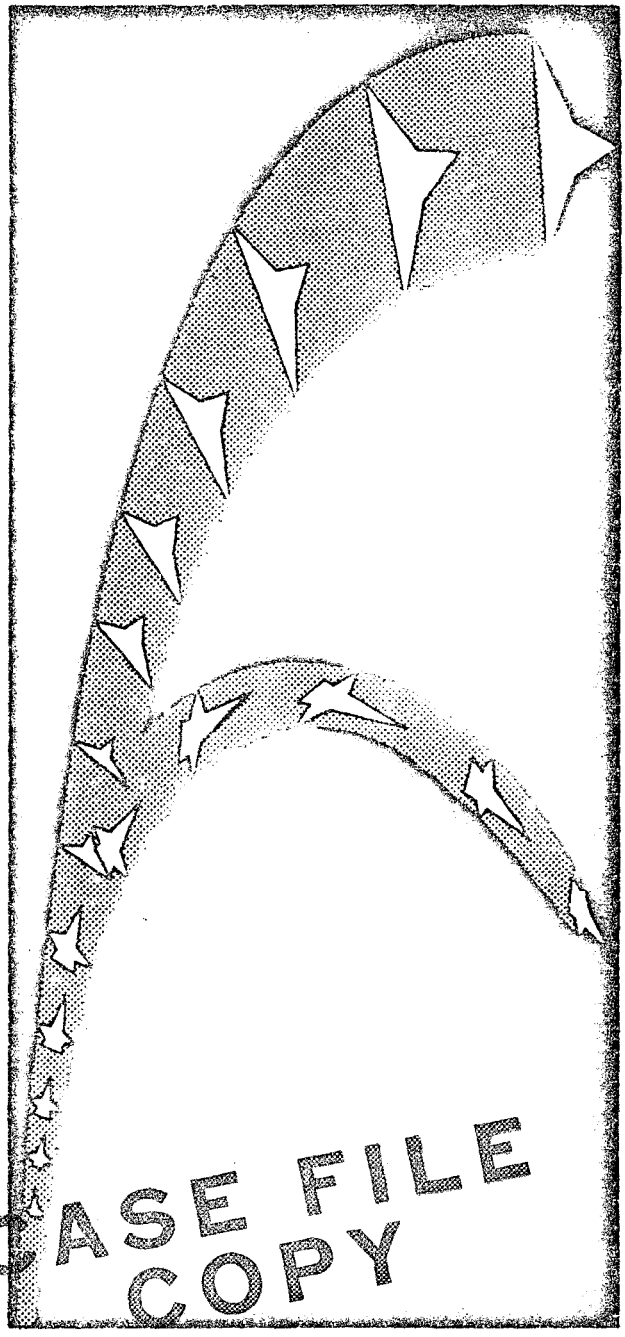
DMS-DR-1003

CR-103152

N71-35102



CASE FILE COPY

-SPACE SHUTTLE-

MMC PHASE A SPACE SHUTTLE MODIFIED ORBITER

INVESTIGATION OF STABILITY CHARACTERISTICS AND CONTROL EFFECTIVENESS

WIND TUNNEL TEST RESULTS DATA REPORT JULY, 1970

CONTRACT NAS8-4016

SCHEDULE II

AMENDMENT 126

SADSAC SPACE SHUTTLE AEROTHERMODYNAMIC DATA MANAGEMENT SYSTEM

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PREFACE

This document is a compilation of wind tunnel test information and data collected at NASA facilities and submitted in fulfillment of SADSAC dry run requirements.

The primary purpose of this document is to demonstrate joint capability of the Space Shuttle Data Management System and the NASA facility to convert wind tunnel test data into a data report using the SADSAC Computer System. The SADSAC program used in this demonstration is the Phase B Version I (dry run) system which is the initial Phase B program configuration. The capability of this version is deliberately restricted as its purpose is to demonstrate overall system through put capability. The Version II program is slated for full Phase B operational capability.

The reproduction of plots is by an interim XEROX means using a secondary master. Standard report reproduction will be by an offset process using a direct film image offset master. Also, standard production plots will be printed back to back, thereby reducing the bulk of the report.

N.D. Kemp.
SADSAC Technical Manager

REPORT NUMBER: DMS-DR-1003

PUBLISHED: JULY, 1970

SPACE SHUTTLE

WIND TUNNEL TEST

DATA REPORT

TEST FACILITY: NASA MSFC 14-INCH TRISONIC WIND TUNNEL: TEST NO. 453

CONFIGURATION: MMC PHASE A SPACE SHUTTLE MODIFIED ORBITER

MODEL SCALE: 0.0038

TEST PURPOSE: INVESTIGATION OF STABILITY CHARACTERISTICS AND CONTROL EFFECTIVENESS

MACH NUMBER RANGE: 0.4 TO 4.95

TESTS CONDUCTED BY:

MARTIN MARIETTA CORPORATION, DENVER, COLORADO

TEST CONDUCTOR(S) DALE SARVER

TEST DATE: MARCH 1970

(This report has been prepared by Chrysler Corporation Space Division, under a Data Management Contract to NASA. Chrysler assumes no responsibility for the data presented herein other than its display characteristics.)

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ABSTRACT

A 0.0038 scale model of the Martin Marietta Corporation Phase A Space Shuttle Modified Obriter was tested in the NASA MSFC 14-inch trisonic wind tunnel during March 1970. This force and moment test was conducted to determine the effect of increased camber on the orbiter stability characteristics. The model was tested at a Mach number range of 0.4 to 4.95 at pitch angles of -4^{o} to 25^{o} and at zero sideslip. The model was tested with the elevons and rudders off, at elevon deflections of 0, -15^{o}, and -30^{o}, and at zero rudder deflections. The purpose of this report is to present the test data for this test.

TEST CONDITIONS
TEST MSFC TWT 453

MACH NUMBER	REYNOLDS NUMBER per unit length	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)
.4	4.8×10^6 /ft.	2.9	
.8	8.2×10^6 /ft.	8.7	
1.0	9.0×10^6 /ft.	10.9	
1.2	9.2×10^6 /ft.	12.2	
2.74	4.9×10^6 /ft.	6.3	
3.48	5.6×10^6 /ft.	5.6	
4.95	5.2×10^6 /ft.	3.1	

BALANCE UTILIZED: NASA MSFC 5/8 in. dia. internal strain gage balance #226

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE
NF	± 150 LBS.	± .5 lbs.	
SF	± 50 LBS.	± .5 lbs.	
AF	± 30 in-lb.	± .5 lbs.	
PM		± 1.5 in-lb.	
YM		± 1.0 in-lb.	
RM	± 40 in-lb.	± .5 in-lb.	

COMMENTS: STATED ACCURACY IS based on repeatibility and check-loadings

DATA REDUCTION

Balance six component force and moment data were reduced about the body axis with the origin at the model moment reference point located as described on the Data Set Descriptor Sheet and Figure 2. Forces and moments were converted to coefficient form by use of the model total planform area, total span, and total body length. Base and balance chamber pressures were reduced to coefficient form and used to provide an axial force coefficient for the model with the base and balance chamber pressures adjusted to the free stream static pressure. The total axial force coefficients (C_A) were utilized to compute the stability axis lift-to-drag ratio (C_D) values.

CONFIGURATIONS INVESTIGATED

NOMENCLATURE

B2 = Modified Orbiter Body

W2 = Modified Orbiter Double Delta Wind

T1 = Vertical Stabilizer, Constant Taper, Constant Sweep, Dimensions Include Rudder

R1 = Simple Hinged Rudder

E1 = Constant Chord, Simple Hinged Elevon

Refer to the immediately following pages for model component dimensional data.

CONFIGURATIONS TESTED

B2W2E1

B2W2T1R1

B2W2T1E1R1

Figures 2, 3 and 4 are sketches of the MMC Modified Orbiter Configuration and Figure 5 in a photograph of the model. Elevon and rudder deflection were obtained by using interchangeable model components. Bounday layer transition was initiated by utilizing carborundum grit strips on the model nose, wing

and vertical tail as follows:

	Nose	Wing	Vertical Tail
Thickness (inches)	0.125	0.060	0.030
Location (inches aft of Leading Edge)	0.150	0.050	0.050
Grit Size:			
Mach number = 0.4 to 1.2	#120	#120	#120
Mach number = 2.74 to 3.48	# 80	#120	#120
Mach number = 4.95	# 36	#120	#120

All of the above distances were measured prependicular to the surface leading edges. The orbiter model utilized in MSFC TWT 442 was modified and utilized in MSFC TWT 453; the modification was the application of "DEVCOM" to the external surfaces to increase the model camber. Six component force and moment data were measured with the NASA MSFC No. 226, 5/8 inch diameter internal strain gage balance. The balance chamber pressure was measured by utilizing a pressure tube orifice in the model balance cavity. The base pressure was measuring by using a pressure tube orifice in the model base area. Differential pressure transducers, referenced to the facility pressure reference system, were utilized to measure these pressures.

MODEL COMPONENT: BODY - B^2

GENERAL DESCRIPTION: MODIFIED ORBITER BODY

DRAWING NUMBER: WT6917002

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Length	165 ft.	7.52 in.
Max. Width	16.5 ft.	.75 in.
Max. Depth	26.3 ft.	1.28 in.
Fineness Ratio	4.17	4.17
Area		
Max. Cross-Sectional	68.2 ft^2	1.42 in^2
Planform	3,610 ft^2	7.50 in^2
Wetted	11,530 ft^2	23.94 in^2
Base	38.64 ft^2	.804 in^2

MODEL COMPONENT: Wing ~ W^2

GENERAL DESCRIPTION: MODIFIED ORBITER DOUBLE DELTA WING

DRAWING NUMBER: WT6917002

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area		
Planform		
Wetted		
Span (equivalent)	81 ft.	3.67 in.
Aspect Ratio		
Rate of Taper		
Taper Ratio		
Diehedral Angle, degrees	0	0
Incidence Angle, degrees	0	0
Aerodynamic Twist, degrees	0	0
Toe-In Angle		
Cant Angle		
Sweep Back Angles, degrees		
Leading Edge	67.5	67.5
Trailing Edge	30	30
0.25 Element Line		
Chords:		
Root (Wing Sta. 0.0)		
Tip, (equivalent)		
MAC, inches		
Fus. Sta. of .25 MAC		
W.P. of .25 MAC		
Airfoil Section		
Root		
Tip		
EXPOSED DATA		
Area	3810 ft^2	7.91 in^2
Span, (equivalent)	25.2 ft.	1.15 in.
Aspect Ratio	1.66	1.66
Taper Ratio	.223	.223
Chords		
Root	131.5 ft.	6.00 in.
Tip	29.4 ft.	1.34 in.
MAC	97 ft.	4.43 in.
Fus. Sta. of .25 MAC	1394 in.	5.3 in.
W.P. of .25 MAC		

MODEL COMPONENT: TAIL ~ T'

GENERAL DESCRIPTION: VERTICAL STABILIZER, Constant taper, Constant sweep, dimensions include rudder

DRAWING NUMBER: WT6917002

DIMENSIONS:	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area		
Planform	665 ft.²	1.38 in.²
Wetted	1330 ft.²	2.76 in.²
Span (equivalent)	30 ft.	1.37 in.
Aspect Ratio	1.35	1.35
Rate of Taper		
Taper Ratio	.303	.303
Diehedral Angle, degrees	15	15
Incidence Angle, degrees		
Aerodynamic Twist, degrees	0	0
Toe-In Angle	5	5
Cant Angle		
Sweep Back Angles, degrees		
Leading Edge	48	48
Trailing Edge	15	15
0.25 Element Line	41.5	41.5
Chords:		
Root (Wing Sta. 0.0)	33 ft.	1.55 in.
Tip, (equivalent)	10 ft.	.47 in.
MAC, inches	23.6 ft.	1.05 in.
Fus. Sta. of .25 MAC	1740 in.	6.57 in.
W.P. of .25 MAC		
Airfoil Section		
Root		
Tip		
EXPOSED DATA		
Area	665 ft.²	1.38 in.²
Span, (equivalent)	30 ft.	1.37 in.
Aspect Ratio	1.35	1.35
Taper Ratio	.303	.303
Chords		
Root	33 ft.	1.55 in.
Tip	10 ft.	.47 in.
MAC	23.6 ft	1.05 in.
Fus. Sta. of .25 MAC	1740 in.	6.57 in.
W.P. of .25 MAC		

MODEL COMPONENT: RUDDER ~ R'

GENERAL DESCRIPTION: Simple hinged rudder

DRAWING NUMBER: WT6917002

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area	274 ft.^{2}	.570 in.^{2}
Span (equivalent)	26.5 ft.	1.218 in.
Inb'd equivalent chord	12 ft.	.550 in.
Outb'd equivalent chord	8 ft.	.370 in.
Ratio Elevator chord/ tail chord		
At Inb'd equiv. chord	.374	.374
At Outb'd equiv. chord	.823	.823
Sweep Back Angles, degrees		
Leading Edge	22	22
Tailing Edge	15	15
Hingeline	22	22
Area Moment (Normal to hinge line)		

MODEL COMPONENT: ELEVON ~ E'

GENERAL DESCRIPTION: Constant Chord, Simple hinged ELEVON

DRAWING NUMBER: WT6917002

DIMENSIONS:	FULL-SCALE	MODEL SCALE
Area	351 ft.^{2}	.731 in.^{2}
Span (equivalent)	28 ft.	1.277 in.
Inb'd equivalent chord	12 ft.	.575 in.
Outb'd equivalent chord	12 ft.	.5751 in.
Ratio Elevator chord/horizontal tail chord		
At Inb'd equiv. chord	.096	.096
At Outb'd equiv. chord	.371	.371
Sweep Back Angles, degrees		
Leading Edge	30	30
Tailing Edge	30	30
Hingeline	30	30
Area Moment (Normal to hinge line)		

TEST MSFC TWT453 DATA SET COLLATION SHEET

☐ PRETEST
☑ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD. α	SCHD. β	CONTROL DEFLECTION δ_E	CONTROL DEFLECTION δ_R	NO. of RUNS	MACH NUMBERS A	.8	1.0	1.2	2.74	3.48	4.95
R17021	$B^2W^2E^1$	A	0	0	OFF	1	53						
R17022	↓	↓	↓	-15	↓	5	47	48		49	43		42
R17023	↓	C	↓	↓	↓	2	52//						46
R17024	$B^2W^2T^1R^1$	A	↓	OFF	0	5	21	22		23	40		41
R17025	$B^2W^2T^1E^1R^1$	↓	↓	0	↓	7	9	10	11	12	30	31	32
R17026	↓	↓	↓	-15	↓	7	1	2	3	4//	24	25	26
R17027	↓	↓	↓	-30	↓	3					54	55	56
R17028	↓	C	↓	-15	↓	2	8					29	
R17029	↓	↓	↓	-30	↓	7	15	16	17	18	39	38	37

11

1 7 13 19 25 31 37 43 49 55 61

COEFFICIENTS: CNM CN CYM CY CRL CATOTL CABASE L/D CAFORE

NDV

α or β SCHEDULES

α A = −4°/+16°

α C = +10°/+25°

TEST MSFC TWT 453 DATA SET DESCRIPTOR SHEET

DATA SET IDENTIFIER	DATA SET DESCRIPTOR (1 / 11 / 21 / 31 / 41)		CURVE SLOPE RANGE (51) LOWER LIMIT	(61) UPPER LIMIT
R17021	MSFC 453 MMC MOD ORB B2W2E1 DEL EO	1.1	-1.5	+1.5
R17022	E-15 RO			
R17023				
R17024	B2W2T1E1 DEL RO			
R17025	B2W2T1E1R1 DEL EO RO			
R17026	E-15, RO			
R17027	E-30, RO			
R17028	E-15, RO			
R17029	E-30, RO			

1	11	21	31	41	51	61
0.1169 FT²	0.6467 FT	0.4050 FT	0.4067 FT	0.0	0.04558FT	

REFERENCE AREA	LONGITUDINAL	LATERAL	LONGITUDINAL	LATERAL	VERTICAL	SOURCE DOCUMENT
S_R	ℓ_R	b_R	XMRP	YMRP	ZMRP	
	REFERENCE LENGTH		MOMENT REFERENCE POINT			

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 0.20 through 2.50, and the supersonic 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 dew point 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 25°.

The diffuser section has movable floor and ceiling panels which are the primary means of controlling the subsonic Mach numbers and permit more efficient running supersonically. The sector assembly and supersonic diffuser telescope into the subsonic diffuser to allow easy access to the model and test section.

Tunnel flow is exhausted through an acoustically damped tower to atmosphere or into the vacuum field of 42,000 cubic feet. The vacuum tanks are evacuated by vacuum pumps driven by a total of 500 hp.

Data is recorded by a solid state digital data acquisition system. The digital data is transferred to punched cards during the run to be reduced later by a computer to proper coefficient form.

The tunnel components and performance are discussed in more detail in NASA TM X-53185, dated December 22, 1964, and NASA TM X-53113, dated August 20, 1964.

NOMENCLATURE

SYMBOL	SADSAC SYMBOL	DEFINITION
A_b		base area; m^2, ft^2, in^2
a		speed of sound; m/sec, ft/sec
AR	ASPECT	aspect ratio, b^2/S
b	REFB	wing span or reference span; m, ft, in
c		wing chord; m, ft, in
$\bar{c}$		wing mean aerodynamic chord or reference chord; m, ft, in
c.g.		center of gravity
C.P.		center of pressure
C_A	CATOTL	axial force coefficient, $F_A/q\,S_{ref}$
C_{A_b}	CABASE	base axial force coefficient, $[(p_\infty - p_b/q]\,(A_b/S_{ref})$
C_{A_f}	CAFORE	forebody axial force coefficient, $C_A - C_{A_b}$
C_D	CDTOTL	drag force coefficient in the wind axis system, $F_D/q\,S_{ref}$
C_D'	CD	drag force coefficient in the stability axis system, $F_D'/q\,S_{ref}$
C_L	CL	lift force coefficient (stability or wing axis) $F_L/q\,S_{ref}$
C_ℓ	CRL	rolling moment coefficient in body axis system, $M_x/q\,S_{ref}\,b$
$C_{\ell,s}$	CSL	rolling moment coefficient in the stability axis system, $M_{x,s}/q\,S_{ref}\,b$
$C_{\ell,w}$	CWL	rolling moment coefficient in the wind axis system, $M_{x,w}/q\,S_{ref}\,b$

SYMBOL	SADSAC SYMBOL	DEFINITION
C_m	CNM	pitching moment coefficient in the body axis system, $M_y/q\ S_{ref}\ \ell_{ref}$
$C_{m,s}$	CNM	pitching moment coefficient in the stability axis system, $C_{m,s} = C_m$
$C_{m,w}$	CWM	pitching moment coefficient in the wind axis system, $M_{y,w}/q\ S_{ref}\ \ell_{ref}$
C_N	CN	normal force coefficient in the body axis system, $F_N/q\ S_{ref}$
C_n	CYM	yawing moment coefficient in the body axis system, $M_z/q\ S_{ref}\ b$
$C_{n,s}$	CWN	yawing moment coefficient in the stability axis system, $C_{n,s} = C_n$
$C_{n,w}$	CWN	yawing moment coefficient in the wind axis system, $M_{z,w}/q\ S_{ref}\ b$
C_p	CP	pressure coefficient, $(p - p_\infty)/q$
C_y	CY	side force coefficient (body or stability axis system), $F_y/q\ S_{ref}$
F_A		axial force; N, lb
F_D		drag force in wind axis system; N, lb
F_D'		drag force in the stability axis system; N, lb
F_L		lift force (stability or wind axis system); N, lb
F_N		normal force; N, lb
F_Y		side force; N, lb
ℓ_{ref}	REFL	reference length ; m, ft, in
L/D	L/D	lift-to-drag ratio, C_L/C_D
M	MACH	Mach number

SYMBOL	SADSAC SYMBOL	DEFINITION
MRP	MRP	abbreviation for moment reference point
M_x		rolling moment in the body axis system; N-m, ft-lb
$M_{x,s}$		rolling moment in the stability axis system; N-m, ft-lb
$M_{x,w}$		rolling moment in the wind axis system; N-m, ft-lb
M_y		pitching moment in the body (or stability) axis system; N-m, ft-lb
$M_{y,w}$		pitching moment in the wind axis system; N-m, ft-lb
M_z		yawing moment in the body axis system; N-m, ft-lb
$M_{Z,w}$		yawing moment in the wind axis system; N-m, ft-lb
p		static pressure; N/m^2; psi
P		total pressure; N/m^2; psi
q	Q(PSI) Q(PSF)	dynamic pressure; N/m^2, psi, psf
RN/L	RN/L	Reynold's number per unit length; million/ft.
S		characteristic area; m^2, ft^2
S_{ref}	REFS	reference area; m^2, ft^2
T		temperature; ^oK, ^oC, ^oR, ^oF
V		speed of vehicle relative to surrounding atmosphere; m/sec, ft/sec

SYMBOL	SADSAC SYMBOL	DEFINITION
$\bar{V}$		velocity of vehicle relative to surrounding atmosphere; m/sec, ft/sec
α	ALPHA	angle of attack, angle between the projection of the wind X_W-axis on the body X, Z - plane and the body X-axis; deg
β	BETA	sideslip angle, angle between the wind X_W-axis and the projection of this axis on the body X-Z-plane; deg
γ		ratio of specific heats
Γ	DIHDRL	wing dihedral angle; deg
δ		control surface deflection angle; deg positive deflections are: aileron - left aileron trailing edge down elevator - trailing edge down rudder - trailing edge to the left flap - trailing edge down tab - trailing edge down with respect to control surface
ρ		air density; K_g/m^3, slugs/ft^3
θ		pitch angle, angle of rotation about the body Y-axis, positive when the positive Z-axis is rotated toward the positive X-axis; deg
ϕ	PHI	roll angle, angle of rotation about the body X-axis, positive when the positive Y-axis is rotated toward the positive Z-axis; deg
ψ	PSI	yaw angle, angle of rotation about the body Z-axis, positive when the positive X-axis is rotated toward the positive Y-axis; deg

SUBSCRIPTS	DEFINITION
a	aileron
b	base
c	canard
e	elevator or elevon
f	flap
r	rudder or ruddervator
s	stability axis system
t	tail, or total conditions
w	wind axis system
ref	reference conditions

TEST RESULTS

Balance problems were encountered during TWT 453. The problems were corrected immediately after their discovery. All tests conducted with balance problems were re-run after the balance was repaired. The MSFC TWT data acquisition system encountered an insoluable problem during TWT 453. This caused sporadic bad data points; these bad points were manually deleted from the data.

Check loads hung at the end of test 453 showed that a negative normal force load of 100 lbs applied 3.3 inches aft of the model nose caused model fouling on the balance chamber pressure tube. The pitching moment associated with this loading was found to be of a larger magnitude than encountered during the test.

Orbiter model elevons were not exactly symmetric. The right elevon did not fit as closely to the fuselage mold line as did the left elevon. The left elevon trailing edge extended slightly aft of the wing trailing edge.

