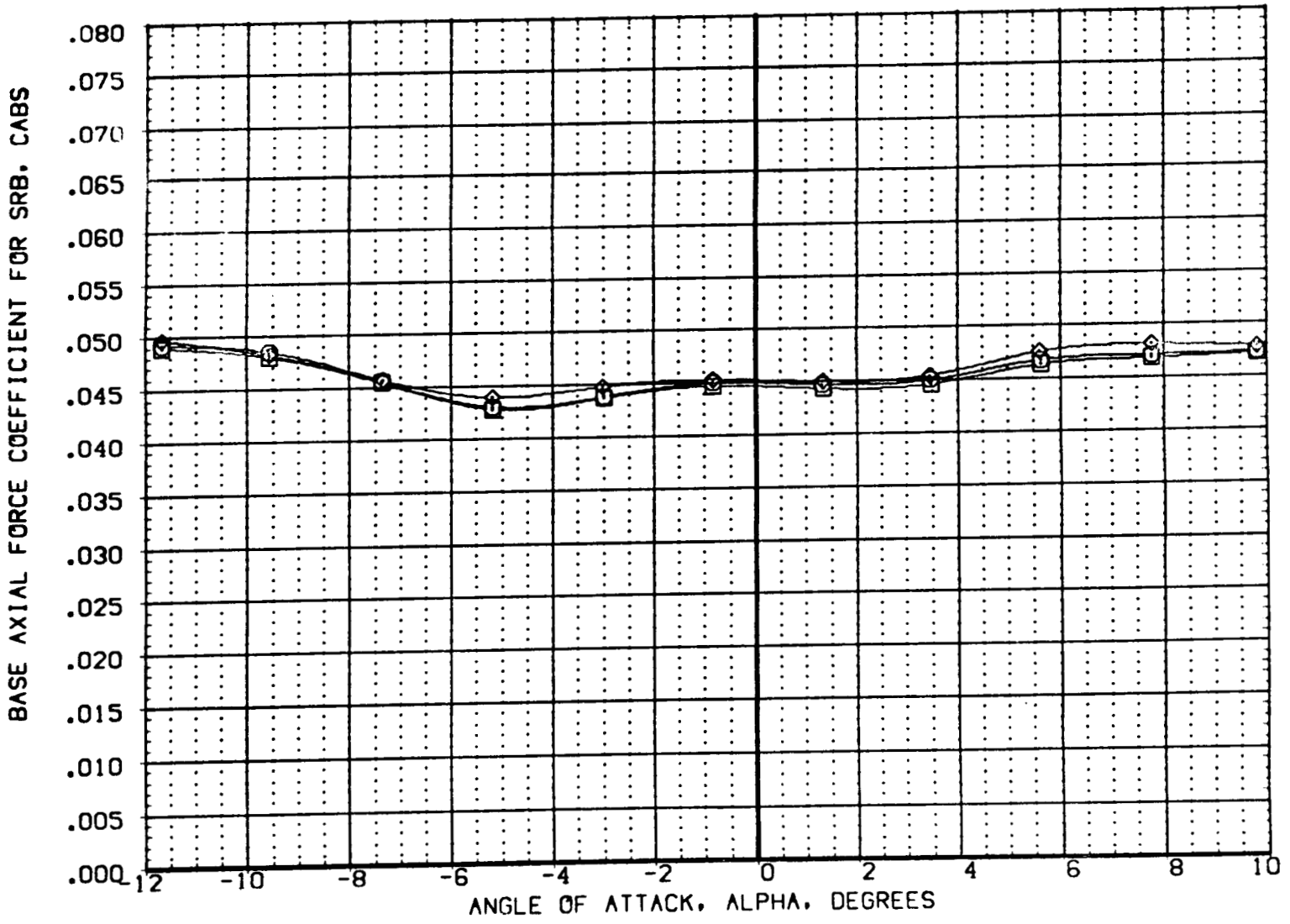


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	□	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

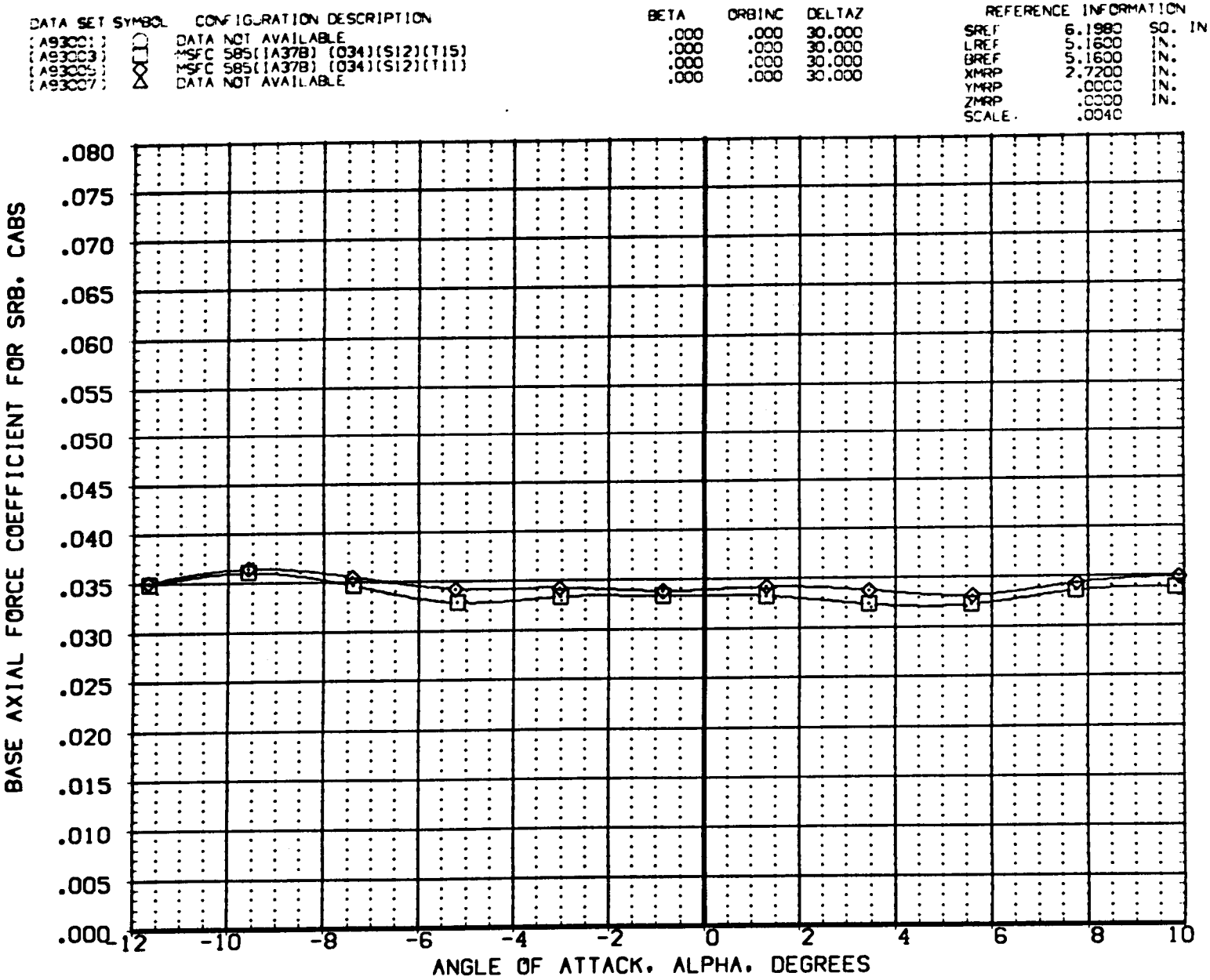
REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

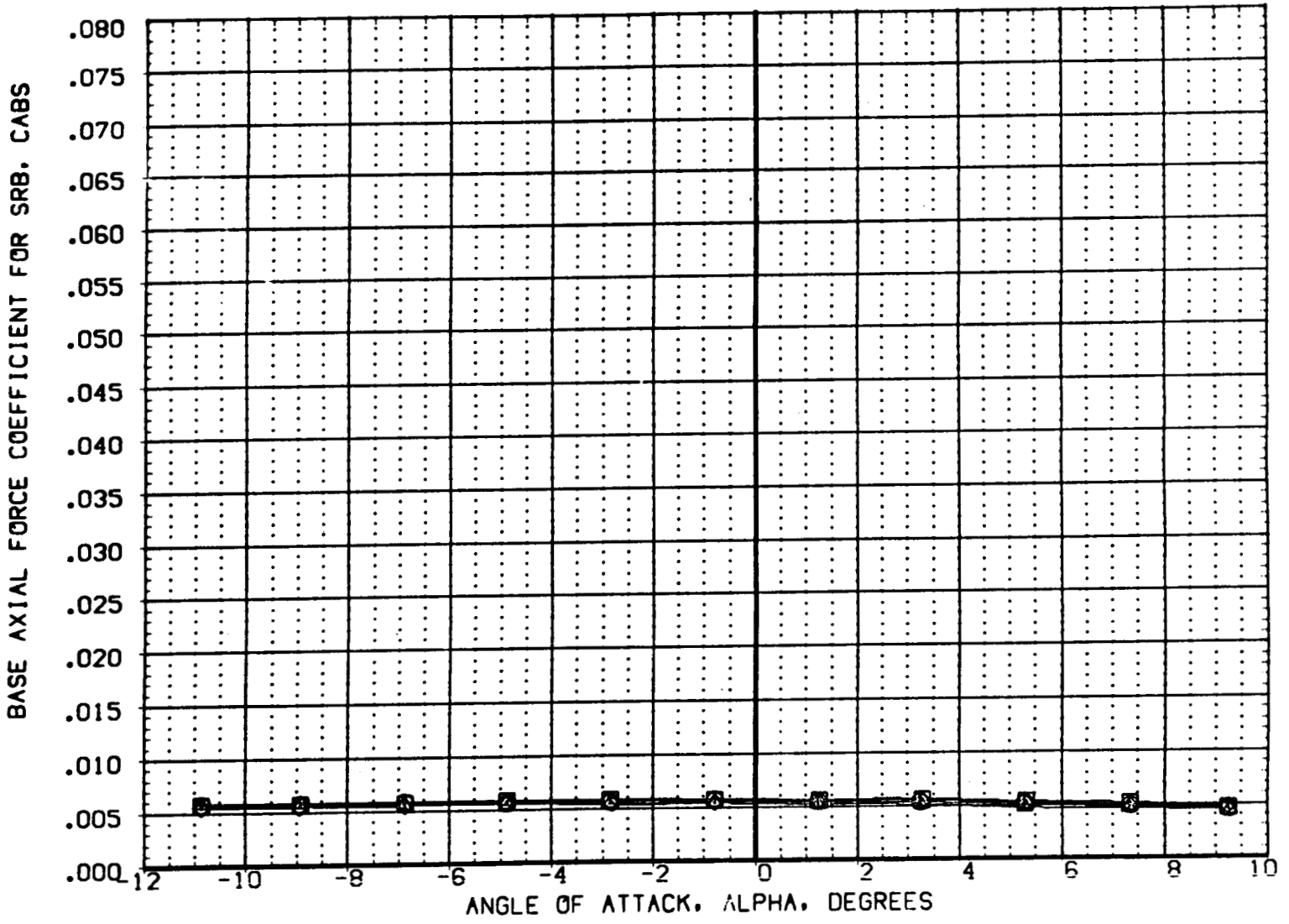


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	□	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93029)	◇	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93027)	△	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

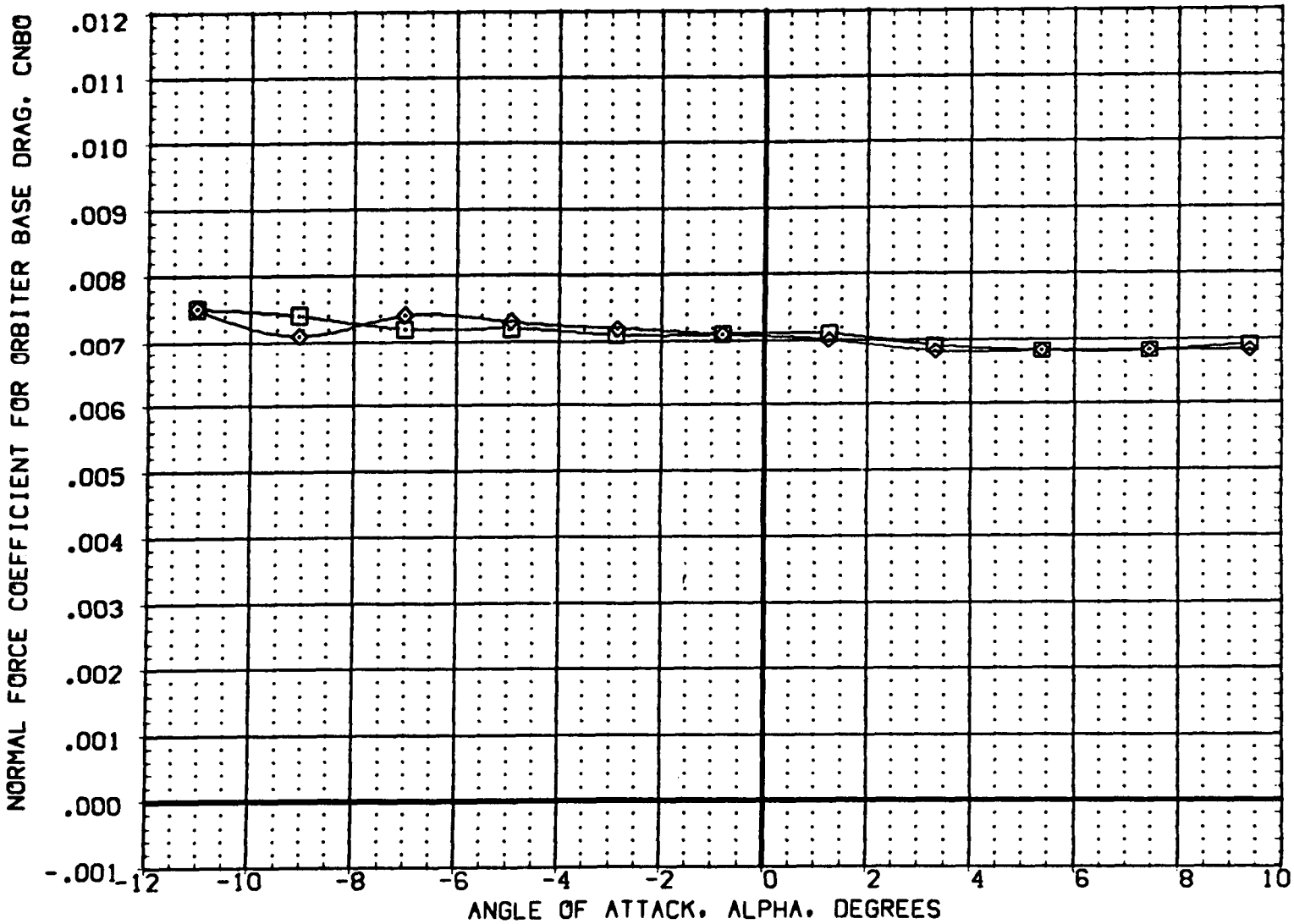


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(F)MACH = 4.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	□	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



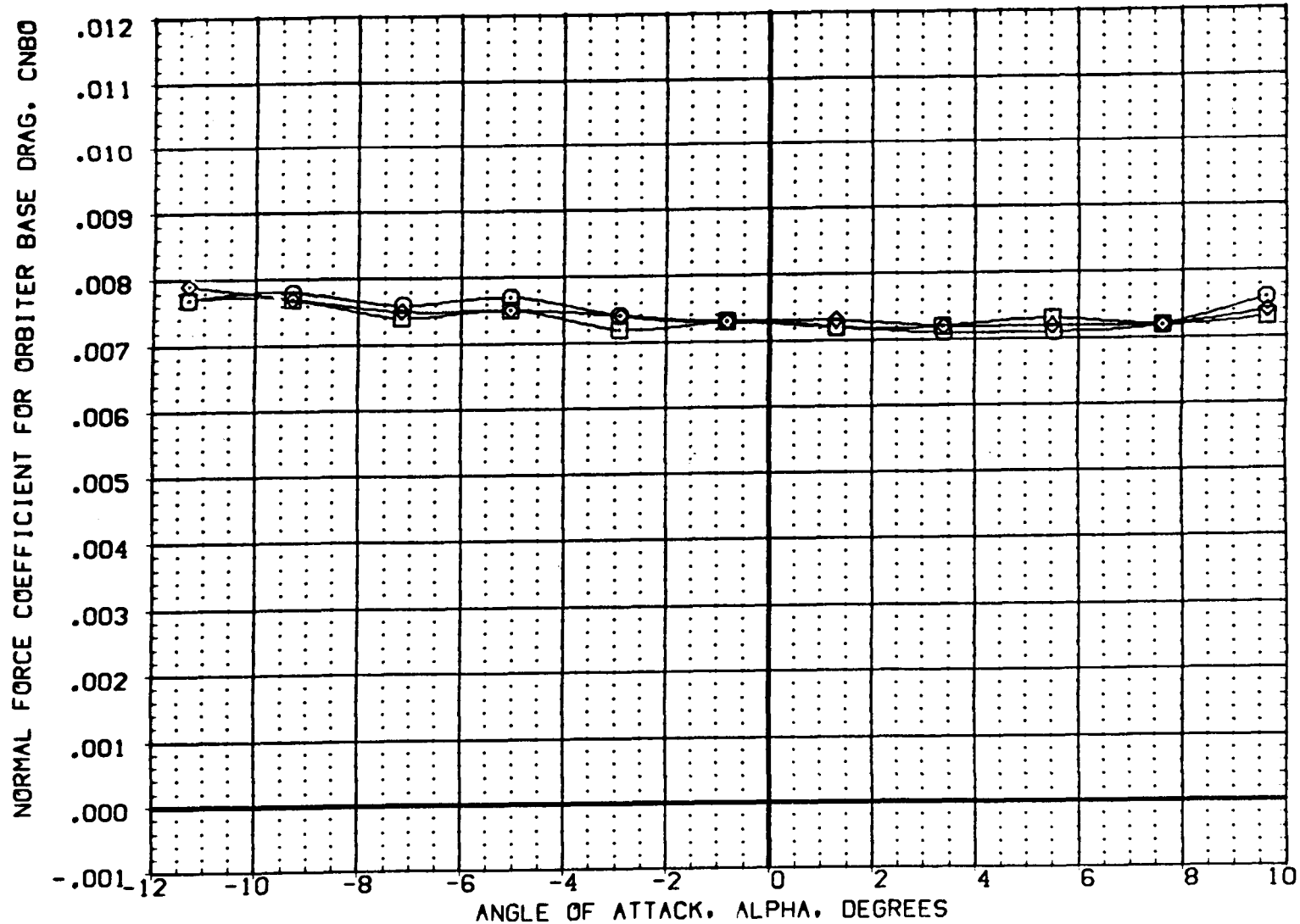
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(A)MACH = .60

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	□	MSFC 585[(A378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	◇	MSFC 585[(A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⋈	MSFC 585[(A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

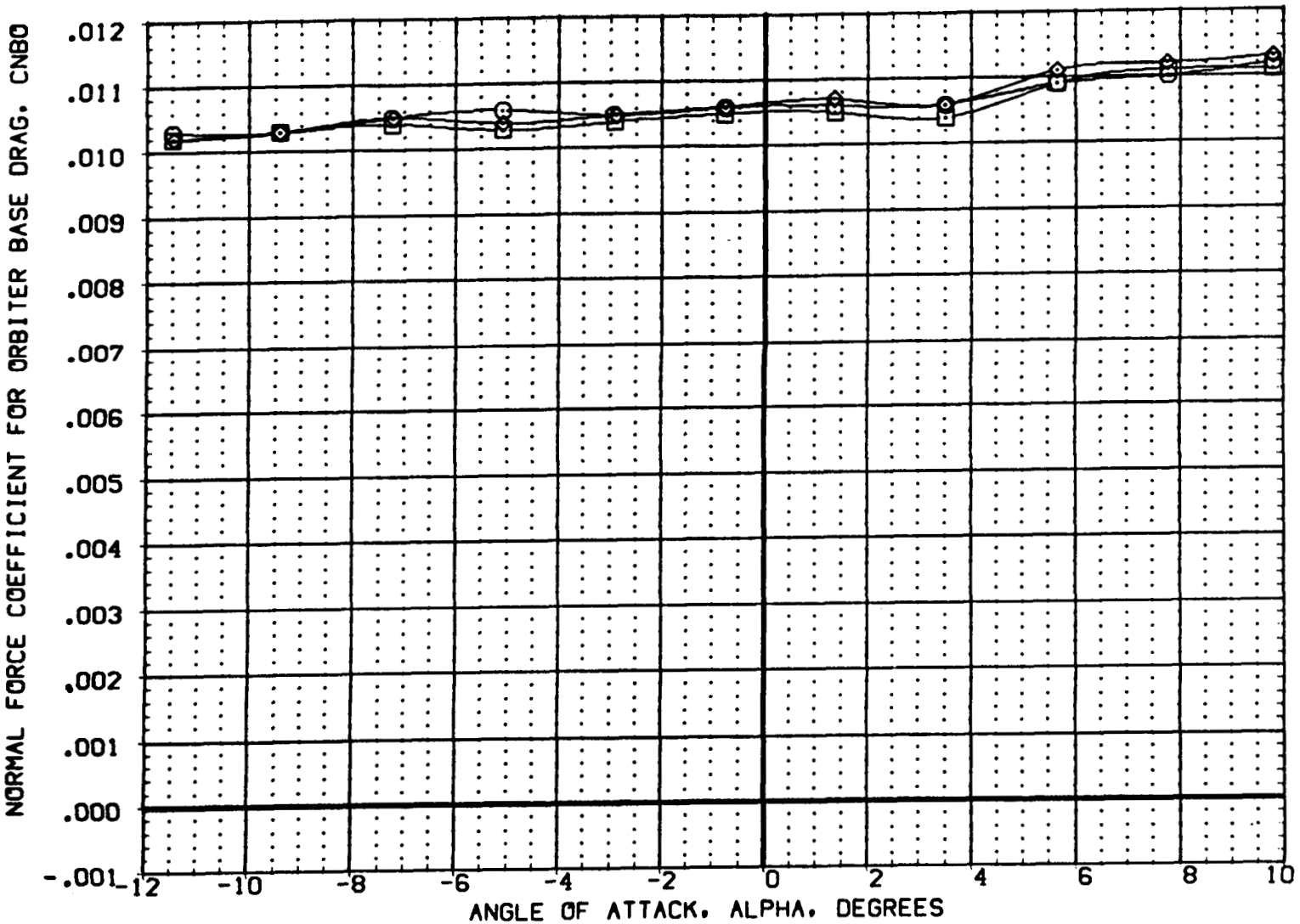


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)		MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)		MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)		MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)		DATA NOT AVAILABLE			

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7700	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



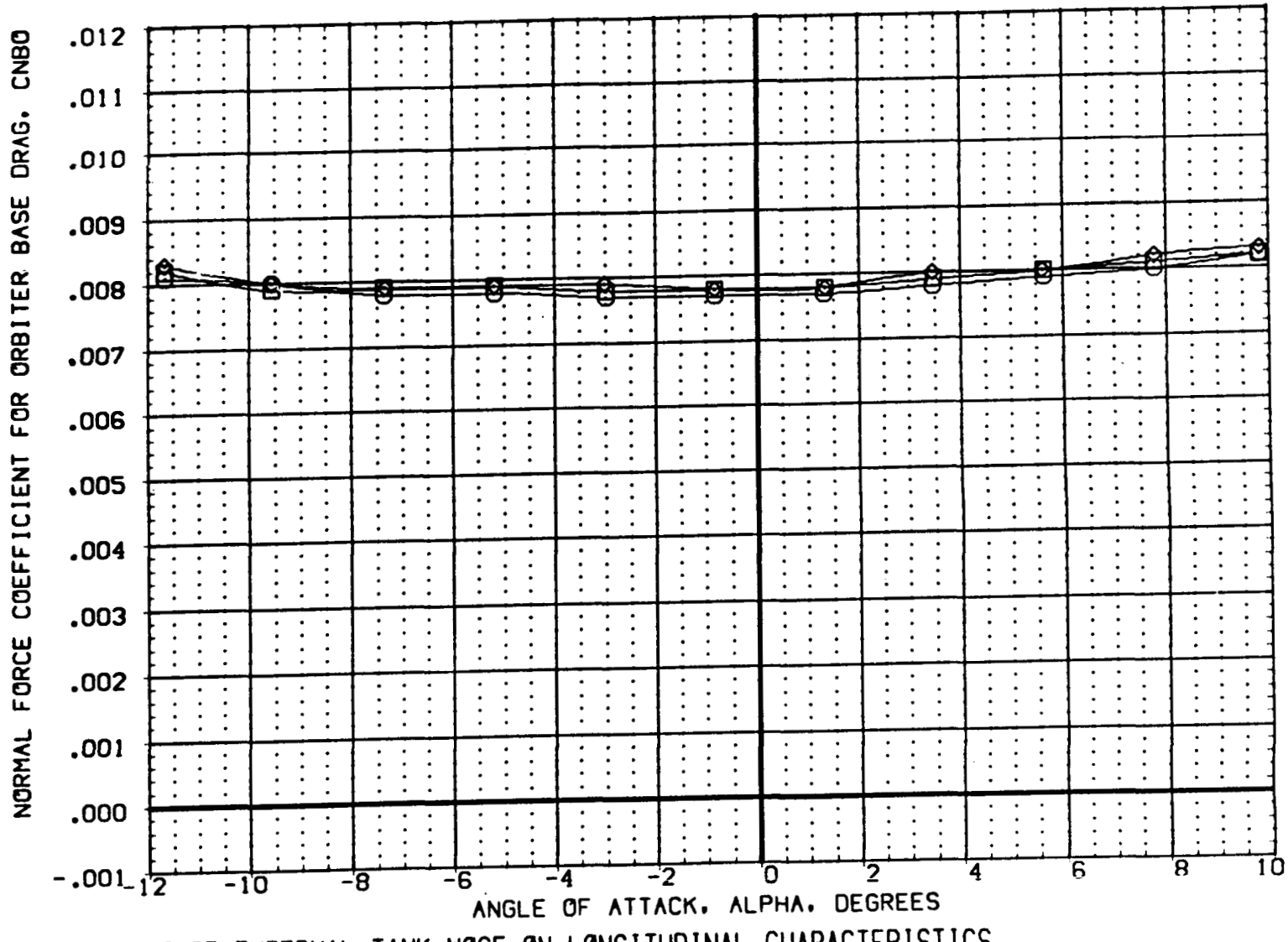
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(C)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(IA37B) (034)(S12)(19)	.000	.000	30.000
(A93003)	□	MSFC 585(IA37B) (034)(S12)(15)	.000	.000	30.000
(A93005)	◇	MSFC 585(IA37B) (034)(S12)(11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE			

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



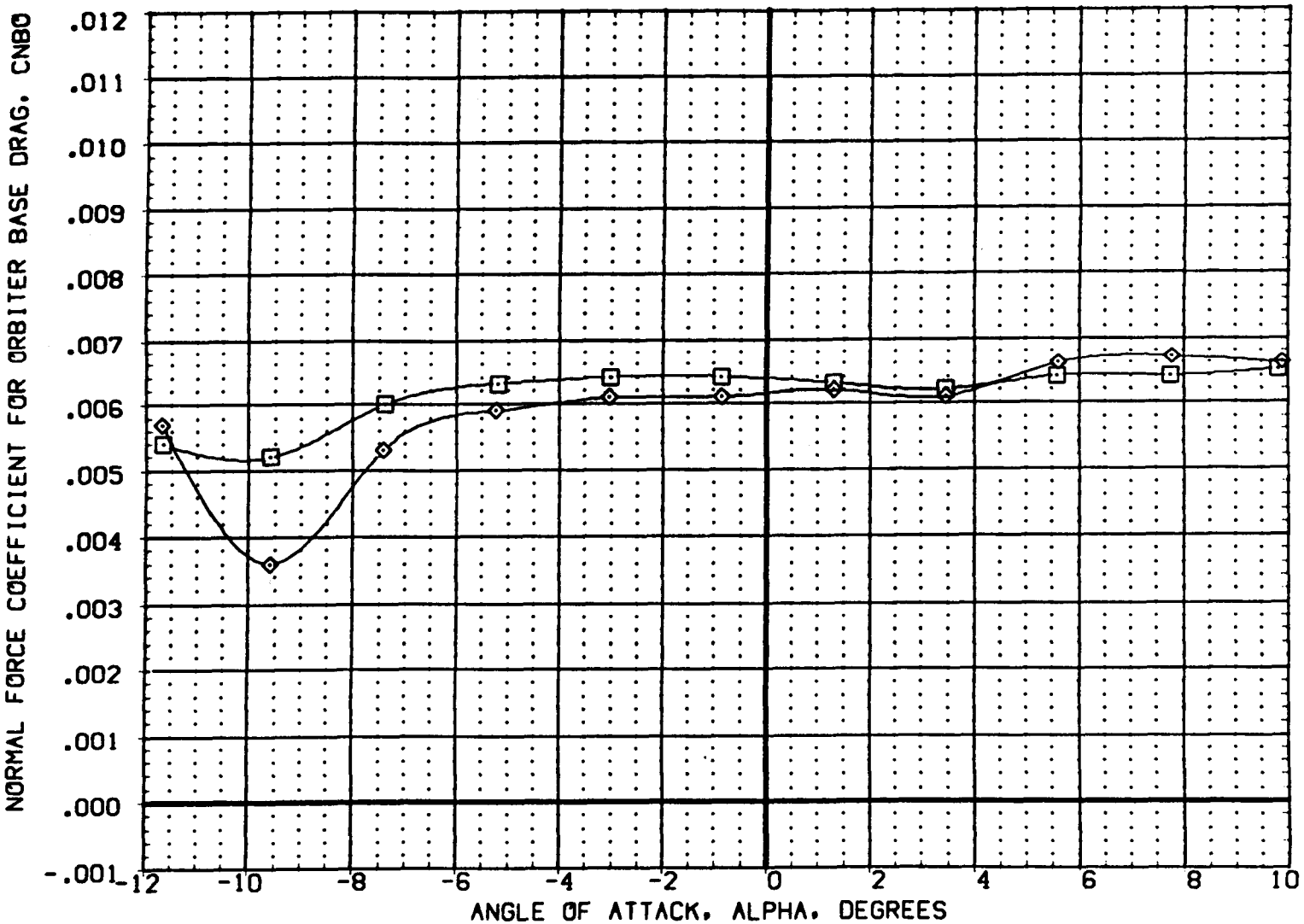
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	□	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	◇	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