FIGURES

Notes:

1. Positive directions of force coefficients moment coefficients, and angles are indicated by arrows.

2. For clarity, origins of wind and stability axes have been displaced from the center of gravity.

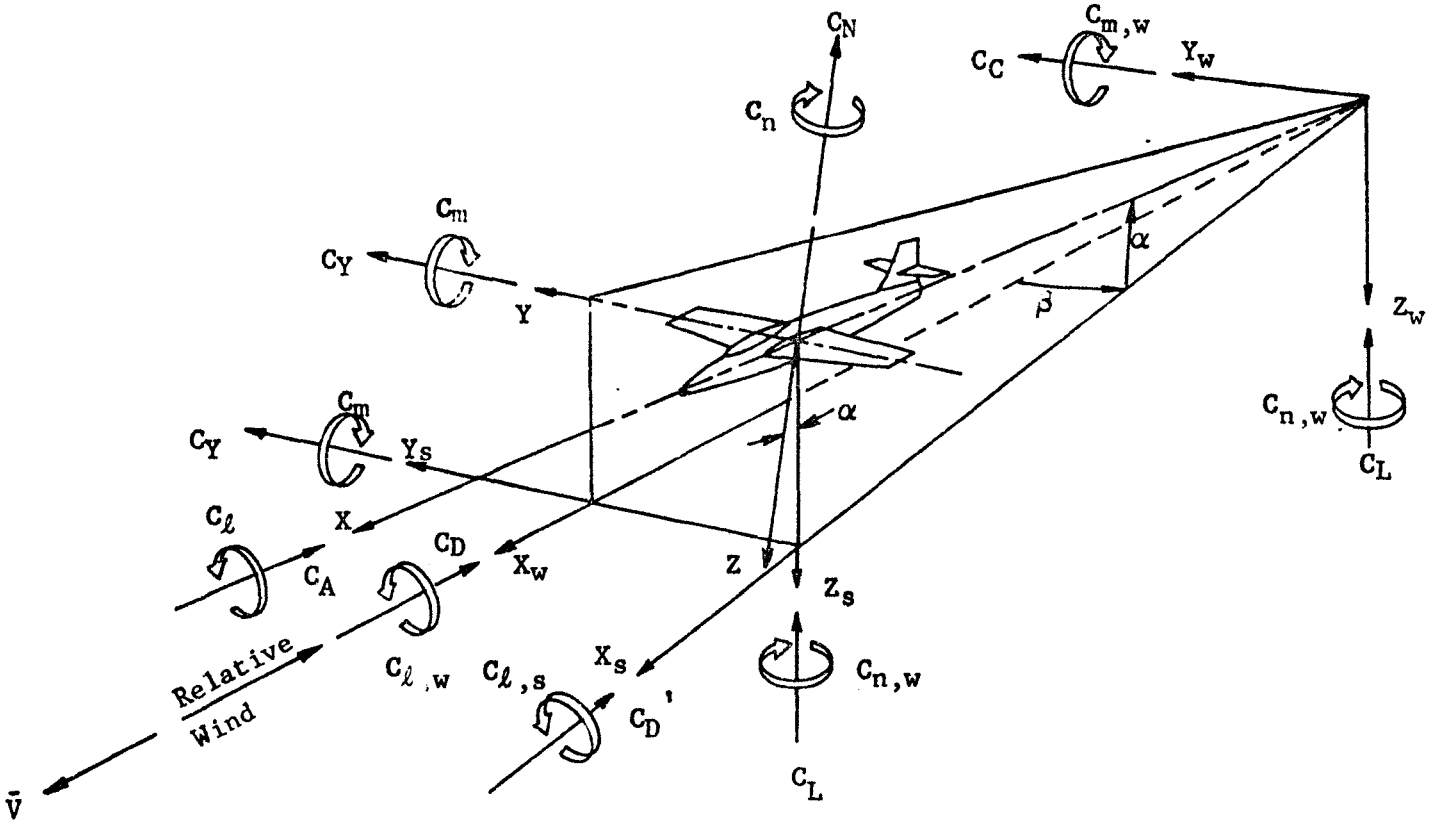


Figure 1. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

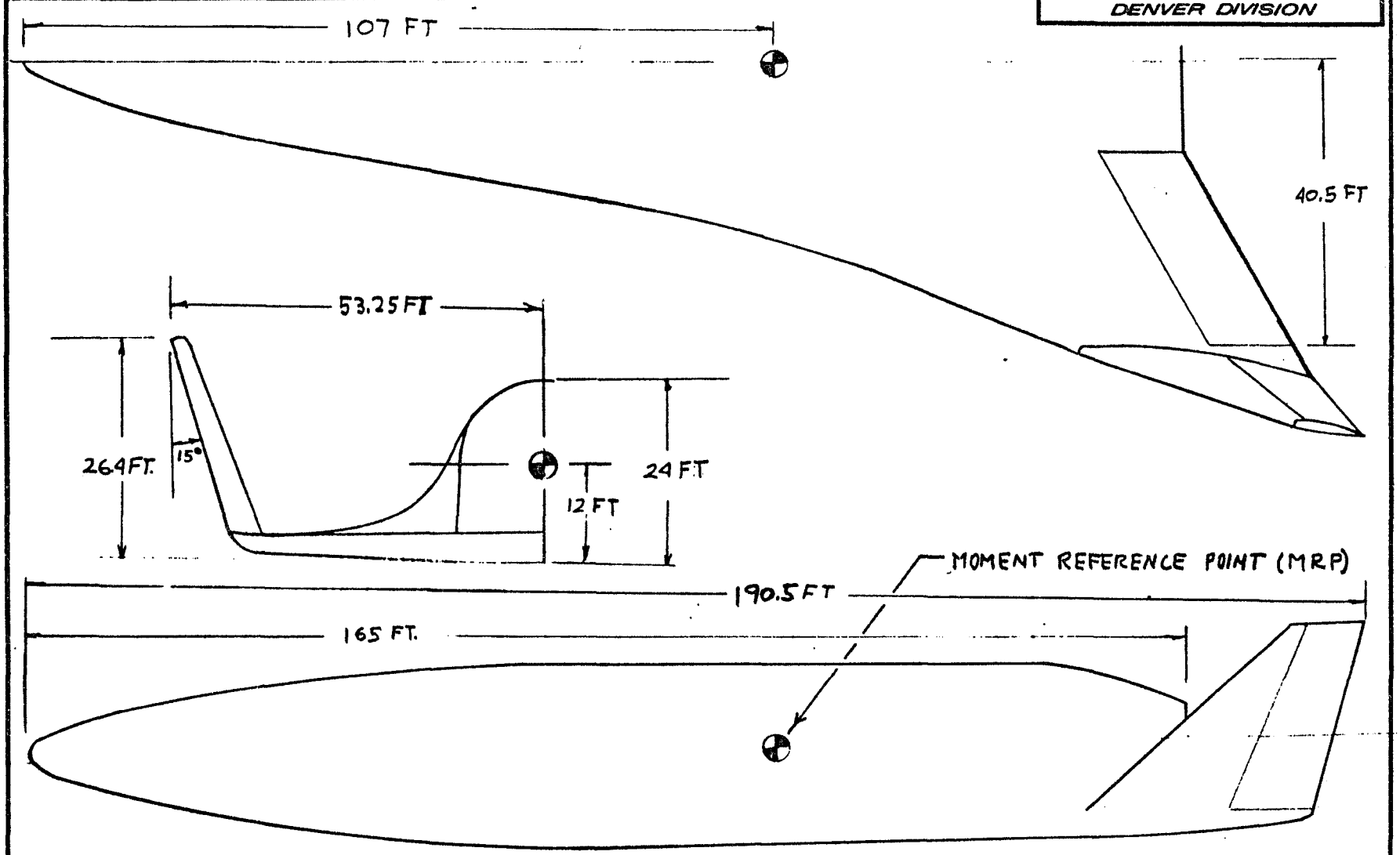
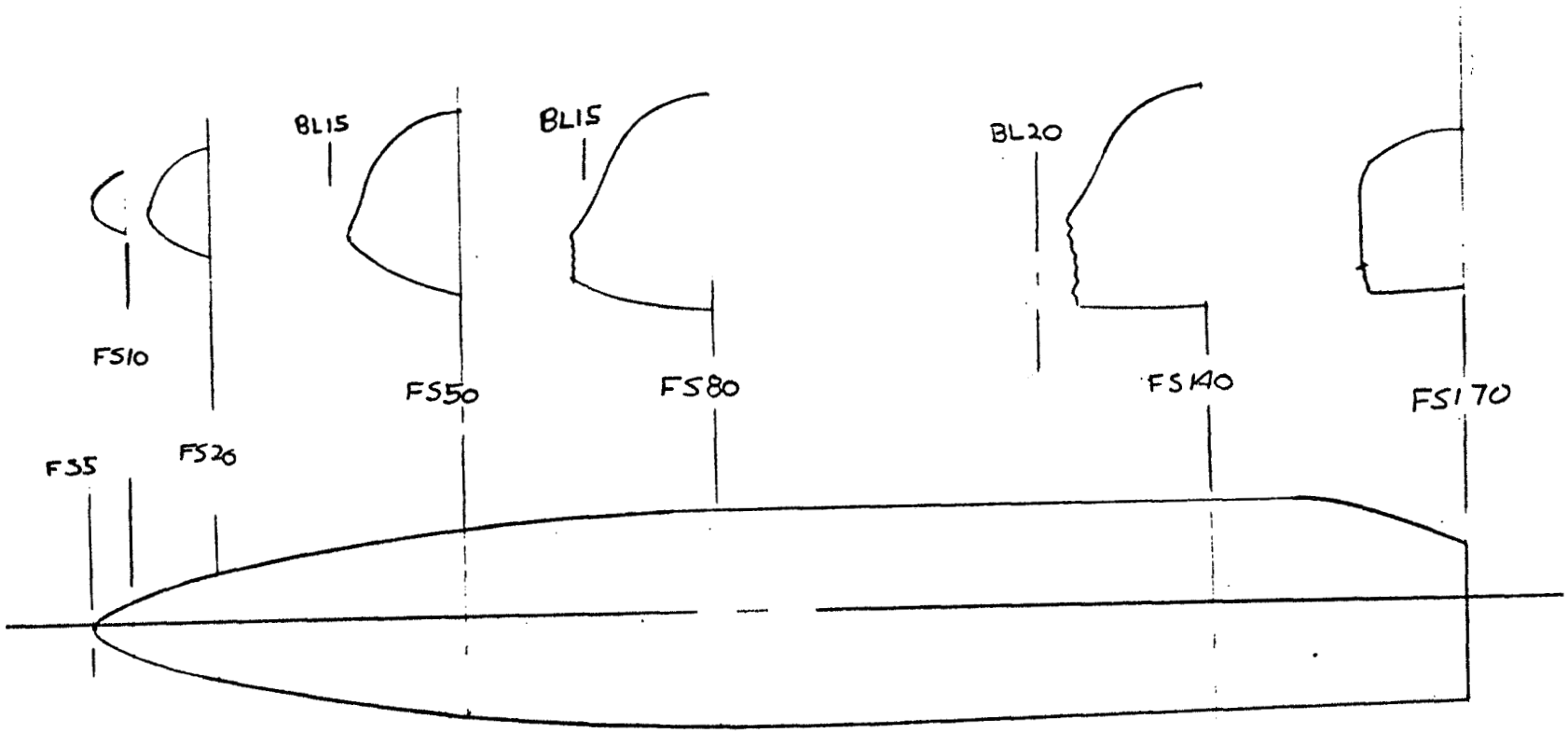
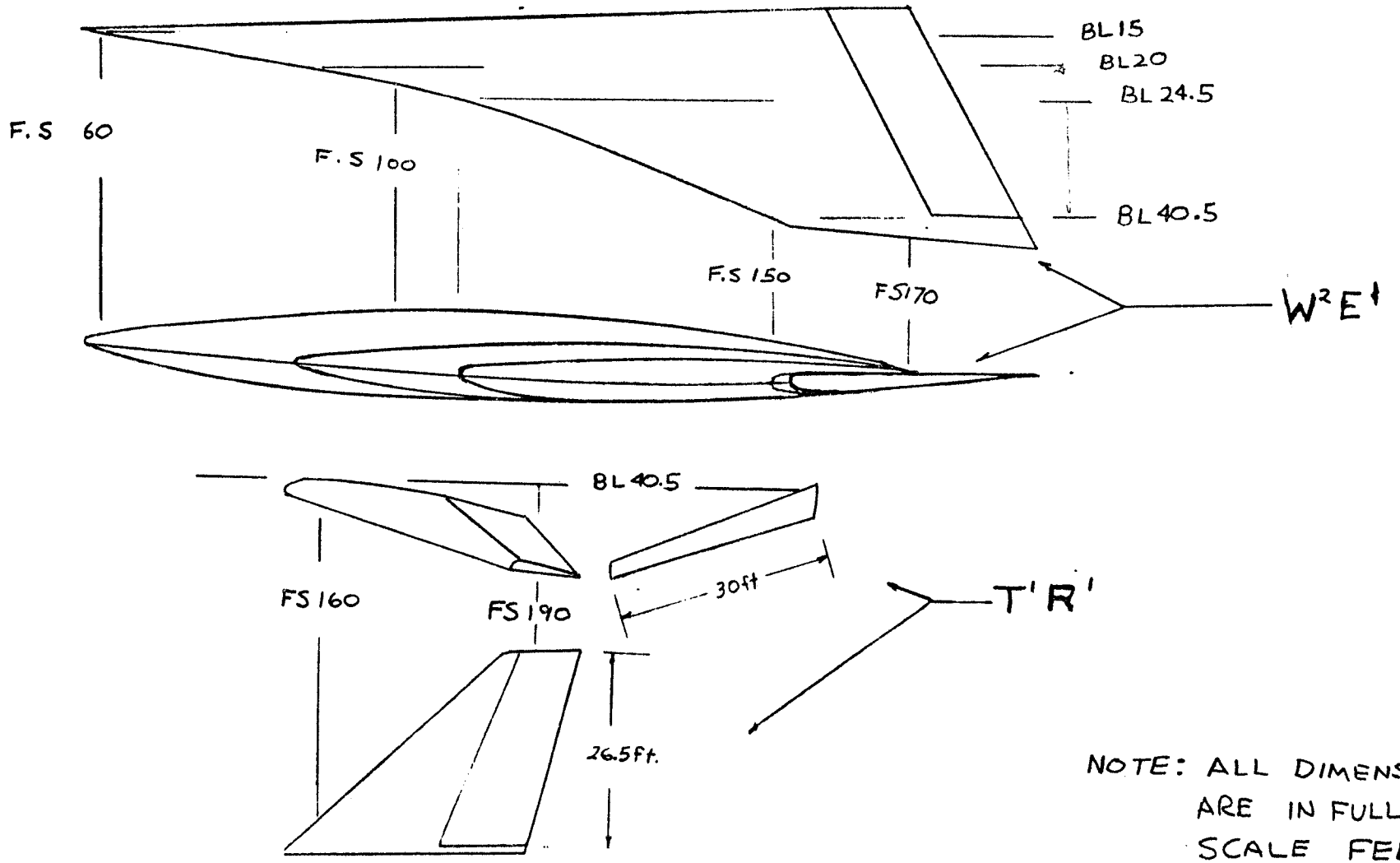


FIGURE 2. MODIFIED ORBITER CONFIGURATION
$B^2W^2T'E'R'$



B²

FIGURE 3. MODEL COMPONENT SKETCH



NOTE: ALL DIMENSIONS ARE IN FULL SCALE FEET

FIGURE 4. MODEL COMPONENT SKETCH

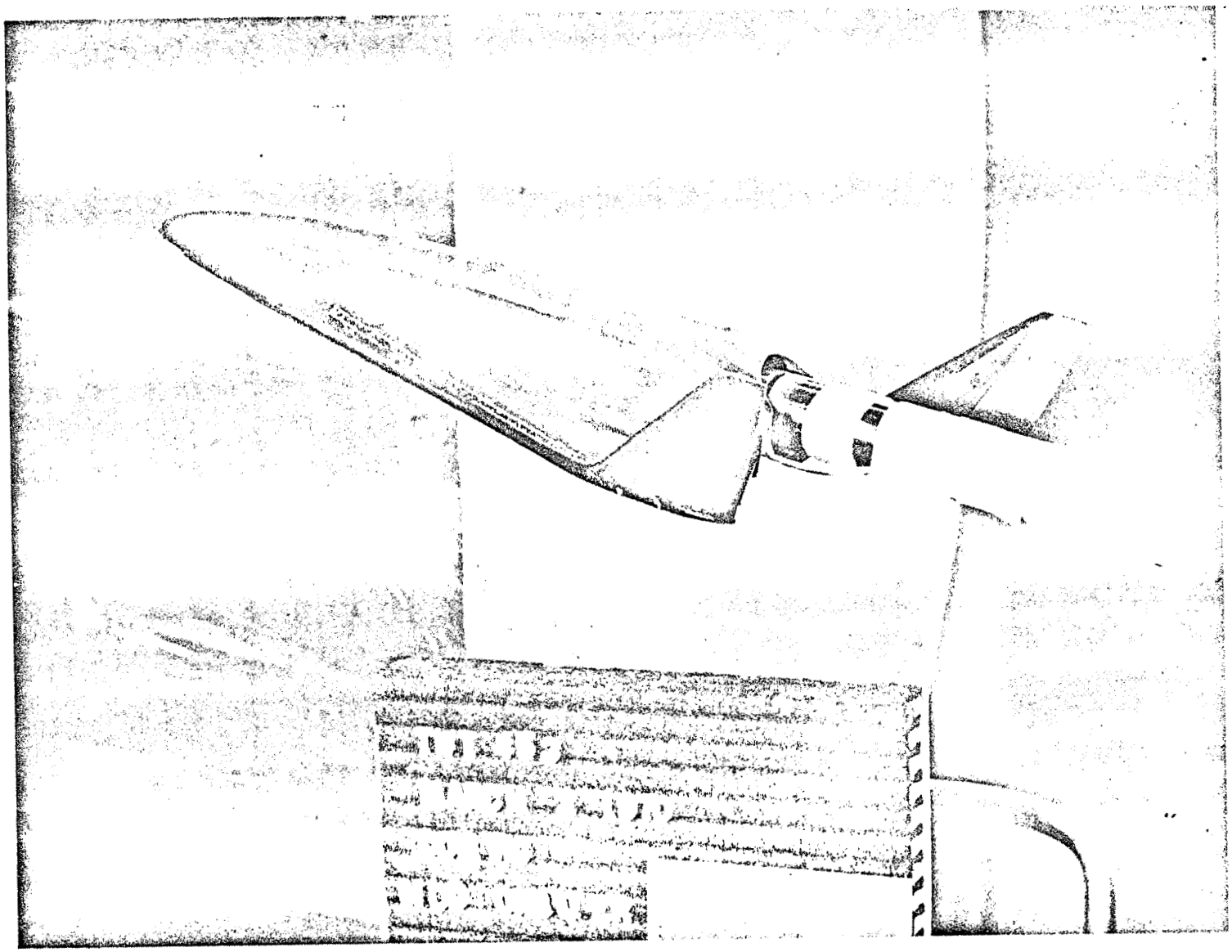


FIGURE 5. PHOTOGRAPH OF MODIFIED ORBITER CONFIGURATION (B2W2T1E1R1)

DATA DISPLAY INDEX

DATA DISPLAY INDEX

I. Single, Dependent Variable vs. Angle of Attack

Data Set Identifier	Data Begins On Plot Page
R17021	1
S17021	6
R17022	8
S17022	13
R17023	15
S17023	20
R17024	22
S17024	27
R17025	29
S17025	39
R17026	43
S17026	53
R17027	57
S17027	62
R17028	64
S17028	69
R17029	71
S17029	81

R Data Set Dependent Variables - CN, CNM, CAFORE, CABASE, L/D
S Data Set Dependent Variables - CL, CD

II. Multiple, Dependent Variable vs. Angle of Attack

Data Set Identifier					Mach Number	Data Begins On Plot Page
R17021	B17022	B17023			0.4	85
S17021	T17022	T17023			0.4	90
B17024	B17025	B17026	B17028	B17029	0.4	92
T17024	T17025	T17026	T17028	T17029	0.4	97
C17024	C17025	C17026	C17029		0.8	99
U17024	U17025	U17026	U17029		0.8	104
D17025	D17026	D17029			1.0	106
V17025	V17026	V17029			1.0	111
E17024	E17025	E17026	E17029		1.2	113
W17024	W17025	W17026	W17029		1.2	118
F17024	F17025	F17026	F17027	F17029	2.74	120
X17024	X17025	X17026	X17027	X17029	2.74	125
G17025	G17026	G17028	G17027	G17029	3.48	127
Y17025	Y17026	Y17028	Y17027	Y17029	3.48	132
H17024	H17025	H17026	H17027	H17029	4.95	134
Z17024	Z17025	Z17026	Z17027	Z17029	4.95	139

	Data Set Type	Dependent Variables
1)	R, B, C, D, E, F, G, H	CN, CNM, CAFORE, CABASE, L/D
2)	S, T, U, V, W, X, Y, Z	CL,CD

III. Single, Dependent Variable Cross-Plots

Data Set Identifier	Data Begins On Plot Page
R17021	141
S17021	142
R17022	144
S17022	145
R17023	147
S17023	148
R17024	150
S17024	151
R17025	153
S17025	155
R17026	159
S17026	161
R17027	165
S17027	166
R17028	168
S17028	169
R17029	171
S17029	173

R Data Set Dependent Variables - CN vs. CNM
S Data Set Dependent Variables - CD vs. CL, CNM vs. CL

IV. Multiple, Dependent Variable Cross-Plots

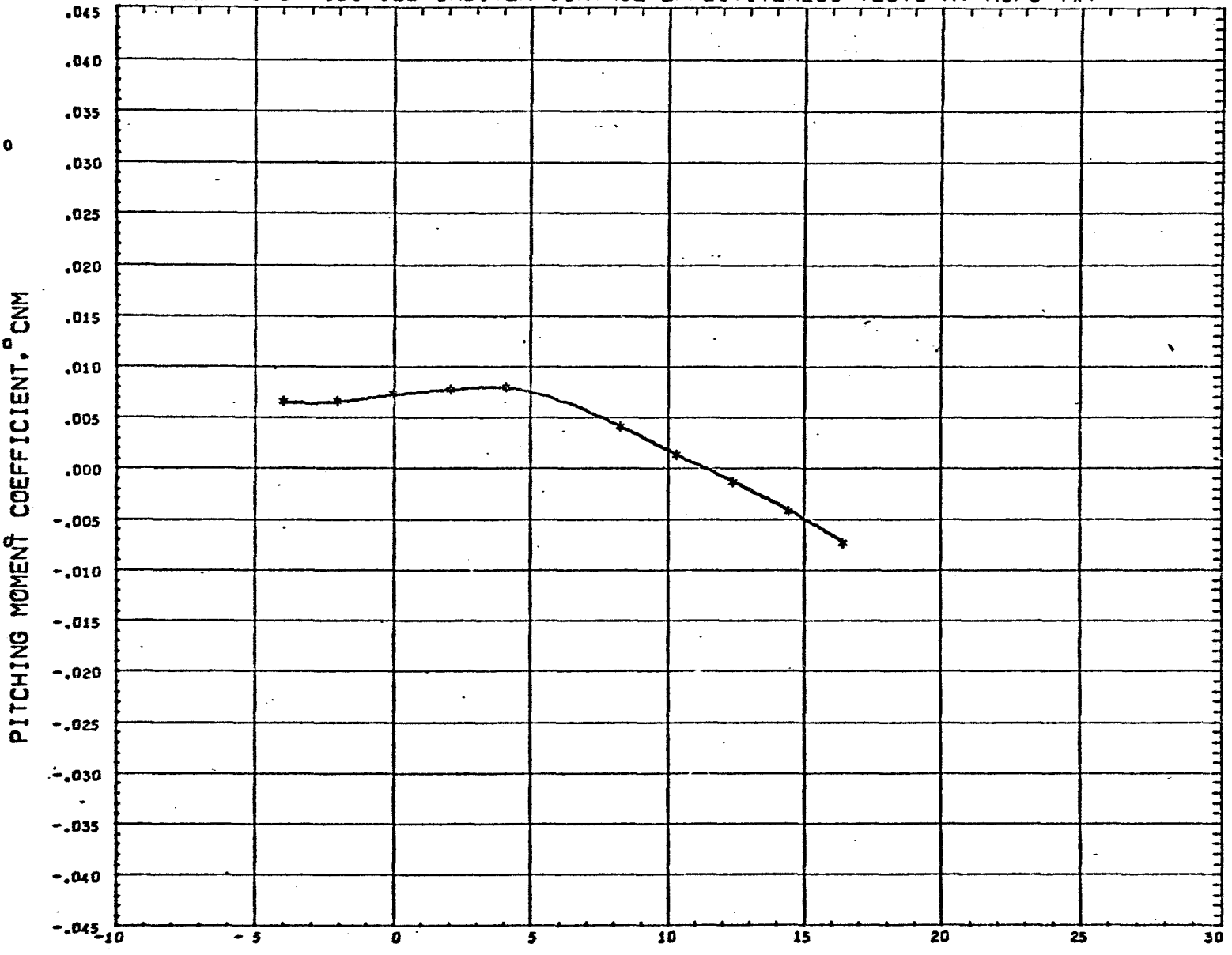
Data Set Identifier					Mach Number	Data Begins On Plot Page
R17021	B17022	B17023			0.4	177
S17021	T17022	T17023			0.4	178
B17024	B17025	B17026	B17028	B17029	0.4	180
T17024	T17025	T17026	T17028	T17029	0.4	181
C17024	C17025	C17026	C17029		0.8	183
U17024	U17025	U17026	U17029		0.8	184
D17025	D17026	D17029			1.0	186
V17025	V17026	V17029			1.0	187
E17024	E17025	E17026	E17029		1.2	189
W17024	W17025	W17026	W17029		1.2	190
F17024	F17025	F17026	F17027	F17029	2.74	192
X17024	X17025	X17026	X17027	X17029	2.74	193
G17025	G17026	G17028	G17027	G17029	3.48	195
Y17025	Y17026	Y17028	Y17027	Y17029	3.48	196
H17024	H17025	H17026	H17027	H17029	4.95	198
Z17024	Z17025	Z17026	Z17027	Z17029	4.95	199

Data Set Type	Dependent Variables
1) R, B, C, D, E, F, G, H	CN vs CNM
2) S, T, U, V, W, X, Y, Z	CD vs CL, CNM vs CL

DATA

NOTE: Data plots are presented with faired lines between data points. However, where the independent variable was not a continuously increasing function, or where the magnitudes of individual data points resulted in irregular fairings, straight lines between data points were substituted. It should also be noted that for some subsonic test conditions both the forebody axial force coefficient, CAFORE, and the base axial force coefficient, CABASE, were negative.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES			REFERENCE INFORMATION		
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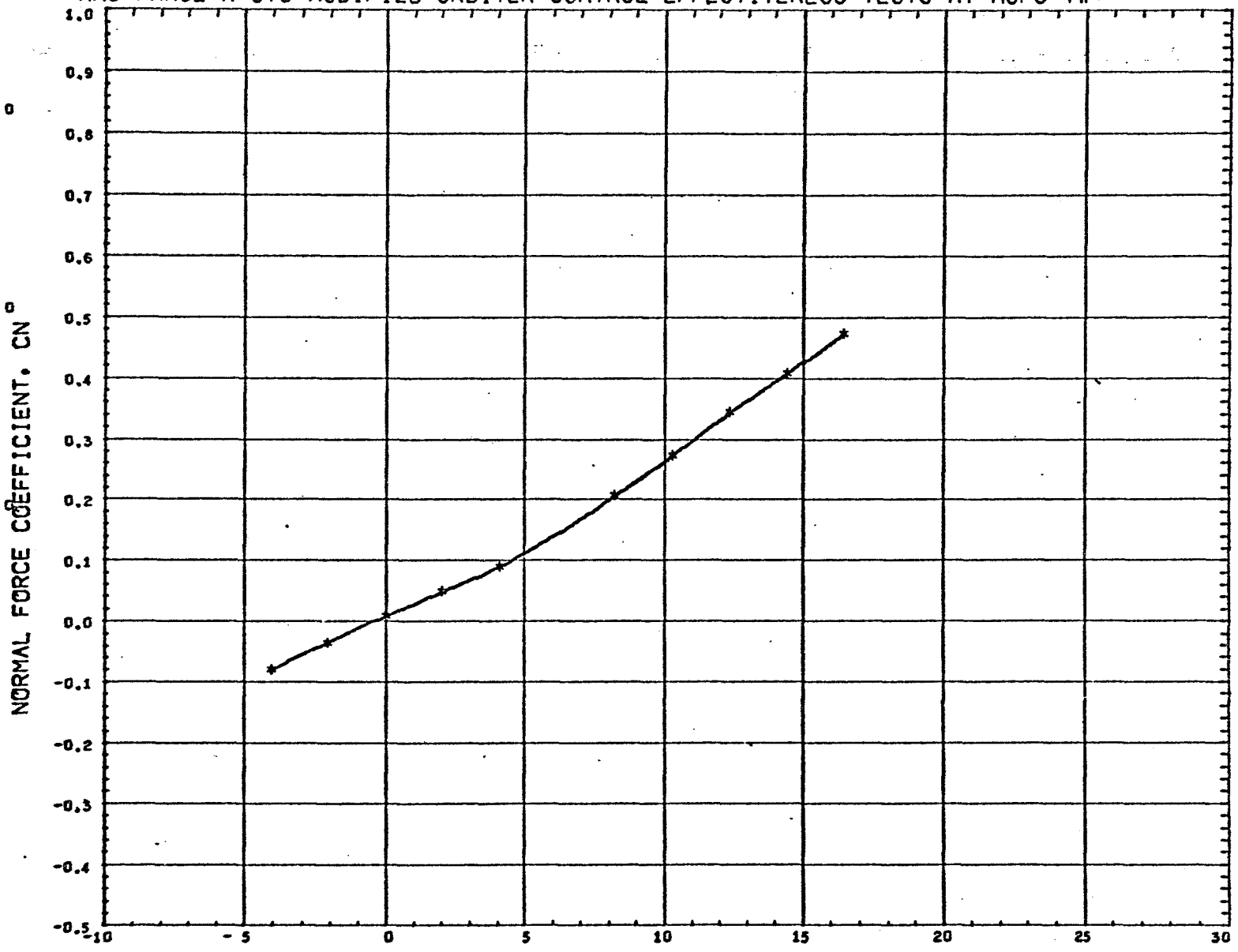
						REFL	0.646	FT.
						REFB	0.405	FT.
						XMRP	0.406	
						YMRP	0.000	
						ZMRP	0.045	

REFERENCE FILE.

°MSFC 453 MMC MOD ORB B2W2E1 DEL E0 (R17021) 02 JUL 70 PAGE 1

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000

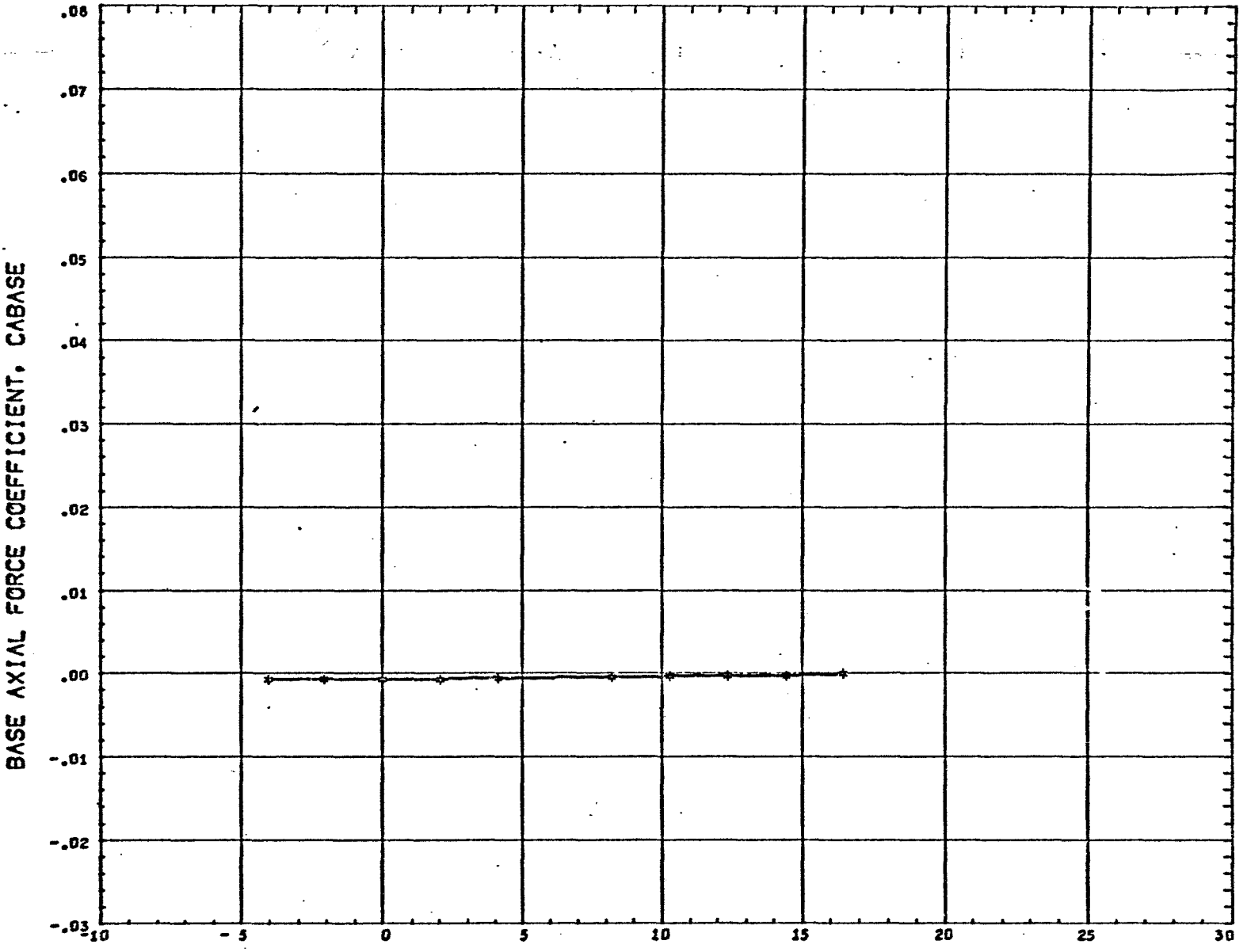
REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E0 (R17021) 02 JUL 70 PAGE 2

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

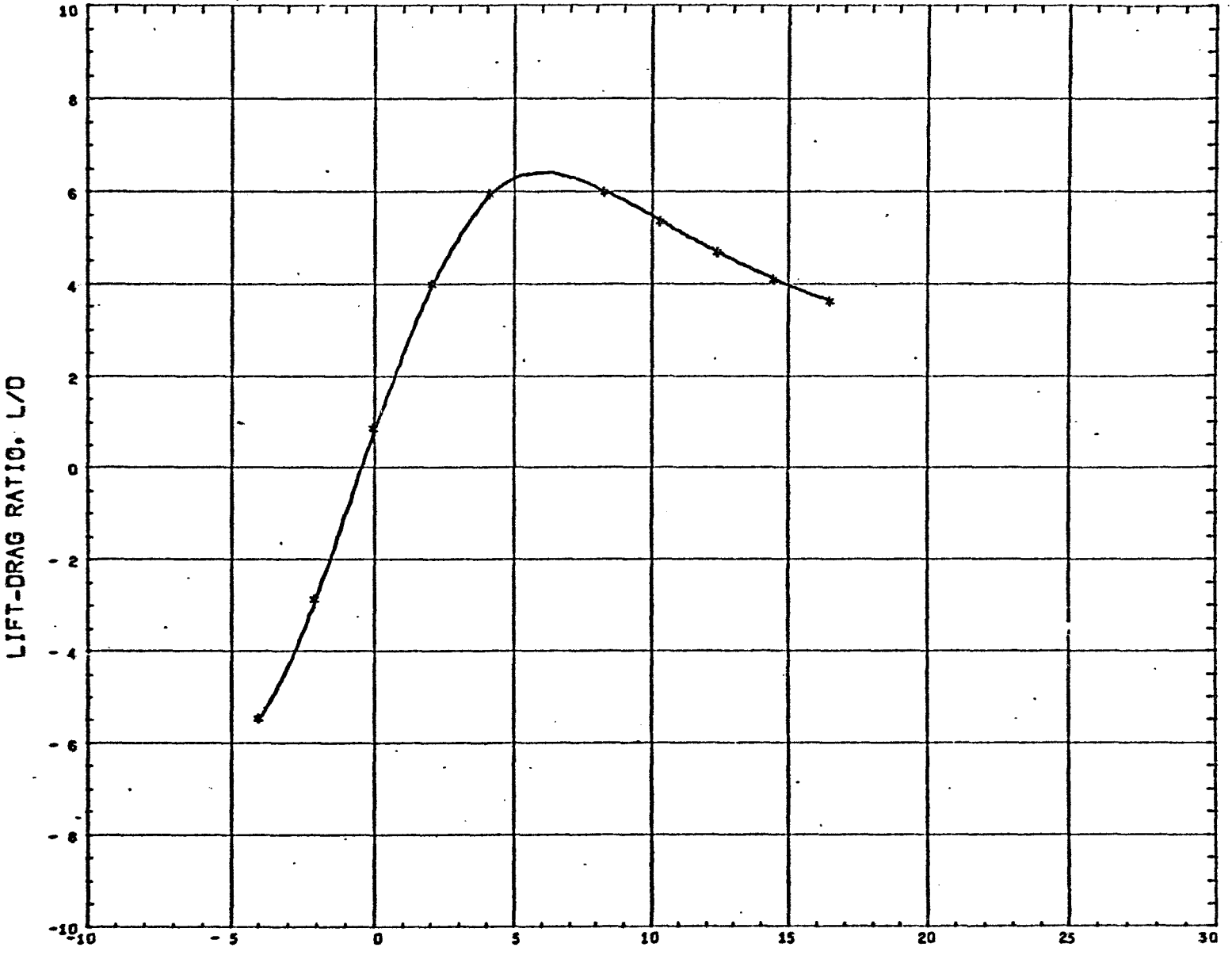


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



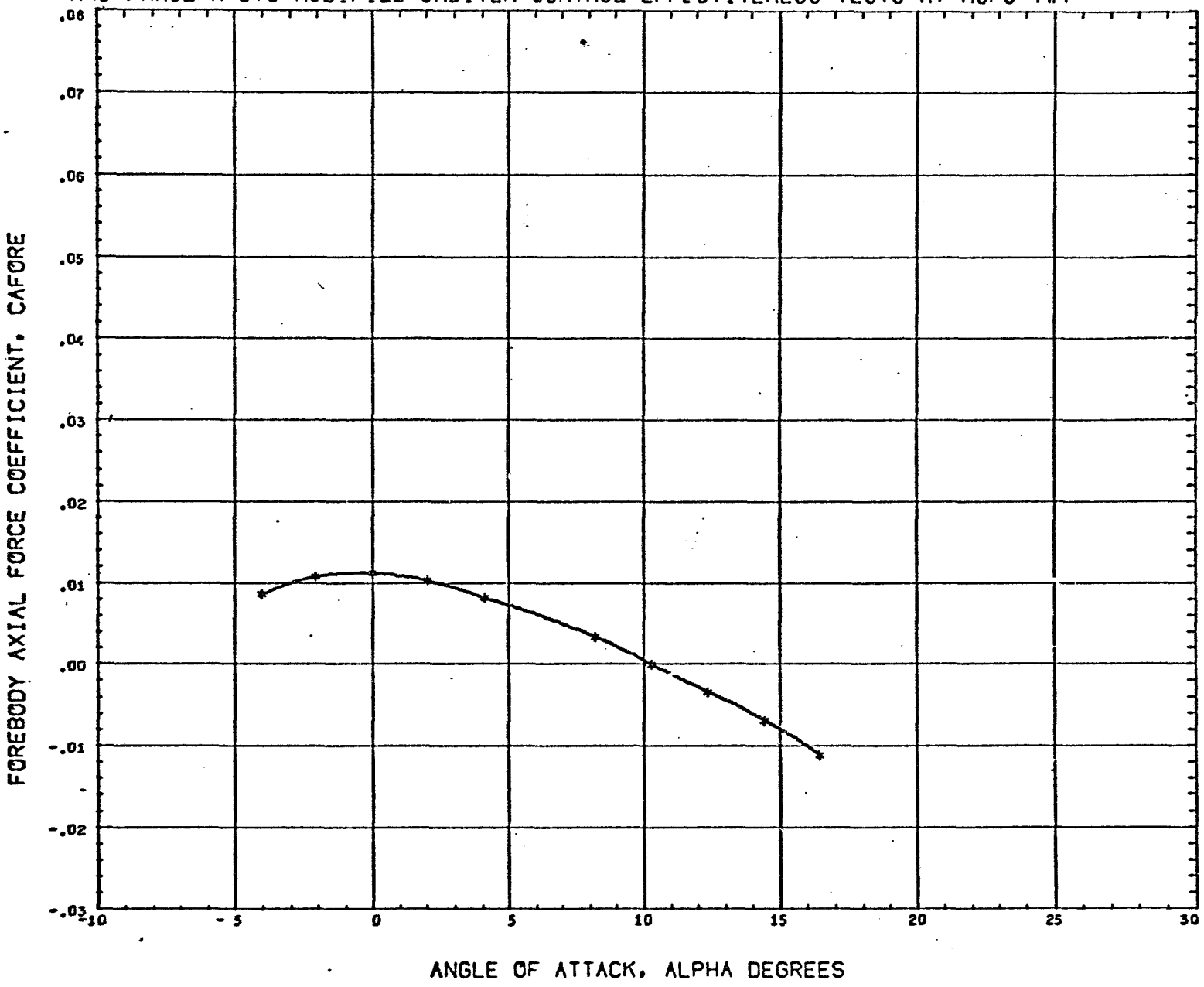
SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E0 (R17021) 02 JUL 70 PAGE 4

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

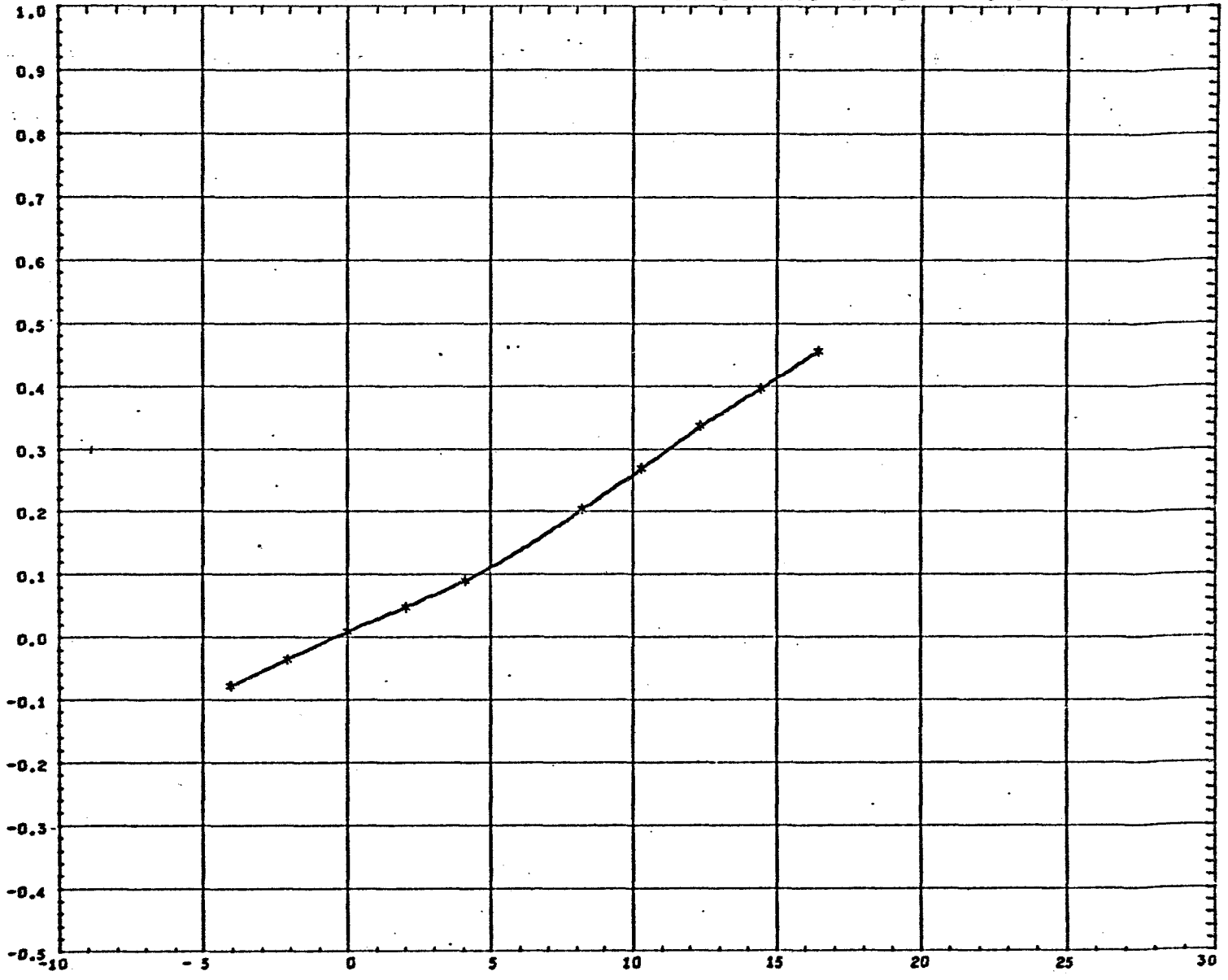


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



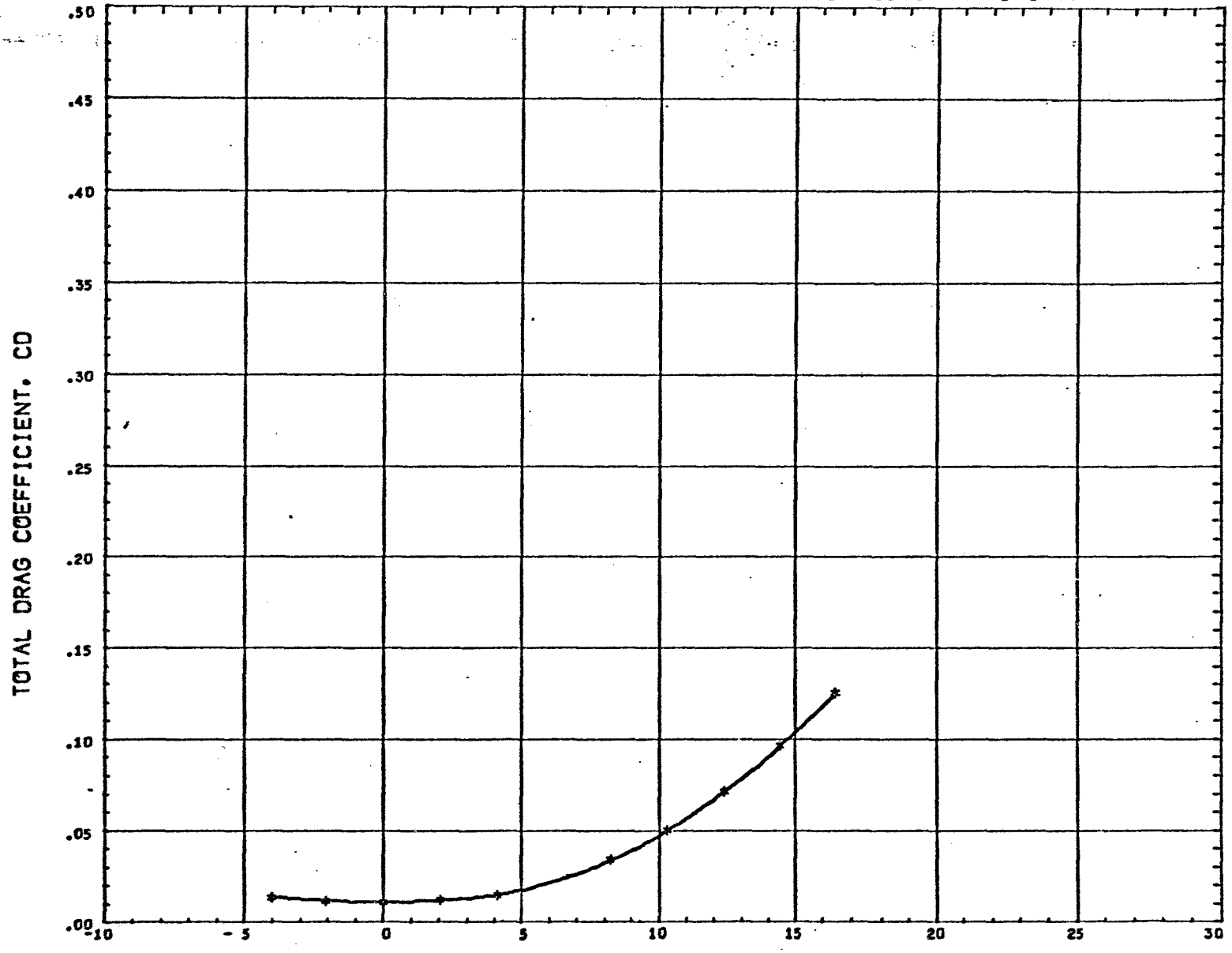
SYMBOL	MACH		PARAMETRIC VALUES		
●	0.396	BETA	0.000	ELEVON	0.000