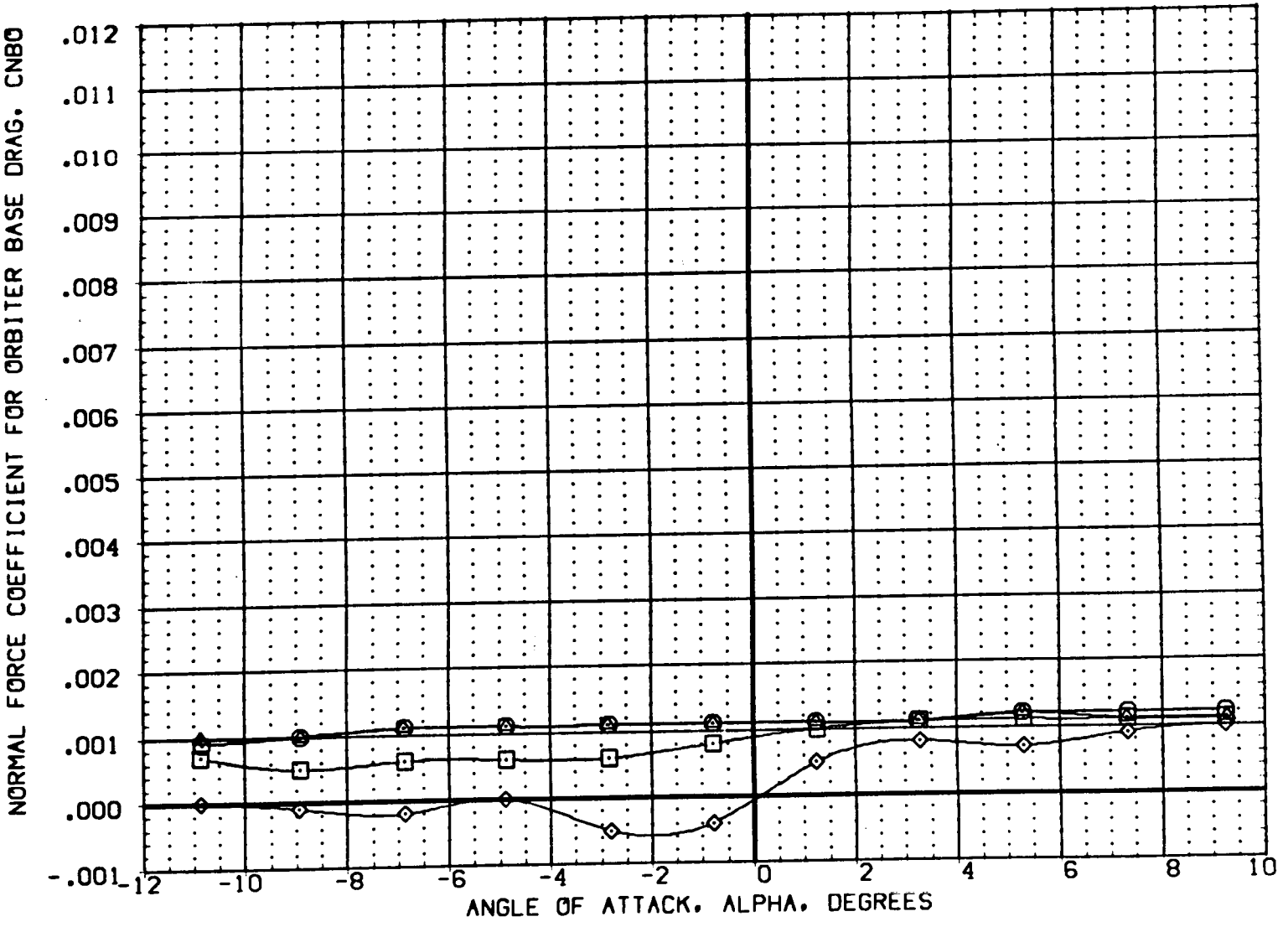
(E)MACH = 1.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93001)	□	MSFC 585(1A378) (034)(S12)(T9)
(A93003)	⊡	MSFC 585(1A378) (034)(S12)(T15)
(A93005)	⊠	MSFC 585(1A378) (034)(S12)(T11)
(A93007)	△	MSFC 585(1A378) (034)(S12)(T15)

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



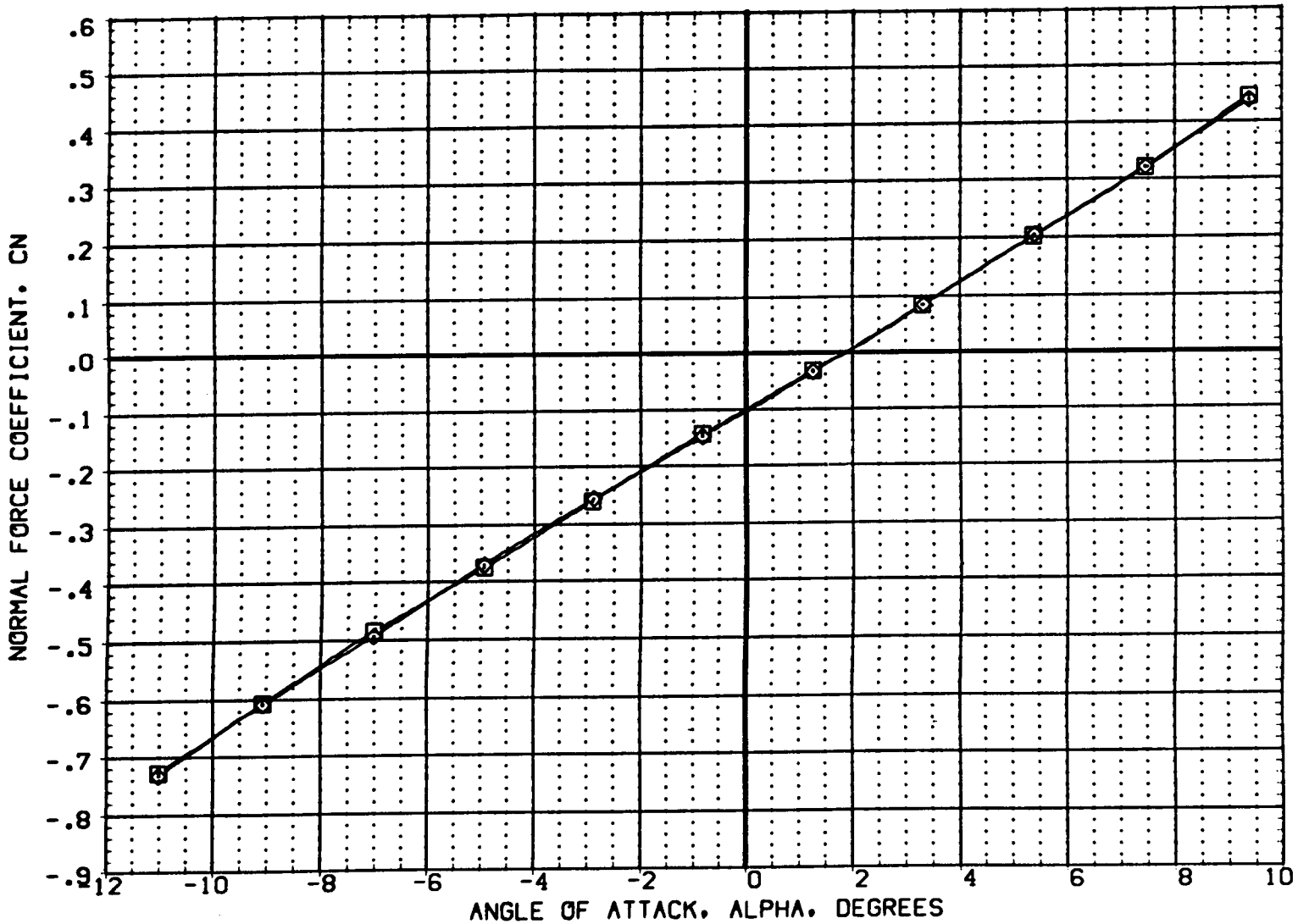
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(F)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	MSFC S85(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	MSFC S85(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



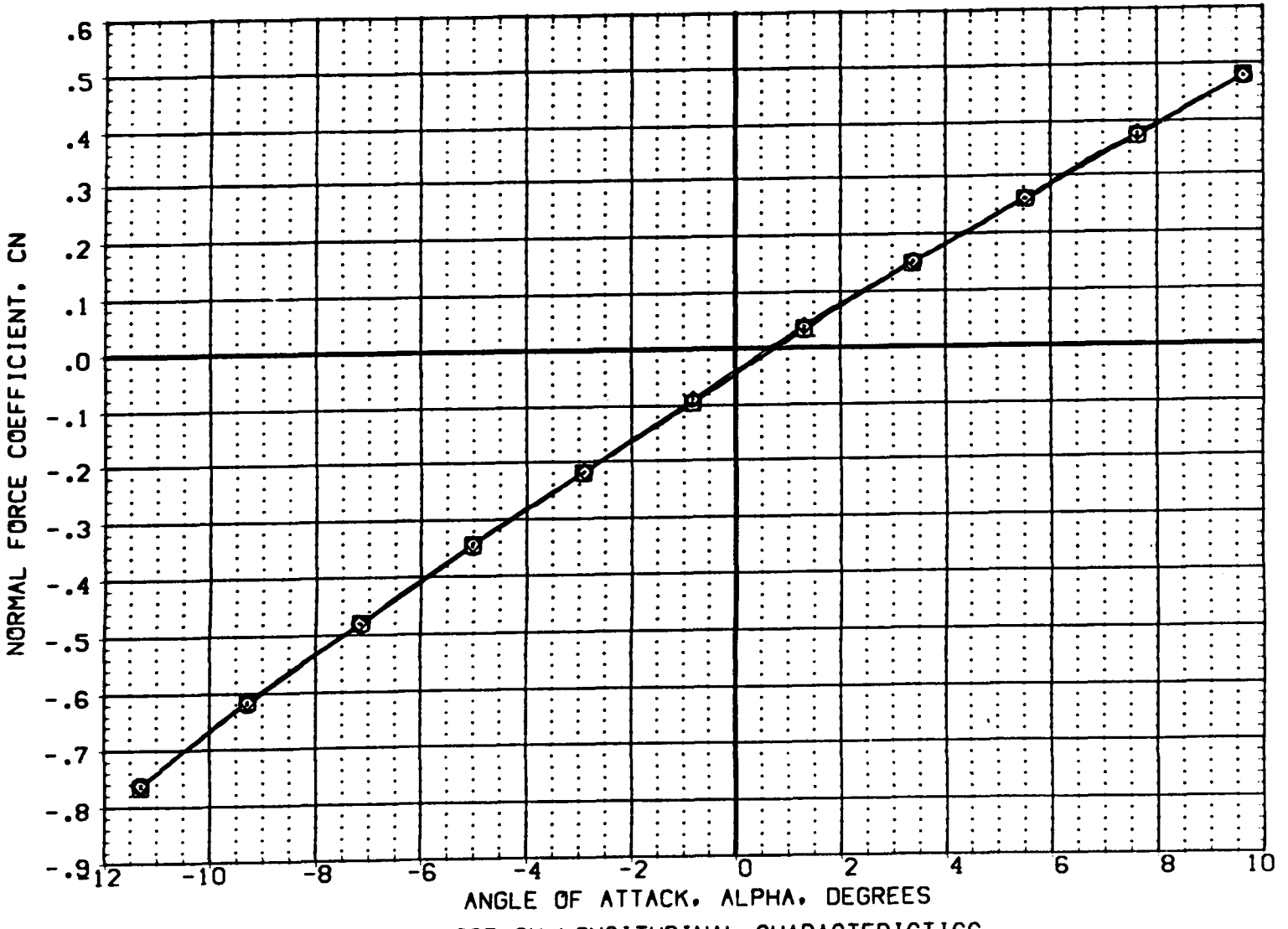
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	MSFC S85(IA37B) (034)(S12)(T9)	.000	.000	30.000
(A93003)	MSFC S85(IA37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	MSFC S85(IA37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	DATA NOT AVAILABLE			

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



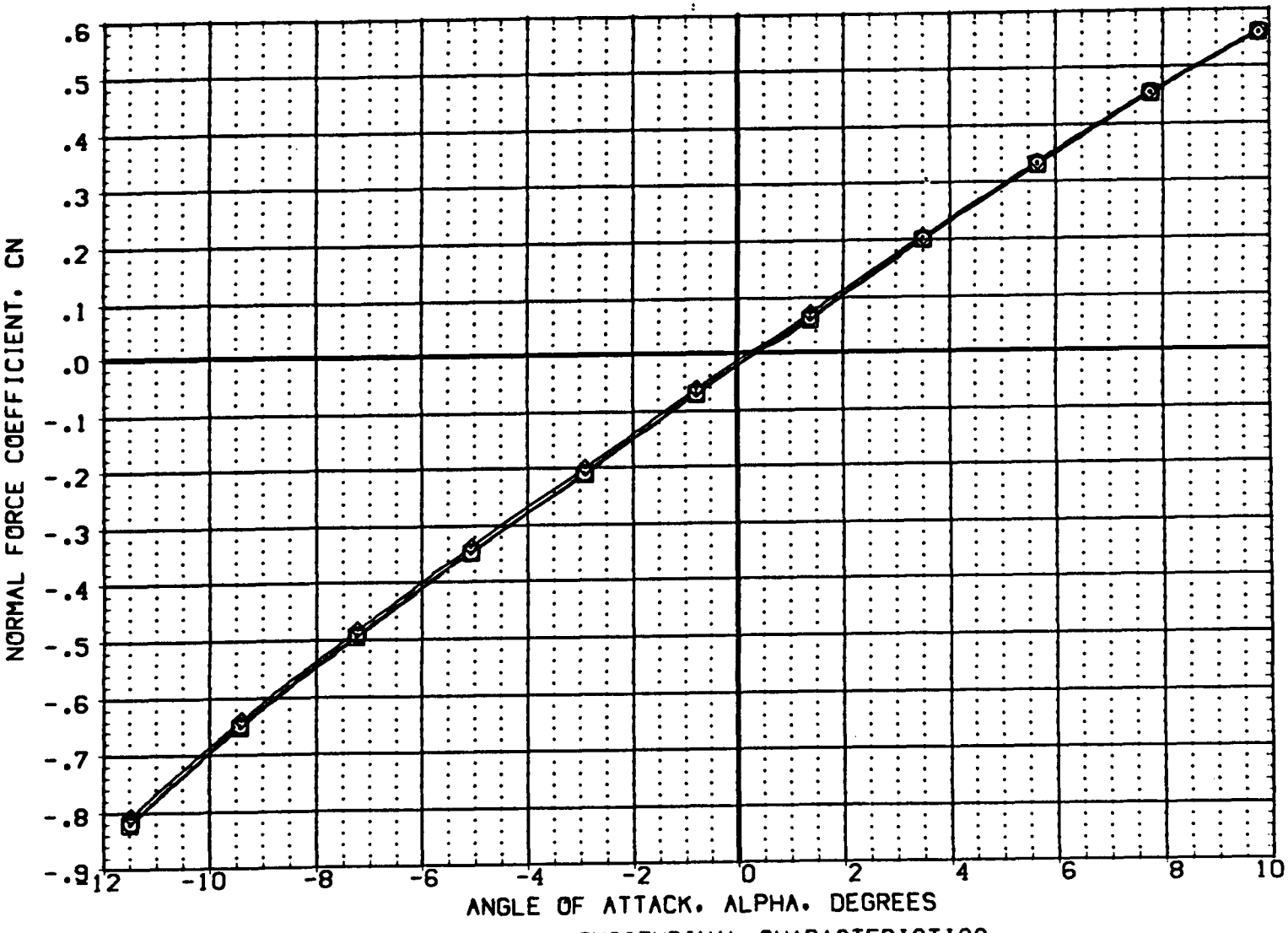
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)		MSFC 585([A378) (034)(S12)(T9)	.000	.000	30.000
(A93003)		MSFC 585([A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)		MSFC 585([A378) (034)(S12)(111)	.000	.000	30.000
(A93007)		DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

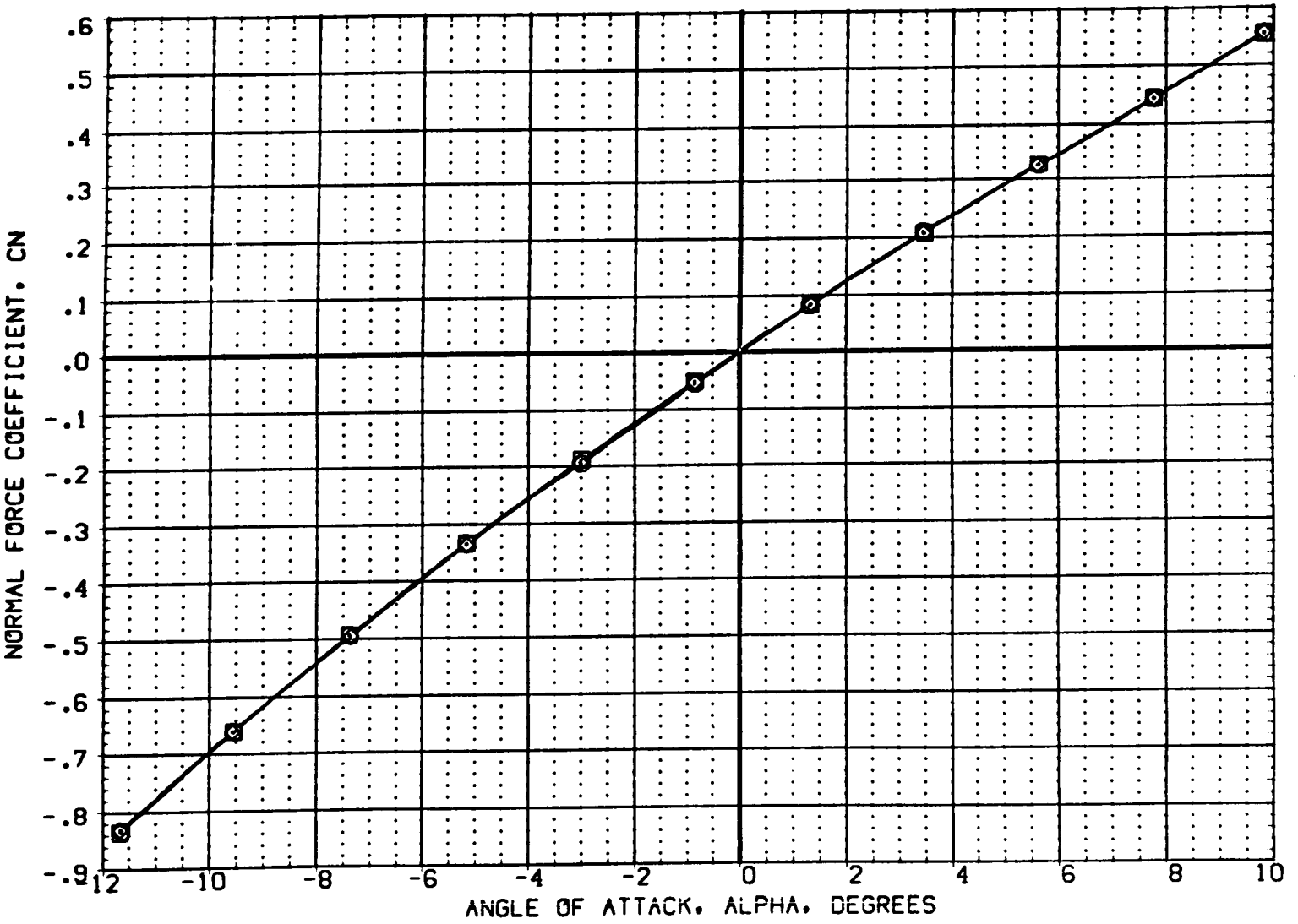
(C)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A93001)	MSFC 585(1A378) (034)(S12)(T9)
(A93003)	MSFC 585(1A378) (034)(S12)(T15)
(A93005)	MSFC 585(1A378) (034)(S12)(T11)
(A93007)	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



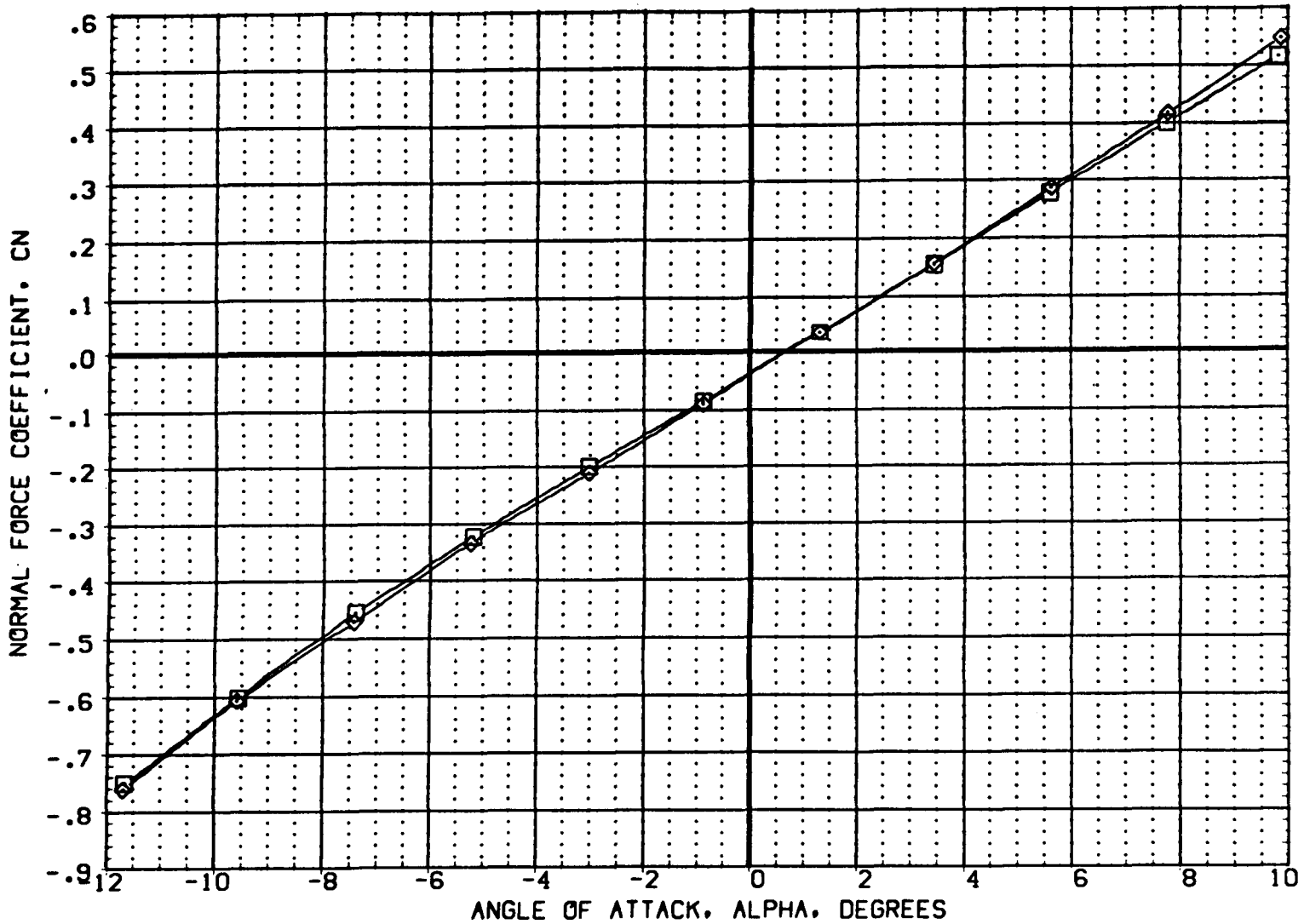
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⋈	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



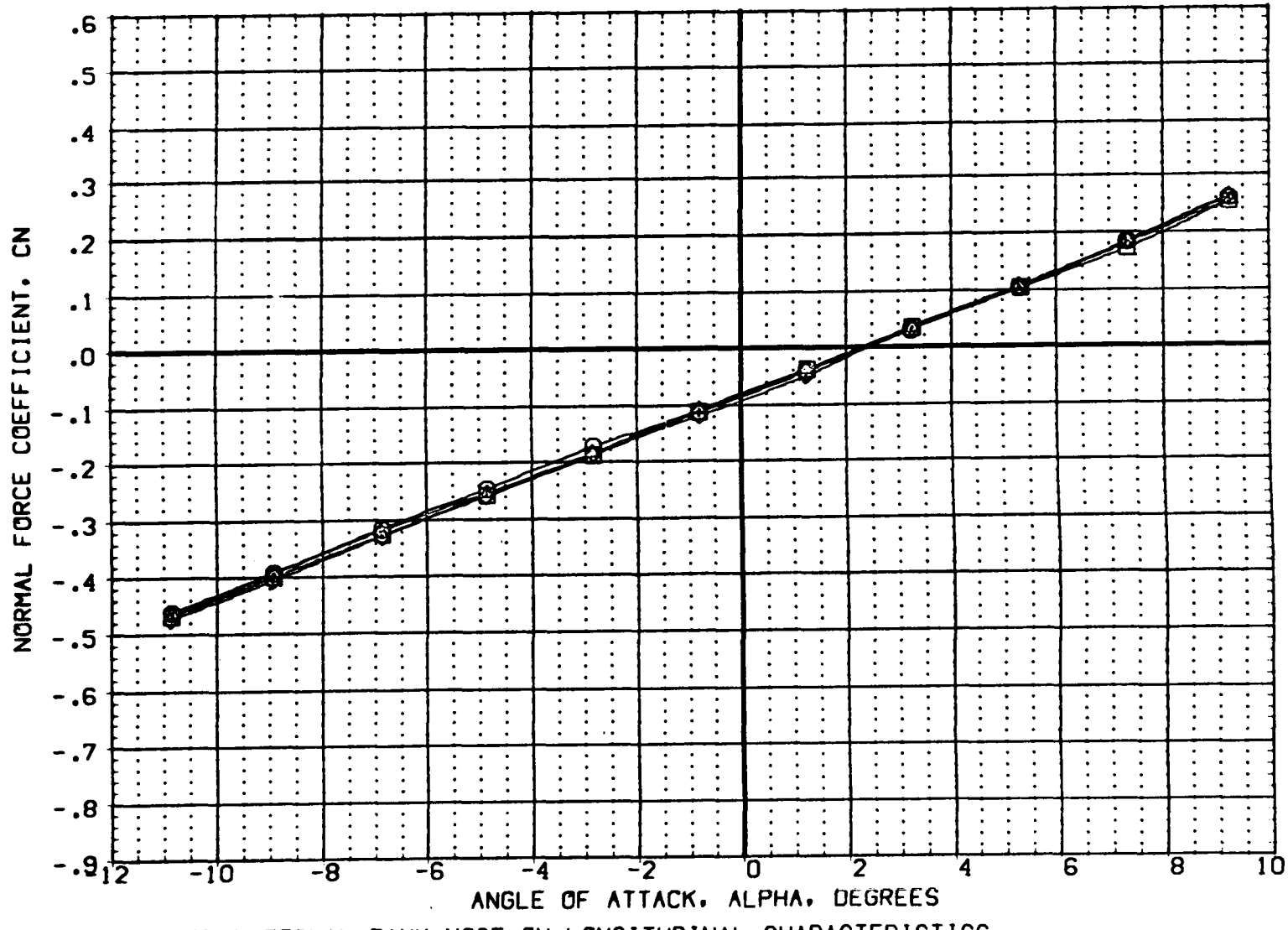
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(E)MACH = 1.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93021)	○	MSFC 585(IA37B) (034)(S12)(T9)	.000	.000	30.000
(A93023)	□	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000
(A93025)	◇	MSFC 585(IA37B) (034)(S12)(T11)	.000	.000	30.000
(A93027)	△	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