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E0

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

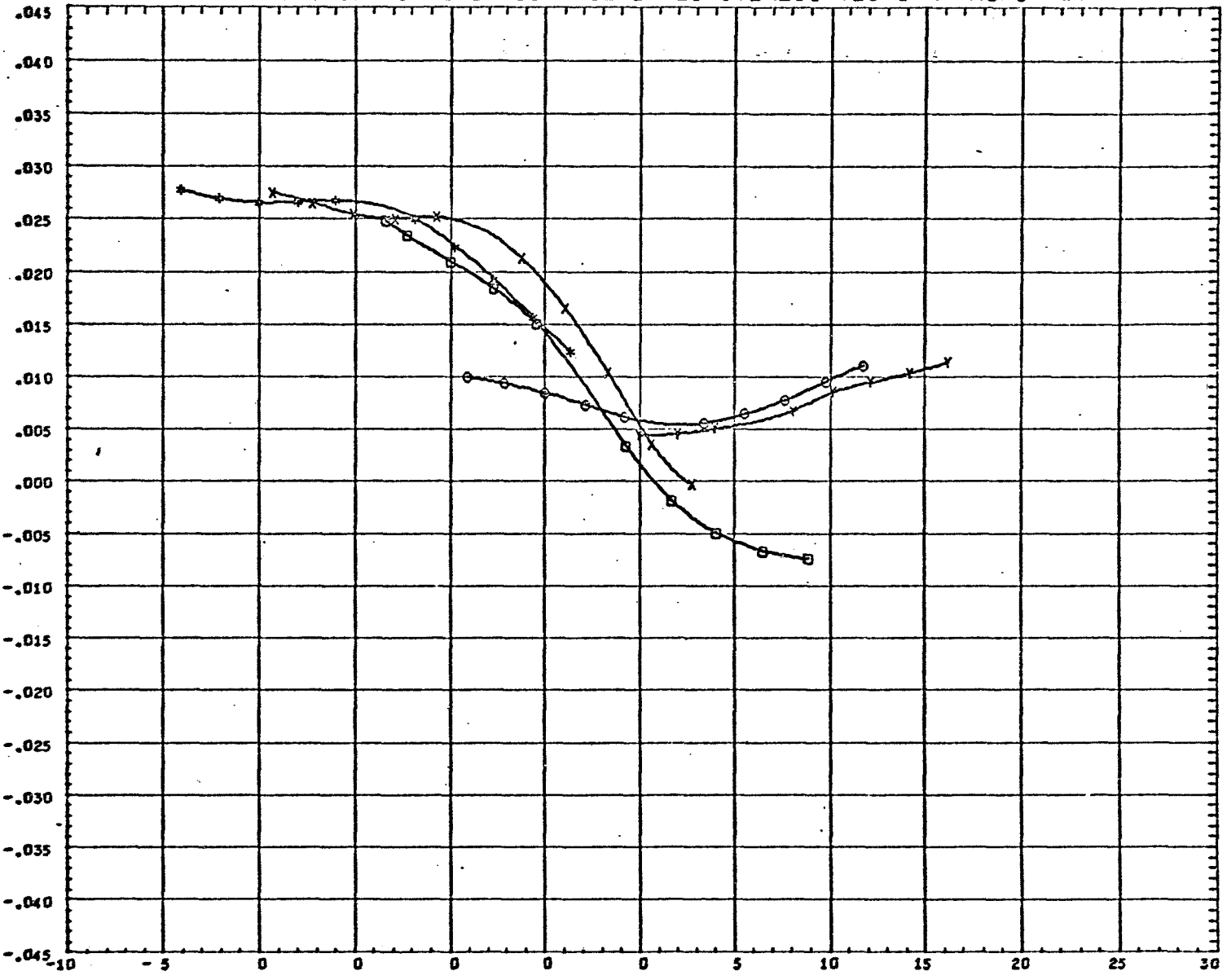


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

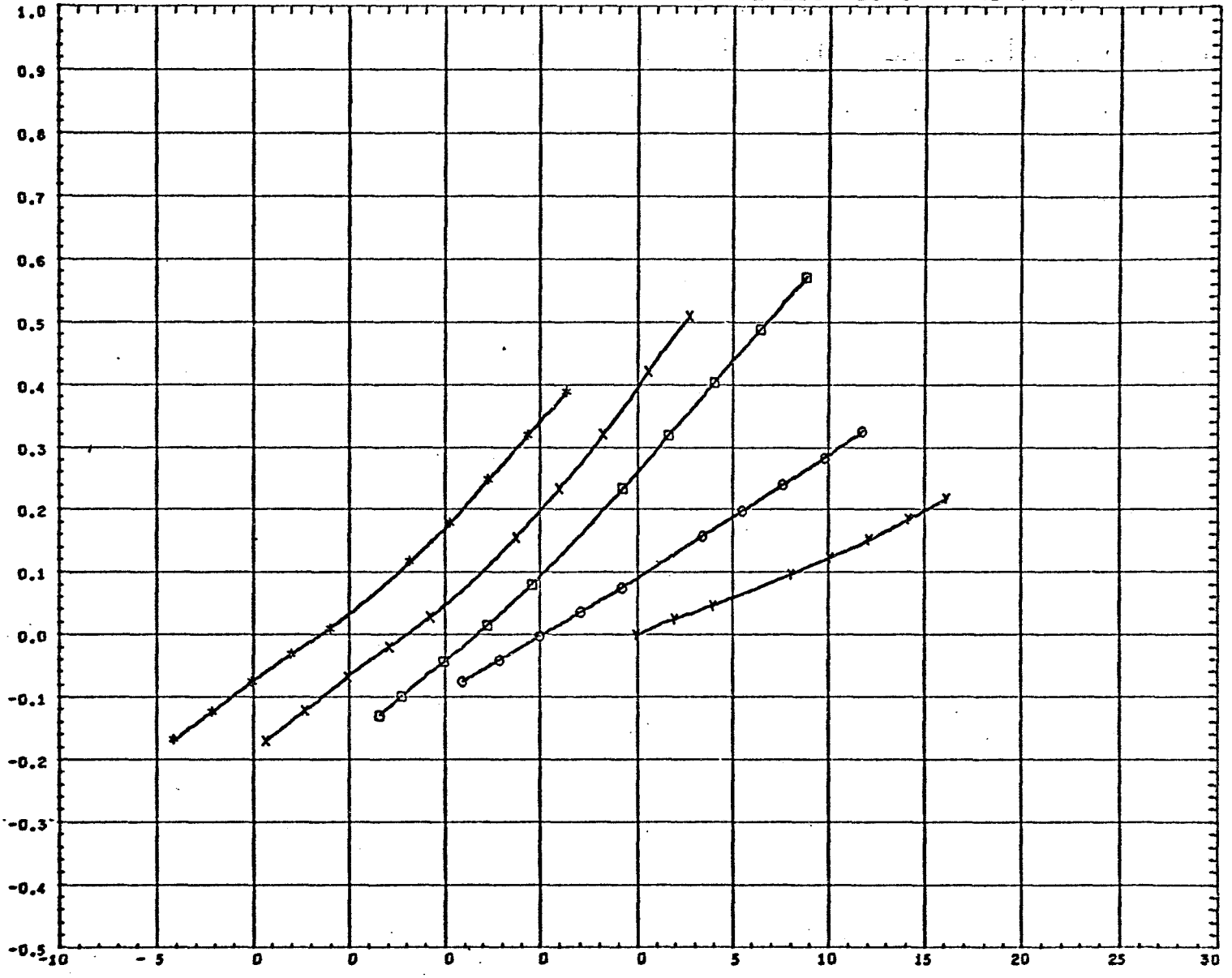


PITCHING MOMENT COEFFICIENT, CNM

ANGLE OF ATTACK, ALPHA DEGREES

SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
*	0.397	BETA	0.000	ELEVON - 15.000	REFS	0.116	SQ.FT.
x	0.797				REFL	0.646	FT.
3 ⊡	1.199				REFB	0.405	FT.
⊕	2.740				XMRP	0.406	
▼	4.960				YMRP	0.000	
		REFERENCE FILE.			ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

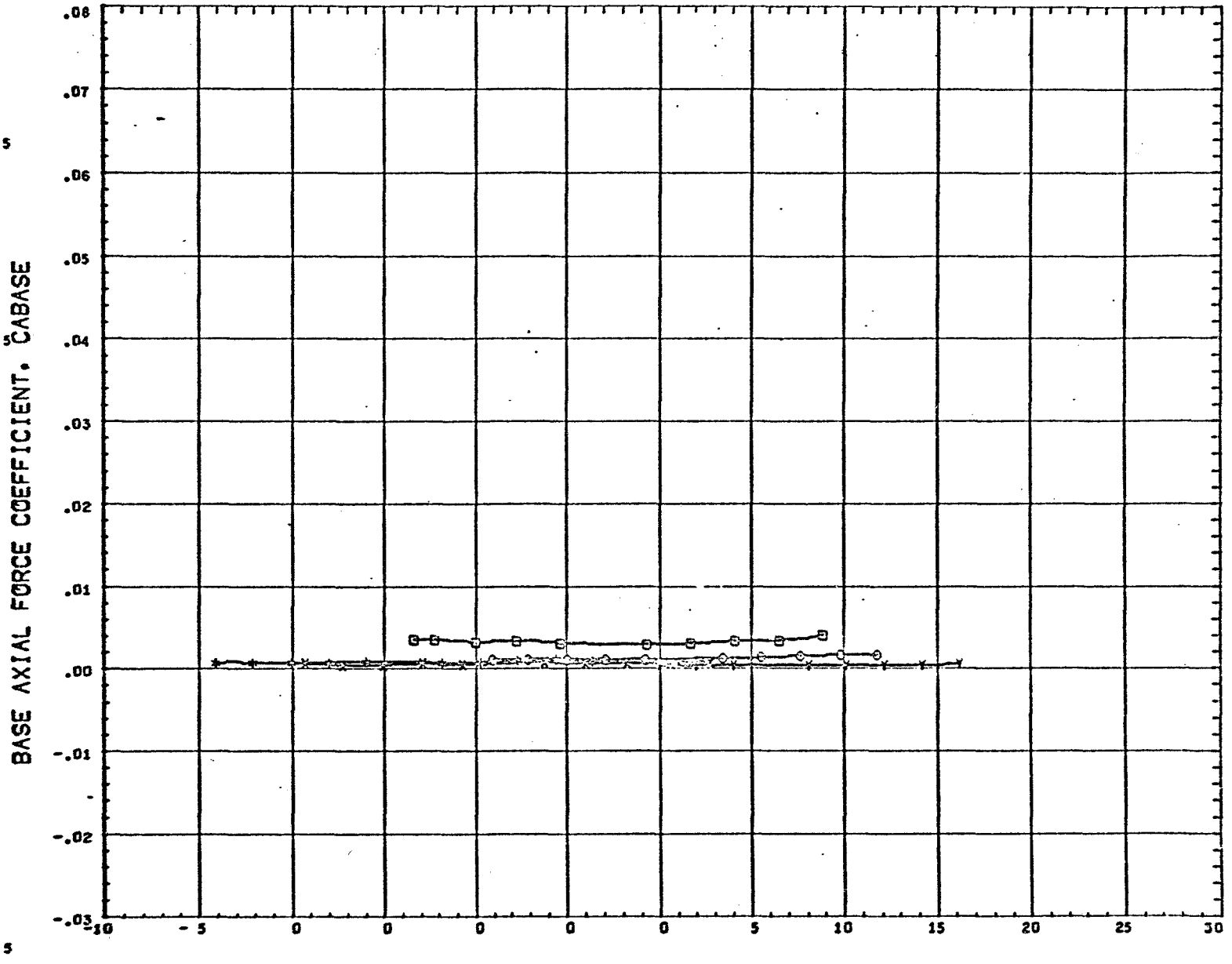


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.397	BETA	0.000	ELEVON	- 15.000
X	0.797				
⊞	1.199				
⊙	2.740				
▼	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
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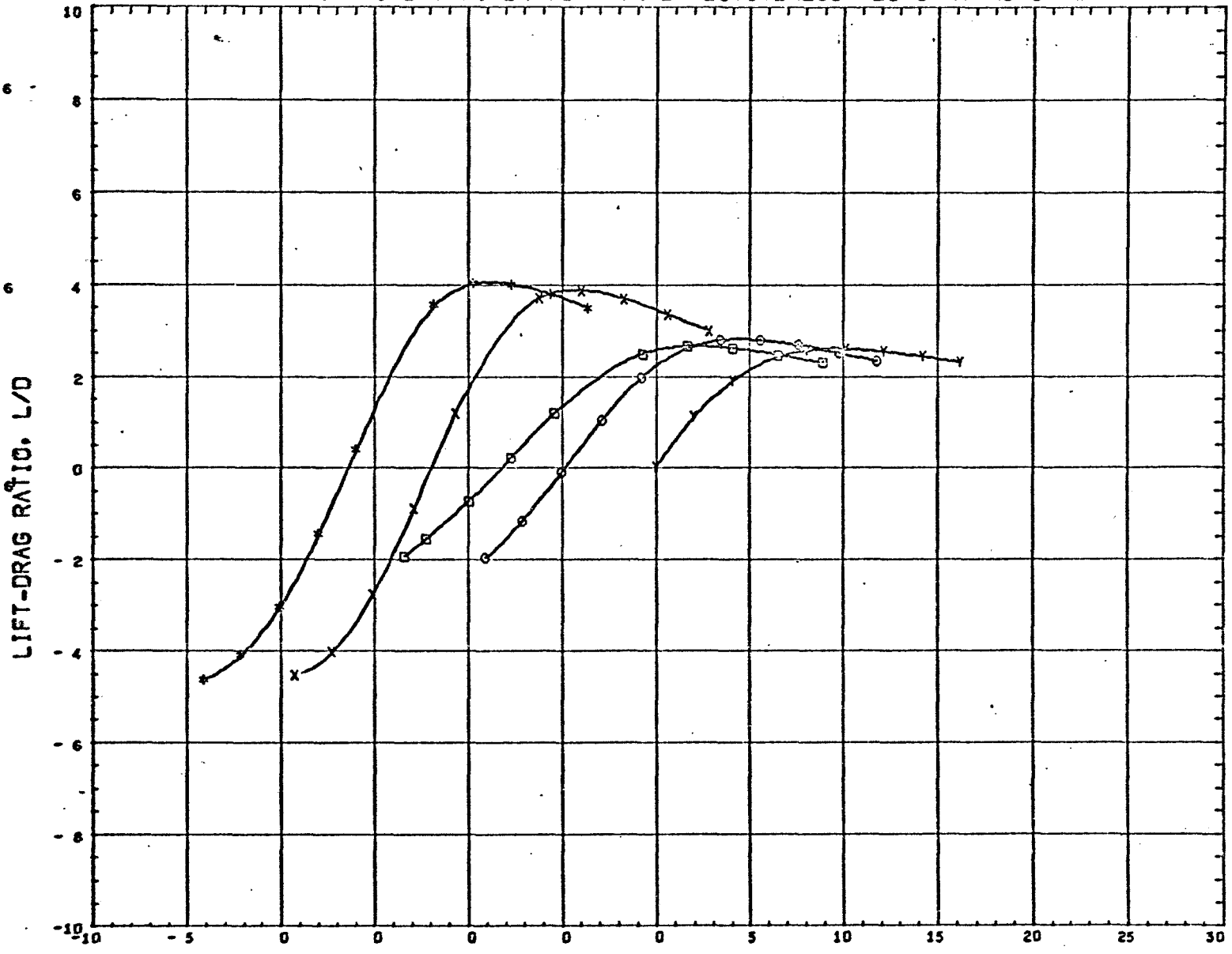
X	0.797				REFL	0.645	FT.
B	1.199				REFB	0.405	FT.
G	2.740				XMRP	0.406	
Y	4.960				YMRP	0.000	
		REFERENCE FILE.			ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.397	BETA	0.000	ELEVON	- 15.000
x	0.797				
⊡	1.199				
⊙	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

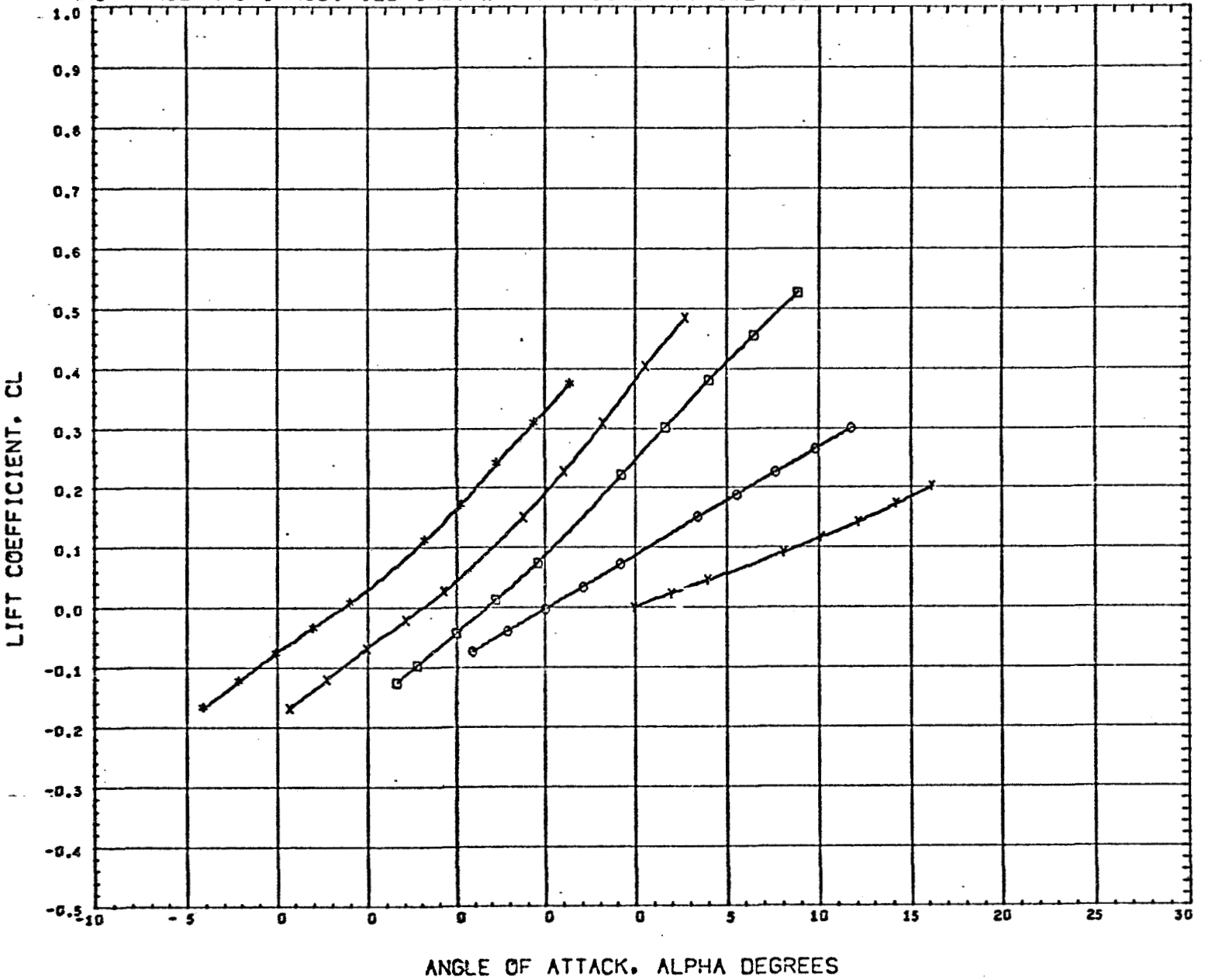
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

SYMBOL	MACH	PARAMETRIC VALUES			
*	0.397	BETA	0.000	ELEVON	- 15.000
X	0.797				
⊡	1.199				
⊕	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH
*	0.397
X	0.797
⊡	1.199
⊙	2.740
Y	4.960

PARAMETRIC VALUES

BETA 0.000 ELEVON - 15.000

REFERENCE FILE.

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
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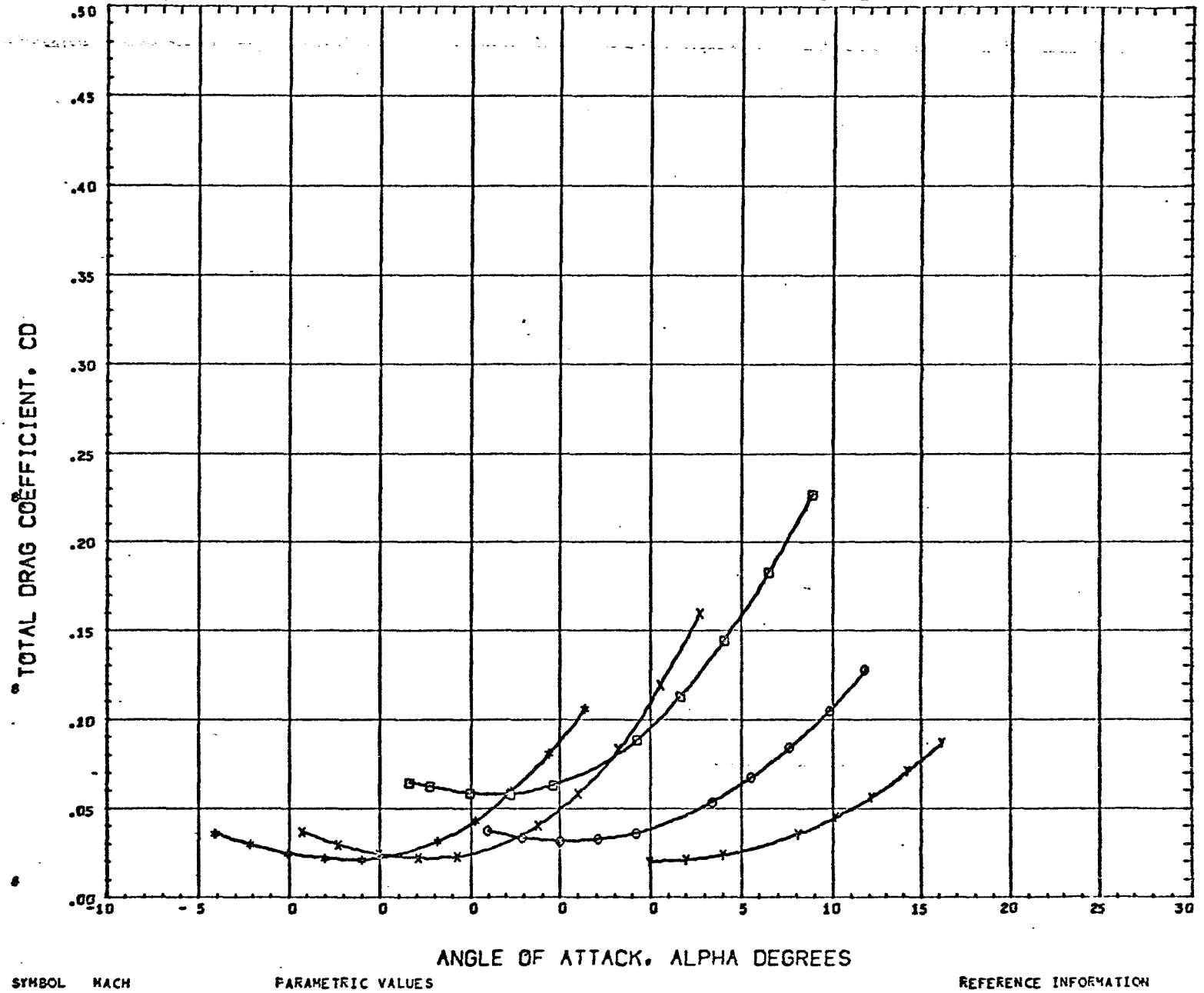
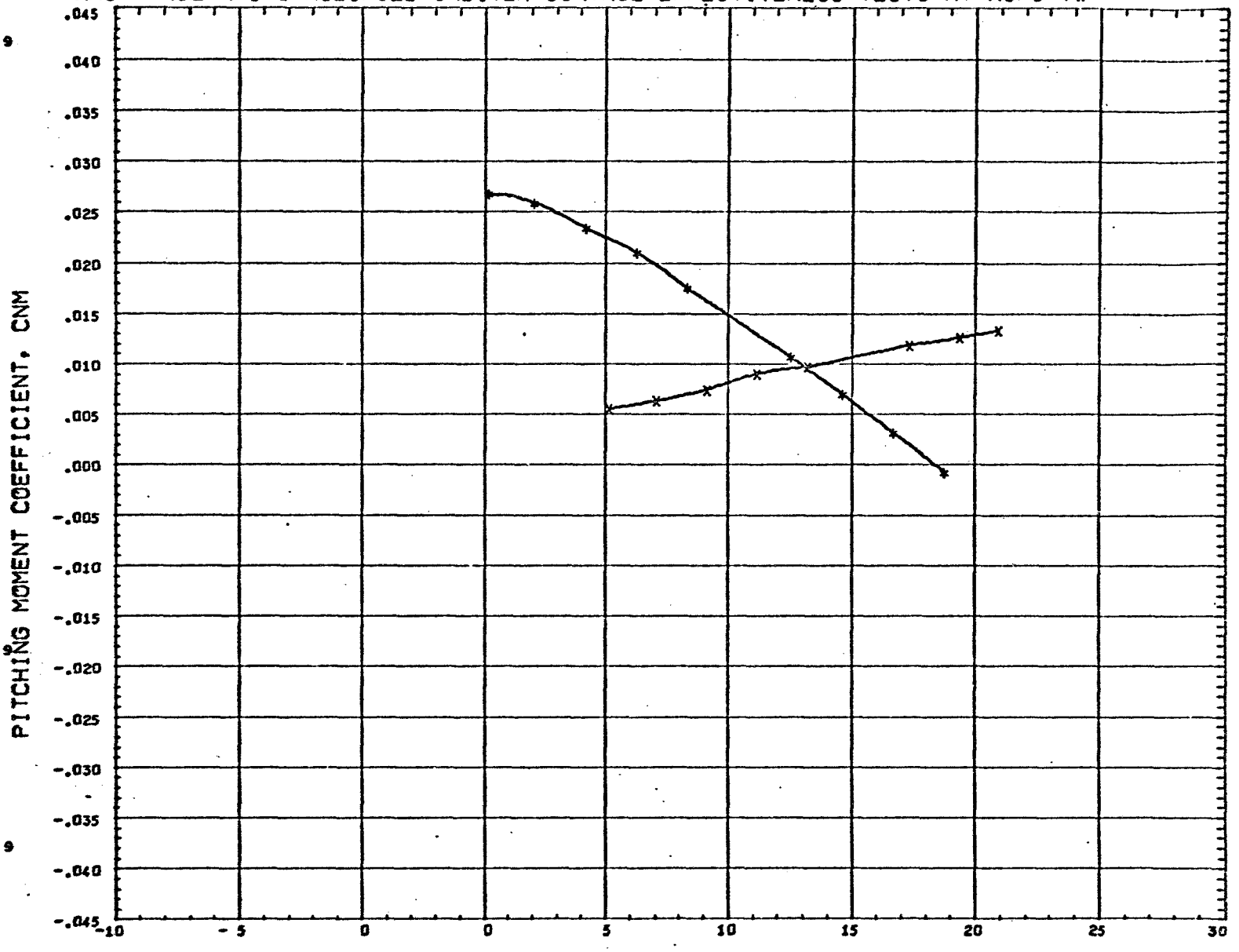
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
*	0.397	BETA	0.000	ELEVON - 15.000	REFS	0.116	SQ.FT.
X	0.797				REFL	0.646	FT.
⊡	1.199				REFB	0.405	FT.
⊙	2.740				XMRF	0.405	
Y	4.960				YMRF	-0.000	
		REFERENCE FILE.			ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
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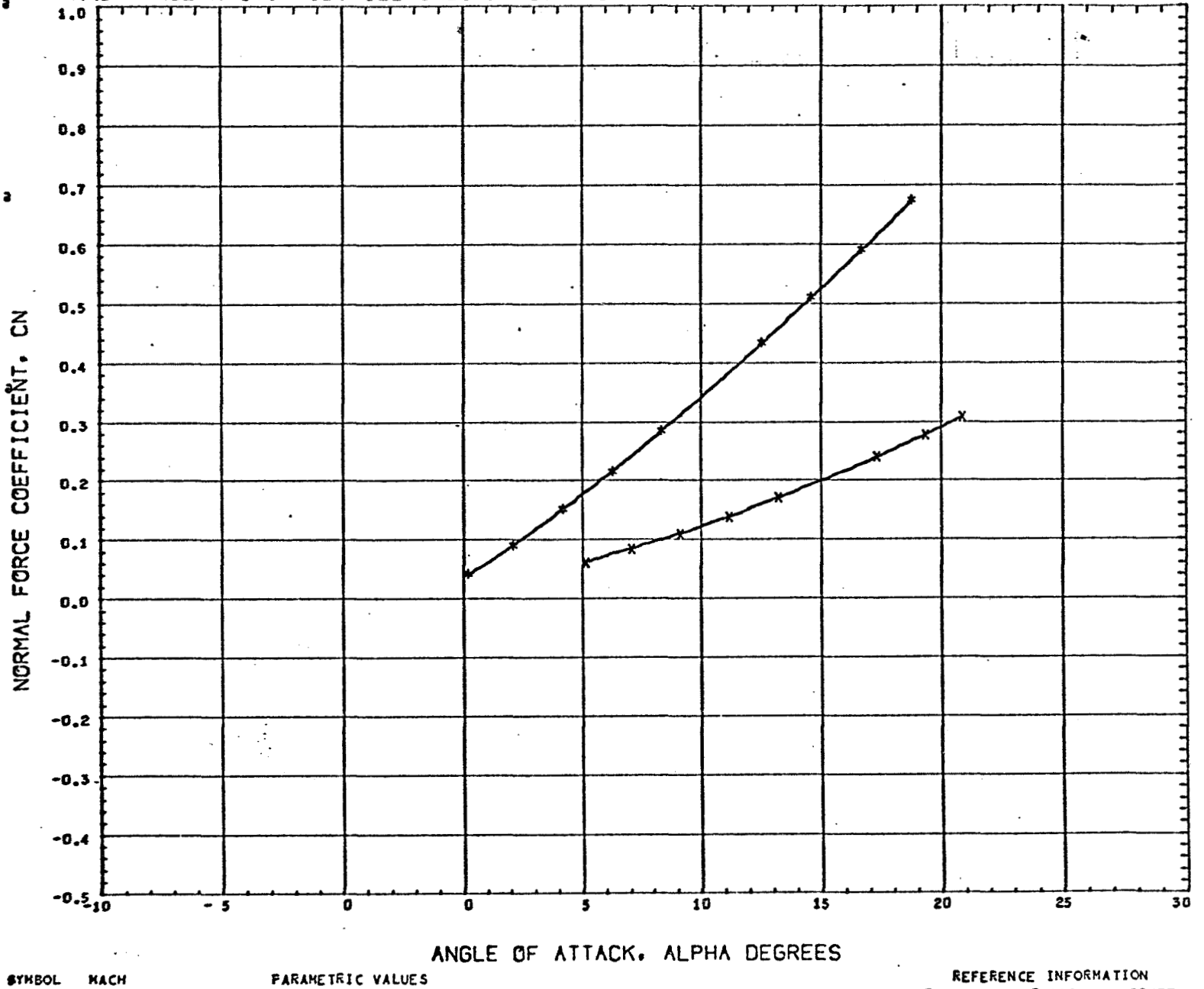
x	4.960				REFL	0.646	FT.
					REFB	0.405	FT.
					XMRP	0.406	
					YMRP	0.000	
					ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E-15 R0 (R17023) 02 JUL 70 PAGE 15

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

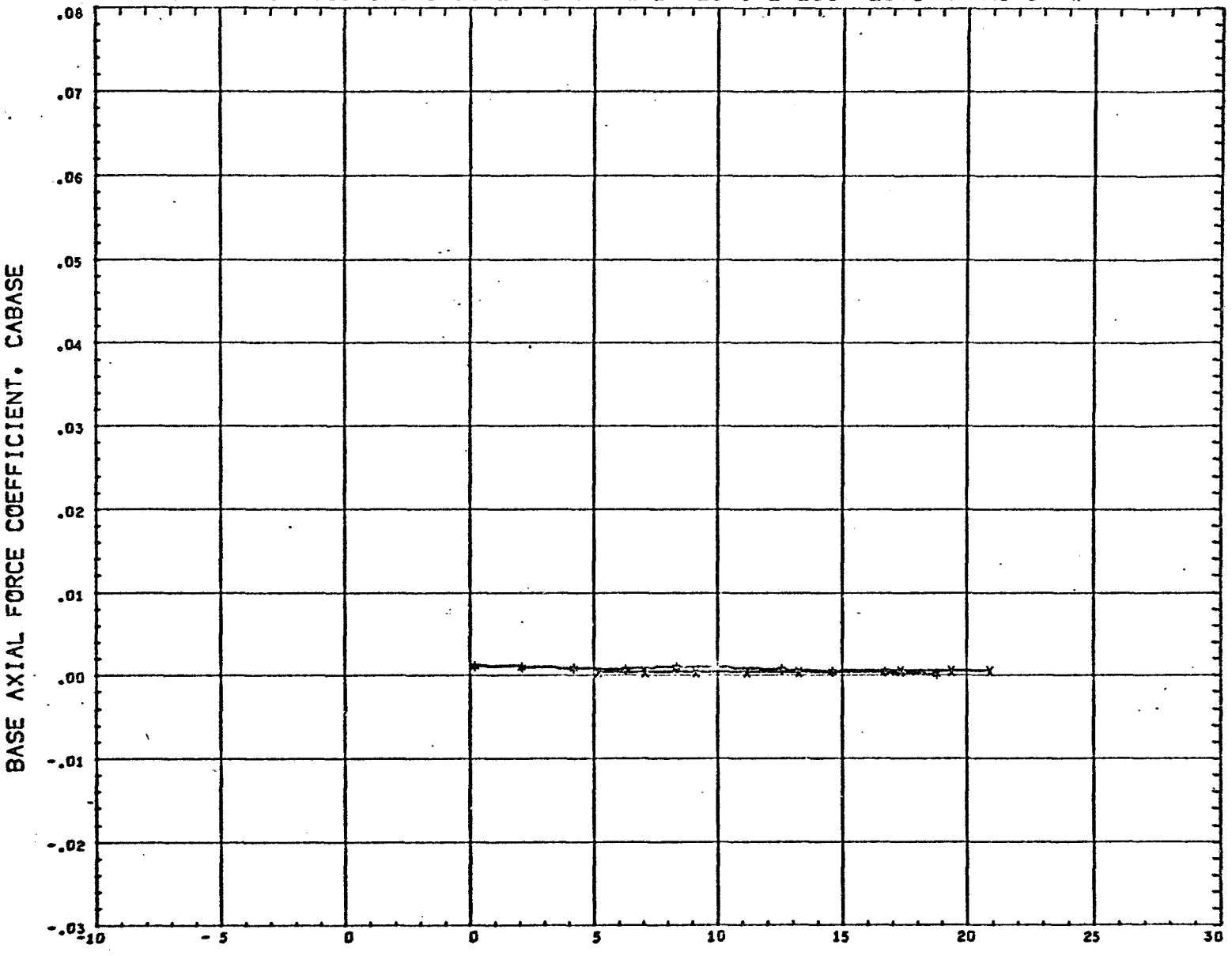


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 15.000
x	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

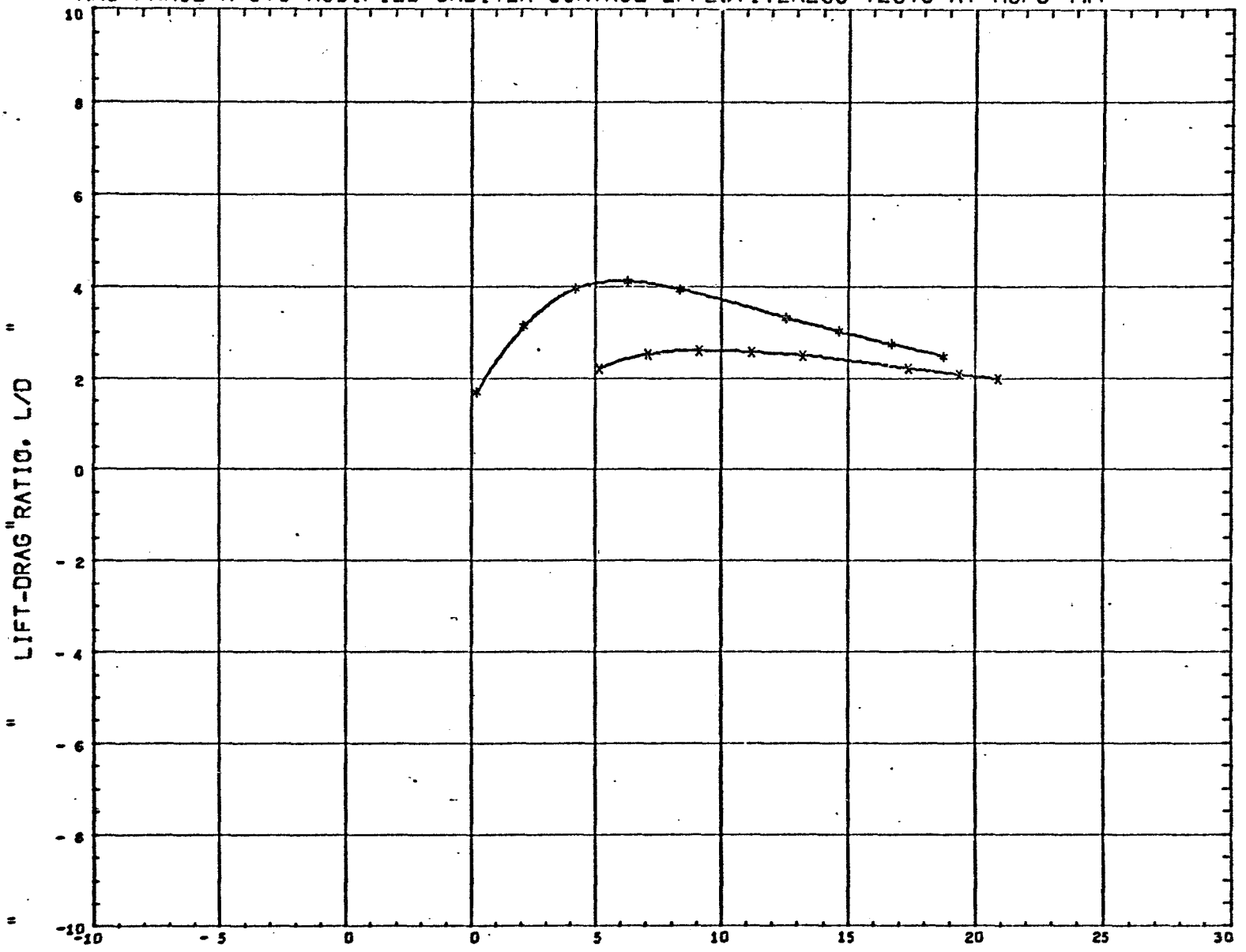


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 15.000
x	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

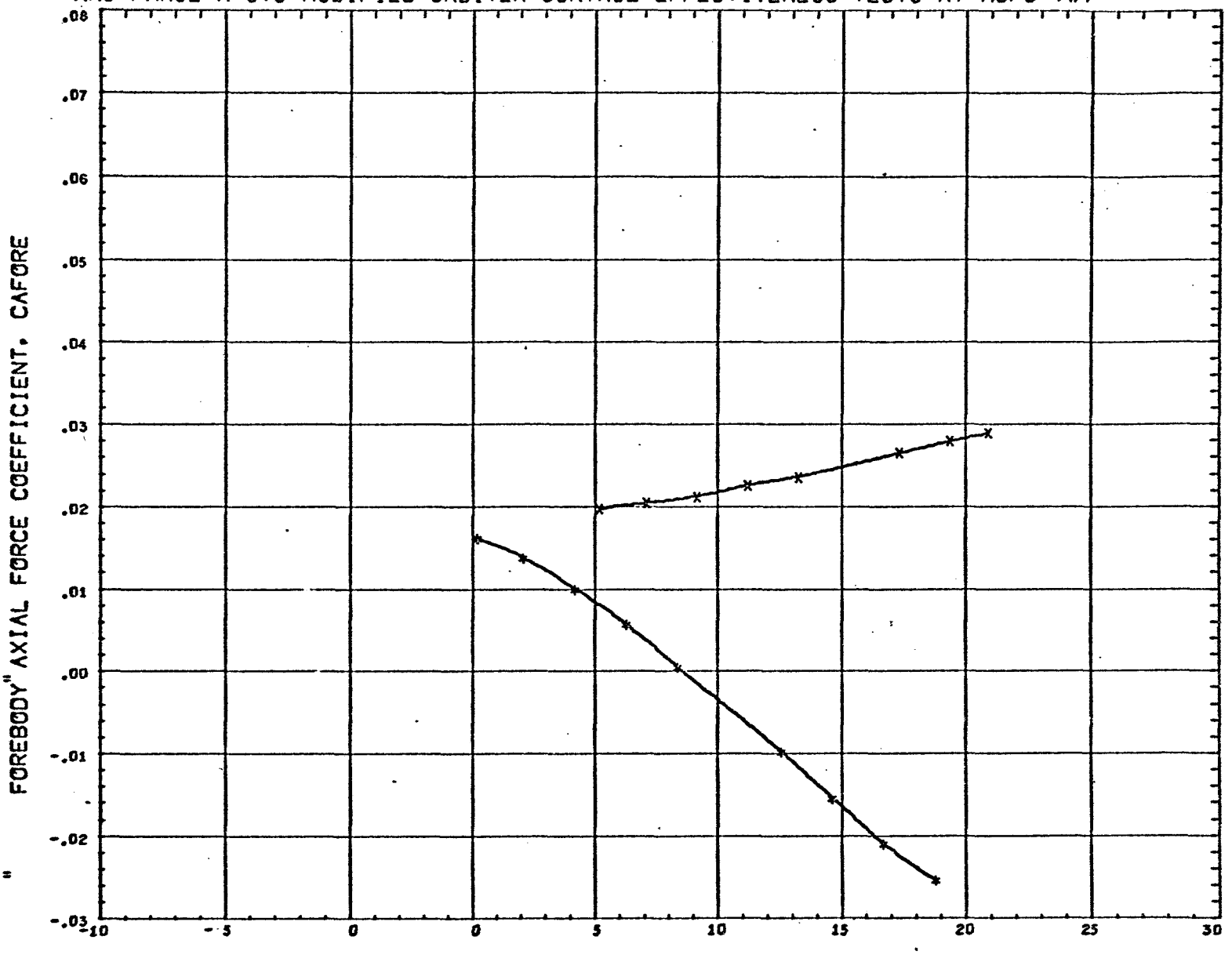


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 15.000
x	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