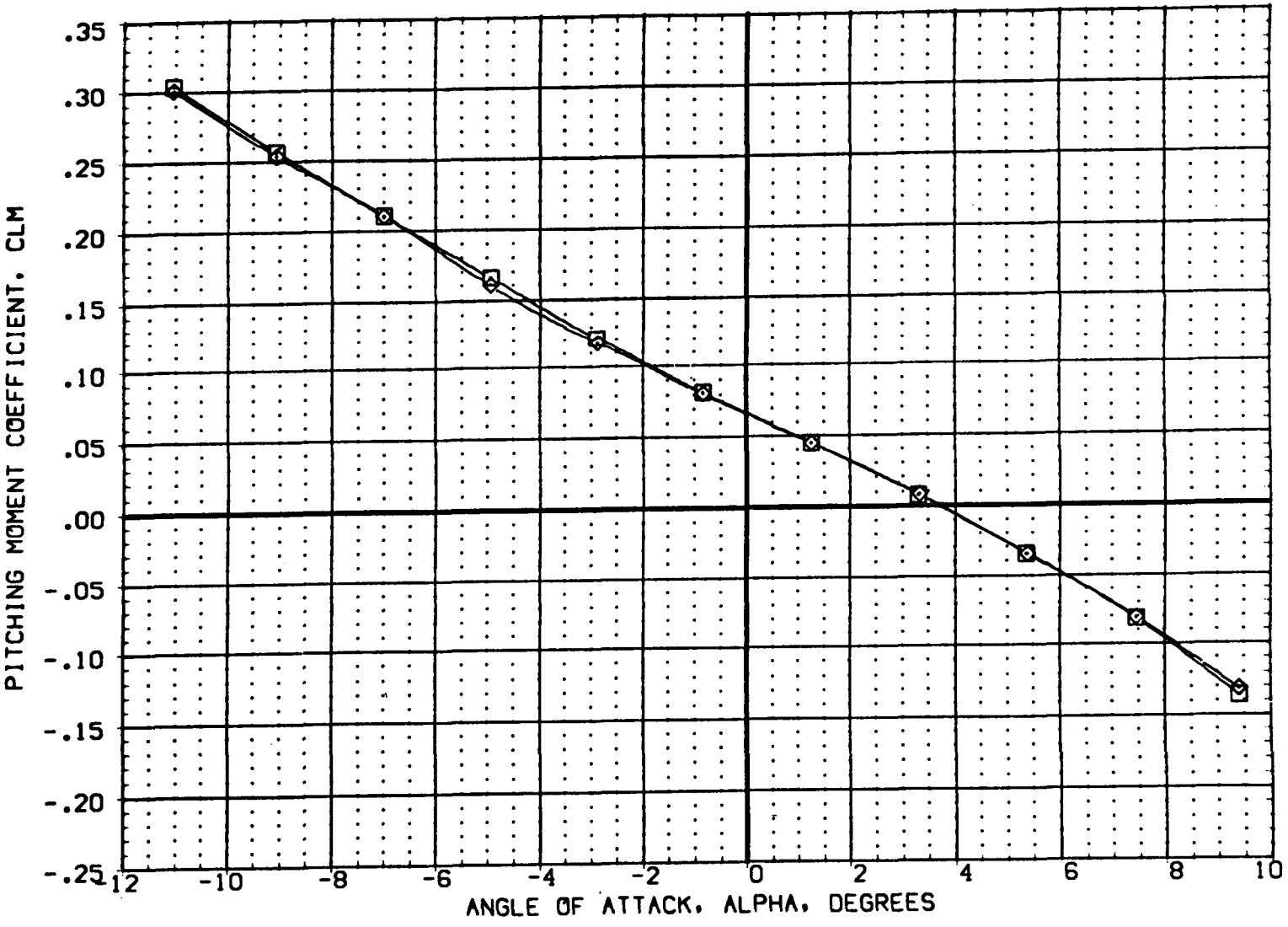
(F)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A93001)	DATA NOT AVAILABLE
(A93003)	MSFC 585((A378) (034)(S12)(T15)
(A93005)	MSFC 585((A378) (034)(S12)(T11)
(A93007)	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

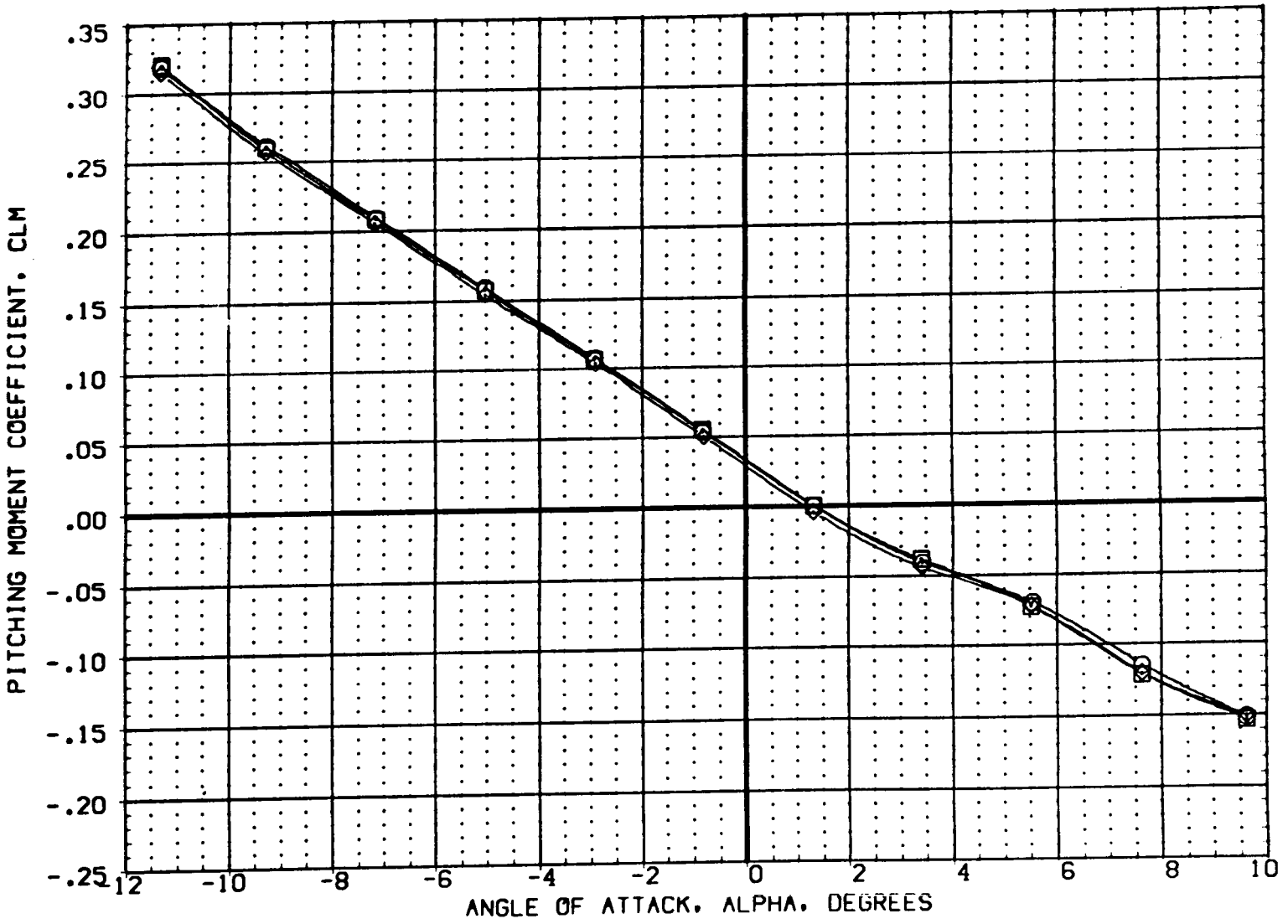
(A)MACH = .60

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
A93001	○	MSFC 585(1A378) (034)(S12)(T9)
A93003	□	MSFC 585(1A378) (034)(S12)(T15)
A93005	◇	MSFC 585(1A378) (034)(S12)(T11)
A93007	⋈	DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

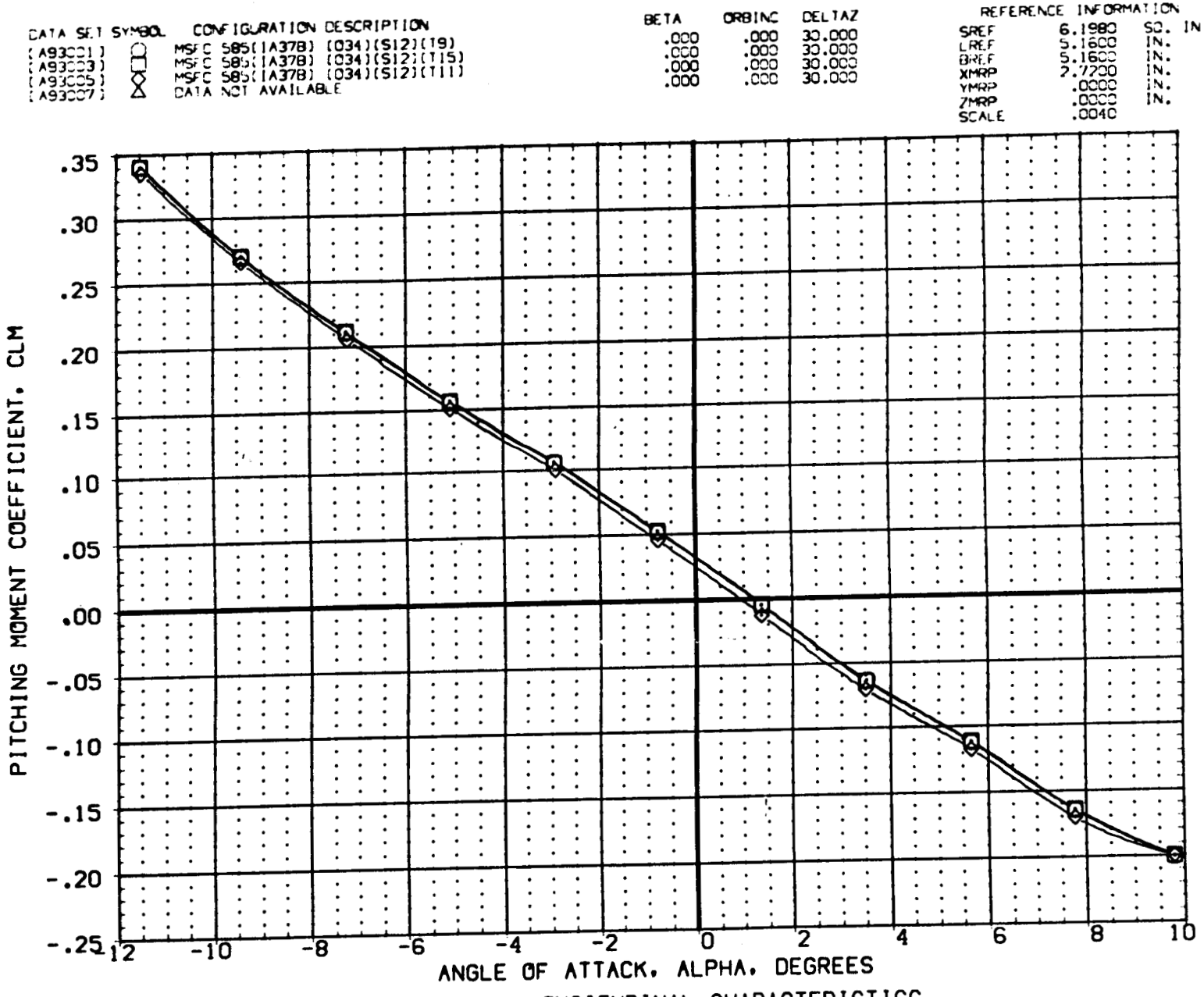
REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(B)MACH = .90



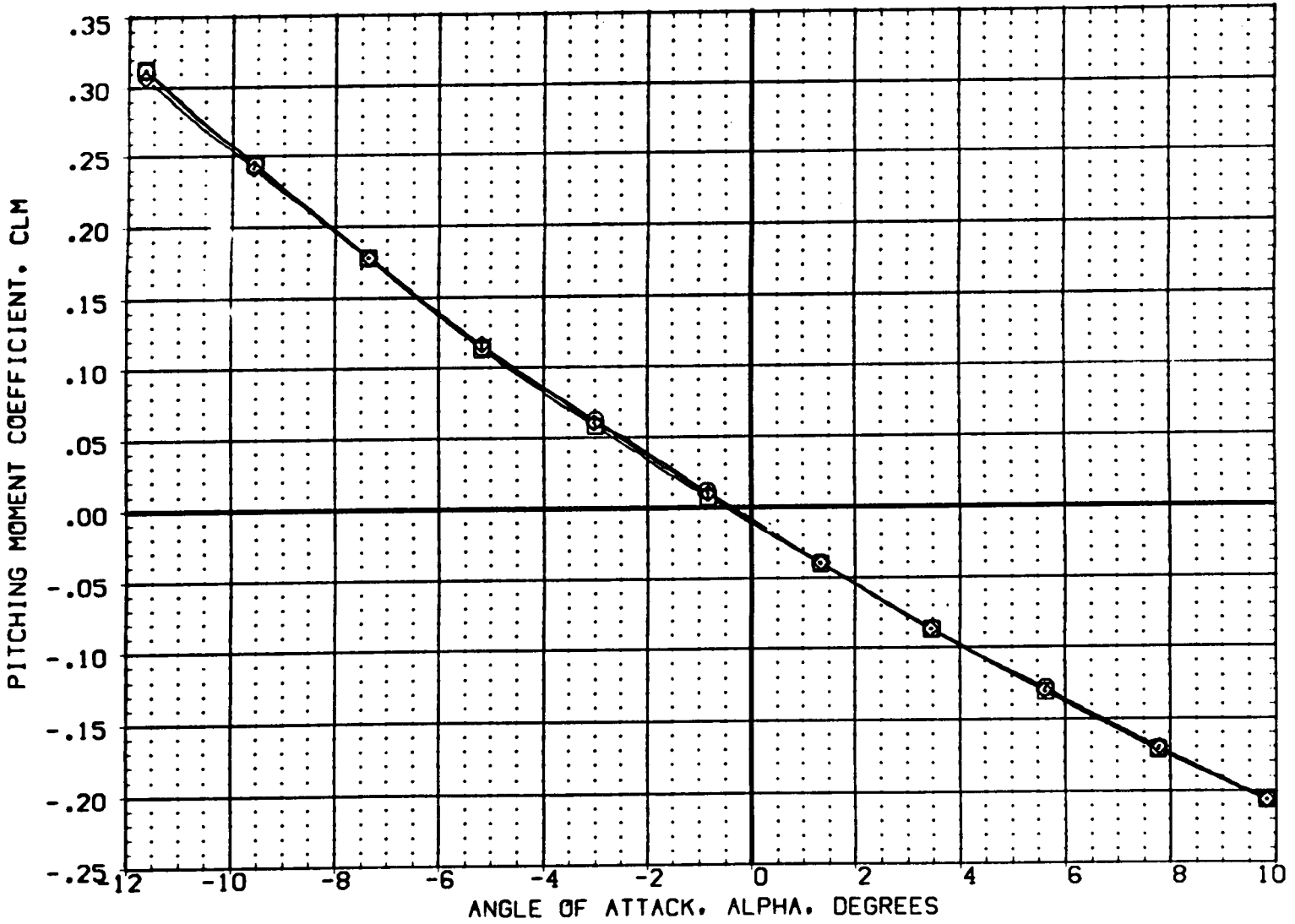
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(C)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	◯	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)	⊠	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	△	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)		DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



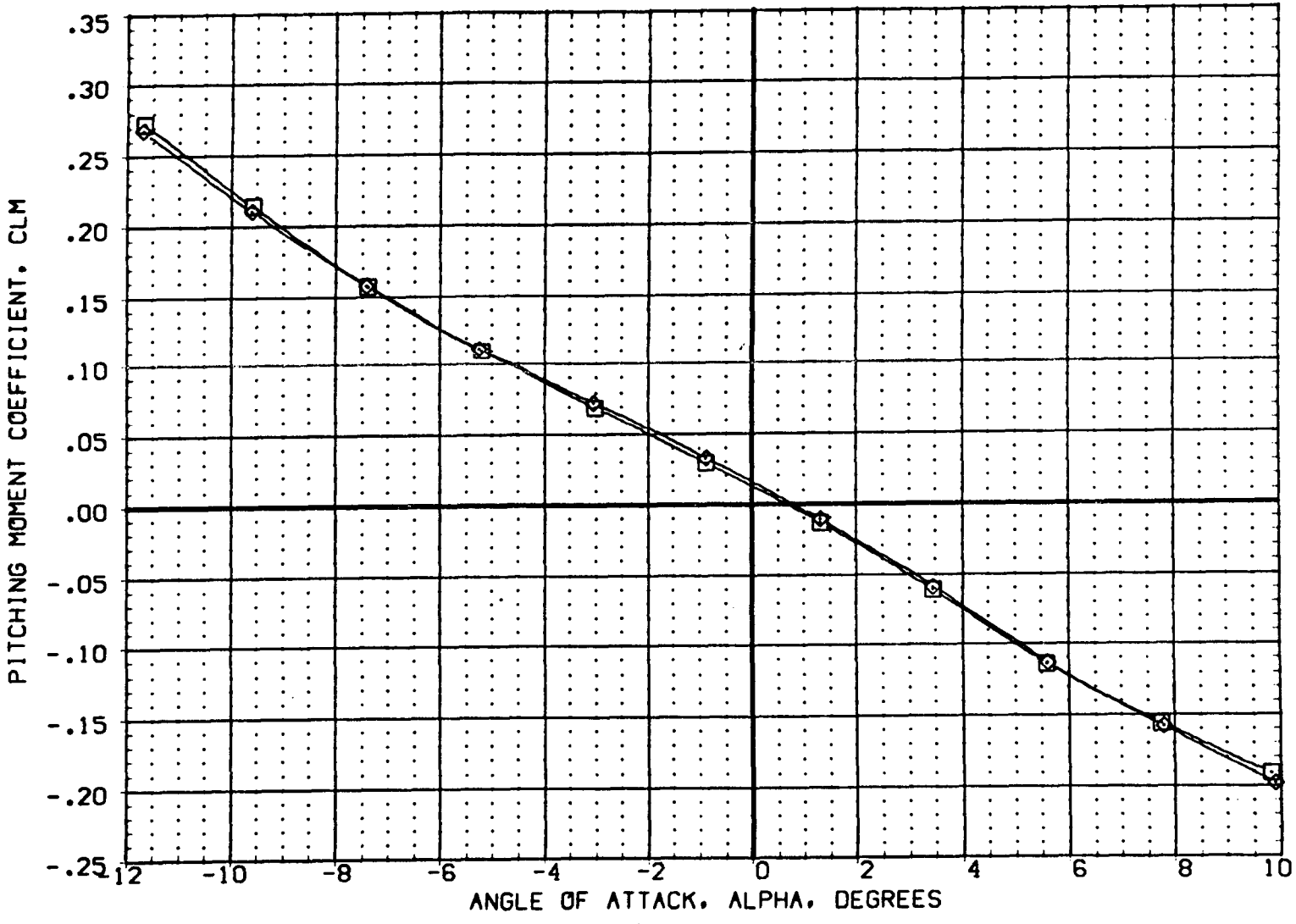
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	□	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	◇	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

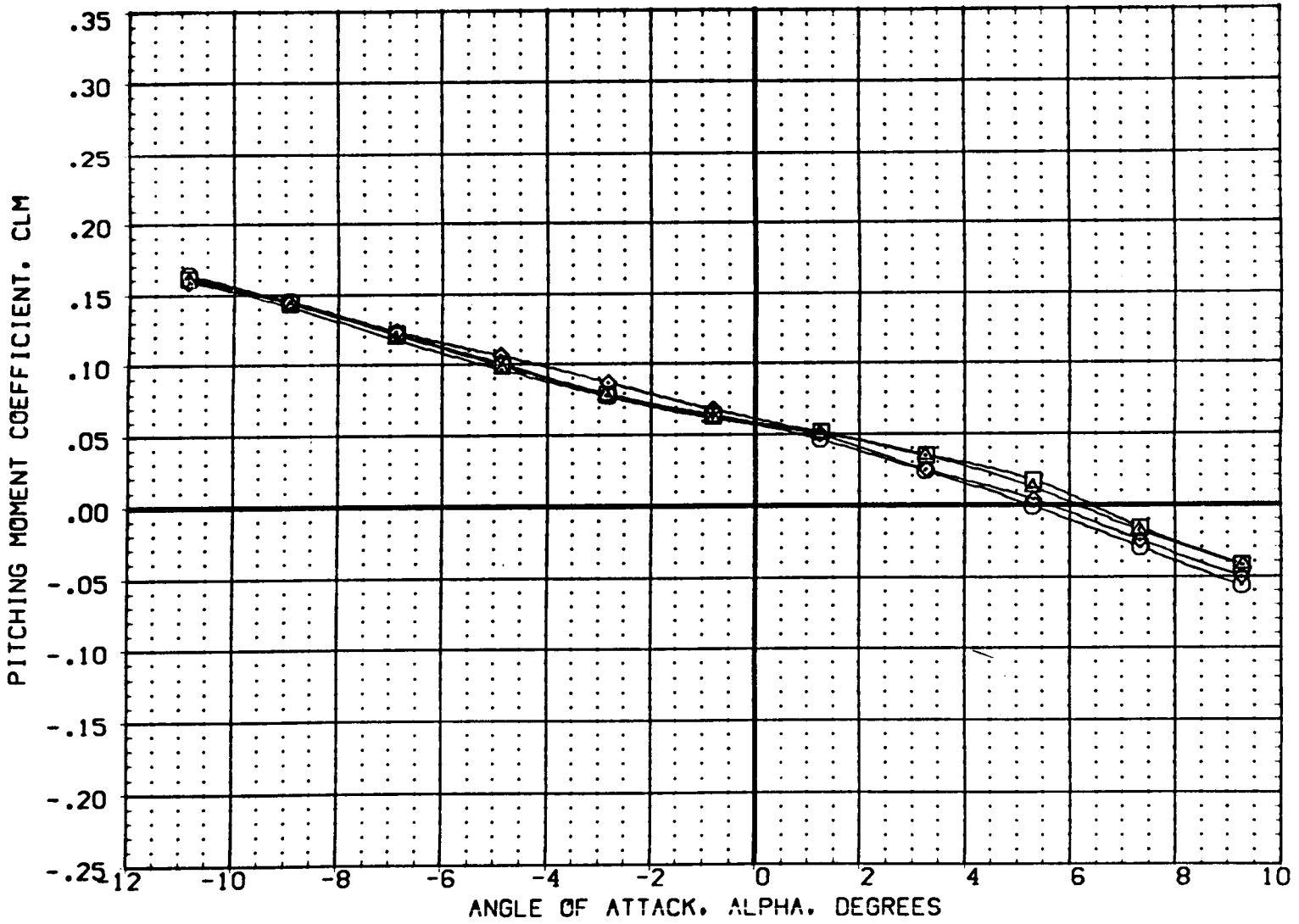


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(E)MACH = 1.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)		MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93003)		MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93005)		MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93007)		MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

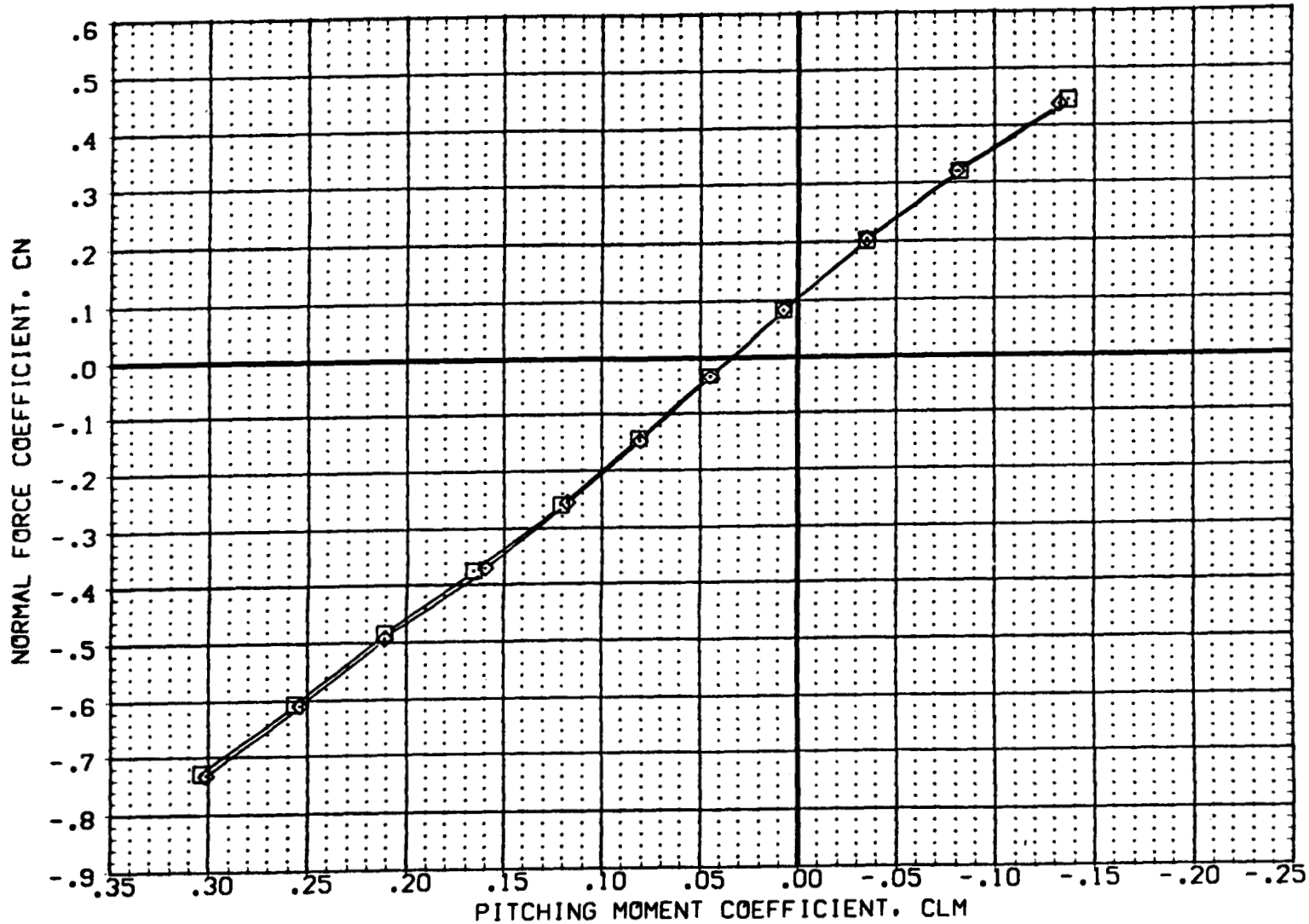
(F)MACH = 4.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93001)		DATA NOT AVAILABLE
(A93003)		MSFC 585(1A37B) (034)(S12)(T15)
(A93005)		MSFC 585(1A37B) (034)(S12)(T11)
(A93007)		DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

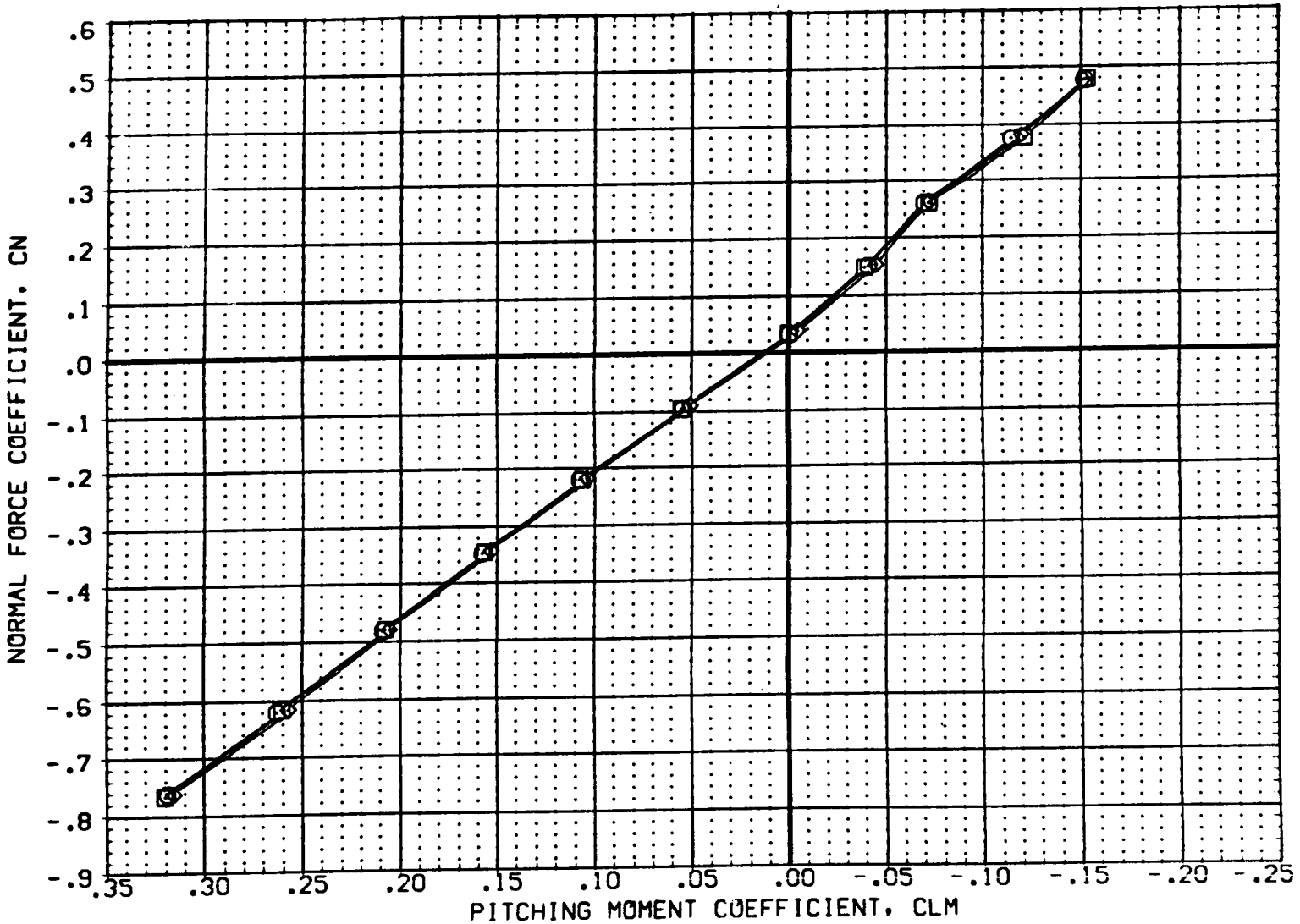
(A)MACH = .60

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93001)		MSFC 585(1A378) (034)(S12)(T9)
(A93003)		MSFC 585(1A378) (034)(S12)(T15)
(A93005)		MSFC 585(1A378) (034)(S12)(T11)
(A93007)		DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