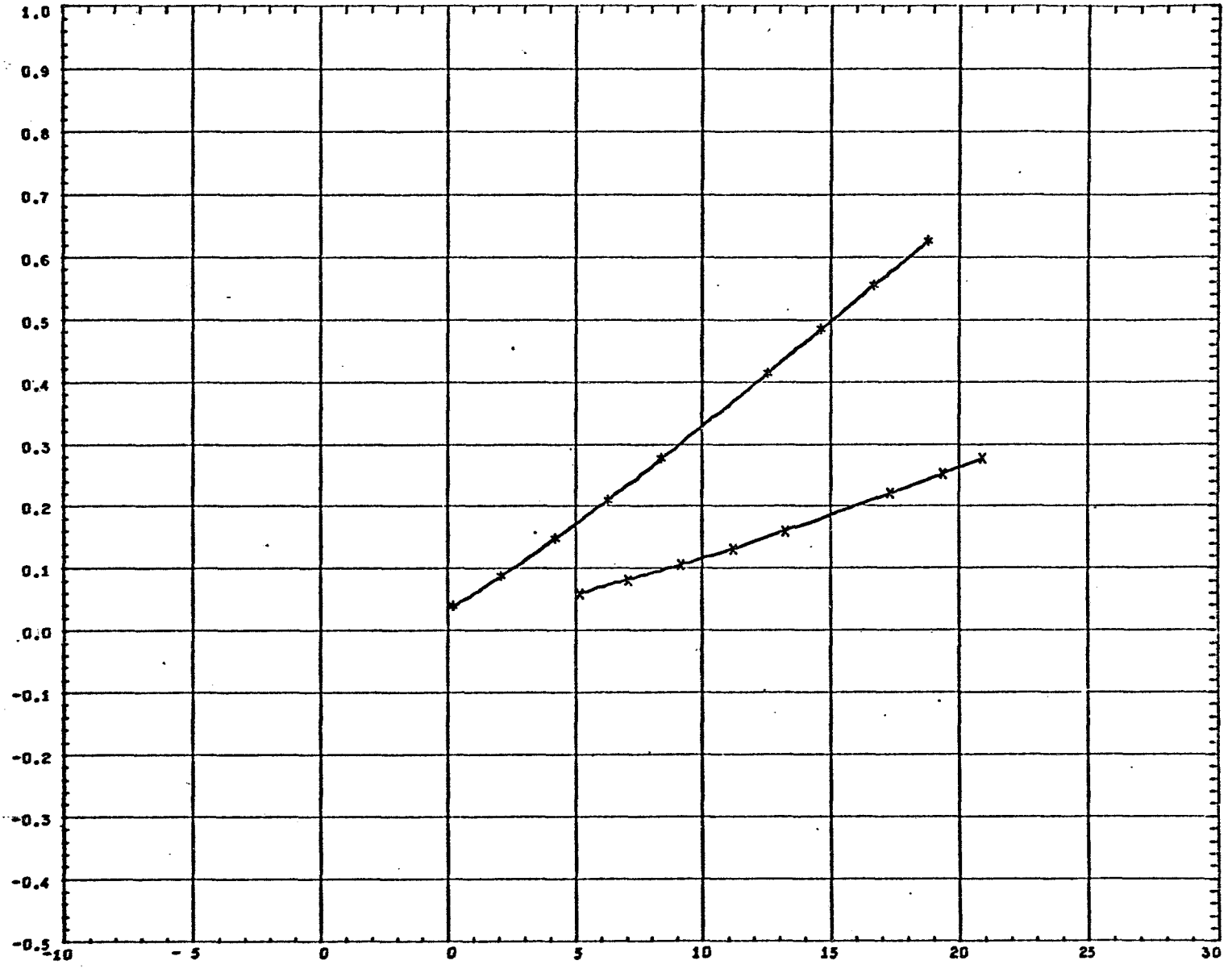


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 15.000
X	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

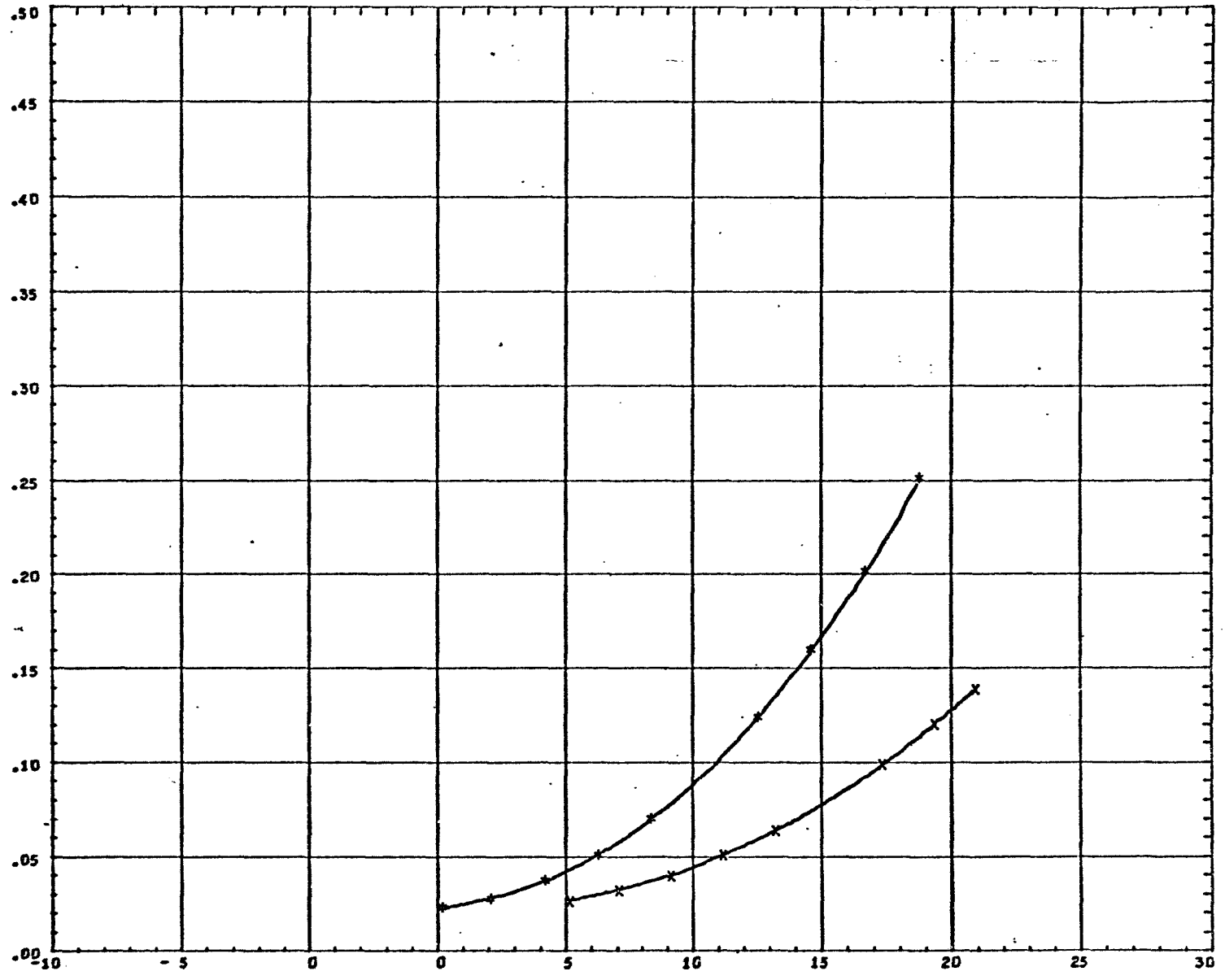


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 15.000
X	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

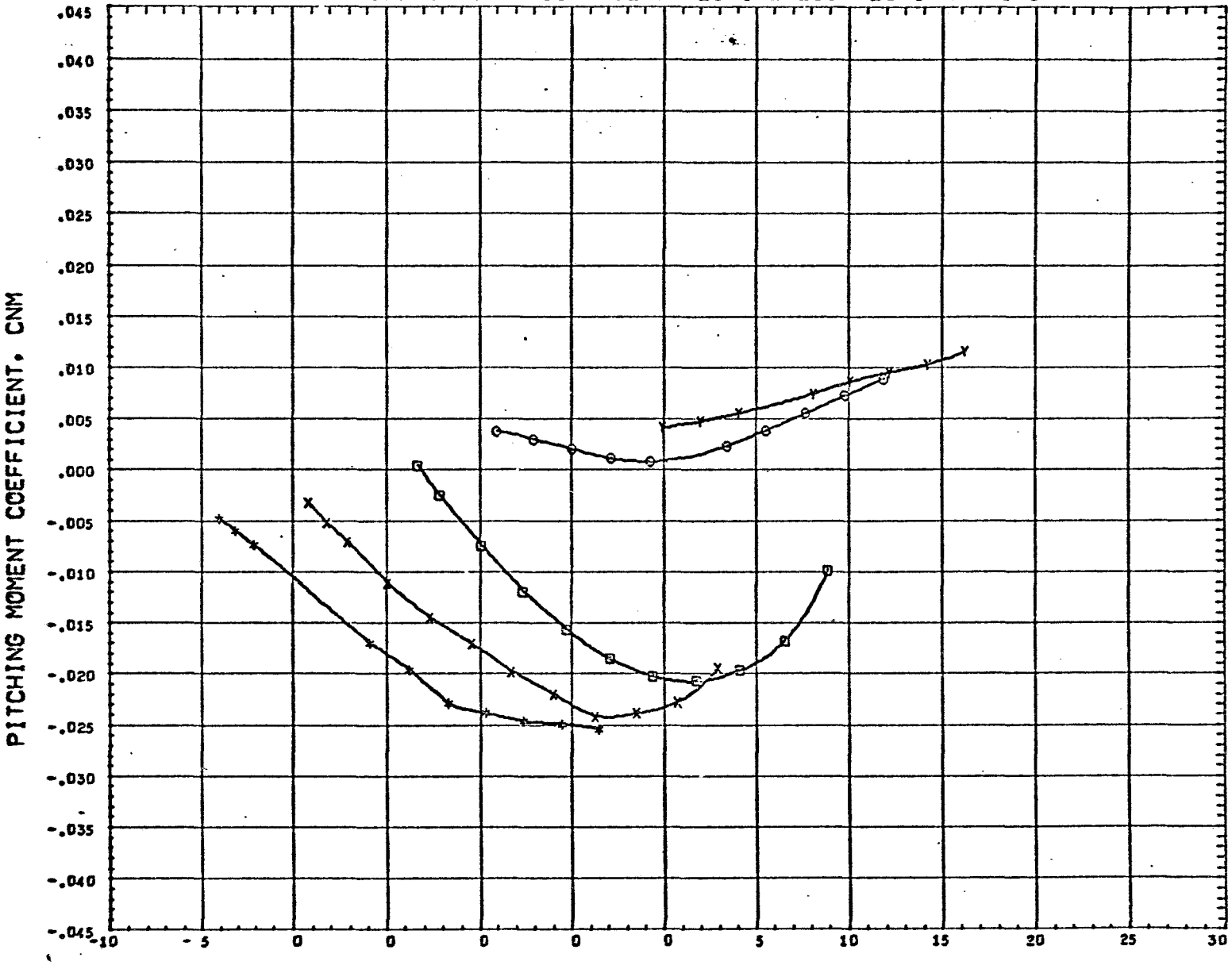


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 15.000
X	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

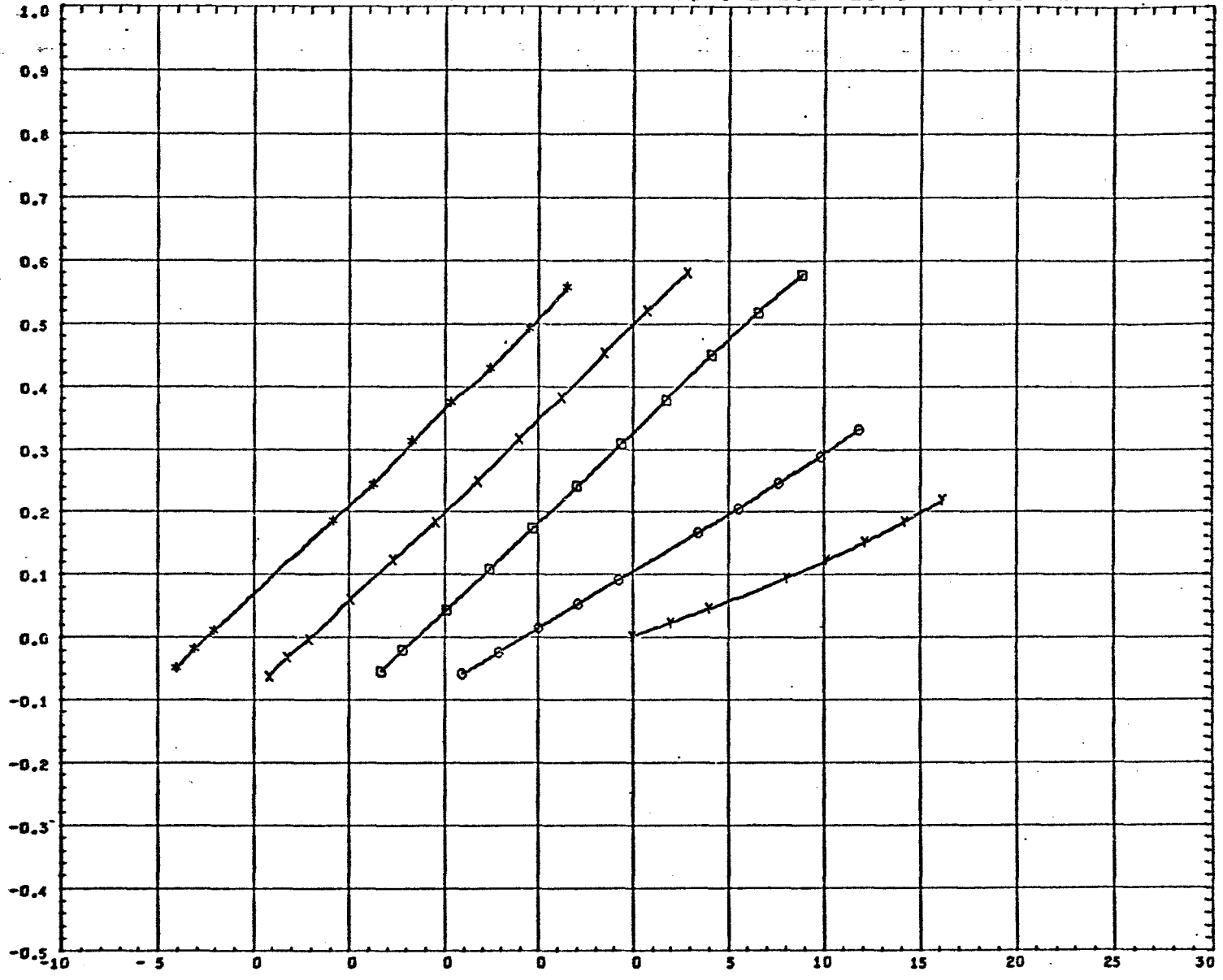


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
⊡	1.199				
⊕	2.740				
▽	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

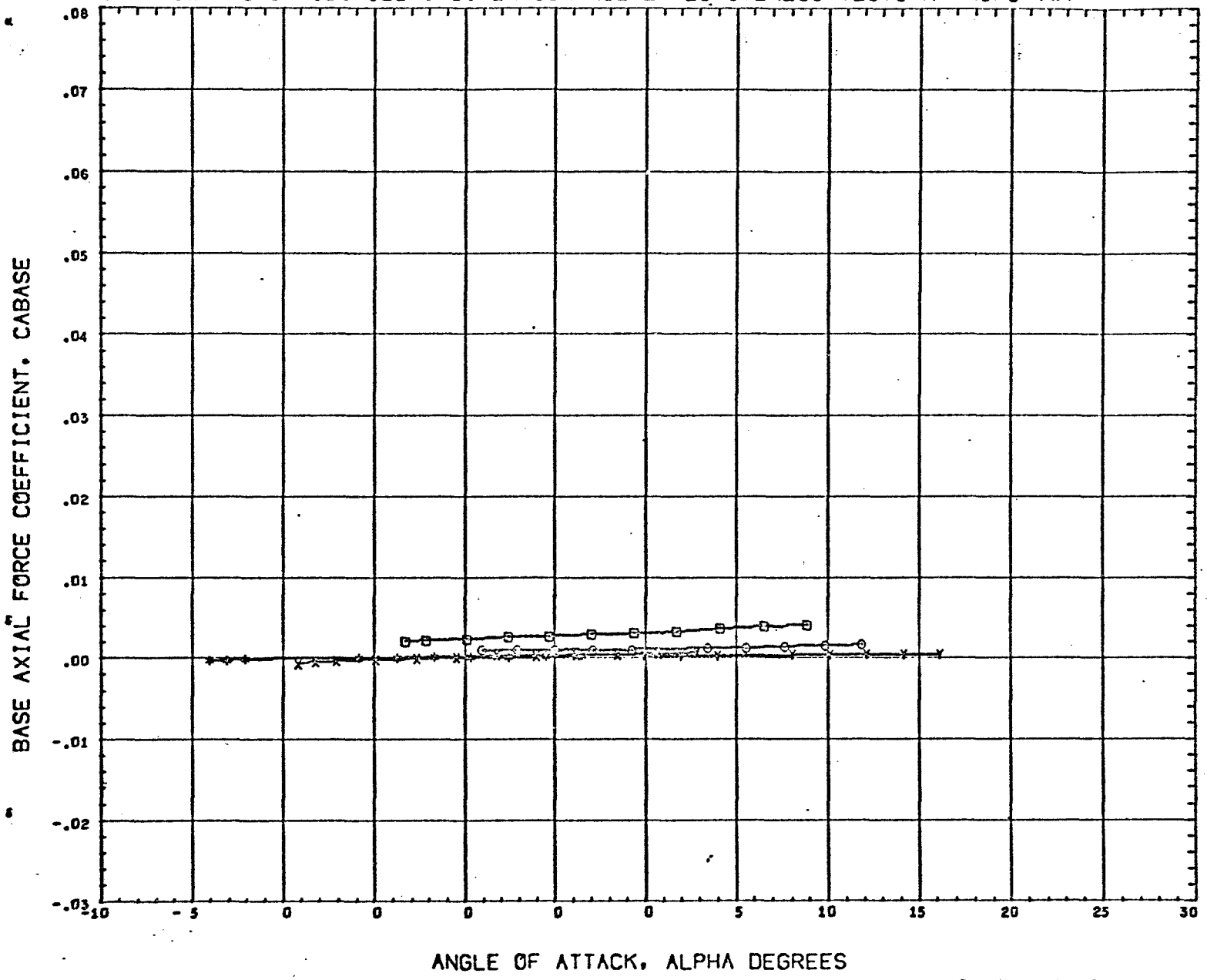


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
Δ	0.797				
□	1.199				
⊙	2.740				
▽	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

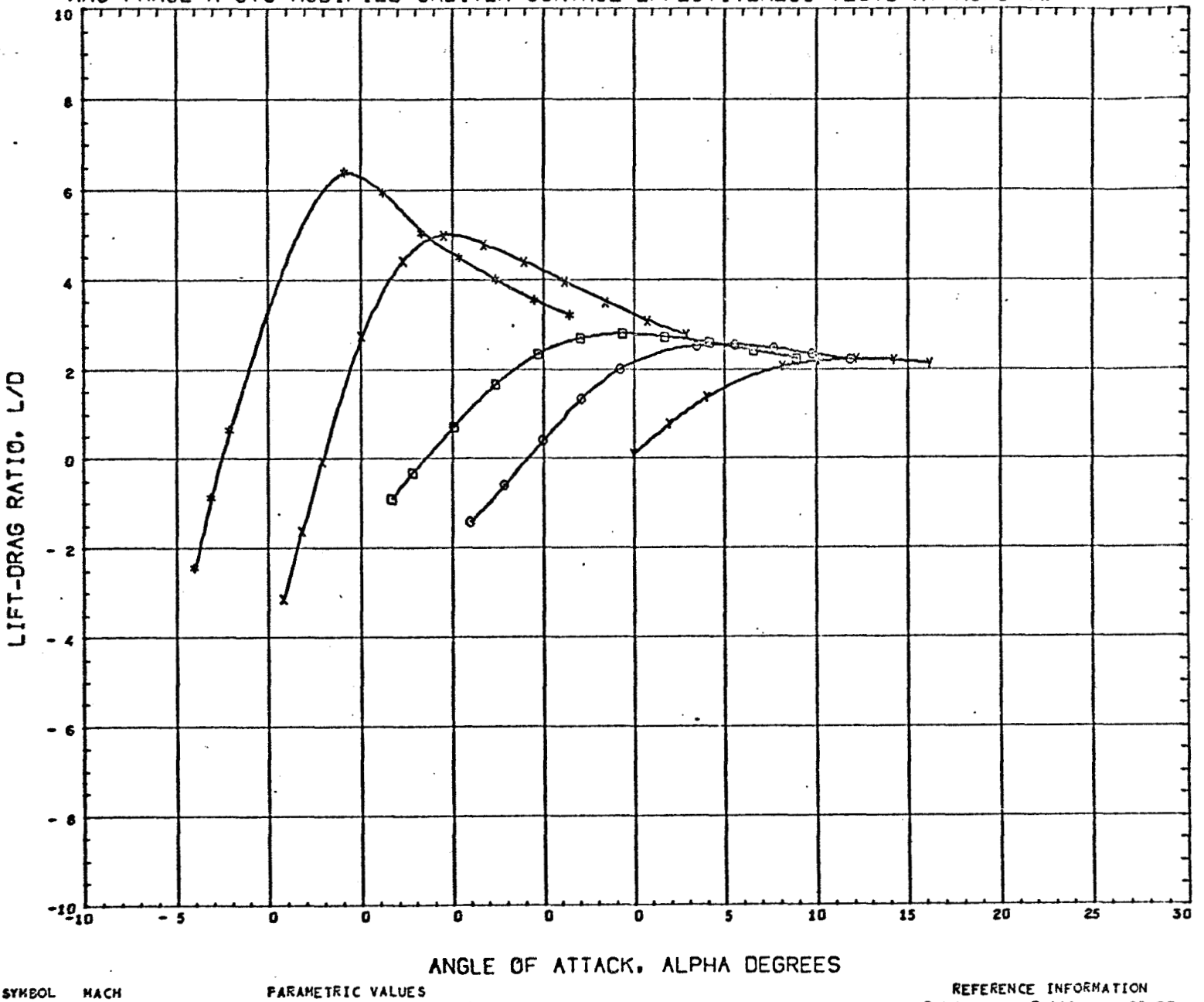


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
B	1.199				
O	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.645	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

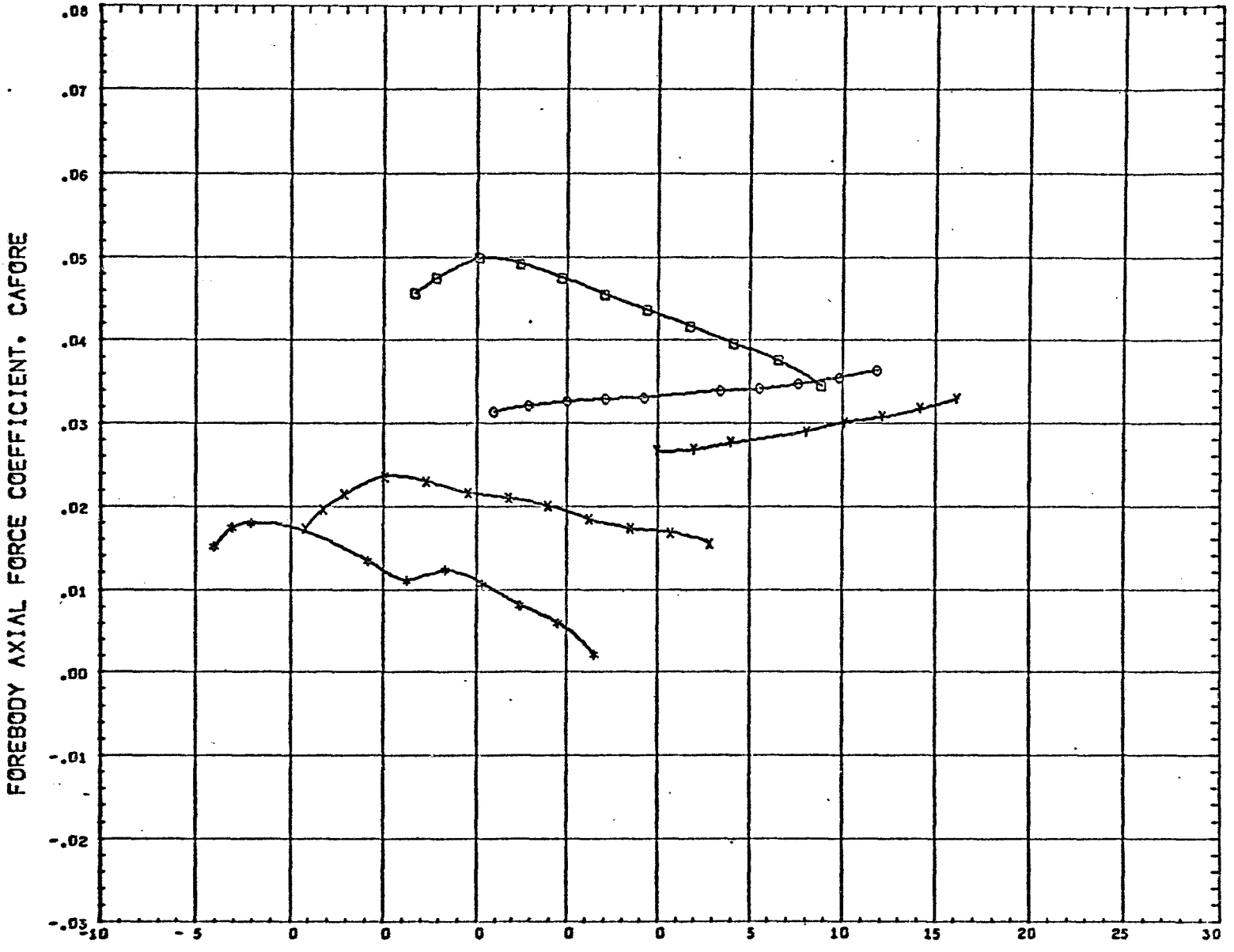


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
G	1.199				
O	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