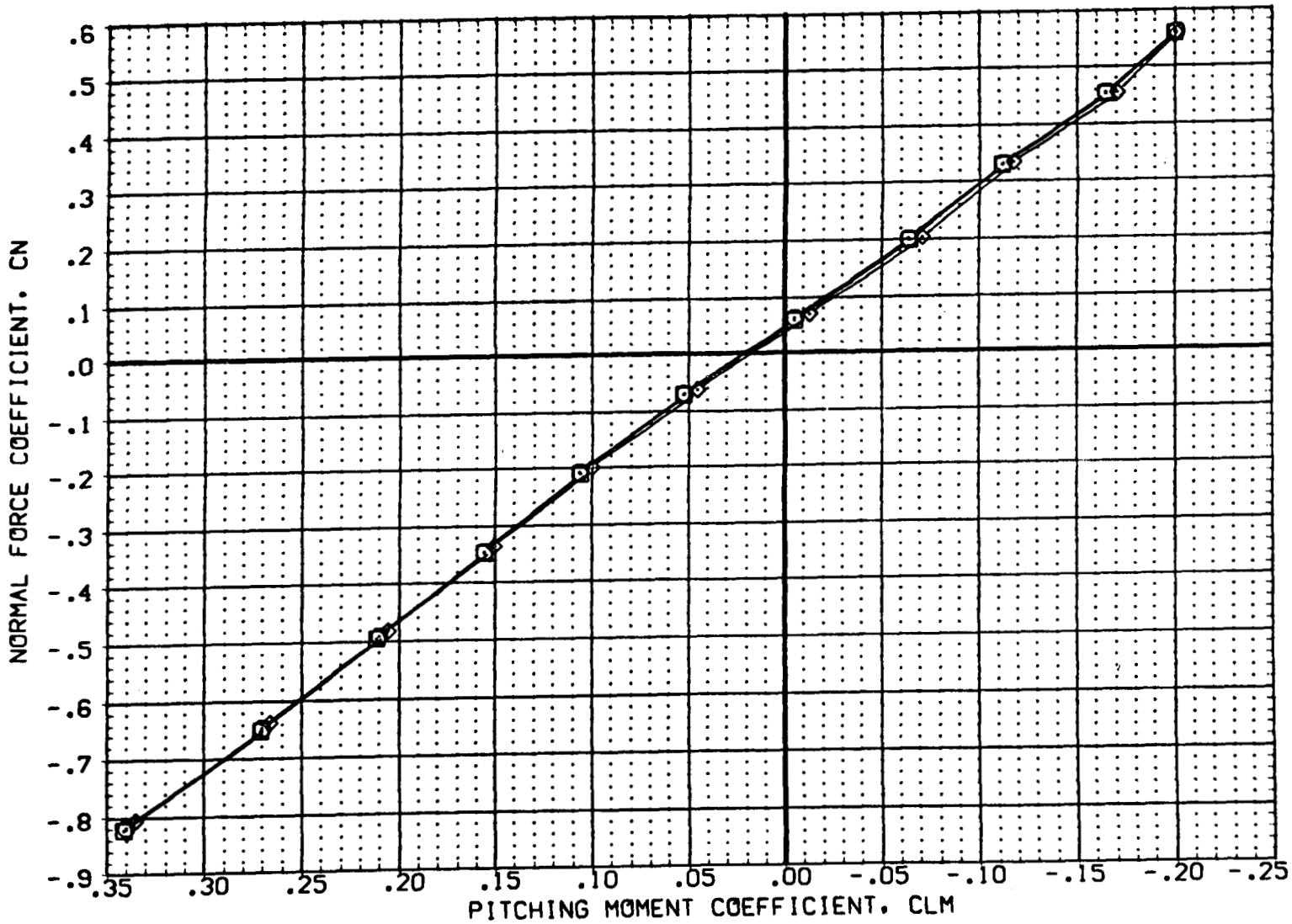
(B)MACH = .90

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93001)		MSFC 585(1A378) (034)(S12)(T9)
(A93003)		MSFC 585(1A378) (034)(S12)(T15)
(A93005)		MSFC 585(1A378) (034)(S12)(T11)
(A93007)		DATA NOT AVAILABLE

BETA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



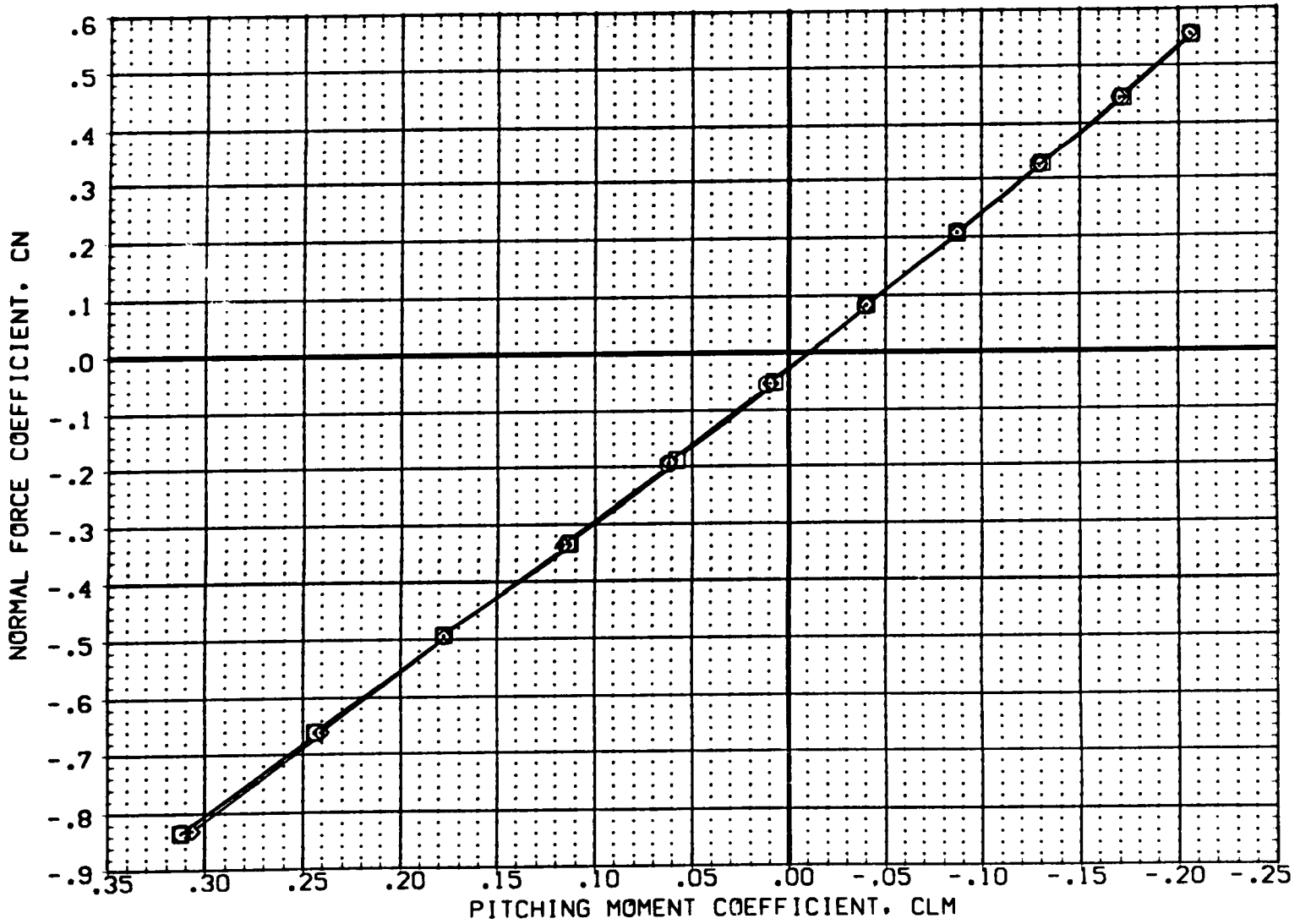
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(C)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93021)	□	MSFC 585(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93023)	◇	MSFC 585(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93025)	⊠	MSFC 585(IA378) (034)(S12)(T11)	.000	.000	30.000
(A93027)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



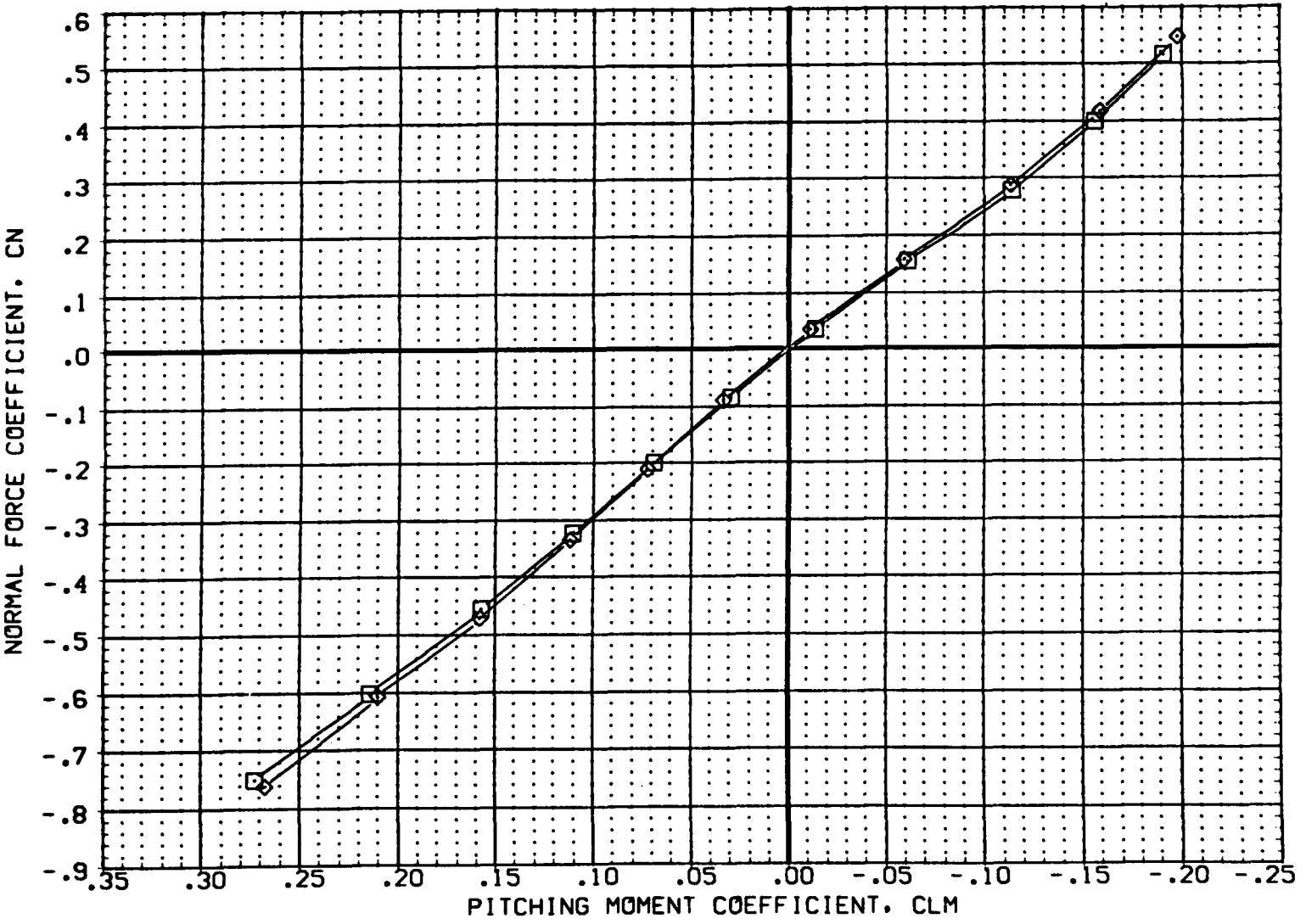
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(D)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)		DATA NOT AVAILABLE	.000	.000	30.000
(A93003)	□	MSFC 585((A378) (034)(S12)(T15)	.000	.000	30.000
(A93005)	⊠	MSFC 585((A378) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	DATA NOT AVAILABLE	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

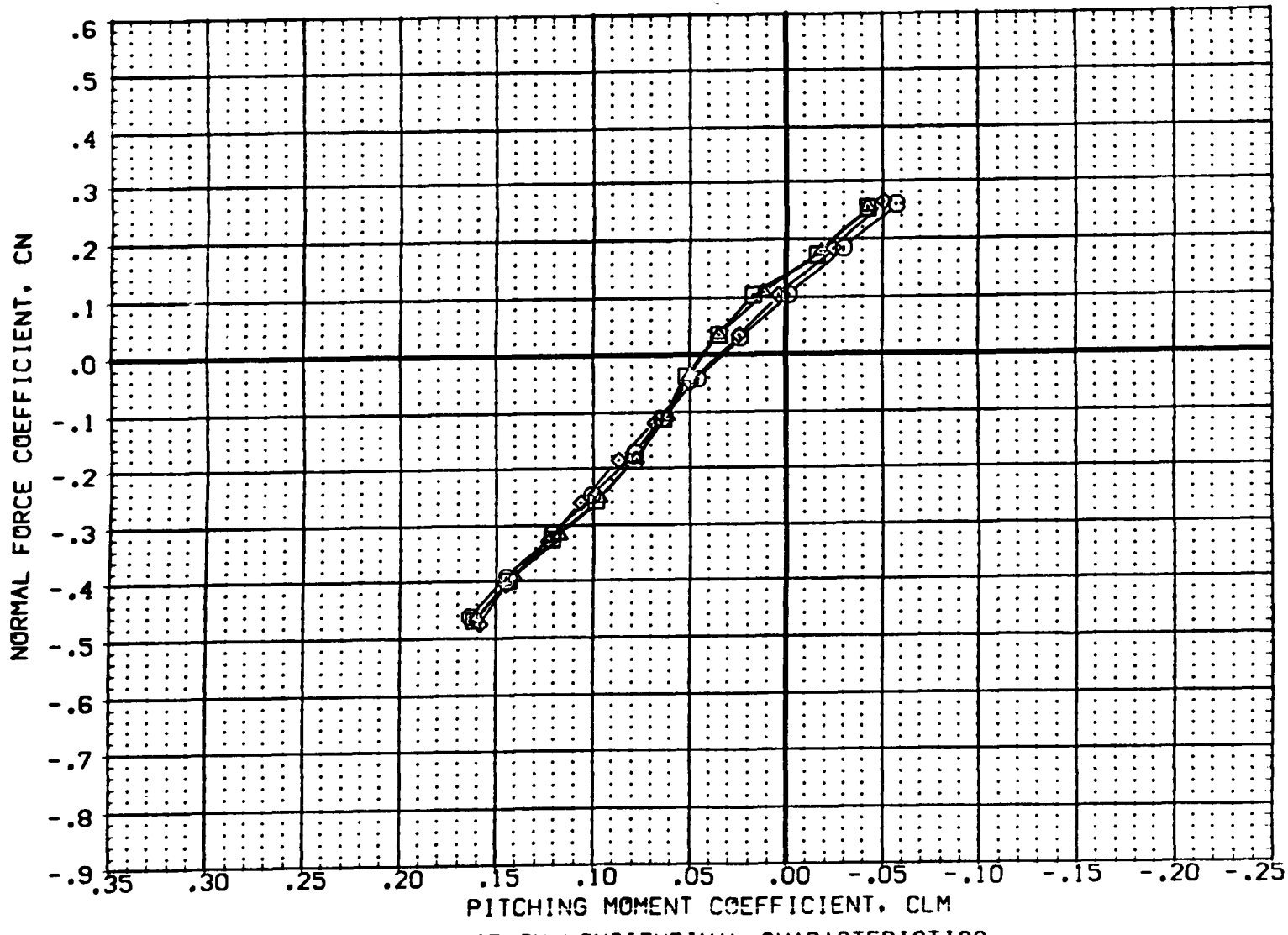


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

(E)MACH = 1.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(A93001)	○	MSFC 585(IA37B) (034)(S12)(T9)	.000	.000	30.000
(A93003)	◇	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000
(A93005)	□	MSFC 585(IA37B) (034)(S12)(T11)	.000	.000	30.000
(A93007)	△	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS

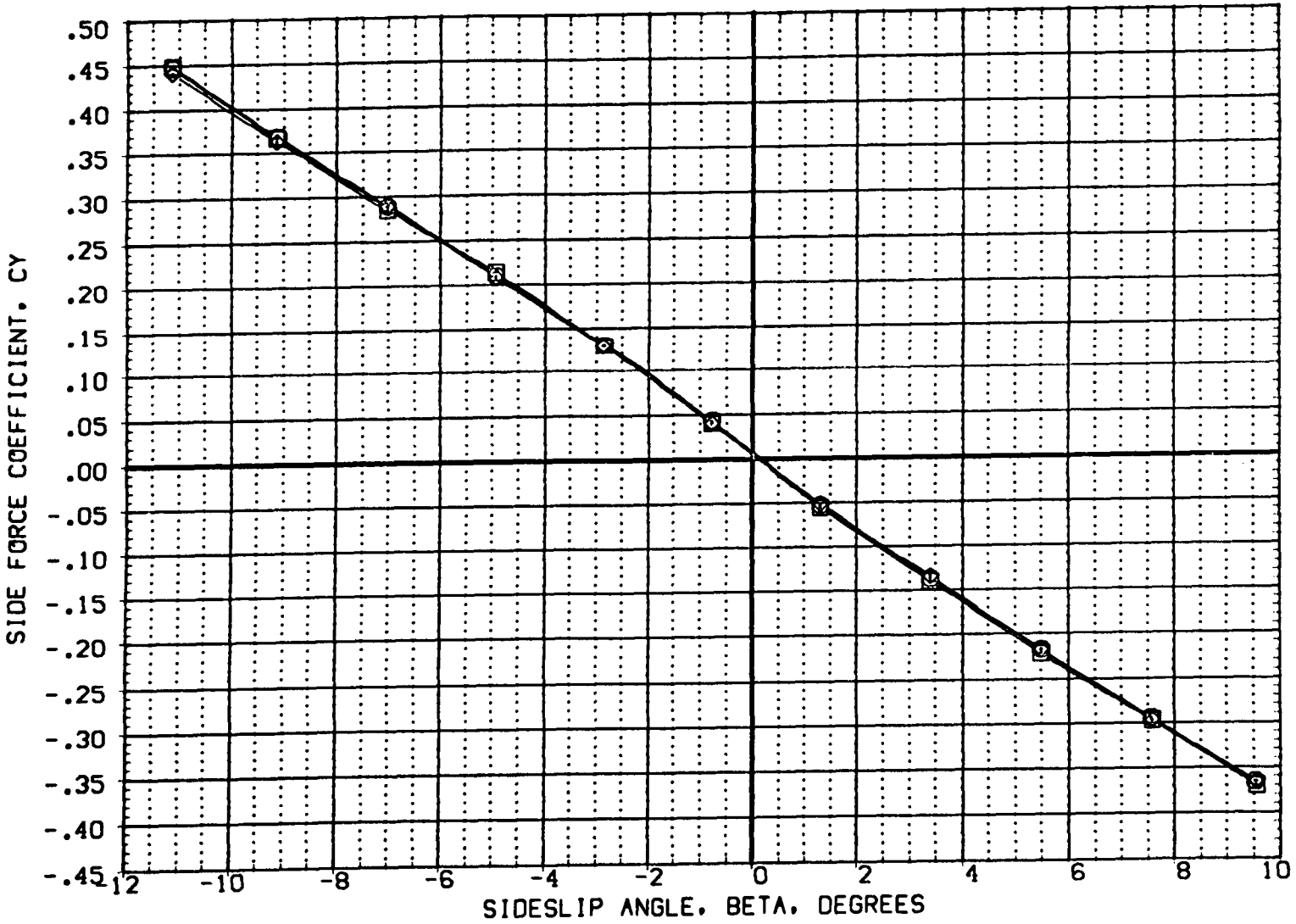
(F)MACH = 4.96

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93002)	□	MSFC 585(1A378) (034)(S12)(T9)
(A93004)	◇	MSFC 585(1A378) (034)(S12)(T15)
(A93006)	◇	MSFC 585(1A378) (034)(S12)(T11)

ALPHA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



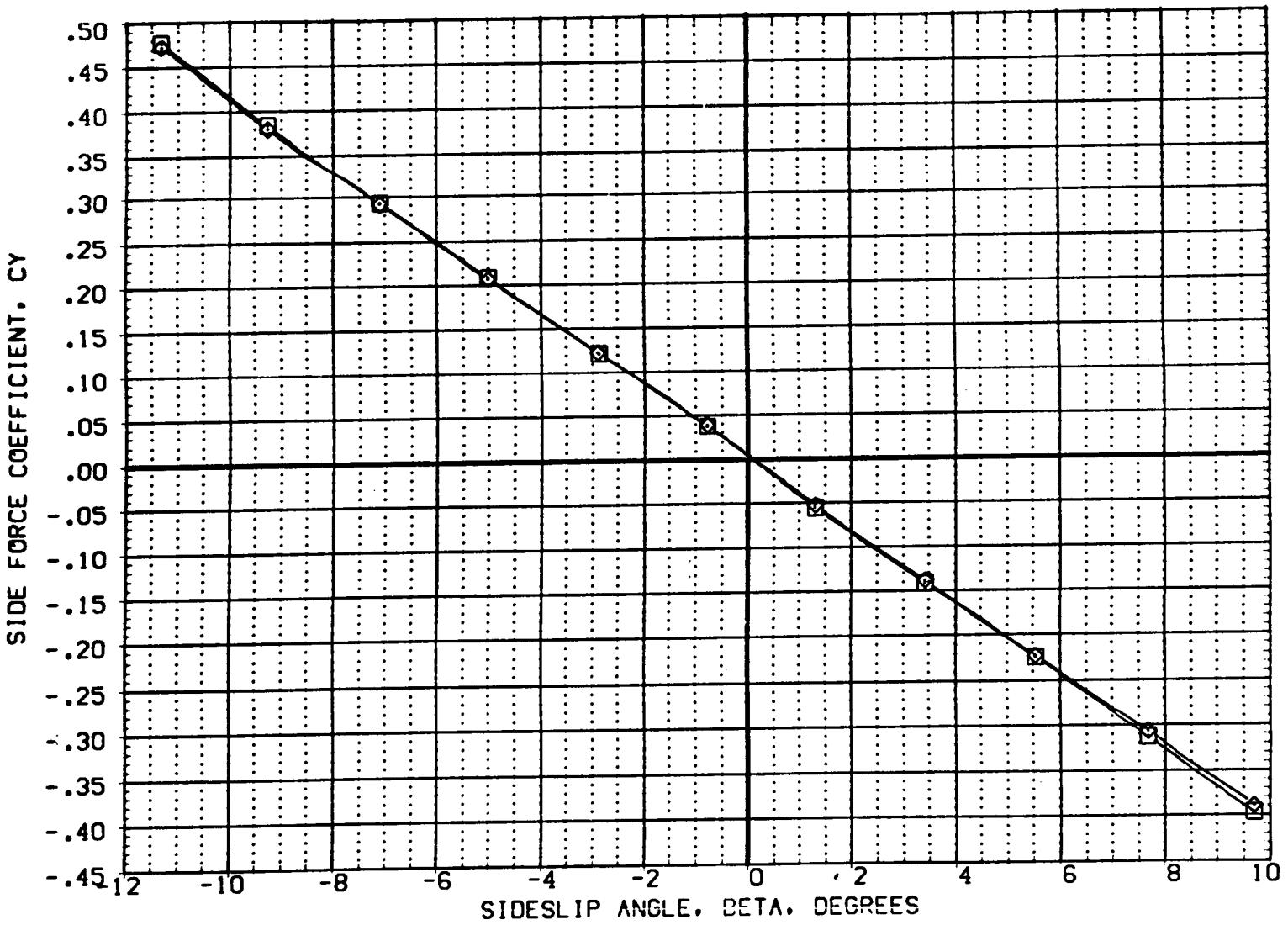
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(A)MACH = .89

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93004)	□	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93006)	◇	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1380	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(B)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93002)	○	DATA NOT AVAILABLE
(A93004)	□	MSFC 585(1A37B) (034)(S12)(T15)
(A93006)	◇	MSFC 585(1A37B) (034)(S12)(T11)

ALPHA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

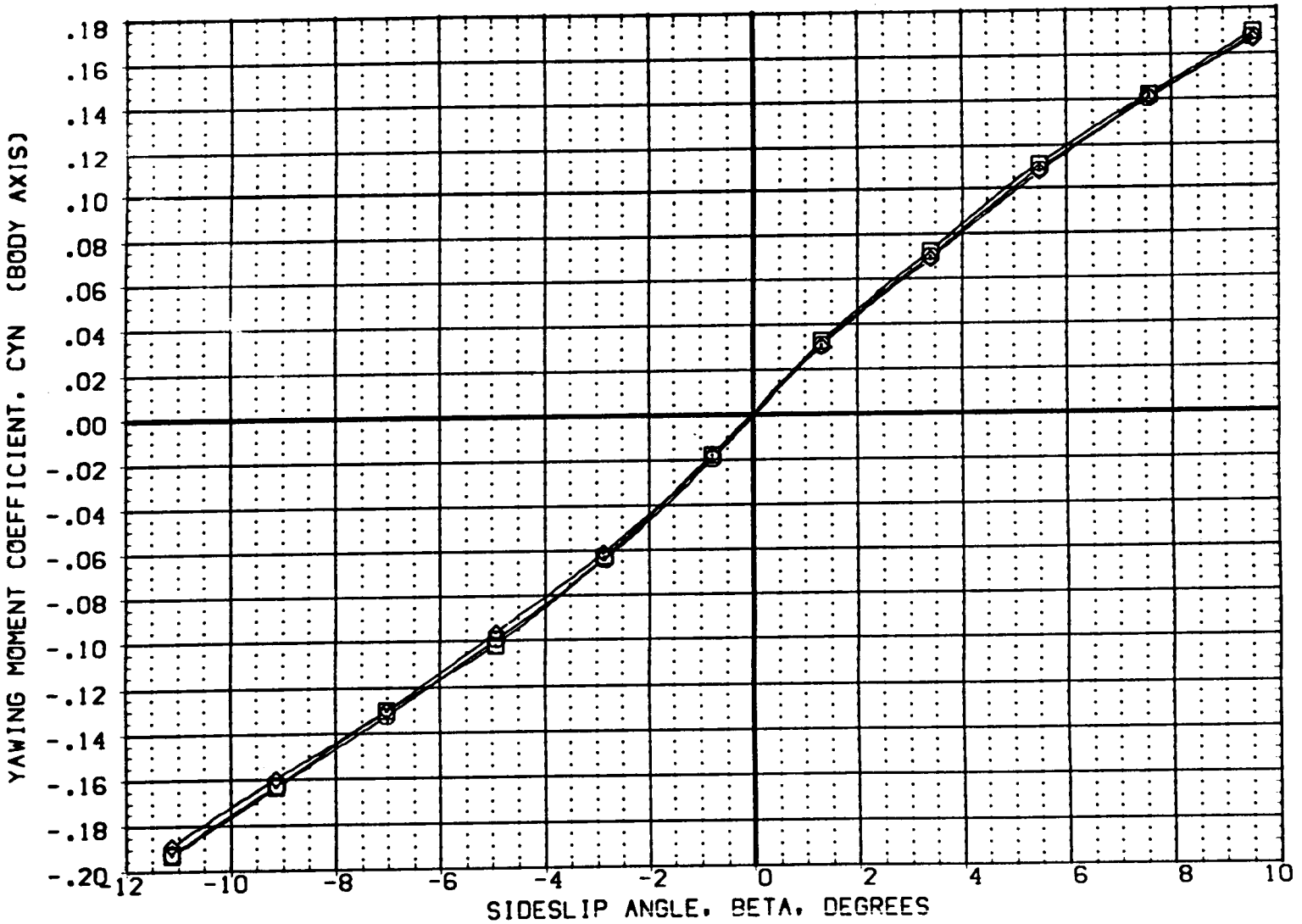
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93CC2)	□	MSFC S85(IA378) (034)(S12)(T9)	.000	.000	30.000
(A93CC4)	○	MSFC S85(IA378) (034)(S12)(T15)	.000	.000	30.000
(A93CC6)	◇	MSFC S85(IA378) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