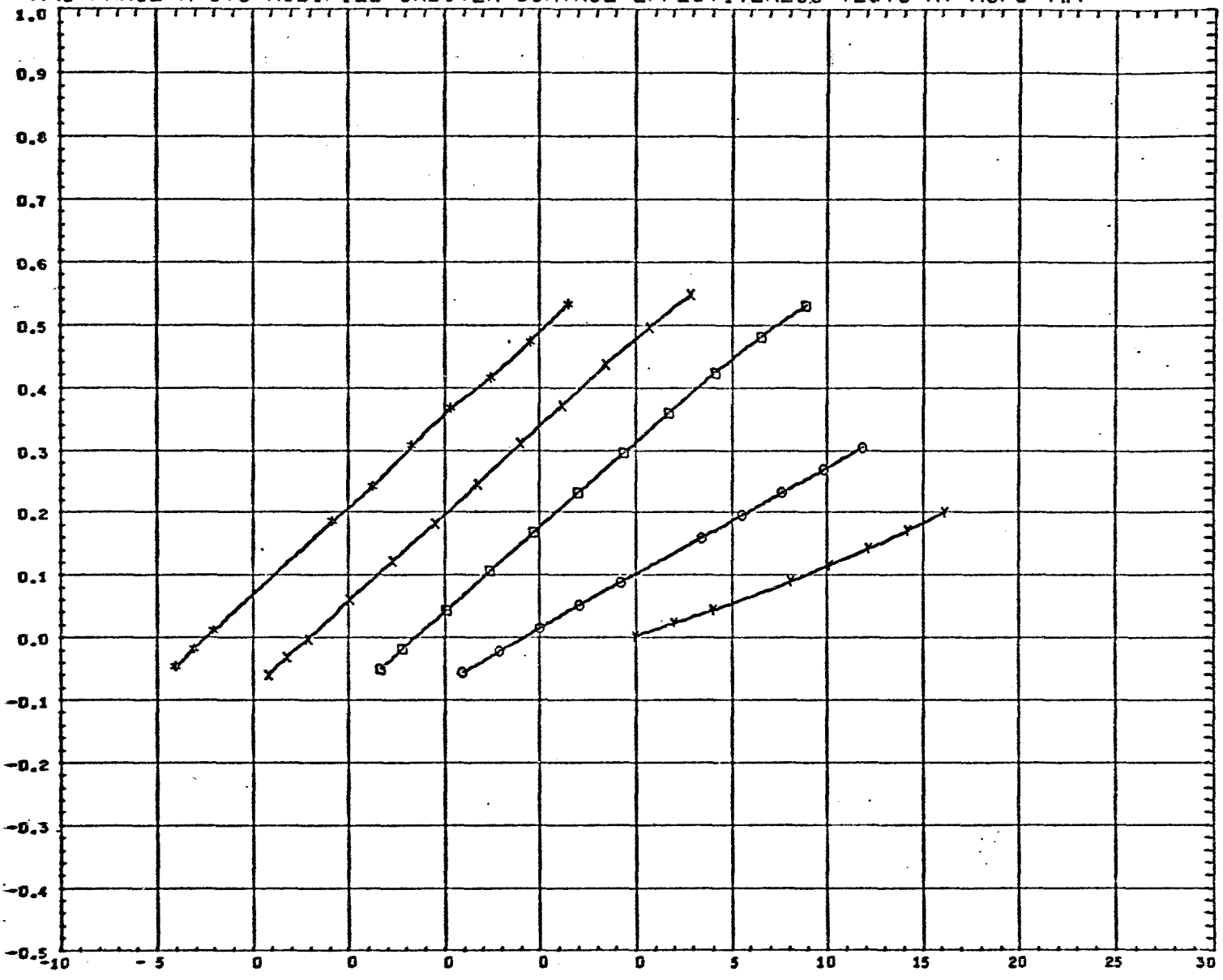


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
x	0.797				
⊡	1.199				
⊙	2.740				
▼	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

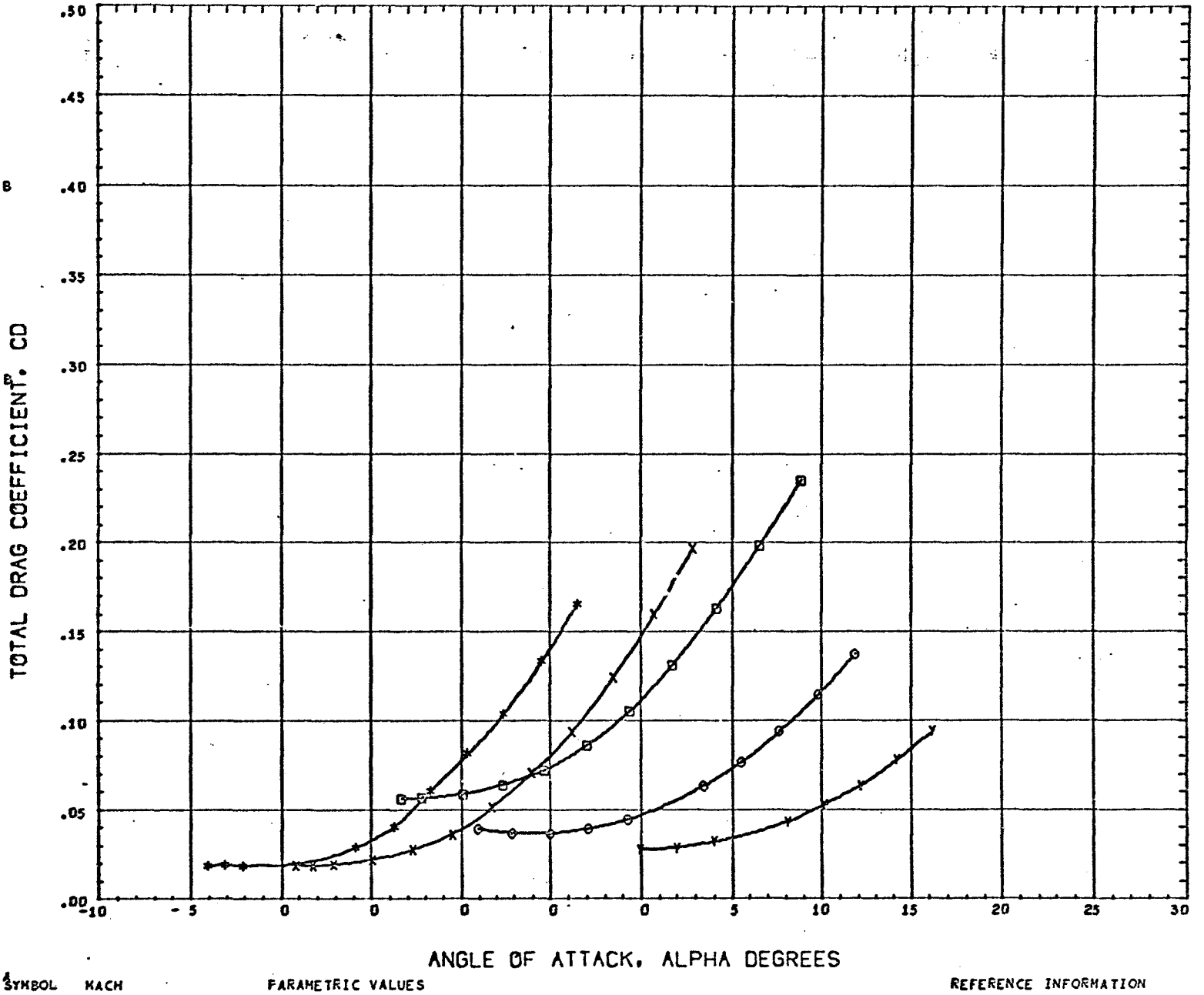


SYMBOL	MACH	PARAMETRIC VALUES			
●	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
⊞	1.199				
⊙	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

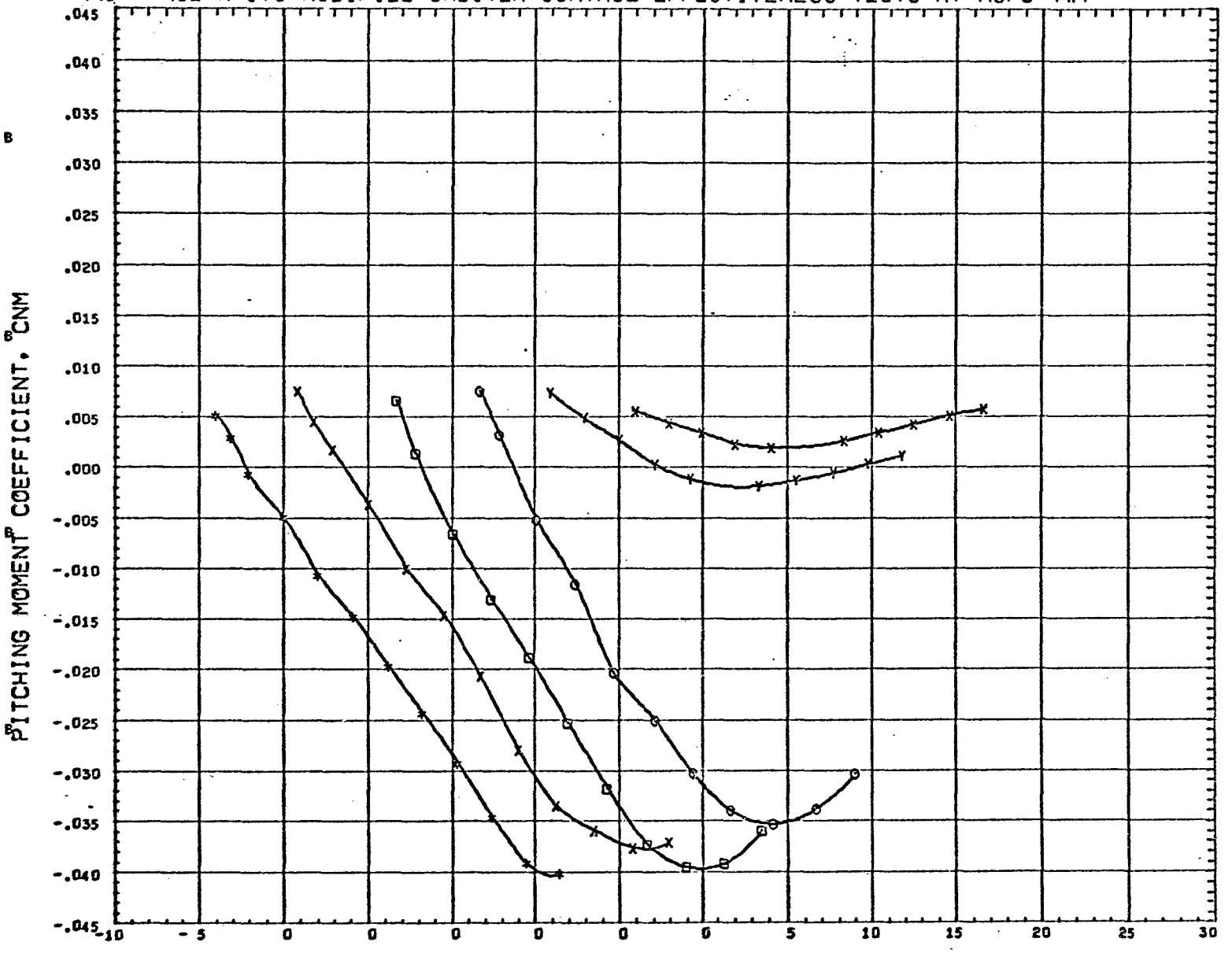


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
⊡	1.199				
⊙	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

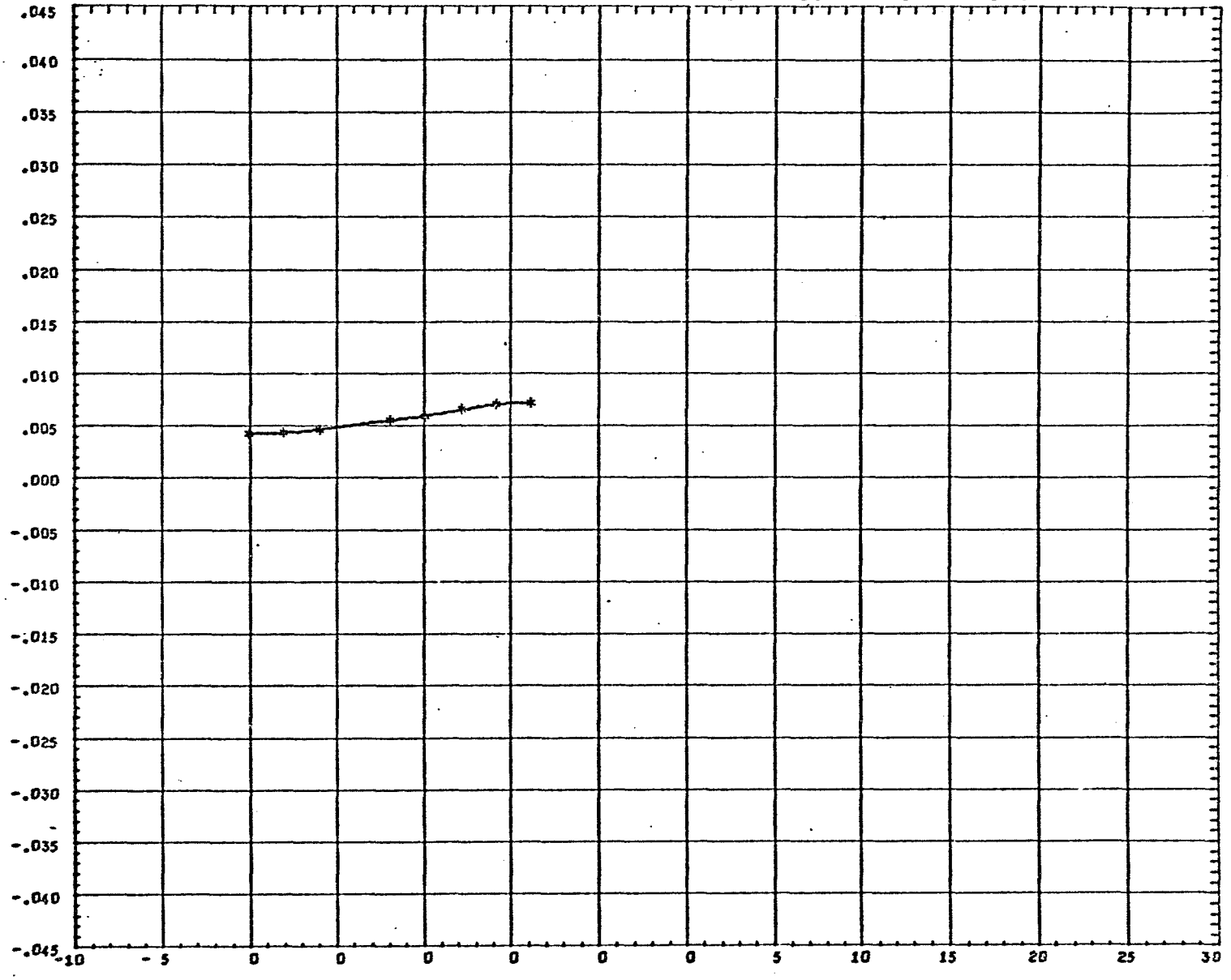
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000
x	0.798	RUDDER	0.000		
G	0.896				
O	1.199				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

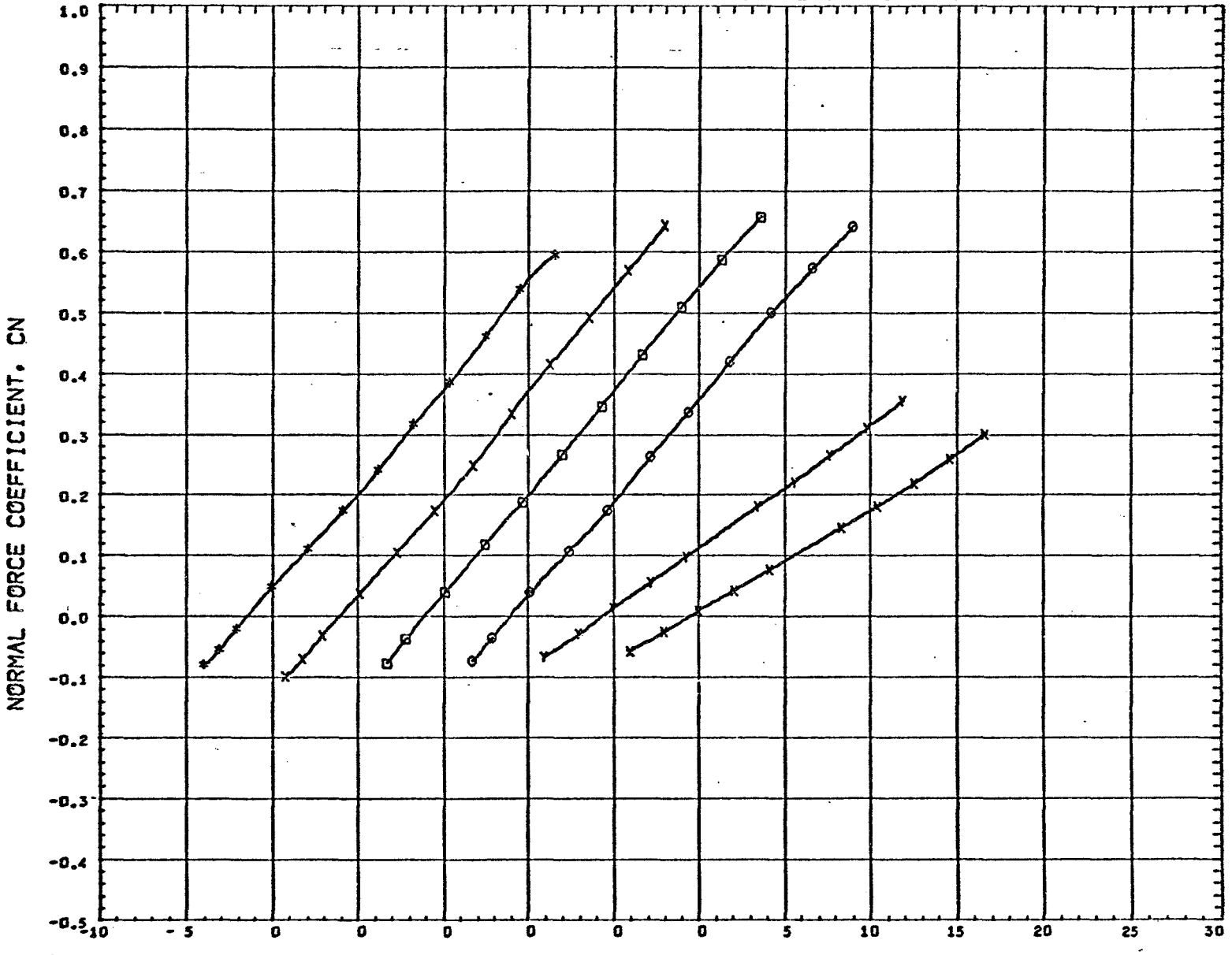


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

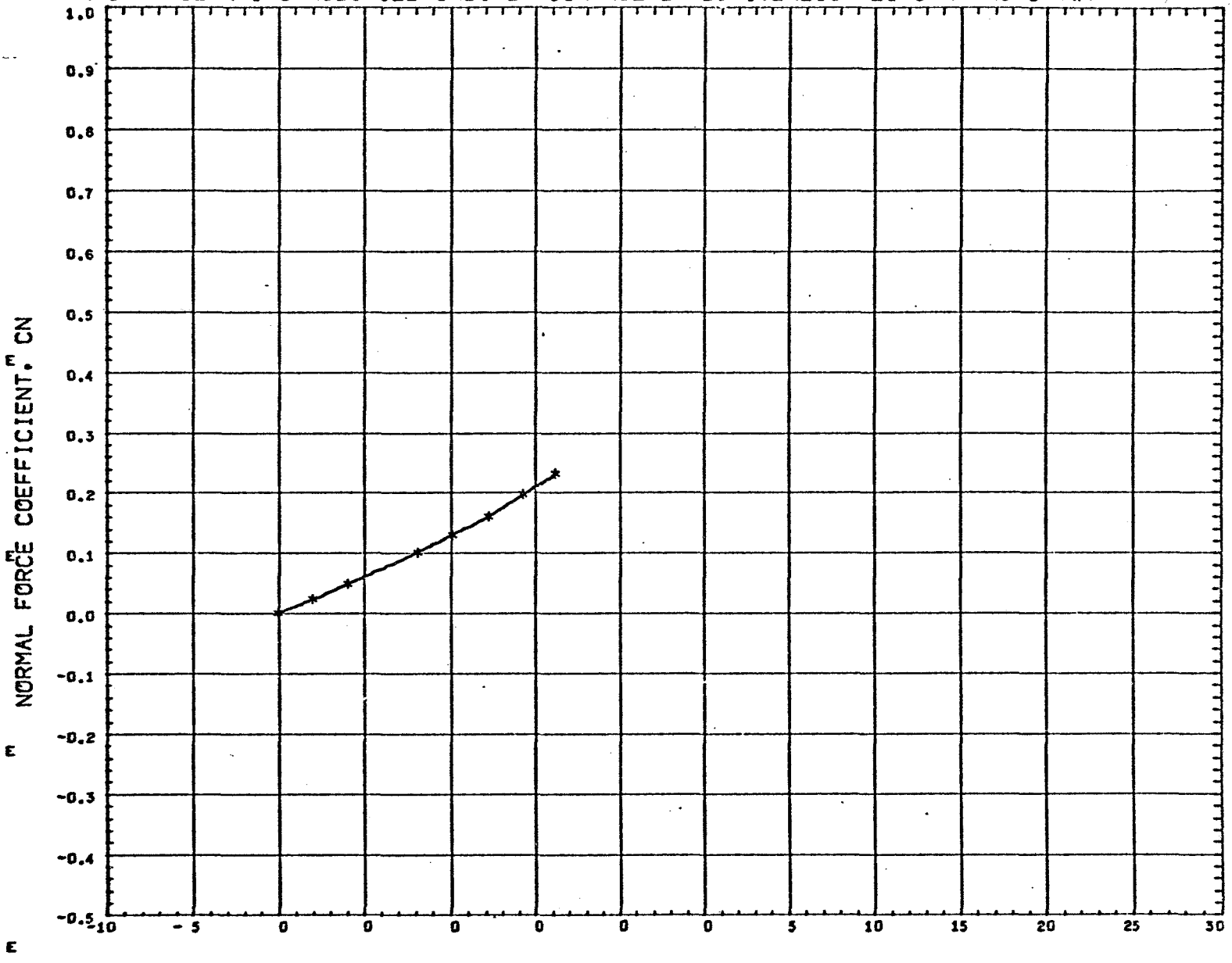
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000
X	0.798	RUDDER	0.000		
G	0.996				
G	1.199				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