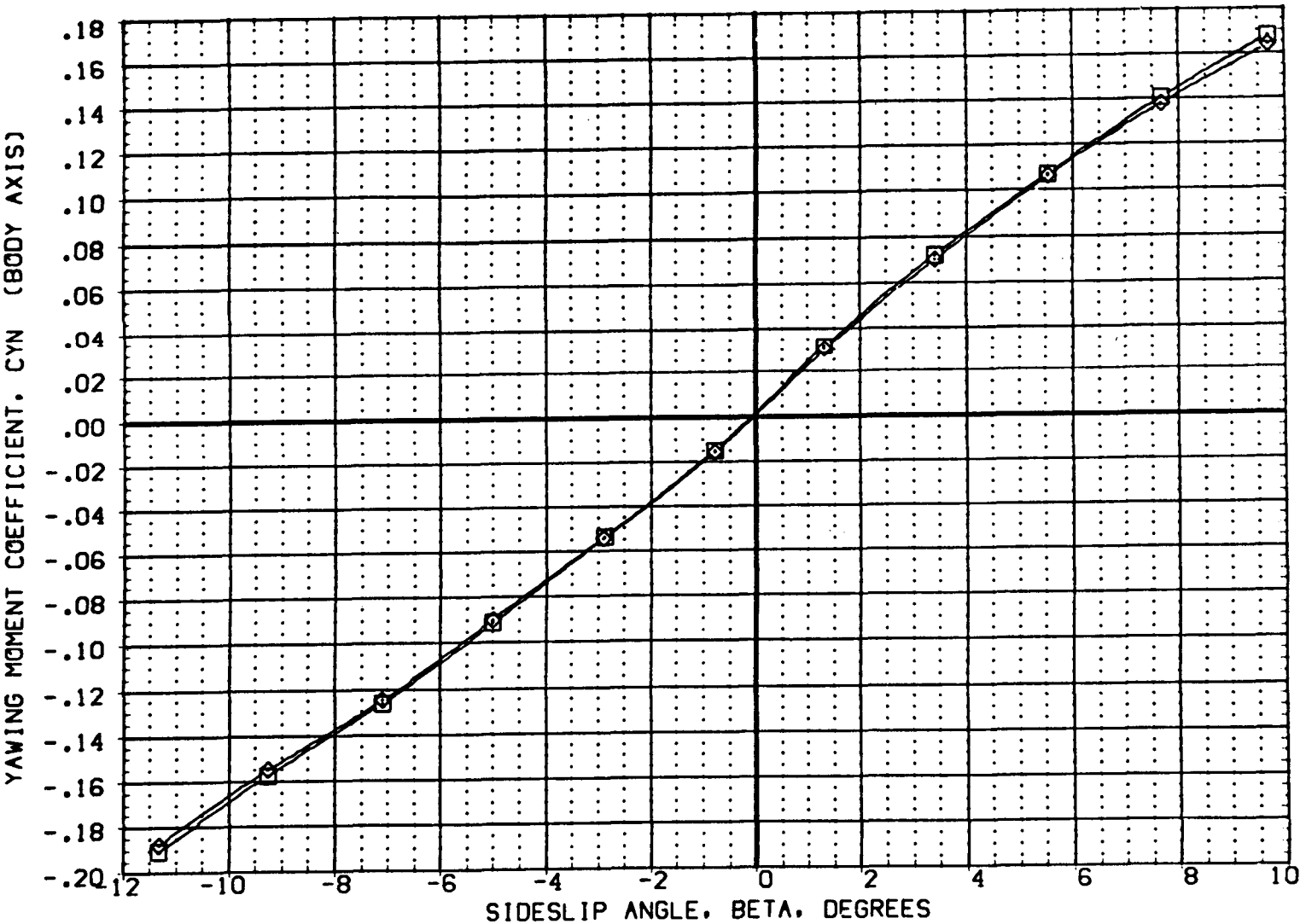
(A)MACH = .89

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93007)		DATA NOT AVAILABLE
(A93004)	◇	MSFC 585((A378) (034)(S12)(T15)
(A93006)	□	MSFC 585((A378) (034)(S12)(T11)

ALPHA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

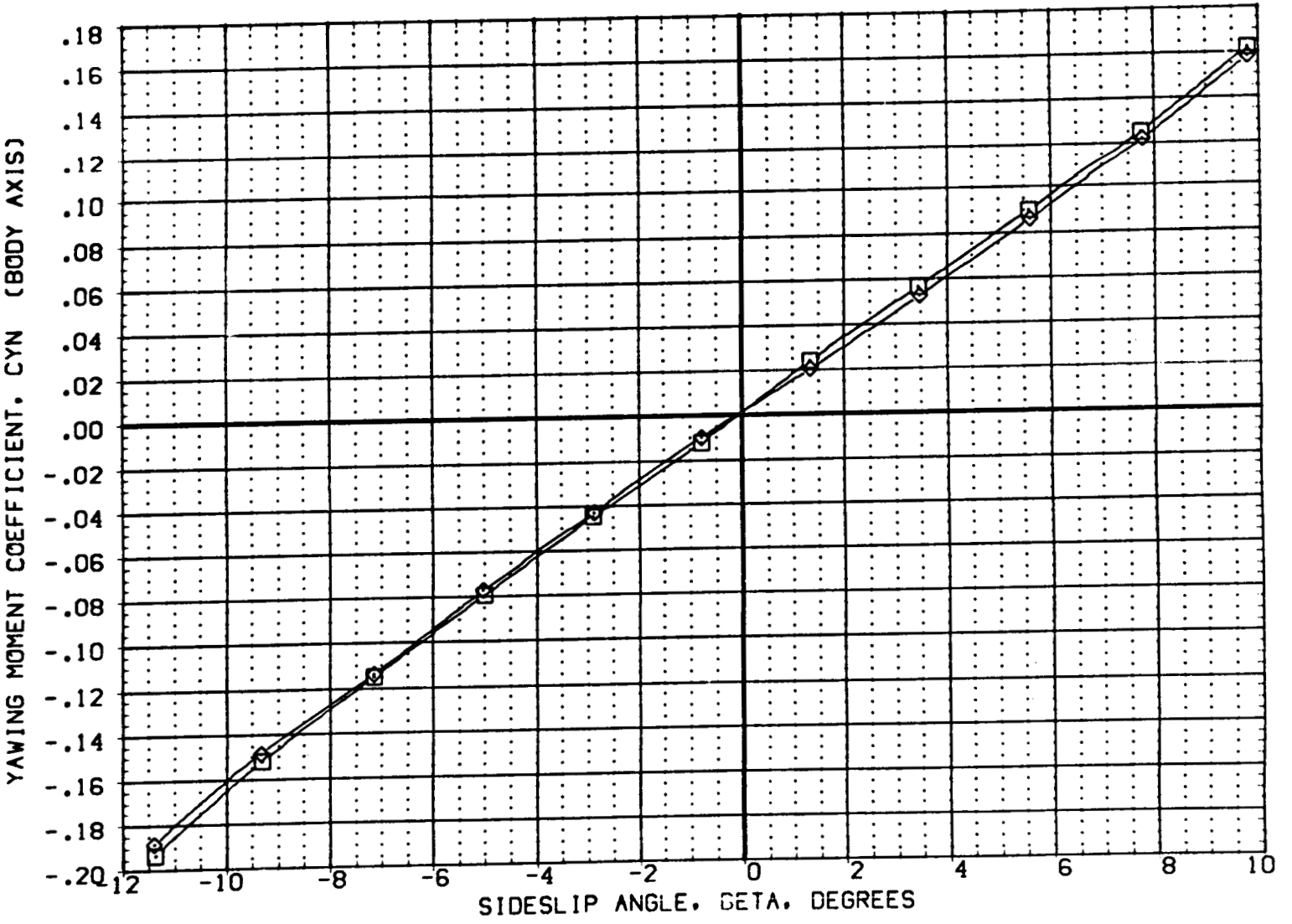
(B)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93002)	○	DATA NOT AVAILABLE
(A93004)	□	MSFC S85(1A378) (034)(S12)(T15)
(A93006)	◇	MSFC S85(1A378) (034)(S12)(T11)

ALPHA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



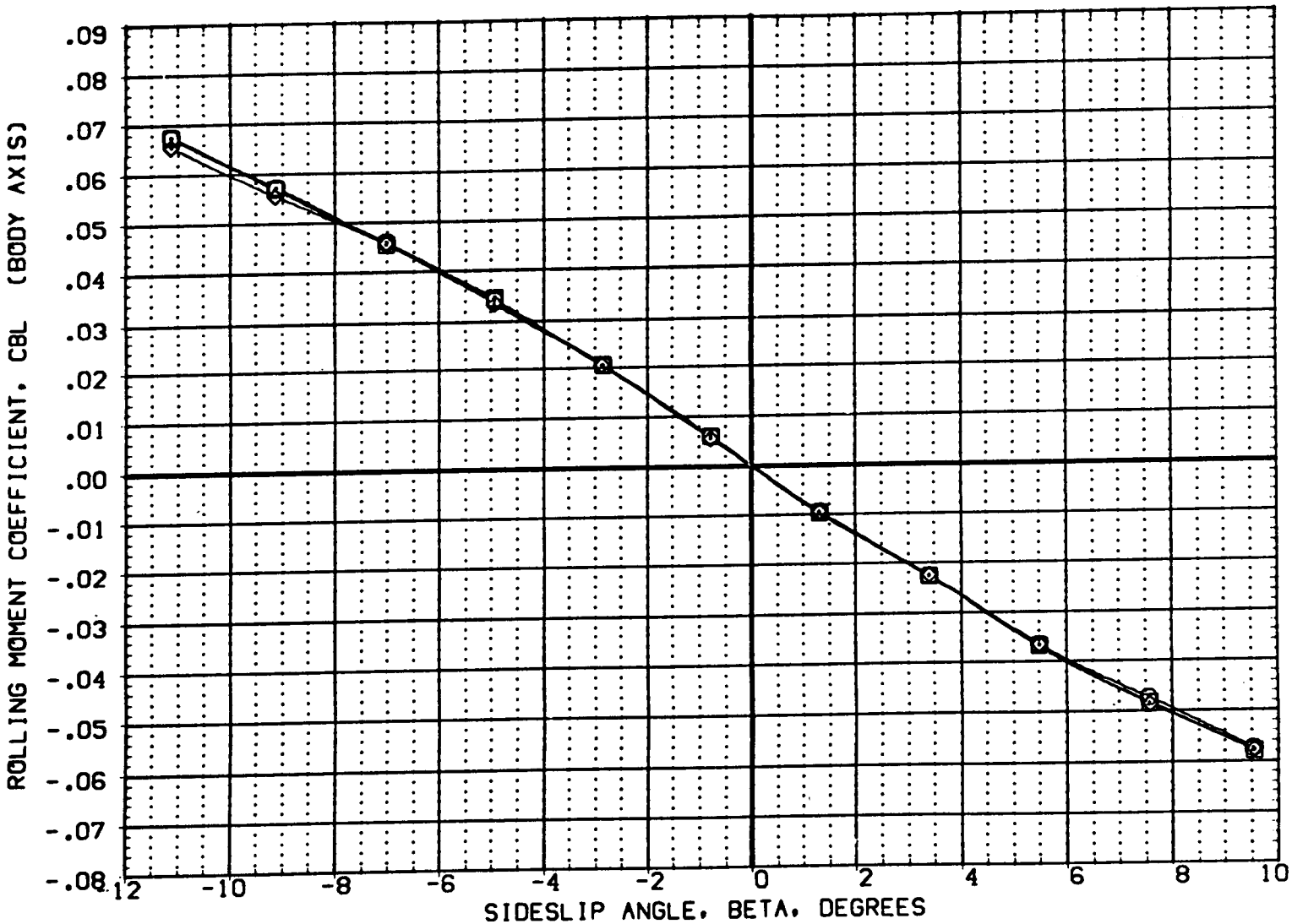
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(C)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)		MSFC 585(1A378) (034)(S12)(T9)	.000	.000	30.000
(A93004)		MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93006)	◇	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



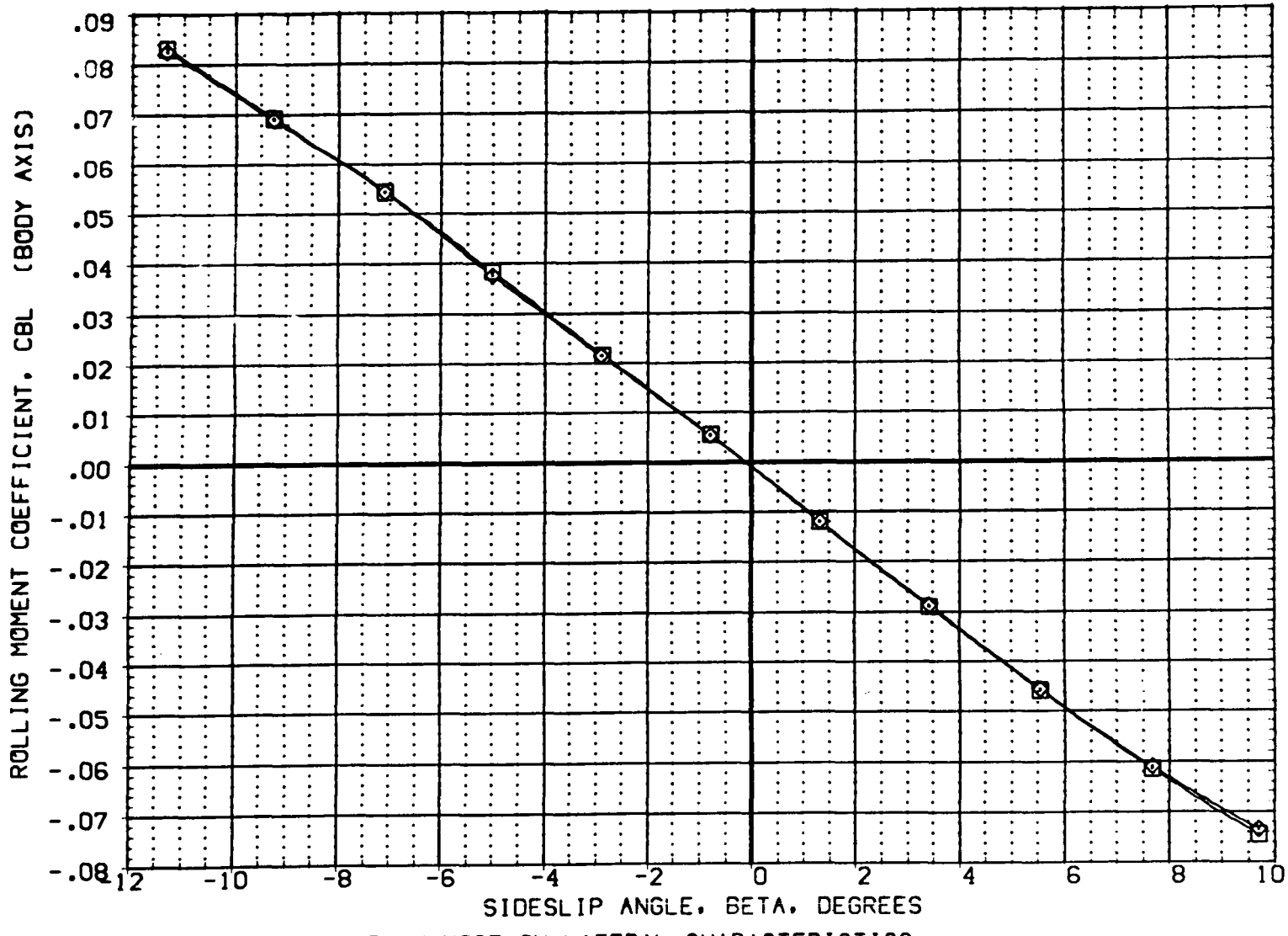
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(A)MACH = .89

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)		DATA NOT AVAILABLE	.000	.000	30.000
(A93004)	◇	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93006)	○	MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

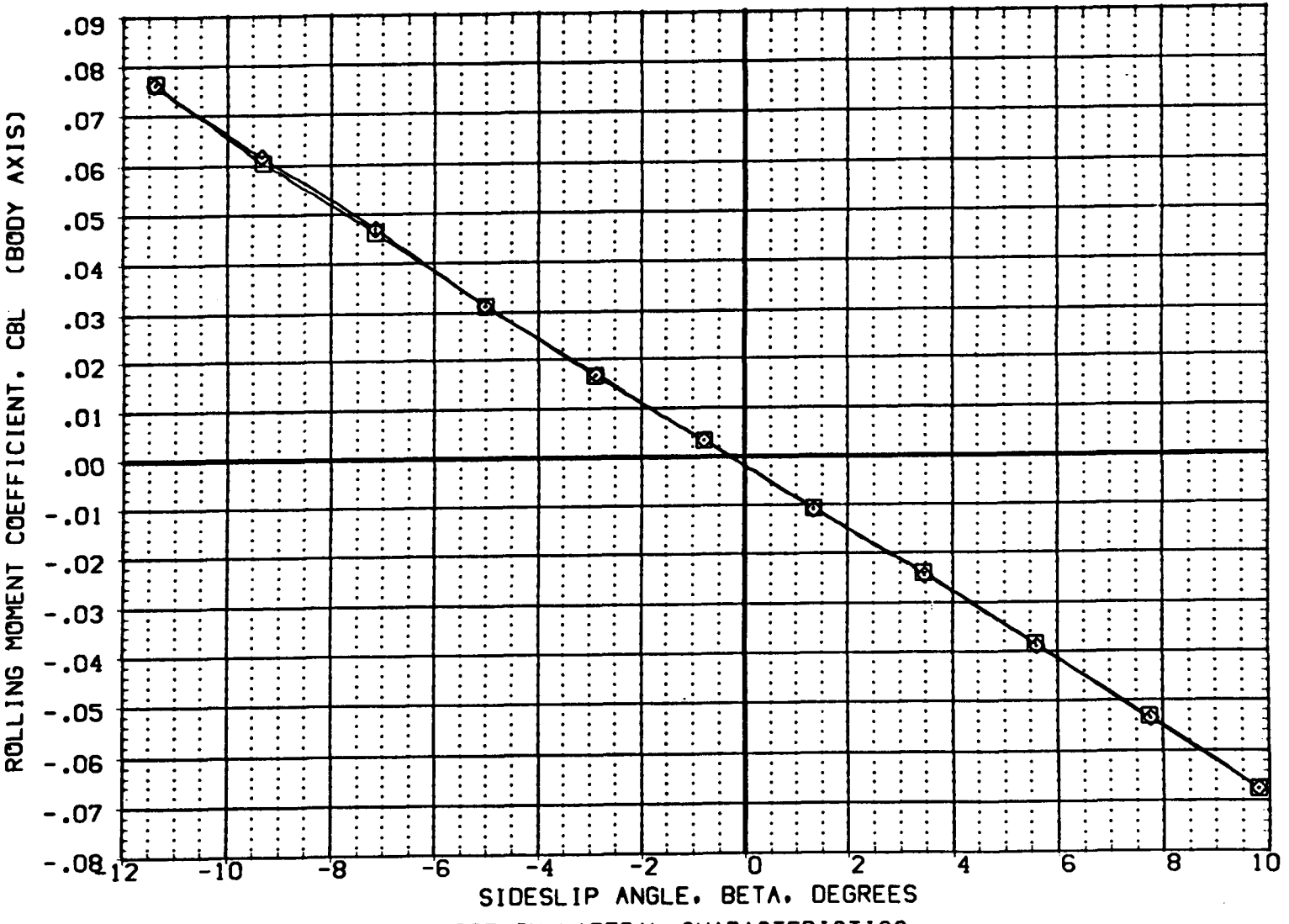
(B)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION
(A93002)	○	DATA NOT AVAILABLE
(A93004)	△	MSFC 585(1A378) (034)(S12)(T15)
(A93006)	◇	MSFC 585(1A378) (034)(S12)(T11)

ALPHA	ORBINC	DELTAZ
.000	.000	30.000
.000	.000	30.000
.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



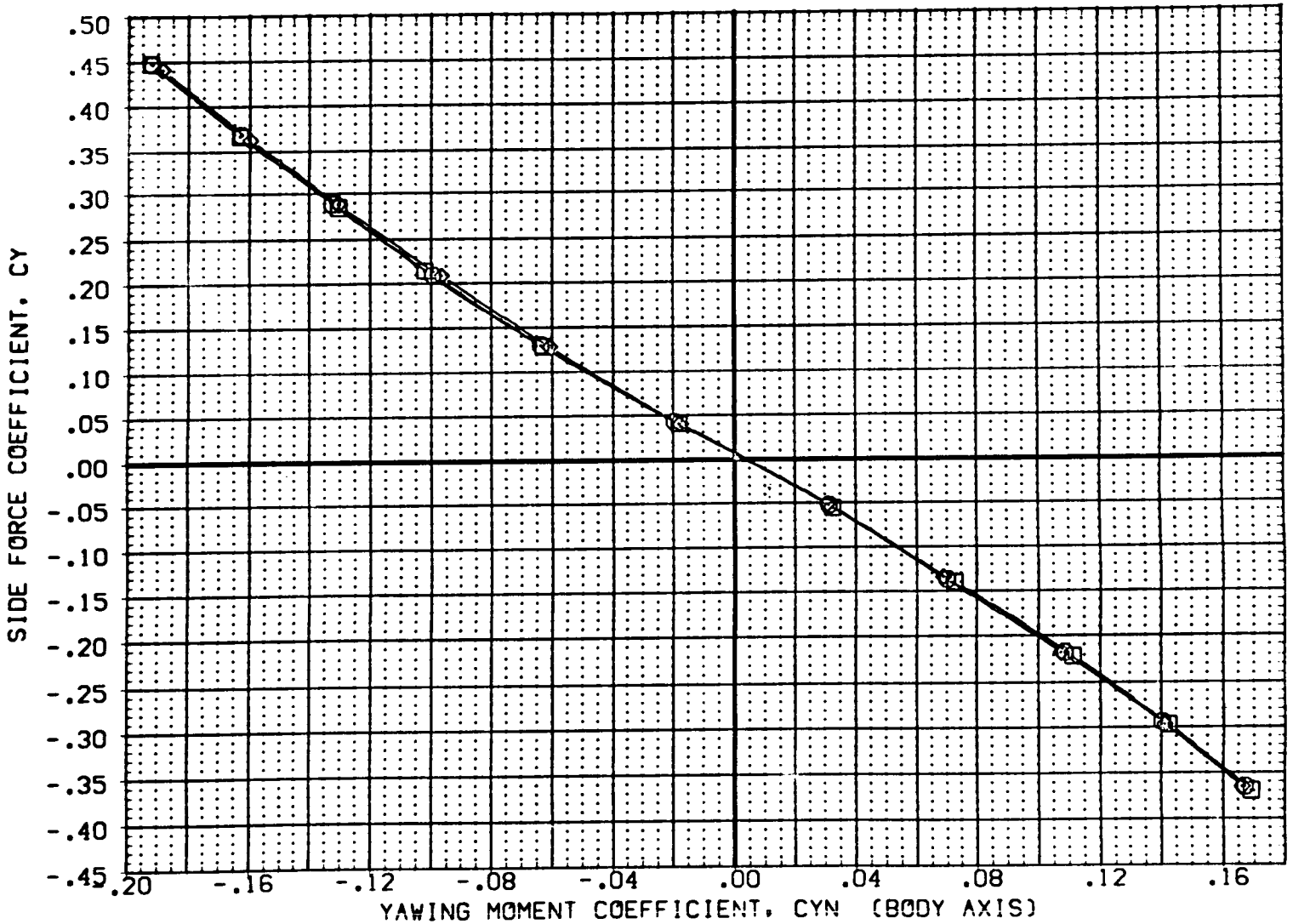
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(C)MACH = 1.47

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)	□	MSC 585(1A37B) (034)(S12)(19)	.000	.000	30.000
(A93004)	◇	MSC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(A93006)		MSC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



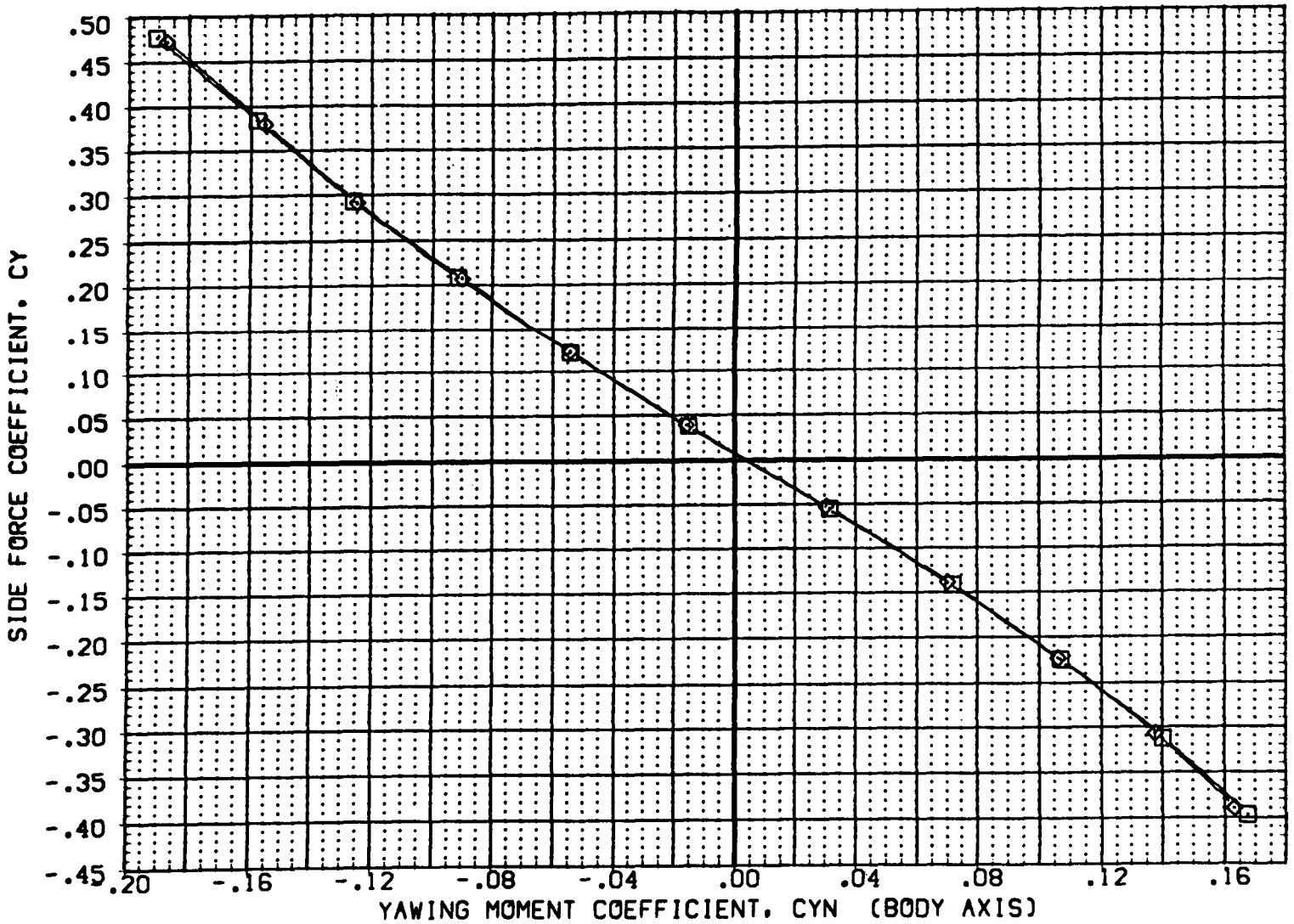
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(A)MACH = .89

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)	○	DATA NOT AVAILABLE	.000	.000	30.000
(A93004)	◇	MSFC 585(1A378) (034)(S12)(T15)	.000	.000	30.000
(A93006)		MSFC 585(1A378) (034)(S12)(T11)	.000	.000	30.000

REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



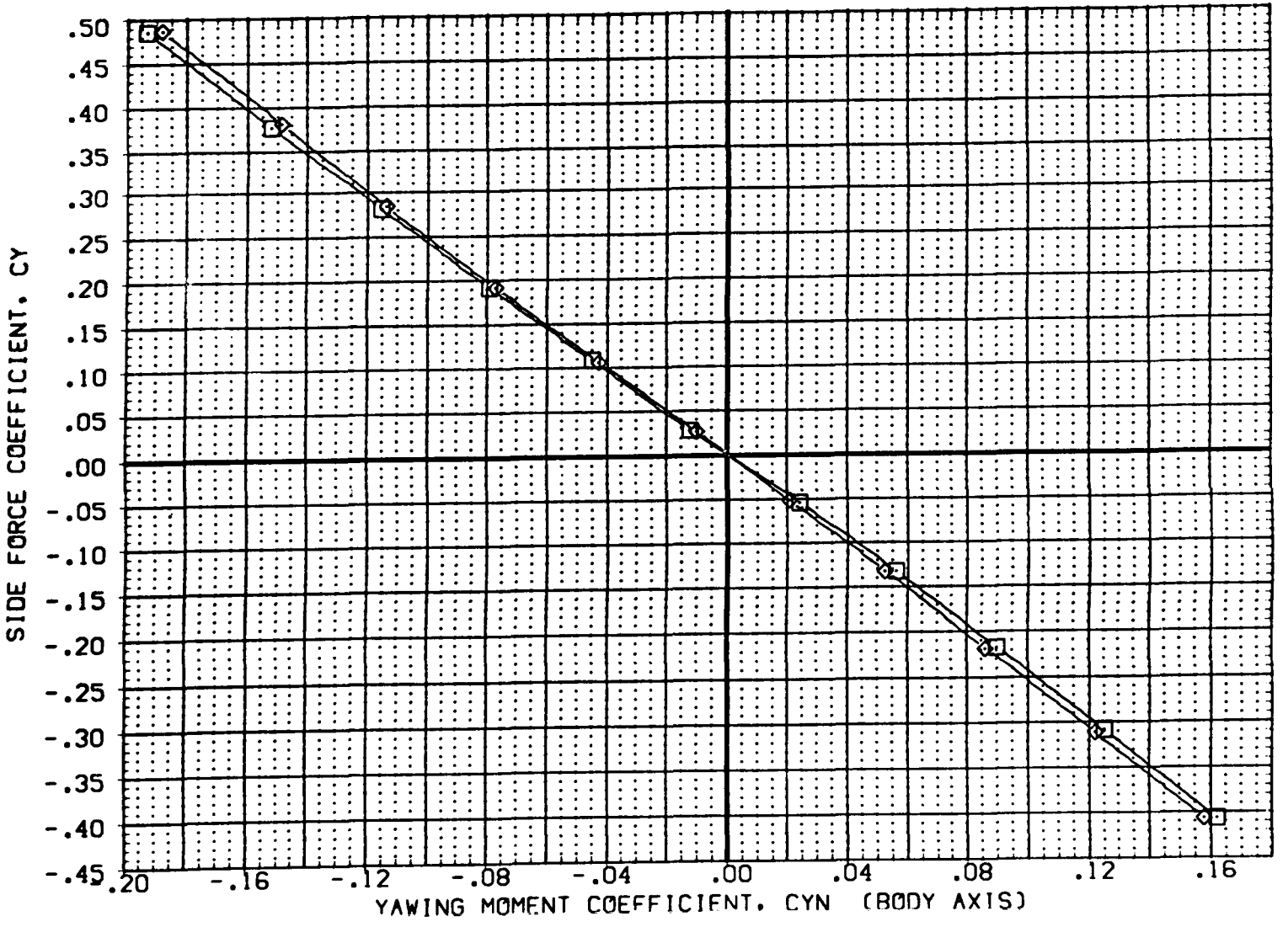
EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(B)MACH = 1.10

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(A93002)		DATA NOT AVAILABLE	.000	.000	30.000
(A93004)	□	MSFC 585(1A37B) (034)(S12)(T1S)	.000	.000	30.000
(A93006)	◇	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000

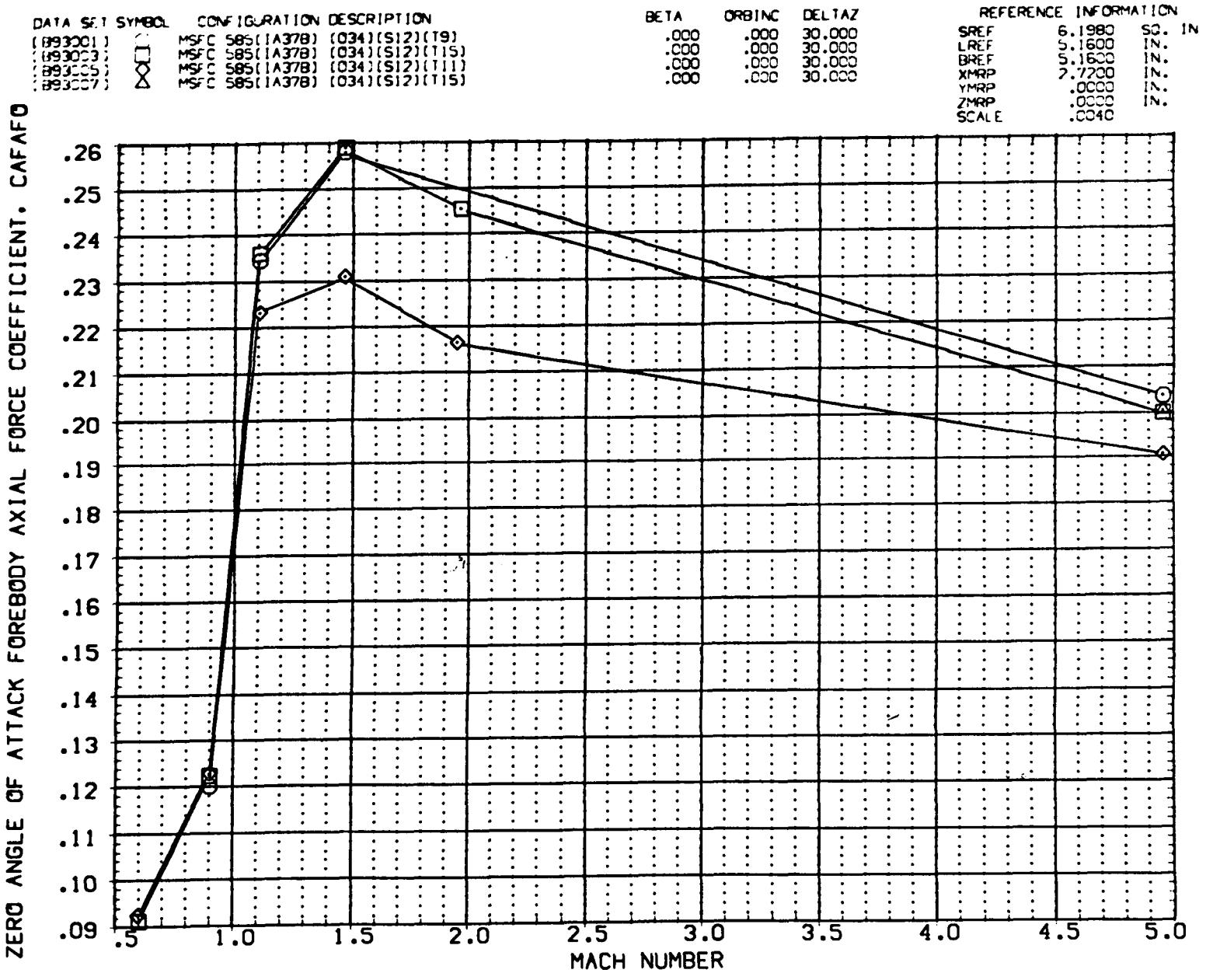
REFERENCE INFORMATION

SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	

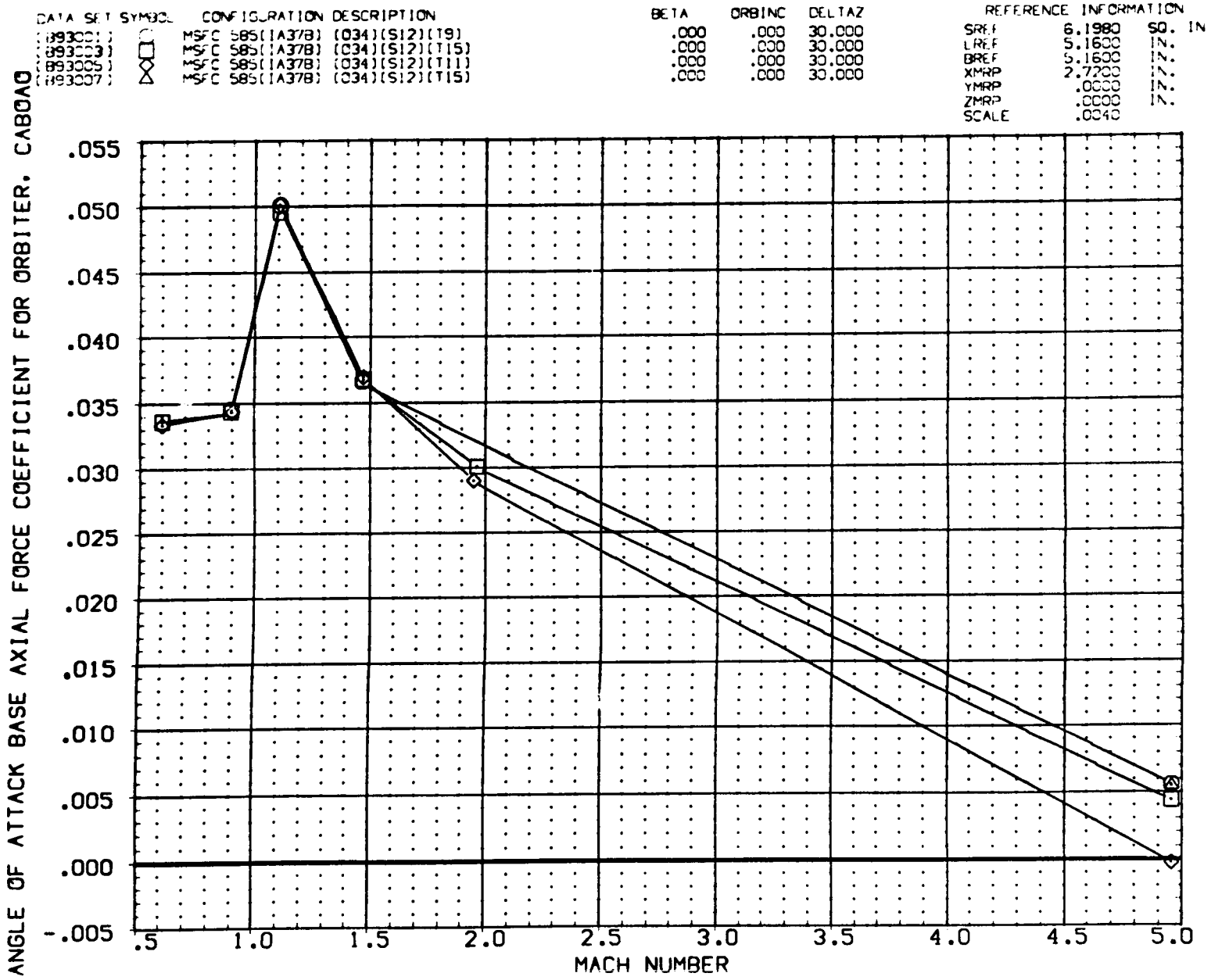


EFFECT OF EXTERNAL TANK NOSE ON LATERAL CHARACTERISTICS

(C)MACH = 1.47

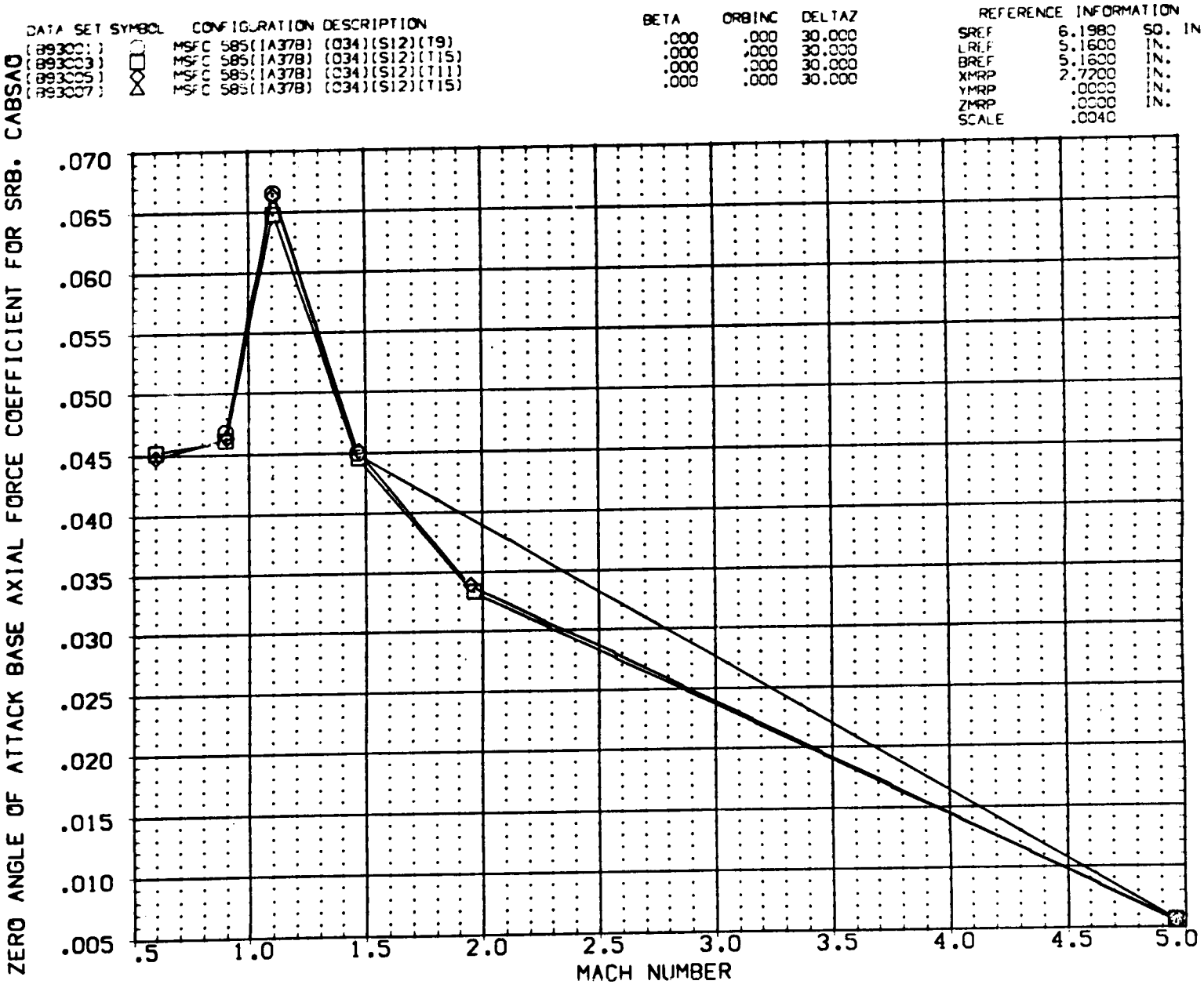


EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA



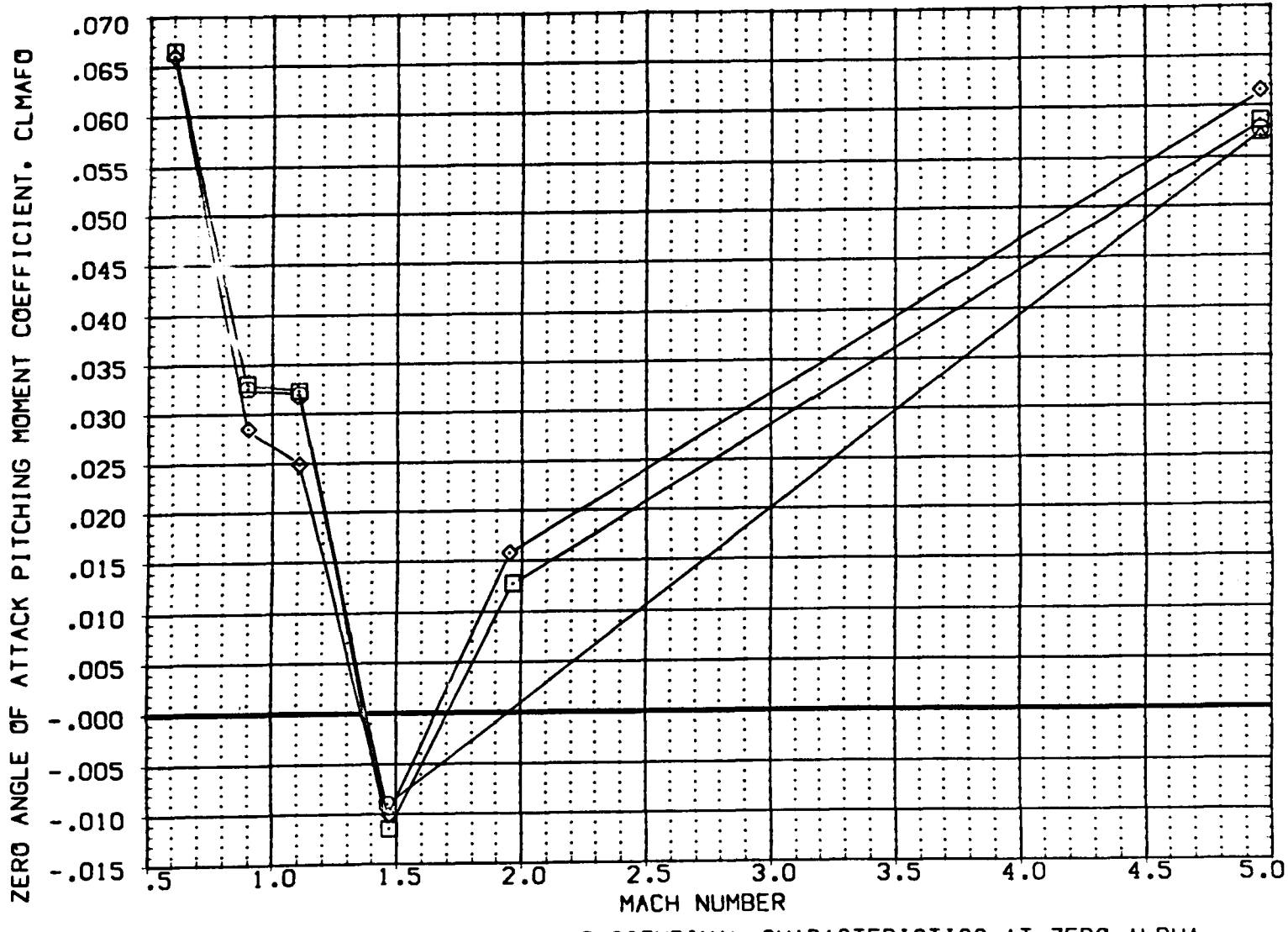
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA

EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA

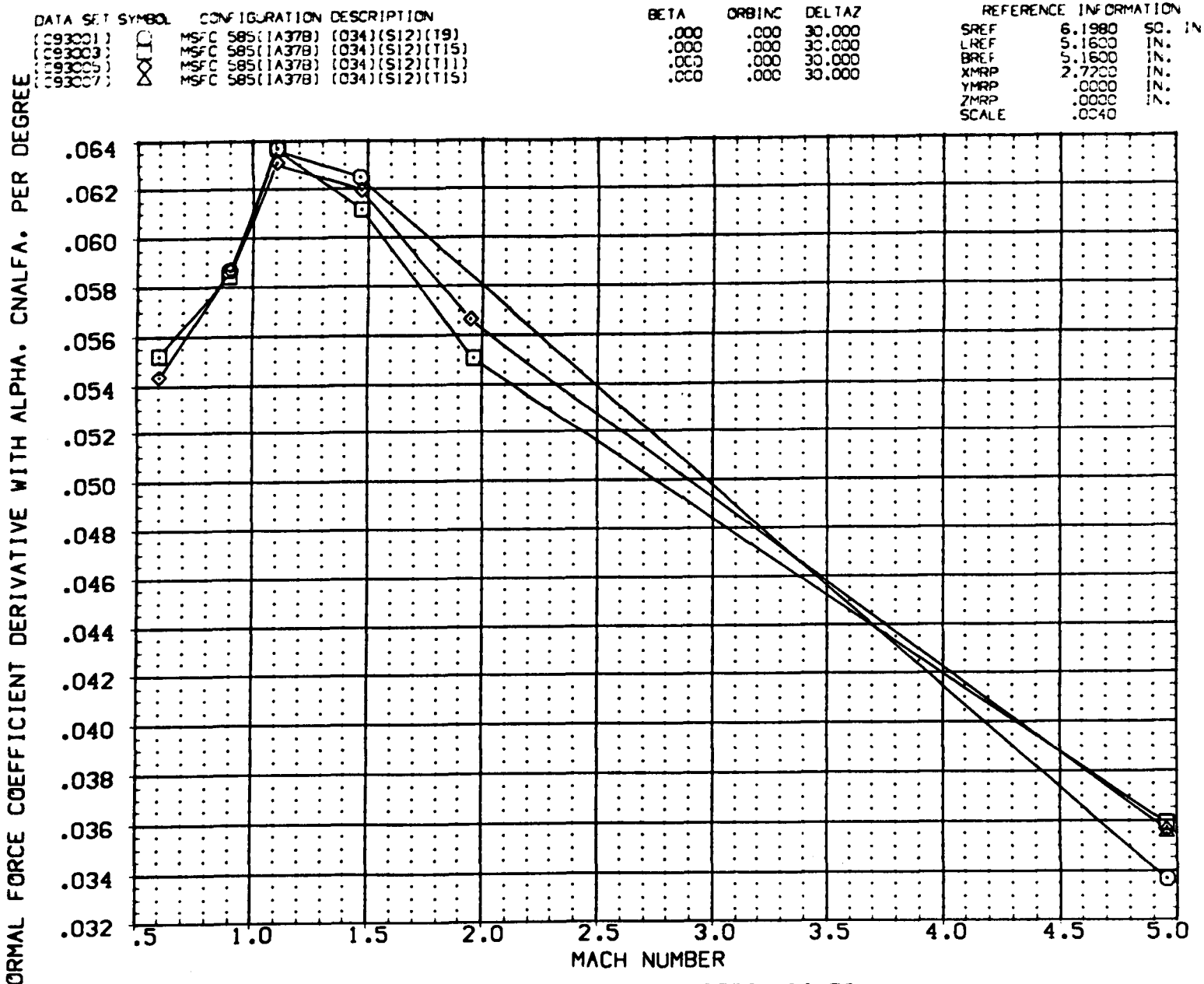
DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	BETA	ORBINC	DELTAZ
(893001)	○	MSFC 585(1A37B) (034)(S12)(T9)	.000	.000	30.000
(893003)	□	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000
(893005)	◇	MSFC 585(1A37B) (034)(S12)(T11)	.000	.000	30.000
(893007)	△	MSFC 585(1A37B) (034)(S12)(T15)	.000	.000	30.000

REFERENCE INFORMATION

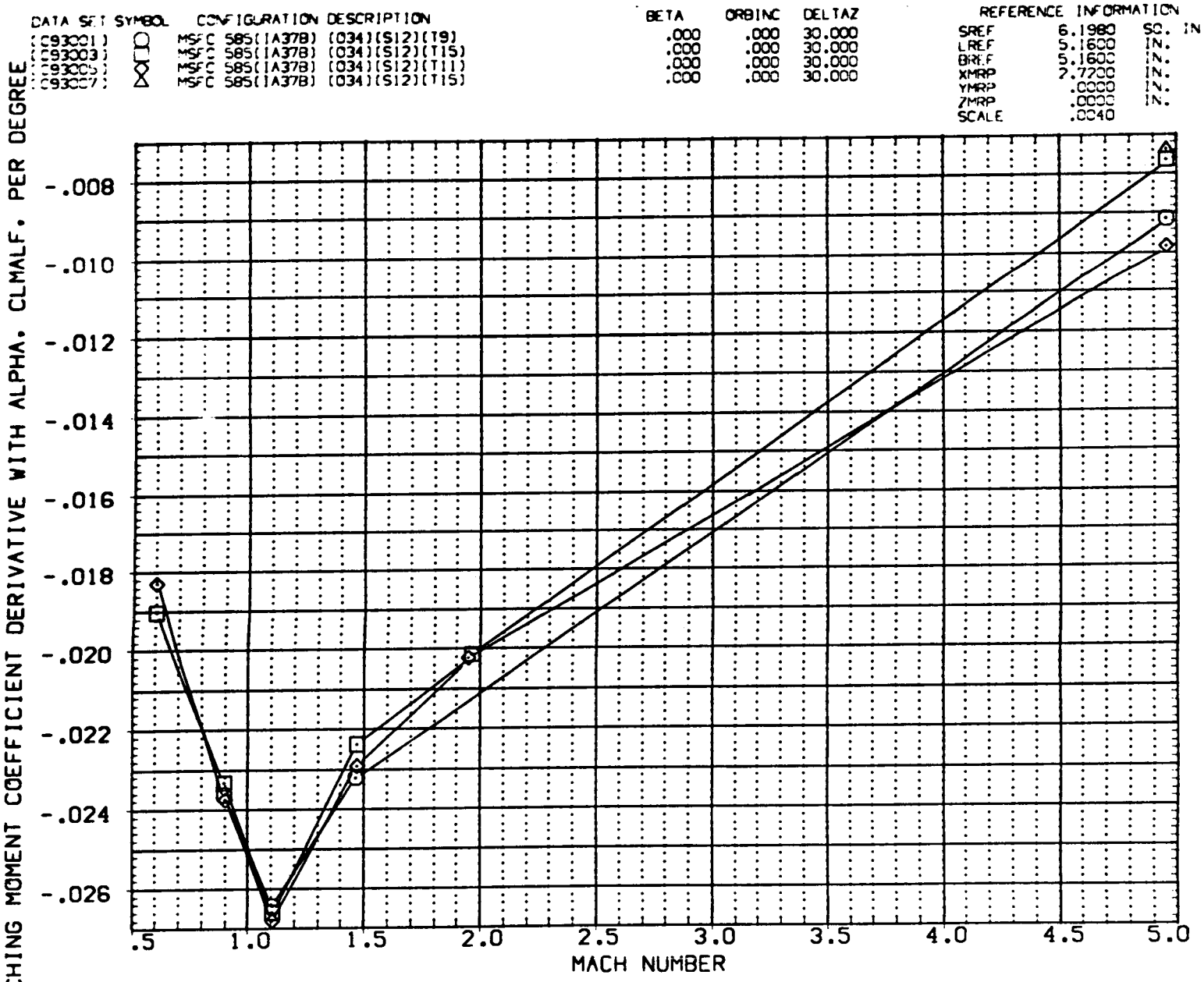
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



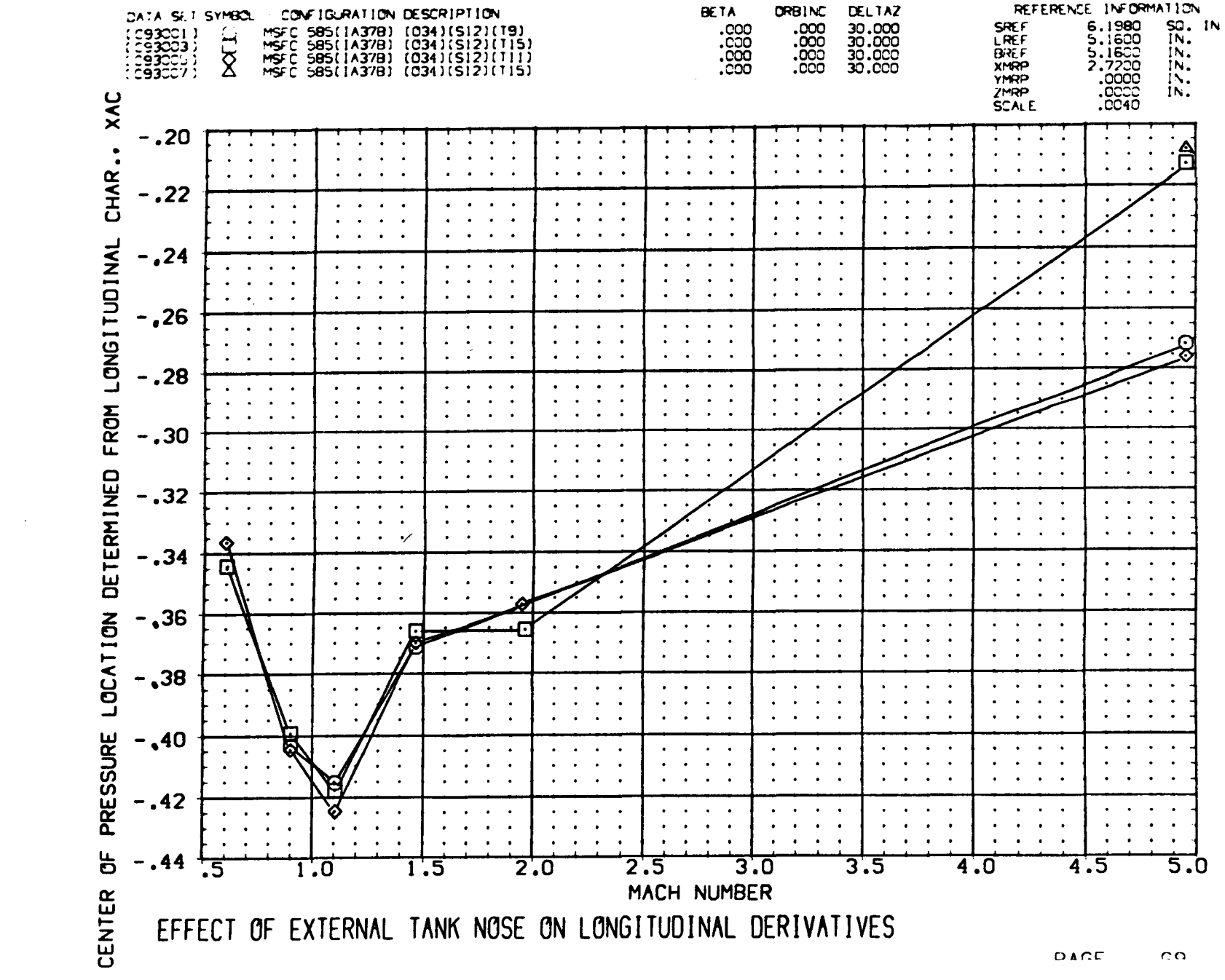
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL CHARACTERISTICS AT ZERO ALPHA



EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL DERIVATIVES



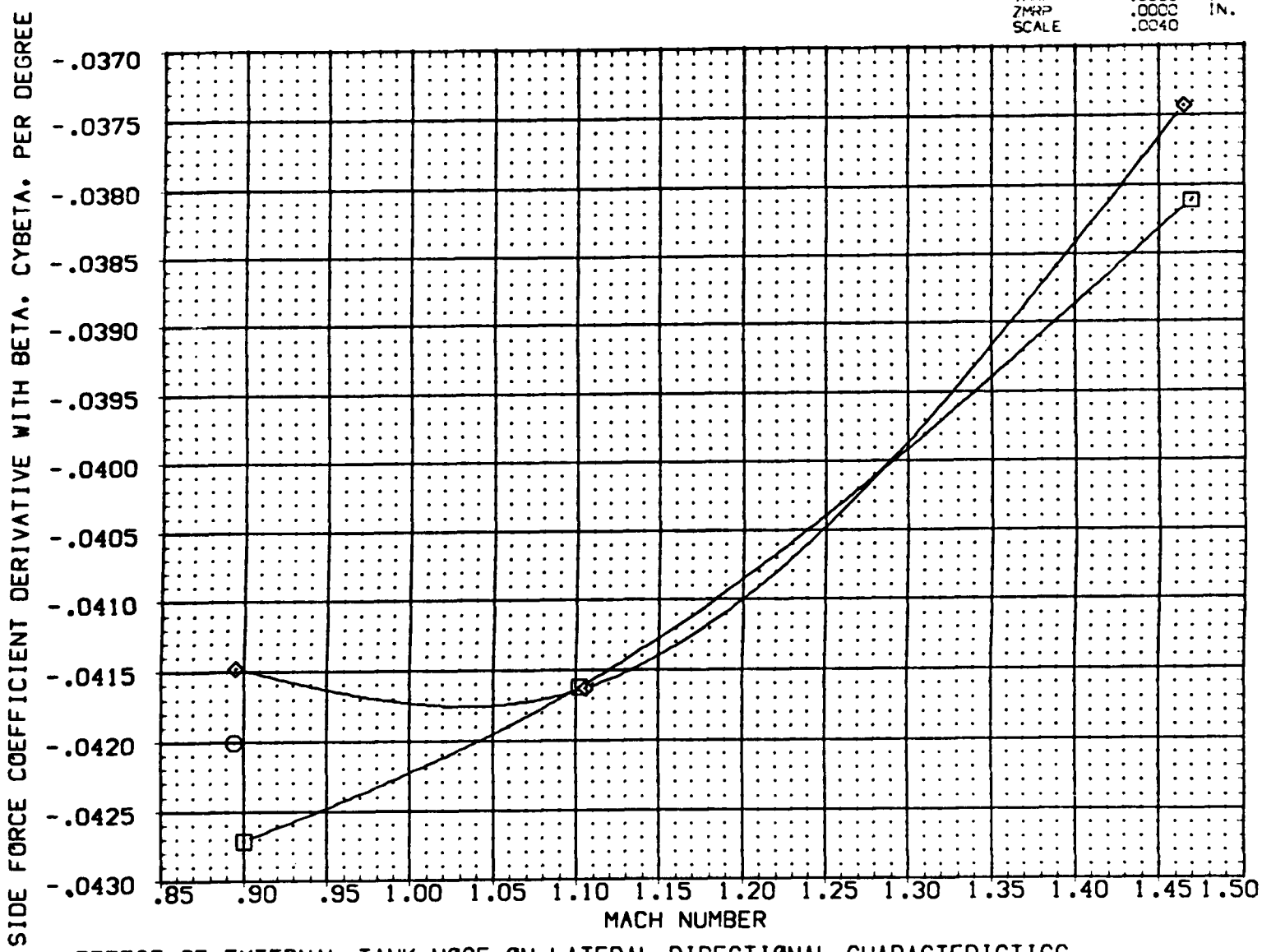
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL DERIVATIVES



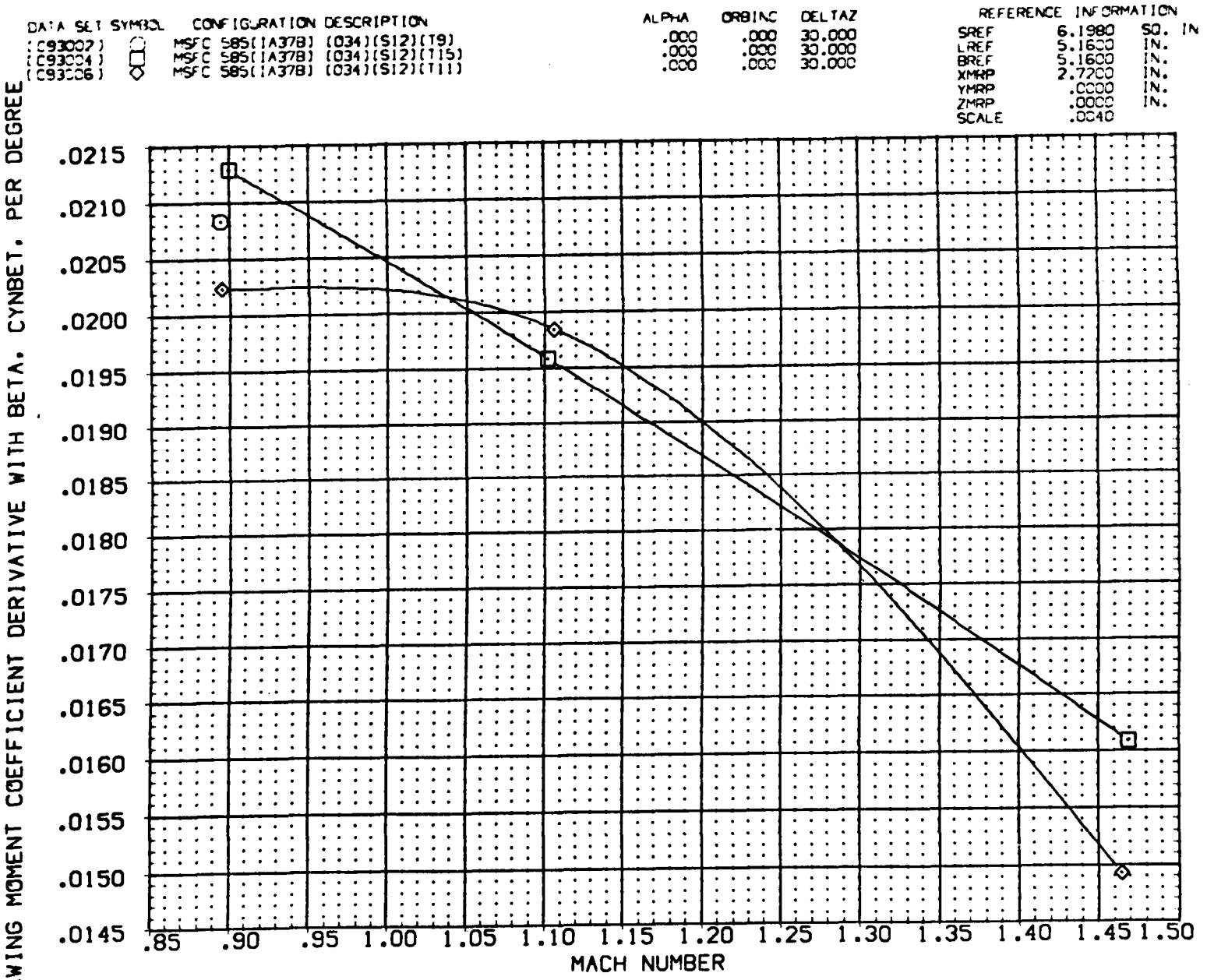
EFFECT OF EXTERNAL TANK NOSE ON LONGITUDINAL DERIVATIVES

DATA SET	SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	ORBINC	DELTAZ
(C93002)	○	MSFC 585(IA37B) (034)(S12)(T9)	.000	.000	30.000
(C93004)	□	MSFC 585(IA37B) (034)(S12)(T15)	.000	.000	30.000
(C93006)	◇	MSFC 585(IA37B) (034)(S12)(T11)	.000	.000	30.000

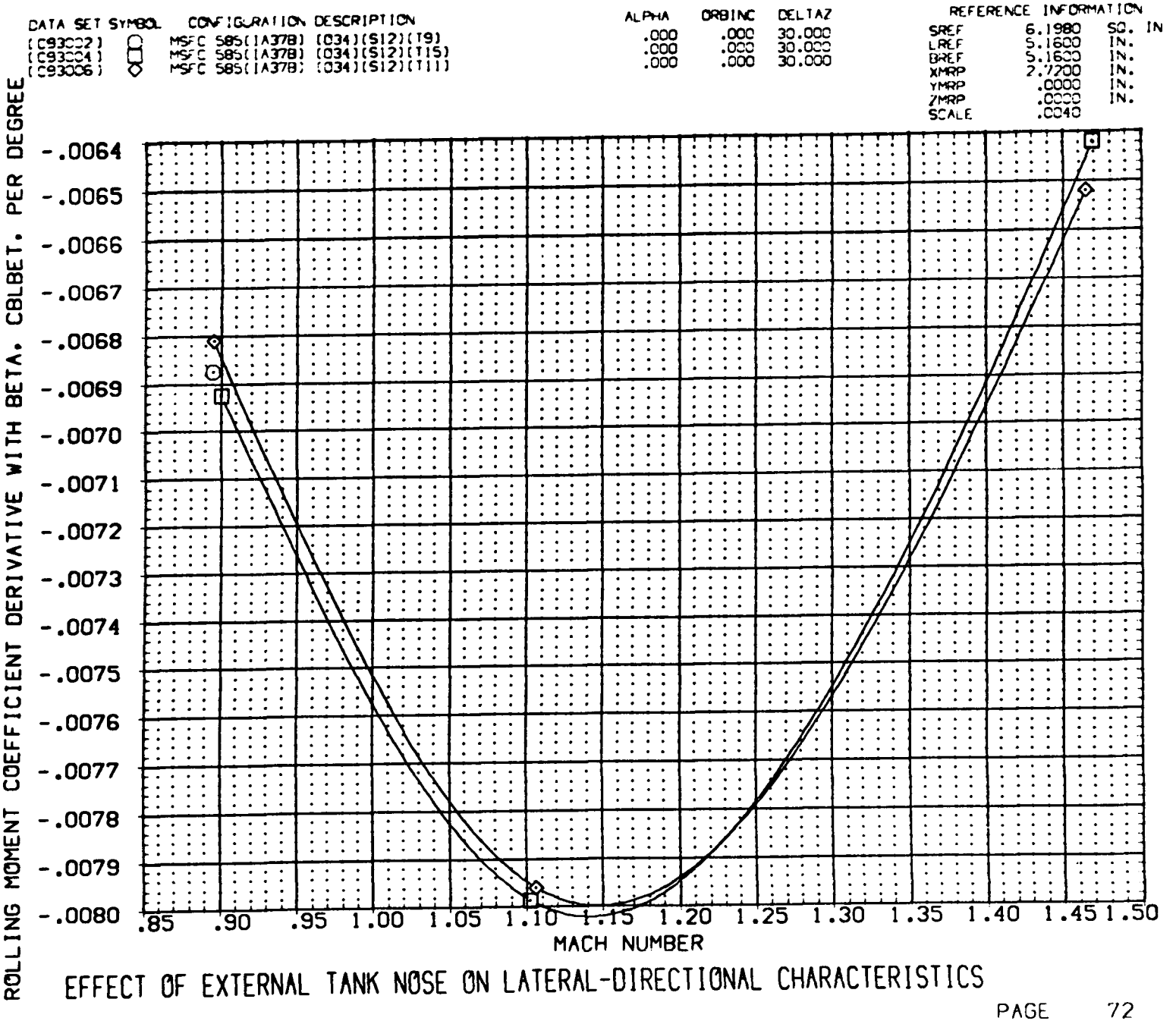
REFERENCE INFORMATION		
SREF	6.1980	SQ. IN
LREF	5.1600	IN.
BREF	5.1600	IN.
XMRP	2.7200	IN.
YMRP	.0000	IN.
ZMRP	.0000	IN.
SCALE	.0040	



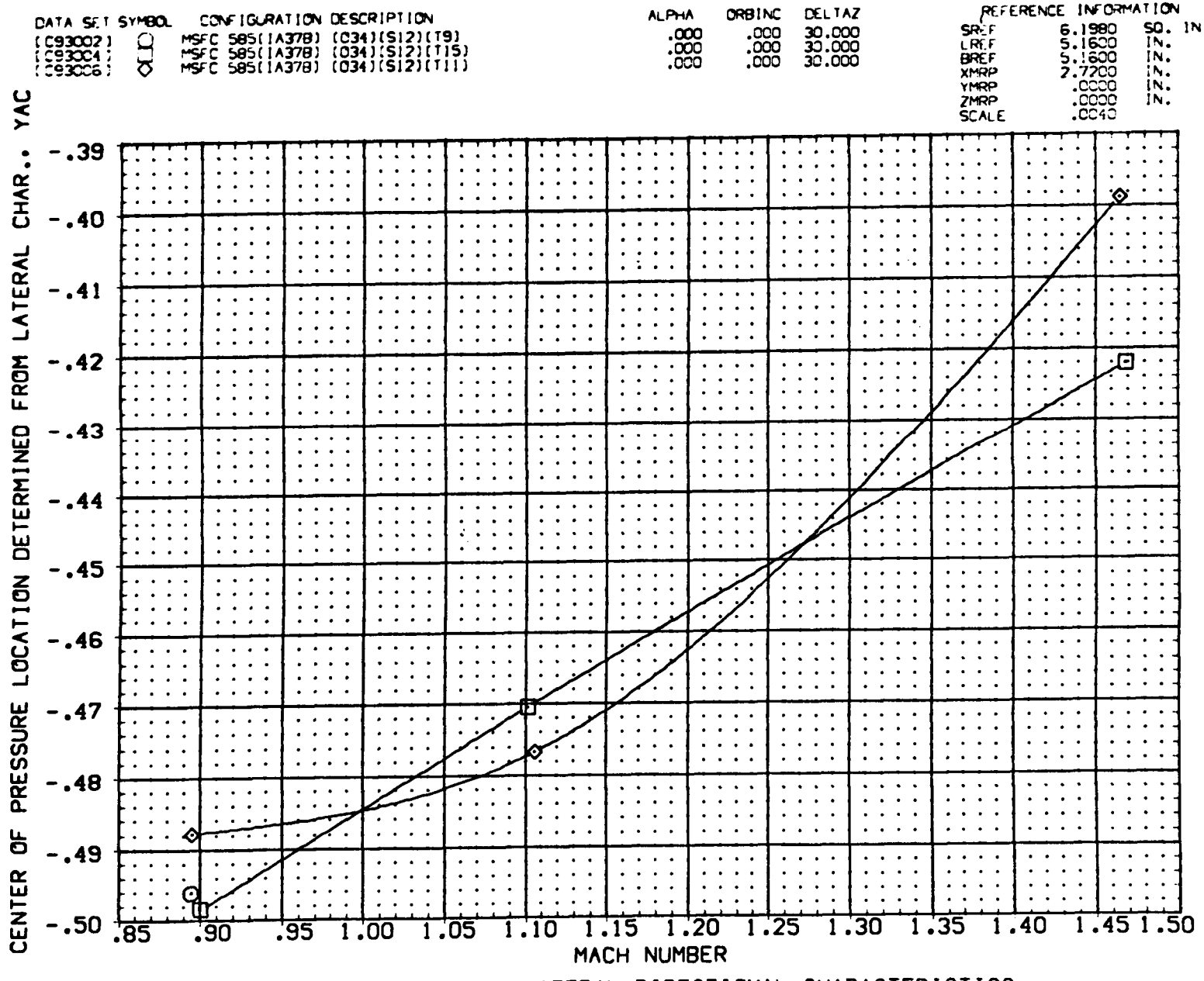
EFFECT OF EXTERNAL TANK NOSE ON LATERAL-DIRECTIONAL CHARACTERISTICS



EFFECT OF EXTERNAL TANK NOSE ON LATERAL-DIRECTIONAL CHARACTERISTICS



EFFECT OF EXTERNAL TANK NOSE ON LATERAL-DIRECTIONAL CHARACTERISTICS



EFFECT OF EXTERNAL TANK NOSE ON LATERAL-DIRECTIONAL CHARACTERISTICS

APPENDIX

TABULATED SOURCE DATA

Plotted data tabulations are available from Data Management Services on request.

MSFC 585(IA37B) (O34) (S12) (T9) (R93001) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 18/ 1 RN/L = 6.26 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.898	-11.320	-.76130	.31870	.00130	.00130	.00140	.10100	.00770	.03660	.10190	.05990
.898	-9.290	-.62070	.26300	.00260	.00100	.00060	.10690	.00780	.03680	.09810	.05930
.898	-7.140	-.48110	.20910	.00300	.00110	.00070	.11360	.00760	.03600	.09320	.05720
.898	-5.040	-.34760	.15810	.00510	.00000	.00070	.11720	.00770	.03650	.09150	.05490
.898	-2.920	-.22000	.10750	.00390	.00080	.00060	.12130	.00740	.03510	.08590	.05270
.898	-.820	-.09600	.05400	.00270	.00100	.00010	.12090	.00730	.03470	.08800	.04820
.898	1.300	.03120	.00020	.00630	-.00090	.00090	.11950	.00720	.03410	.08540	.04540
.898	3.420	.15090	-.04120	.00520	.00000	.00140	.12030	.00710	.03370	.08510	.04500
.898	5.540	.25950	-.06980	.00480	.00000	.00100	.11570	.00710	.03360	.08980	.04790
.898	7.640	.37140	-.11460	.00680	-.00030	.00070	.10740	.00720	.03410	.08810	.04990
.898	9.620	.47820	-.15190	.00470	.00040	.00000	.10120	.00760	.03570	.08810	.05420
.898	-.820	-.09900	.05450	.00430	.00050	.00030	.12300	.00750	.03540	.08580	.04890
	GRADIENT	.05865	-.02364	.00036	-.00020	.00015	-.00021	-.00005	-.00023	-.00024	-.00122

RUN NO. 19/ 1 RN/L = 6.47 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.103	-11.490	-.81790	.34000	.00900	-.00100	.00110	.21610	.01030	.04850	.10990	.07920
1.103	-9.420	-.64830	.26990	.01020	-.00130	.00090	.21860	.01030	.04880	.10680	.07640
1.103	-7.240	-.49140	.21020	.00940	-.00140	.00100	.22550	.01050	.04970	.10390	.07290
1.103	-5.080	-.34490	.15600	.01260	-.00220	.00100	.23180	.01060	.05000	.10030	.07010
1.103	-2.930	-.20920	.10610	.01300	-.00250	.00060	.23340	.01050	.04970	.10170	.06880
1.103	-.770	-.06880	.05190	.01090	-.00040	.00070	.23370	.01060	.05010	.10000	.06750
1.103	1.370	.06540	-.00510	.01000	.00090	.00070	.23440	.01060	.05000	.09520	.06480
1.103	3.510	.20150	-.06410	.00910	.00200	.00020	.22680	.01060	.04990	.09390	.06440
1.103	5.660	.33110	-.11210	.00960	.00280	.00090	.22250	.01090	.05140	.09400	.06760
1.103	7.780	.45510	-.16520	.01070	.00210	.00130	.21620	.01100	.05180	.09030	.06730
1.103	9.780	.56090	-.20080	.01040	.00190	.00140	.20580	.01120	.05280	.08740	.06910
1.103	-.780	-.07120	.05270	.01160	-.00030	.00080	.23410	.01030	.04870	.09830	.06660
	GRADIENT	.06367	-.02645	-.00059	.00069	-.00006	-.00089	.00001	.00002	-.00131	-.00074

MSFC 585(1A37B) (034) (S12) (T9) (R93001) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 24/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.465	-11.660	-.83460	.31210	-.00780	.00480	-.00180	.25530	.00810	.03830	.07510	.04920
1.465	-9.560	-.66130	.24360	-.00980	.00510	-.00250	.25500	.00800	.03770	.07220	.04850
1.465	-7.370	-.49400	.17760	-.00550	.00300	-.00240	.25680	.00780	.03710	.06790	.04560
1.465	-5.180	-.33420	.11450	.00120	.00040	-.00180	.25950	.00780	.03700	.06400	.04300
1.465	-2.990	-.19400	.06220	.00040	.00060	-.00170	.25910	.00770	.03640	.06230	.04380
1.465	-.850	-.05640	.01110	.00280	-.00120	-.00140	.25770	.00770	.03650	.06250	.04500
1.465	1.310	.08130	-.03970	.00140	.00030	-.00140	.25870	.00770	.03660	.05990	.04470
1.465	3.470	.20870	-.08750	.00310	-.00010	-.00130	.26060	.00780	.03710	.05690	.04500
1.465	5.630	.32520	-.12880	.00420	.00050	-.00070	.25830	.00790	.03740	.05510	.04670
1.465	7.780	.44450	-.17090	.00470	.00090	-.00040	.25570	.00800	.03770	.05340	.04710
1.465	9.810	.55340	-.20690	.00560	-.00070	-.00060	.25040	.00820	.03860	.05490	.04730
1.465	-.850	-.05640	.01010	.00460	-.00210	-.00140	.25850	.00770	.03660	.06080	.04460
	GRADIENT	.06248	-.02321	.00031	-.00003	.00006	.00026	.00001	.00010	-.00087	.00015

RUN NO. 1/ 1 RN/L = 4.92 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
4.959	-10.860	-.46060	.16360	.00240	-.00140	-.00130	.26500	.00090	.00450	.00640	.00570
4.959	-8.930	-.39170	.14470	.00280	-.00150	-.00050	.25160	.00100	.00490	.00650	.00570
4.959	-6.880	-.31510	.12120	.00490	-.00240	-.00040	.23730	.00110	.00520	.00620	.00580
4.959	-4.860	-.24600	.10050	.00360	-.00050	.00230	.22460	.00110	.00540	.00600	.00560
4.959	-2.830	-.17310	.07820	.00360	-.00060	-.00040	.21360	.00110	.00530	.00580	.00560
4.959	-.800	-.11180	.06400	.00190	-.00010	-.00040	.20560	.00110	.00550	.00530	.00570
4.959	1.240	-.04260	.04600	.00220	.00020	-.00010	.20050	.00110	.00550	.00540	.00550
4.959	3.250	.03020	.02390	.00250	.00050	-.00010	.19400	.00110	.00540	.00560	.00530
4.959	5.300	.10290	-.00100	.00080	.00100	-.00010	.18750	.00120	.00560	.00560	.00510
4.959	7.340	.18350	-.02980	.00500	.00030	-.00010	.17990	.00120	.00590	.00540	.00480
4.959	9.250	.26000	-.05710	.00330	.00040	-.00030	.17780	.00120	.00560	.00490	.00450
4.959	-.800	-.10410	.05930	.00190	.00030	-.00040	.20600	.00120	.00560	.00520	.00510
	GRADIENT	.03366	-.00914	-.00018	.00014	-.00022	-.00366	.00000	.00001	-.00006	-.00003

MSFC 585(IA378) (034) (S12) (T9) (R93002) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 17/ 0 RN/L = 6.31 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLN	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.894	-11.140	-.08340	.03660	.44650	-.19240	.06760	.09820	.00940	.04450	.09090	.06300
.894	-9.130	-.08450	.03710	.36830	-.16290	.05700	.10660	.00880	.04160	.08710	.06050
.894	-7.020	-.08030	.03570	.28980	-.13270	.04580	.11050	.00830	.03900	.08380	.06000
.894	-4.940	-.07580	.03300	.20920	-.09940	.03390	.11430	.00770	.03640	.07920	.05670
.894	-2.840	-.07600	.03670	.13030	-.06370	.02040	.11740	.00760	.03610	.07790	.05390
.894	-.780	-.09020	.05000	.04310	-.01970	.00590	.12280	.00730	.03460	.07920	.04980
.894	1.310	-.08650	.04600	-.05290	.03100	-.00960	.12640	.00730	.03460	.08200	.04310
.894	3.400	-.09100	.04570	-.13670	.07030	-.02270	.12960	.00790	.03750	.08150	.04090
.894	5.480	-.09000	.04450	-.21780	.10880	-.03670	.12880	.00800	.03800	.08350	.03980
.894	7.560	-.09460	.04960	-.29460	.14050	-.04730	.12370	.00870	.04110	.09090	.03810
.894	9.530	-.10140	.05600	-.36600	.16720	-.05740	.12740	.00920	.04350	.09080	.03710
.894	-.780	-.09490	.05280	.04460	-.01980	.00560	.12130	.00750	.03560	.08130	.04880
	GRADIENT	-.00196	.00166	-.04201	.02084	-.00687	.00190	.00000	.00003	.00042	-.00204

MSFC 585(IA378) (034) (S12) (T15) (R93003) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 16/ 1 RN/L = 5.02 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.601	-11.040	-.72800	.30380	.01550	-.00700	.00130	.07100	.00750	.03550	.08740	.05430
.601	-9.070	-.60720	.25670	.01590	-.00760	.00090	.07690	.00740	.03490	.08400	.05180
.601	-7.010	-.48500	.21050	.01780	-.00680	.00140	.08690	.00720	.03390	.07710	.04990
.601	-4.950	-.37480	.16570	.01940	-.00790	.00120	.09130	.00720	.03390	.07260	.04970
.601	-2.890	-.25880	.12090	.01980	-.00780	.00120	.09710	.00710	.03350	.06840	.04620
.601	-.820	-.14340	.08110	.01620	-.00500	.00100	.09350	.00710	.03360	.06790	.04530
.601	1.260	-.03320	.04450	.01800	-.00710	.00150	.08790	.00710	.03340	.07160	.04450
.601	3.310	.08300	.00730	.01720	-.00550	.00190	.08250	.00690	.03250	.07390	.04340
.601	5.380	.20180	-.03500	.01630	-.00440	.00220	.07260	.00680	.03220	.07480	.04460
.601	7.460	.32190	-.08210	.01660	-.00470	.00210	.06160	.00680	.03240	.07360	.04300
.601	9.400	.44400	-.13690	.01580	-.00360	.00190	.04630	.00690	.03260	.07480	.04820
.601	-.820	-.14530	.08040	.01750	-.00520	.00120	.09240	.00700	.03330	.07090	.04480
	GRADIENT	.05521	-.01902	-.00030	.00027	.00008	-.00130	-.00003	-.00014	.00028	-.00069

RUN NO. 15/ 1 RN/L = 6.23 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.898	-11.320	-.76620	.32050	-.00020	.00180	.00100	.10040	.00770	.03660	.10250	.05960
.898	-9.290	-.61550	.26040	.00500	-.00030	.00100	.10690	.00770	.03620	.09540	.05870
.898	-7.160	-.48000	.20760	.00620	-.00080	.00060	.11610	.00740	.03510	.09030	.05630
.898	-5.040	-.34480	.15650	.00830	-.00170	.00120	.11820	.00750	.03540	.08930	.05520
.898	-2.920	-.21900	.10660	.00550	-.00050	.00070	.12590	.00720	.03400	.08290	.05160
.898	-.820	-.09610	.05500	.00680	-.00050	.00100	.12210	.00730	.03430	.08390	.04750
.898	1.300	.03490	.00000	.00720	-.00090	.00120	.12350	.00720	.03410	.08400	.04490
.898	3.400	.14800	-.03900	.00760	-.00150	.00160	.11840	.00720	.03400	.08500	.04580
.898	5.520	.26030	-.07260	.00880	-.00200	.00130	.11930	.00730	.03430	.08810	.04830
.898	7.640	.37550	-.12090	.00670	-.00030	.00090	.11290	.00720	.03420	.08540	.05090
.898	9.630	.47970	-.15320	.00630	.00000	.00040	.10600	.00730	.03470	.08490	.05390
.898	-.820	-.09930	.05650	.00680	-.00010	.00090	.12330	.00740	.03490	.08300	.04780
	GRADIENT	.05845	-.02333	.00032	-.00016	.00014	-.00100	-.00000	-.00001	.00030	-.00095

MSFC 585(IA378) (034) (S12) (T15) (R93003) (01 NOV 73)

REFERENCE DATA

SREF =	8.1980 SQ. IN	XMRP =	2.7200 IN.		
LREF =	9.1600 IN.	YMRP =	.0000 IN.		
BREF =	5.1600 IN.	ZMRP =	.0000 IN.		
SCALE =	.0040				

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 14/ 1 RN/L = 8.50 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.103	-11.500	-.82240	.34100	.00900	-.00110	.00080	.21560	.01020	.04820	.10950	.07950
1.103	-9.420	-.65160	.27050	.01020	-.00150	.00090	.21850	.01030	.04840	.10720	.07650
1.103	-7.250	-.49640	.21120	.01080	-.00120	.00110	.22650	.01040	.04900	.10370	.07300
1.103	-5.080	-.34720	.15630	.01190	-.00150	.00090	.23280	.01030	.04880	.10080	.06970
1.103	-2.910	-.21060	.10800	.01300	-.00250	.00090	.23440	.01040	.04910	.10100	.06830
1.103	-.780	-.07130	.05250	.01150	-.00130	.00060	.23510	.01050	.04950	.10050	.06590
1.103	1.370	.06130	-.00490	.01060	.00000	.00040	.23530	.01050	.04940	.09520	.06340
1.103	3.500	.19900	-.06450	.00910	.00150	.00020	.22610	.01040	.04930	.09430	.06380
1.103	5.660	.32960	-.11160	.01100	.00220	.00120	.22650	.01090	.05150	.09280	.06660
1.103	7.780	.45300	-.16460	.01130	.00120	.00130	.21390	.01110	.05250	.09260	.06830
1.103	9.790	.59870	-.20040	.01170	.00110	.00160	.20990	.01110	.05240	.08640	.06870
1.103	-.780	-.07680	.05400	.01020	.00040	.00070	.23160	.01030	.04880	.10090	.06620
	GRADIENT	.06368	-.02661	-.00059	.00062	-.00011	-.00115	.00000	.00002	-.00119	-.00075

RUN NO. 23/ 0 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.466	-11.670	-.83540	.31260	-.00900	.00540	-.00200	.25560	.00820	.03870	.07500	.04900
1.466	-9.560	-.66110	.24380	-.01040	.00510	-.00270	.25590	.00790	.03750	.07190	.04800
1.466	-7.370	-.49290	.17780	-.00620	.00290	-.00280	.25820	.00790	.03720	.06780	.04550
1.466	-5.180	-.33330	.11320	.00120	-.00010	-.00200	.26040	.00790	.03710	.06380	.04280
1.466	-2.990	-.18800	.05780	.00170	.00000	-.00160	.25910	.00780	.03710	.06170	.04370
1.466	-.840	-.05030	.00700	.00340	-.00110	-.00150	.25850	.00780	.03690	.06110	.04470
1.466	1.340	.08370	-.04050	.00390	-.00100	-.00140	.26040	.00780	.03670	.05870	.04430
1.466	3.480	.20740	-.08740	.00250	.00040	-.00140	.26240	.00790	.03740	.05690	.04460
1.466	5.630	.32730	-.13120	.00420	.00020	-.00080	.25890	.00800	.03790	.05430	.04630
1.466	7.780	.44440	-.17190	.00530	-.00020	-.00050	.25580	.00810	.03810	.05220	.04680
1.466	9.810	.55430	-.20640	.00690	-.00070	-.00070	.24950	.00820	.03890	.05510	.04720
1.466	-.840	-.05280	.00850	.00400	-.00150	-.00150	.25960	.00780	.03710	.06050	.04460
	GRADIENT	.06115	-.02238	.00013	.00006	.00003	.00055	.00001	.00003	-.00078	.00011

MSFC 585(1A378) (034) (S12) (T15) (R93003) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 25/ 0 RN/L = 7.06 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.963	-11.670	-.75200	.27270	-.00310	.00400	-.00190	.26420	.00540	.02560	.04940	.03480
1.963	-9.580	-.60210	.21370	-.00100	.00190	-.00170	.25910	.00520	.02460	.04770	.03600
1.963	-7.390	-.45560	.15710	-.00050	.00210	-.00180	.25230	.00600	.02850	.04680	.03460
1.963	-5.200	-.32230	.11030	.00160	.00060	-.00180	.24540	.00630	.02970	.04470	.03280
1.963	-3.010	-.19970	.06900	.00260	.00070	-.00170	.24420	.00640	.03010	.04180	.03330
1.963	-.870	-.08420	.02940	.00300	.00070	-.00170	.24680	.00640	.03020	.03770	.03330
1.963	1.300	.03630	-.01330	.00350	.00090	-.00160	.24290	.00630	.02980	.03430	.03320
1.963	3.450	.15570	-.06140	.00560	-.00030	-.00150	.24420	.00620	.02940	.03390	.03230
1.963	5.600	.27930	-.11410	.00430	.00090	-.00170	.24300	.00640	.03050	.03600	.03220
1.963	7.760	.40040	-.15600	.00700	-.00110	-.00130	.23940	.00640	.03040	.03690	.03350
1.963	9.810	.51640	-.19120	.00860	-.00160	-.00120	.23840	.00650	.03050	.03670	.03380
1.963	-.870	-.08600	.03240	.00190	.00140	-.00160	.24430	.00600	.02820	.03700	.03260
	GRADIENT	.05507	-.02014	.00044	-.00013	.00003	-.00018	-.00003	-.00012	-.00126	-.00014

RUN NO. 3/ 1 RN/L = 4.94 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
4.959	-10.870	-.46800	.16160	.00260	.00040	-.00020	.26300	.00070	.00360	.00630	.00570
4.959	-8.930	-.39870	.14380	.00280	.00020	-.00050	.25000	.00050	.00280	.00640	.00570
4.959	-6.880	-.32600	.12160	.00120	.00070	.00000	.23710	.00060	.00290	.00630	.00570
4.959	-4.870	-.25700	.09890	.00520	-.00120	.00030	.21940	.00060	.00300	.00600	.00580
4.959	-2.840	-.18800	.07910	.00160	.00000	-.00040	.21030	.00060	.00290	.00570	.00580
4.959	-.800	-.11140	.06310	.00190	-.00010	-.00040	.20180	.00080	.00390	.00560	.00570
4.959	1.250	-.03850	.05140	.00420	.00000	.00010	.19780	.00100	.00490	.00540	.00560
4.959	3.280	.03430	.03490	.00250	.00100	-.00030	.19350	.00110	.00540	.00540	.00560
4.959	5.320	.10340	.01700	.00290	.00130	.00010	.18680	.00110	.00540	.00570	.00530
4.959	7.340	.17210	-.01610	.00300	.00060	-.00030	.18030	.00110	.00560	.00540	.00510
4.959	9.250	.25260	-.04200	.00330	.00000	-.00030	.17630	.00110	.00550	.00470	.00460
4.959	-.810	.32790	-.07200	-.00600	.00240	-.00190	.30150	-.00180	-.00880	-.01030	-.00320
	GRADIENT	.03591	-.00764	-.00014	.00022	-.00003	-.00315	.00007	.00033	-.00007	-.00003

MSFC 585(IA378) (034) ($12) (T15) (R93004) (01 NOV 73)

REFERENCE DATA

SREF = 0.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 12/ 0 RN/L = 6.34 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.900	-11.140	-.07830	.03080	.44860	-.19280	.06750	.10340	.00940	.04440	.09150	.06220
.900	-9.140	-.07910	.03320	.36760	-.16340	.05680	.10710	.00870	.04130	.08790	.06020
.900	-7.020	-.07140	.03010	.28470	-.13040	.04550	.11390	.00810	.03820	.08470	.05810
.900	-4.950	-.06440	.02600	.21330	-.10180	.03440	.11760	.00790	.03720	.08000	.05530
.900	-2.840	-.06930	.03170	.12850	-.06280	.02040	.12080	.00780	.03670	.07880	.05310
.900	-.780	-.08660	.04720	.04050	-.01790	.00590	.12280	.00760	.03590	.08050	.04960
.900	1.310	-.08440	.04430	-.05570	.03240	-.00980	.13190	.00740	.03480	.08010	.04200
.900	3.400	-.08580	.04210	-.13990	.07260	-.02270	.13290	.00800	.03760	.08250	.04000
.900	5.460	-.08320	.04030	-.22200	.11150	-.03700	.13180	.00820	.03860	.08310	.03950
.900	7.570	-.08650	.04460	-.29800	.14240	-.04830	.13000	.00870	.04100	.08780	.03770
.900	9.540	-.09490	.05230	-.36990	.16950	-.05790	.12870	.00940	.04430	.09140	.03650
.900	-.780	-.09020	.04930	.04290	-.01900	.00530	.12140	.00770	.03660	.08260	.04780
	GRADIENT	-.00277	.00215	-.04271	.02129	-.00693	.00200	-.00001	-.00005	.00030	-.00200

RUN NO. 13/ 0 RN/L = 6.79 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.102	-11.320	-.03290	.00700	.47660	-.19080	.08310	.21570	.01170	.05500	.09740	.06920
1.102	-9.270	-.03540	.01240	.38370	-.15760	.06940	.21980	.01120	.05280	.09610	.06840
1.102	-7.110	-.04210	.01920	.29380	-.12620	.05440	.21990	.01100	.05200	.09820	.06770
1.102	-5.000	-.04720	.02800	.20760	-.09140	.03820	.22170	.01110	.05250	.10180	.06730
1.102	-2.870	-.05810	.03890	.12190	-.05390	.02160	.22970	.01080	.05100	.09990	.06440
1.102	-.790	-.06250	.04610	.03740	-.01490	.00540	.23190	.01080	.05100	.09880	.06500
1.102	1.320	-.06130	.04730	-.05590	.03150	-.01210	.23600	.01090	.05150	.09590	.06110
1.102	3.430	-.05800	.04060	-.14160	.07200	-.02900	.23570	.01110	.05240	.09650	.05770
1.102	5.540	-.05240	.03690	-.22530	.10720	-.04580	.23890	.01160	.05480	.09620	.05750
1.102	7.670	-.04840	.03330	-.31320	.14050	-.06160	.24200	.01170	.05500	.09620	.05640
1.102	9.700	-.04420	.02800	-.39730	.16780	-.07450	.23810	.01230	.05800	.09630	.05770
1.102	-.790	-.06120	.04380	.03940	-.01600	.00440	.22810	.01070	.05040	.09940	.06340
	GRADIENT	-.00118	.00160	-.04162	.01958	-.00799	.00163	.00000	.00001	-.00069	-.00107

MSFC 585(IA378) (034) (S12) (T15) (R93004) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 3.1600 IN. YMRP = .0000 IN.
BREF = 3.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 20/ 0 RN/L = 6.51 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.469	-11.390	-.01210	-.02150	.48560	-.19340	.07630	.24220	.00890	.04210	.06730	.05170
1.469	-9.320	-.01210	-.01800	.37750	-.15200	.06050	.24550	.00870	.04100	.06610	.05040
1.469	-7.160	-.01210	-.01490	.28170	-.11520	.04620	.25100	.00860	.04060	.06380	.04920
1.469	-5.020	-.01180	-.01310	.19150	-.07930	.03120	.25370	.00840	.03960	.06270	.04740
1.469	-2.900	-.01480	-.01020	.10820	-.04490	.01670	.25520	.00810	.03830	.06210	.04650
1.469	-.780	-.01430	-.00890	.02810	-.01200	.00330	.25840	.00790	.03740	.05980	.04590
1.469	1.330	-.01490	-.00850	-.05490	.02420	-.01070	.26240	.00790	.03730	.05900	.04400
1.469	3.450	-.00990	-.01020	-.13300	.05650	-.02390	.26630	.00820	.03900	.06100	.04090
1.469	5.580	-.01100	-.01100	-.21740	.09000	-.03850	.26720	.00830	.03920	.06120	.04120
1.469	7.750	-.00770	-.01460	-.30930	.12540	-.05330	.26550	.00860	.04040	.06190	.04170
1.469	9.790	-.00580	-.01710	-.40620	.16200	-.06760	.26470	.00890	.04200	.06360	.03930
1.469	-.780	-.01430	-.00930	.03000	-.01270	.00260	.25890	.00790	.03740	.05990	.04590
	GRADIENT	.00067	.00002	-.03812	.01609	-.00642	.00176	.00001	.00009	-.00019	-.00088

MSFC 585(IA37B) (O34) (S12) (T11) (R93005) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 9.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 7/ 1 RN/L = 4.99 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLN	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.598	-11.040	-.73350	.30140	.01560	-.00680	.00120	.06740	.00750	.03550	.08990	.05400
.598	-9.080	-.60970	.25390	.01460	-.00620	.00060	.07750	.00710	.03370	.08360	.05160
.598	-7.010	-.49270	.21080	.01650	-.00640	.00130	.08220	.00740	.03500	.07870	.05120
.598	-4.950	-.36870	.16020	.01690	-.00660	.00160	.08810	.00730	.03460	.07420	.04960
.598	-2.870	-.25600	.11750	.01730	-.00730	.00120	.09320	.00720	.03390	.06990	.04670
.598	-.820	-.14740	.08020	.01920	-.00610	.00160	.09300	.00710	.03350	.07000	.04540
.598	1.260	-.03610	.04450	.01400	-.00530	.00120	.09050	.00700	.03290	.06860	.04390
.598	3.330	.08370	.00740	.01600	-.00510	.00230	.08170	.00680	.03210	.07460	.04370
.598	5.400	.20350	-.03530	.01920	-.00600	.00280	.07130	.00680	.03230	.07640	.04370
.598	7.460	.32010	-.08100	.01960	-.00600	.00260	.05960	.00680	.03210	.07490	.04630
.598	9.400	.43740	-.13240	.01580	-.00390	.00150	.04450	.00680	.03210	.07540	.04950
.598	-.820	-.14330	.07770	.02030	-.00650	.00150	.09380	.00710	.03350	.06760	.04430
	GRADIENT	.05436	-.01830	-.00025	.00024	.00007	-.00075	-.00006	-.00029	-.00002	-.00071

RUN NO. 8/ 1 RN/L = 6.21 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLN	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.900	-11.320	-.78230	.31550	.00130	.00220	.00120	.10030	.00790	.03740	.10160	.06010
.900	-9.290	-.61630	.25710	.00420	.00060	.00090	.10740	.00770	.03640	.09700	.05910
.900	-7.170	-.47910	.20560	.00550	.00060	.00090	.11460	.00750	.03560	.09270	.05650
.900	-5.040	-.34260	.15360	.00590	-.00040	.00080	.11850	.00750	.03550	.08930	.05420
.900	-2.900	-.21620	.10410	.00390	.00130	.00060	.12320	.00740	.03490	.08510	.05250
.900	-.810	-.08900	.05030	.00190	.00220	.00000	.12300	.00730	.03440	.08570	.04830
.900	1.300	.03910	-.00450	.00560	.00020	.00110	.12270	.00730	.03440	.08520	.04440
.900	3.420	.15350	-.04460	.00660	-.00070	.00160	.12000	.00720	.03430	.08550	.04360
.900	5.520	.26280	-.07210	.00800	-.00170	.00140	.11350	.00720	.03410	.09190	.04740
.900	7.640	.37840	-.12010	.00600	.00010	.00090	.10930	.00720	.03420	.08510	.05040
.900	9.630	.47700	-.15110	.00550	.00000	.00020	.10410	.00740	.03520	.08540	.05290
.900	-.820	-.09570	.05370	.00280	.00240	.00040	.12510	.00710	.03380	.08560	.04790
	GRADIENT	.05671	-.02377	.00059	-.00038	.00020	-.00047	-.00003	-.00009	.00003	-.00117

MSFC 585(IA37B) (034) (S12) (T11) (R93005) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO, 9/ 1 RN/L = 6.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.103	-11.480	-.80680	.33540	.01170	-.00210	.00120	.20500	.01020	.04800	.10990	.07950
1.103	-9.410	-.63980	.26630	.01160	-.00200	.00130	.20850	.01030	.04840	.10790	.07640
1.103	-7.220	-.48280	.20550	.01220	-.00240	.00150	.21380	.01050	.04970	.10520	.07390
1.103	-5.080	-.33660	.15060	.01330	-.00300	.00100	.22120	.01040	.04910	.10110	.07060
1.103	-2.900	-.19870	.10000	.01440	-.00350	.00130	.22310	.01050	.04950	.10270	.06890
1.103	-.770	-.06220	.04540	.01420	-.00330	.00130	.22230	.01060	.04990	.10270	.06750
1.103	1.370	.07300	-.01300	.01260	-.00200	.00070	.22360	.01070	.05050	.09640	.06430
1.103	3.500	.20520	-.07130	.01040	-.00010	.00040	.21590	.01060	.05030	.09600	.06470
1.103	5.650	.33470	-.11760	.01150	.00030	.00090	.21320	.01110	.05230	.09470	.06810
1.103	7.770	.45580	-.17100	.01200	.00040	.00120	.20680	.01120	.05270	.09110	.06790
1.103	9.790	.55880	-.20050	.01100	.00080	.00120	.19680	.01130	.05330	.09130	.06910
1.103	-.770	-.06490	.04760	.01430	-.00230	.00140	.21900	.01060	.04980	.10390	.06700
	GRADIENT	.06312	-.02682	-.00064	.00054	-.00015	-.00095	.00002	.00014	-.00124	-.00074

RUN NO, 22/ 0 RN/L = 6.52 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.467	-11.670	-.83130	.30670	-.00970	.00580	-.00190	.22910	.00830	.03910	.07560	.04970
1.467	-9.570	-.66040	.24070	-.00980	.00490	-.00240	.23030	.00800	.03770	.07220	.04820
1.467	-7.350	-.49570	.17750	-.00740	.00410	-.00250	.23140	.00790	.03730	.06790	.04570
1.467	-5.180	-.33690	.11600	-.00250	.00200	-.00160	.23220	.00790	.03760	.06430	.04390
1.467	-3.010	-.19320	.06120	-.00200	.00170	-.00150	.23200	.00790	.03720	.06300	.04480
1.467	-.840	-.05400	.00920	.00090	.00010	-.00160	.23060	.00780	.03700	.06250	.04530
1.467	1.330	.08240	-.04010	.00260	-.00020	-.00130	.23250	.00780	.03690	.06000	.04500
1.467	3.460	.20720	-.06730	.00240	-.00030	-.00140	.23440	.00800	.03760	.05700	.04540
1.467	5.610	.32630	-.12990	.00360	.00040	-.00080	.23320	.00800	.03800	.05520	.04750
1.467	7.790	.44430	-.17000	.00530	.00090	-.00080	.22940	.00820	.03860	.05370	.04810
1.467	9.810	.55560	-.20620	.00630	.00030	-.00080	.22680	.00830	.03930	.05510	.04780
1.467	-.850	-.05780	.00930	.00270	-.00120	-.00160	.23210	.00790	.03720	.06090	.04520
	GRADIENT	.06199	-.02293	.00069	-.00029	.00003	.00042	.00001	.00005	-.00095	.00007

MSFC 585(1A378) (034) (S12) (T11) (R93005) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 26/ 0 RN/L = 7.11 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.947	-11.700	-.76190	.26750	-.00150	.00290	-.00150	.23470	.00570	.02690	.05020	.03500
1.947	-9.600	-.60770	.21030	.00000	.00170	-.00150	.23600	.00360	.01720	.04850	.03640
1.947	-7.420	-.46990	.15780	.00000	.00140	-.00150	.22940	.00530	.02490	.04760	.03550
1.947	-5.250	-.33350	.11170	.00040	.00170	-.00180	.22040	.00590	.02820	.04970	.03420
1.947	-3.030	-.21110	.07220	.00080	.00150	-.00170	.21870	.00610	.02870	.04320	.03420
1.947	-.870	-.08640	.03310	.00190	.00150	-.00150	.21580	.00610	.02880	.03890	.03380
1.947	1.300	.03510	-.01130	.00350	.00150	-.00110	.21870	.00620	.02920	.03530	.03410
1.947	3.460	.15650	-.05900	.00500	.00050	-.00120	.22120	.00610	.02880	.03440	.03370
1.947	5.620	.28740	-.11330	.00430	.00100	-.00130	.22340	.00660	.03140	.03620	.03310
1.947	7.800	.41660	-.15840	.00700	-.00130	-.00130	.22200	.00670	.03170	.03800	.03430
1.947	9.880	.54730	-.19810	.00970	-.00360	-.00030	.22780	.00660	.03130	.03670	.03490
1.947	-.880	-.09420	.03530	.00240	.00120	-.00150	.21460	.00610	.02870	.03920	.03370
	GRADIENT	.05667	-.02024	.00066	-.00014	.00009	.00048	.00000	.00003	-.00139	-.00006

RUN NO. 5/ 1 RN/L = 5.09 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
4.959	-10.880	-.47420	.15870	.00440	-.00070	.00000	.24990	.00000	-.00030	.00630	.00540
4.959	-8.940	-.40520	.14460	.00460	-.00080	-.00040	.23530	-.00010	-.00050	.00630	.00550
4.959	-6.880	-.32670	.12310	.00480	-.00100	-.00190	.22310	-.00020	-.00110	.00600	.00550
4.959	-4.890	-.26000	.10610	.00900	-.00250	-.00010	.21030	.00000	.00000	.00600	.00560
4.959	-2.820	-.18680	.08700	.00350	-.00200	-.00030	.20280	-.00050	-.00270	.00570	.00540
4.959	-.800	-.11780	.06810	.00370	-.00070	-.00110	.19480	-.00040	-.00200	.00530	.00550
4.959	1.240	-.04980	.04990	.00210	.00020	-.00030	.18410	.00050	.00240	.00540	.00550
4.959	3.280	.03450	.02450	.00250	.00180	-.00010	.17630	.00080	.00390	.00550	.00550
4.959	5.310	.10340	.00370	.00460	-.00070	.00000	.16830	.00070	.00360	.00560	.00510
4.959	7.340	.18360	-.02490	-.00270	.00220	-.00110	.16230	.00090	.00420	.00570	.00480
4.959	9.250	.26410	-.05080	.00710	-.00180	-.00030	.15610	.00100	.00510	.00510	.00470
4.959	-.800	-.11760	.06900	.00570	-.00100	-.00030	.19560	-.00040	-.00200	.00520	.00510
	GRADIENT	.03560	-.00982	-.00071	.00053	-.00000	-.00425	.00013	.00063	-.00006	-.00000

MSFC 585(1A37B) (054) (S12) (T11) (R93006) (01 NOV 73)

REFERENCE DATA

SREF = 6.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 11/ 0 RN/L = 6.35 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
.895	-11.130	-.08850	.03620	.44100	-.18870	.08550	.09660	.00930	.04400	.09360	.06050
.895	-9.140	-.08230	.03400	.36360	-.15970	.05540	.10200	.00870	.04110	.09030	.05920
.895	-7.040	-.08010	.03450	.28890	-.13060	.04560	.10770	.00820	.03900	.08730	.05770
.895	-4.950	-.07570	.03300	.20790	-.09640	.03350	.11370	.00780	.03680	.07970	.05540
.895	-2.860	-.07760	.03850	.12840	-.06090	.02050	.11820	.00760	.03620	.07870	.05140
.895	-.780	-.09540	.05310	.04080	-.01790	.00560	.11920	.00760	.03580	.08500	.04530
.895	1.310	-.09190	.04910	-.05160	.03060	-.00950	.12610	.00760	.03590	.08110	.04090
.895	3.390	-.08940	.04480	-.13450	.06880	-.02250	.12660	.00780	.03690	.08450	.04010
.895	5.480	-.08560	.04200	-.21750	.10740	-.03660	.12660	.00810	.03820	.08510	.03820
.895	7.570	-.08630	.04400	-.29680	.14100	-.04850	.13050	.00870	.04110	.08870	.03680
.895	9.540	-.09620	.05090	-.36610	.16630	-.05780	.12710	.00940	.04420	.09280	.03560
.895	-.780	-.08350	.04620	.04360	-.01940	.00530	.12310	.00750	.03560	.08160	.04800
	GRADIENT	-.00200	.00164	-.04148	.02023	-.00681	.00162	-.00000	-.00000	.00058	-.00197

RUN NO. 10/ 0 RN/L = 6.77 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.106	-11.320	-.02740	.00040	.47300	-.18760	.08260	.20320	.01170	.05500	.09750	.07320
1.106	-9.270	-.03000	.00740	.37990	-.15510	.06900	.21080	.01140	.05370	.09610	.07300
1.106	-7.110	-.03550	.01460	.29250	-.12500	.05430	.21420	.01130	.05320	.09850	.06990
1.106	-5.010	-.03910	.02190	.20650	-.09000	.03760	.21550	.01130	.05330	.10230	.06910
1.106	-2.900	-.04500	.02960	.12280	-.05420	.02150	.21860	.01120	.05290	.10210	.06770
1.106	-.770	-.05050	.03720	.03860	-.01570	.00520	.22130	.01100	.05190	.10040	.06670
1.106	1.320	-.05320	.03980	-.05360	.03010	-.01200	.22640	.01100	.05180	.09750	.06430
1.106	3.430	-.04740	.03320	-.13900	.07000	-.02870	.22850	.01130	.05330	.09860	.06060
1.106	5.540	-.04450	.02790	-.22370	.10630	-.04560	.22830	.01150	.05410	.09740	.05850
1.106	7.670	-.04070	.02490	-.30770	.13780	-.06110	.22650	.01180	.05560	.09840	.05770
1.106	9.690	-.04020	.02200	-.38910	.16360	-.07350	.22570	.01210	.05700	.09830	.05860
1.106	-.790	-.05190	.03670	.04180	-.01700	.00480	.22070	.01100	.05200	.09970	.06720
	GRADIENT	-.00047	.00064	-.04163	.01985	-.00796	.00165	.00001	.00005	-.00064	-.00112

MSFC 585(1A378) (034) (812) (T11) (R93006) (01 NOV 73)

REFERENCE DATA

SREF = 8.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

ALPHA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 21/ 0 RN/L = 8.53 GRADIENT INTERVAL = -5.00/ 5.00

MACH	BETA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
1.465	-11.410	-.01290	-.02300	.48600	-.18630	.07620	.21960	.00910	.04290	.06840	.05230
1.465	-9.340	-.01420	-.01850	.38130	-.14840	.06160	.22190	.00900	.04230	.06790	.05100
1.465	-7.160	-.01440	-.01500	.28420	-.11380	.04690	.22550	.00870	.04120	.06410	.04990
1.465	-5.030	-.01410	-.01260	.19150	-.07720	.03130	.23090	.00850	.04030	.06240	.04780
1.465	-2.880	-.01720	-.00960	.10640	-.04270	.01700	.23090	.00810	.03840	.06360	.04670
1.465	-.780	-.02140	-.00470	.02630	-.00980	.00310	.23230	.00780	.03700	.06060	.04710
1.465	1.340	-.01650	-.00810	-.05190	.02060	-.01090	.23470	.00800	.03780	.06050	.04560
1.465	3.480	-.01420	-.00950	-.13200	.05260	-.02440	.24220	.00840	.03980	.06230	.04120
1.465	5.620	-.01170	-.01190	-.21880	.08620	-.03890	.24310	.00840	.03950	.06180	.03960
1.465	7.770	-.01080	-.01430	-.31150	.12210	-.05380	.24310	.00860	.04080	.06200	.03880
1.465	9.800	-.01020	-.01630	-.40620	.15790	-.06760	.24060	.00900	.04270	.06500	.03860
1.465	-.780	-.01780	-.00670	.02990	-.01270	.00230	.22880	.00780	.03690	.06200	.04680
	GRADIENT	.00068	-.00015	-.03742	.01492	-.00652	.00171	.00005	.00024	-.00019	-.00085

MSFC 585(1A37B) (034) (S12) (T15) (R93007) (01 NOV 73)

REFERENCE DATA

SREF = 8.1980 SQ. IN XMRP = 2.7200 IN.
LREF = 5.1600 IN. YMRP = .0000 IN.
BREF = 5.1600 IN. ZMRP = .0000 IN.
SCALE = .0040

PARAMETRIC DATA

BETA = .000 ORBINC = .000
DELTAZ = 30.000

RUN NO. 27/ 0 RN/L = 4.92 GRADIENT INTERVAL = -5.00/ 5.00

MACH	ALPHA	CN	CLM	CY	CYN	CBL	CAF	CNBO	CABO	CABT	CABS
4.959	9.280	.25870	-.04240	.00330	.00070	-.00030	.17710	.00110	.00550	.00440	.00440
4.959	7.320	.17990	-.01790	.00500	.00040	-.00010	.18300	.00110	.00560	.00510	.00460
4.959	5.300	.10720	.01180	.00480	.00060	-.00010	.18820	.00120	.00560	.00570	.00470
4.959	3.260	.03420	.03490	.00060	.00170	-.00030	.19380	.00110	.00550	.00540	.00510
4.959	1.230	-.03860	.05040	.00230	.00110	-.00010	.19810	.00110	.00550	.00530	.00520
4.959	-.800	-.10780	.06170	.00200	.00070	-.00010	.20220	.00110	.00540	.00530	.00540
4.959	-2.860	-.18470	.07760	.00160	.00040	-.00010	.20910	.00110	.00530	.00560	.00540
4.959	-4.870	-.25370	.09640	.00330	-.00050	-.00020	.21880	.00110	.00540	.00590	.00580
4.959	-6.900	-.31880	.11780	.00310	.00000	-.00040	.23430	.00110	.00530	.00610	.00570
4.959	-8.930	-.39150	.14090	.00290	.00070	-.00020	.24760	.00100	.00500	.00640	.00580
4.959	-10.870	-.46450	.16030	.00060	.00100	-.00050	.26240	.00100	.00470	.00650	.00580
4.959	-.800	-.10780	.06170	.00200	.00070	.00000	.20080	.00110	.00520	.00580	.00580
	GRADIENT	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000

GOVERNMENT FIELD PRINTING PLANT
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