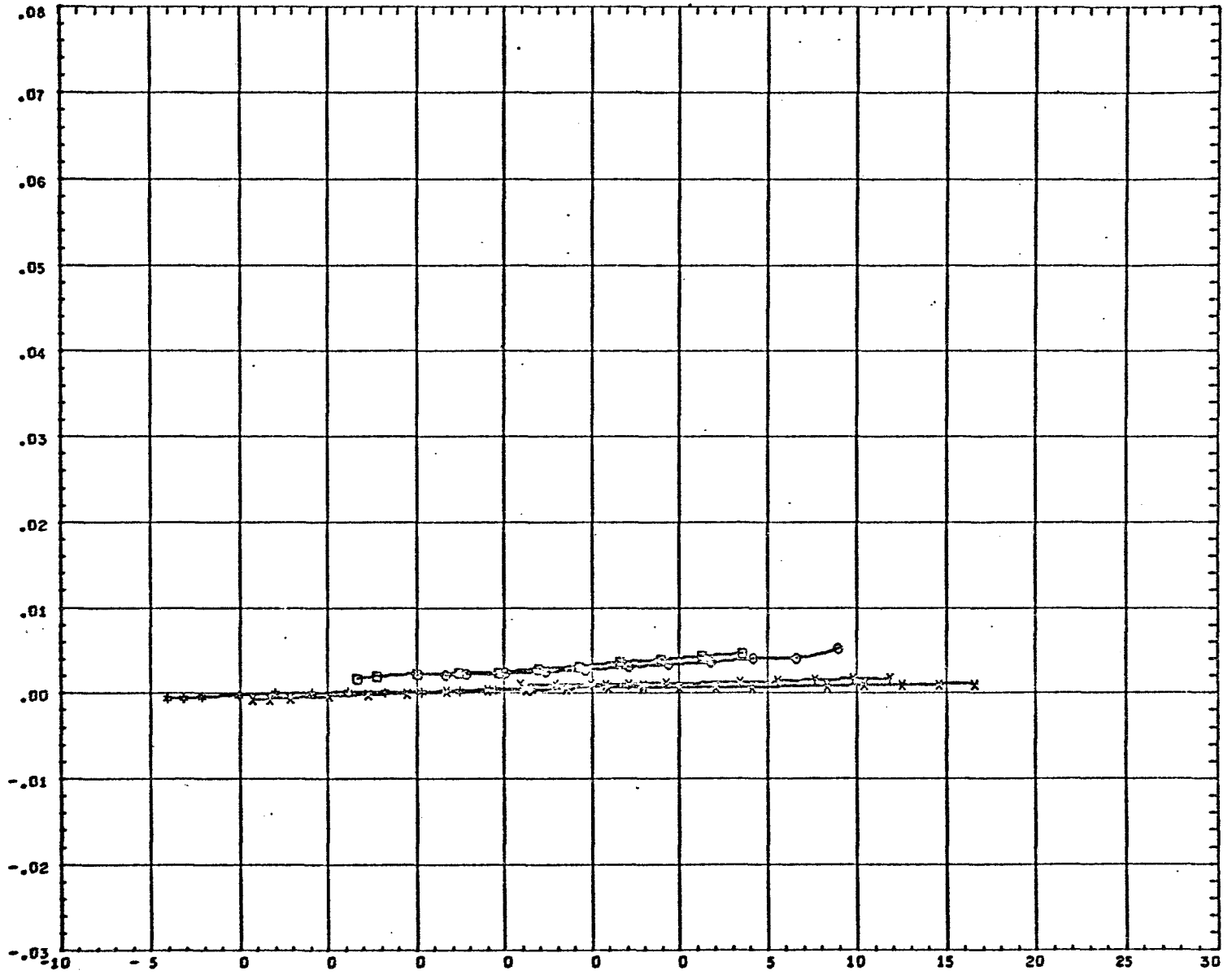


SYMBOL	MACH		PARAMETRIC VALUES		
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

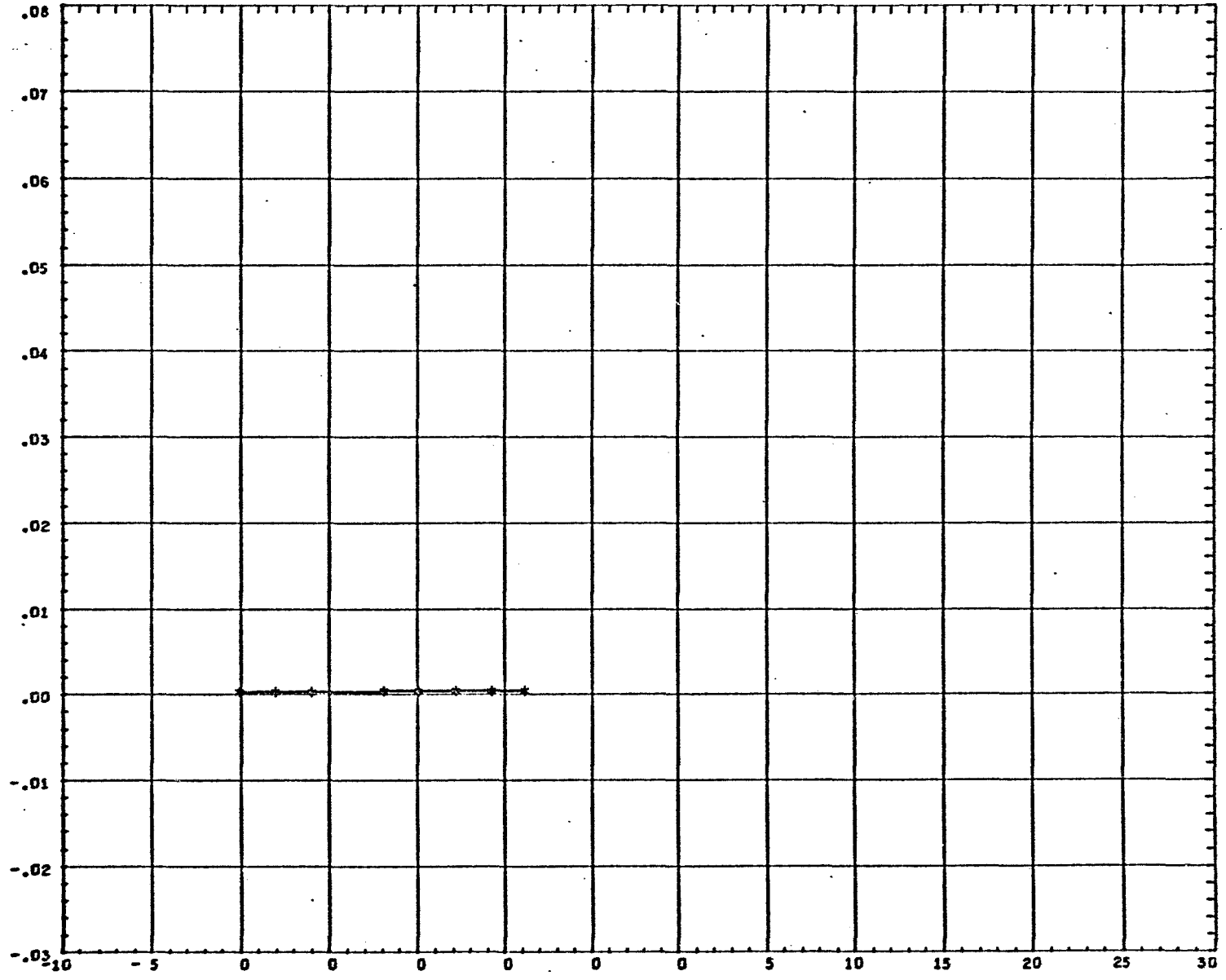
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000
X	0.798	RUDDER	0.000		
G	0.996				
O	1.199				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

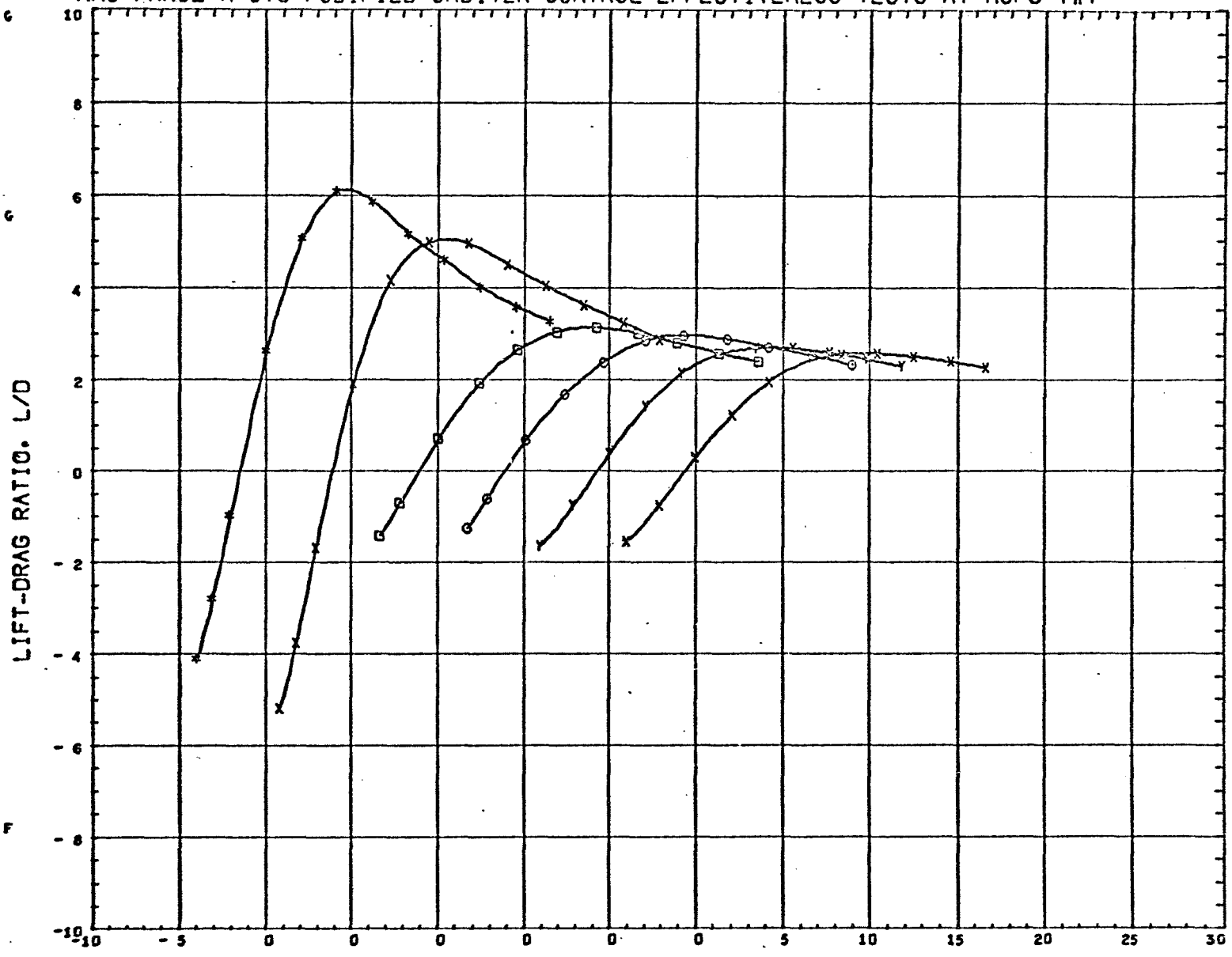


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

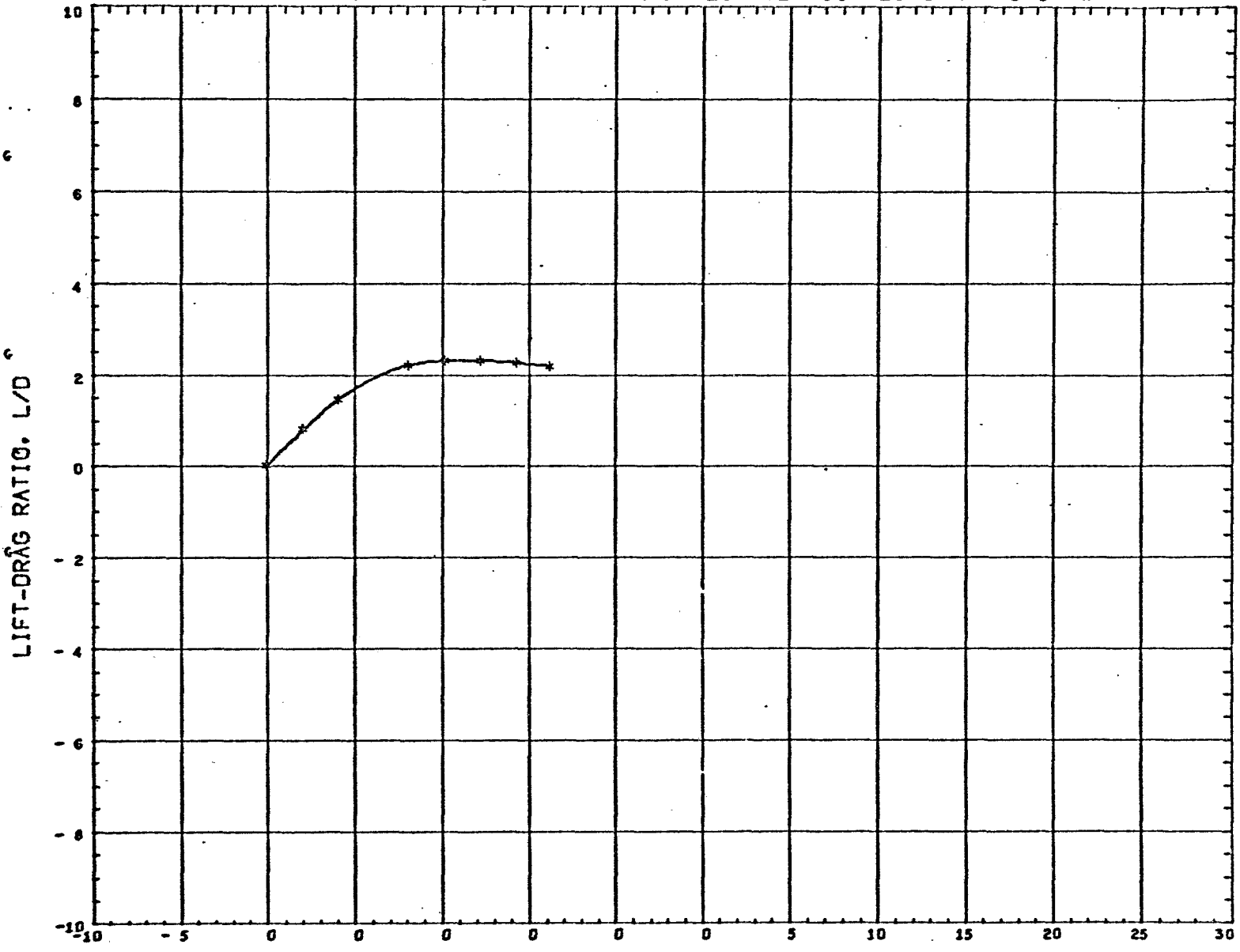
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000
X	0.798	RUDDER	0.000		
⊡	0.996				
⊕	1.199				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

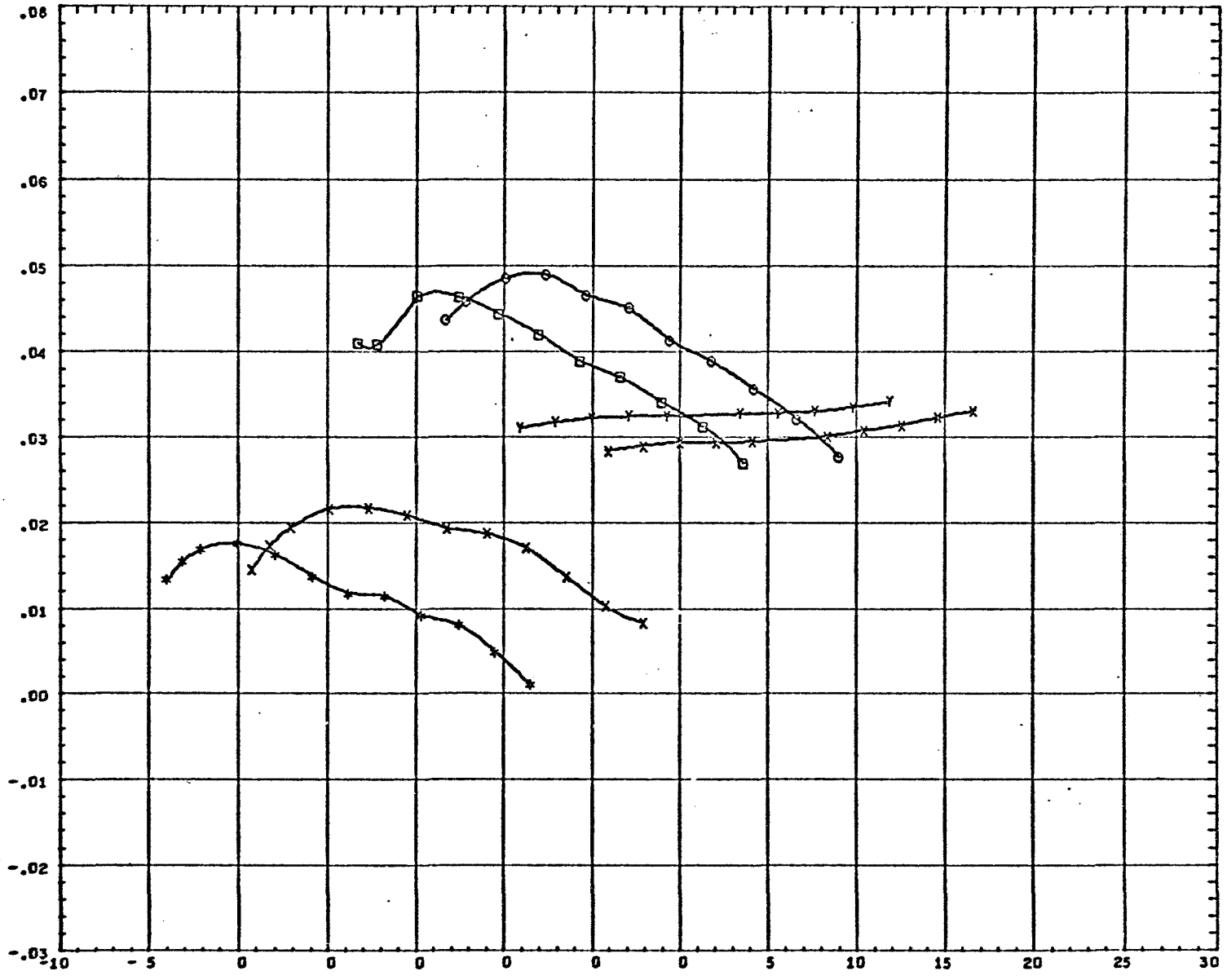


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



FOREBODY AXIAL FORCE COEFFICIENT, CAFORE

ANGLE OF ATTACK, ALPHA DEGREES

SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000
x	0.798	RUDDER	0.000		
⊡	0.996				
⊕	1.199				
▽	2.740				
N x	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
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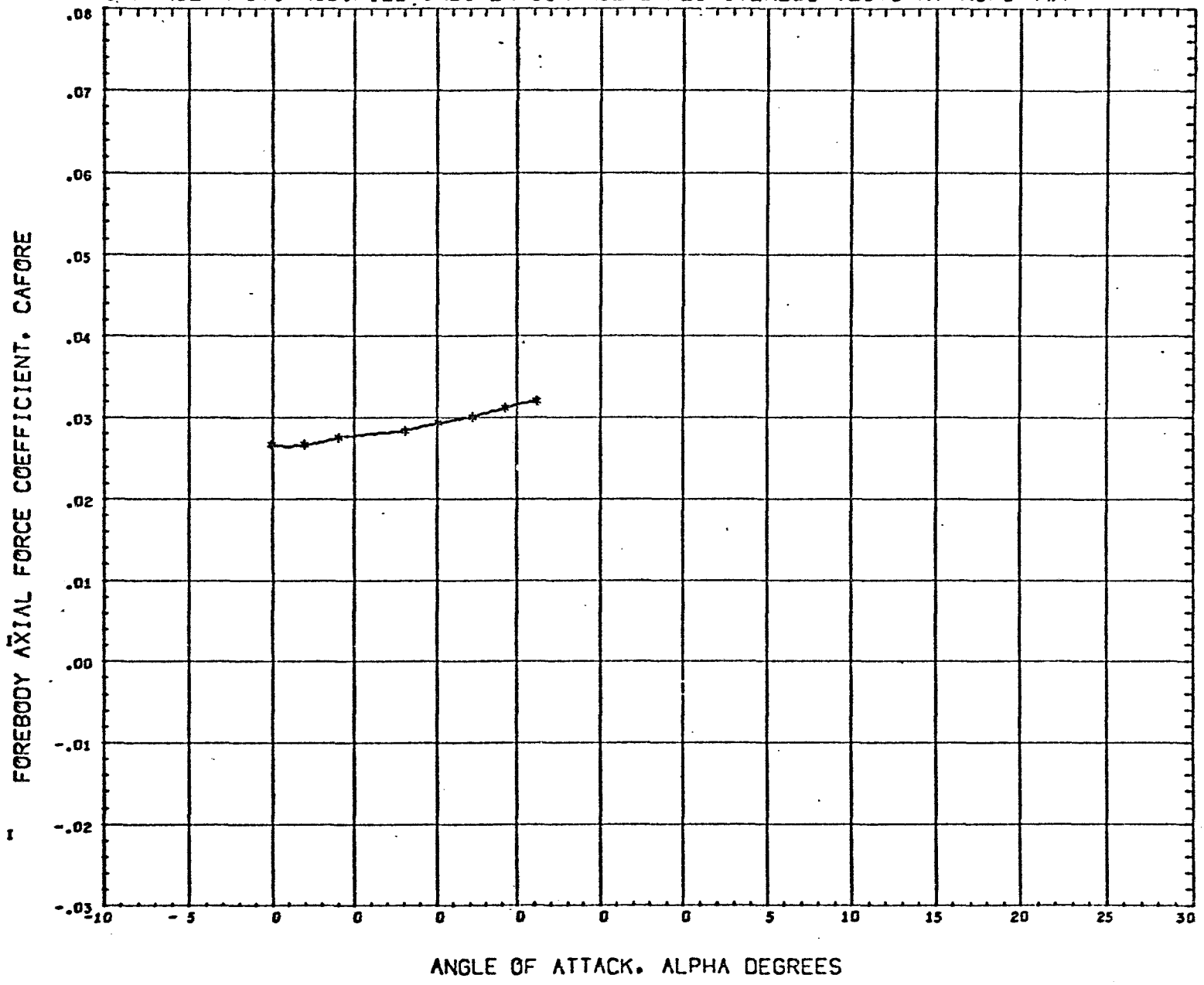
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

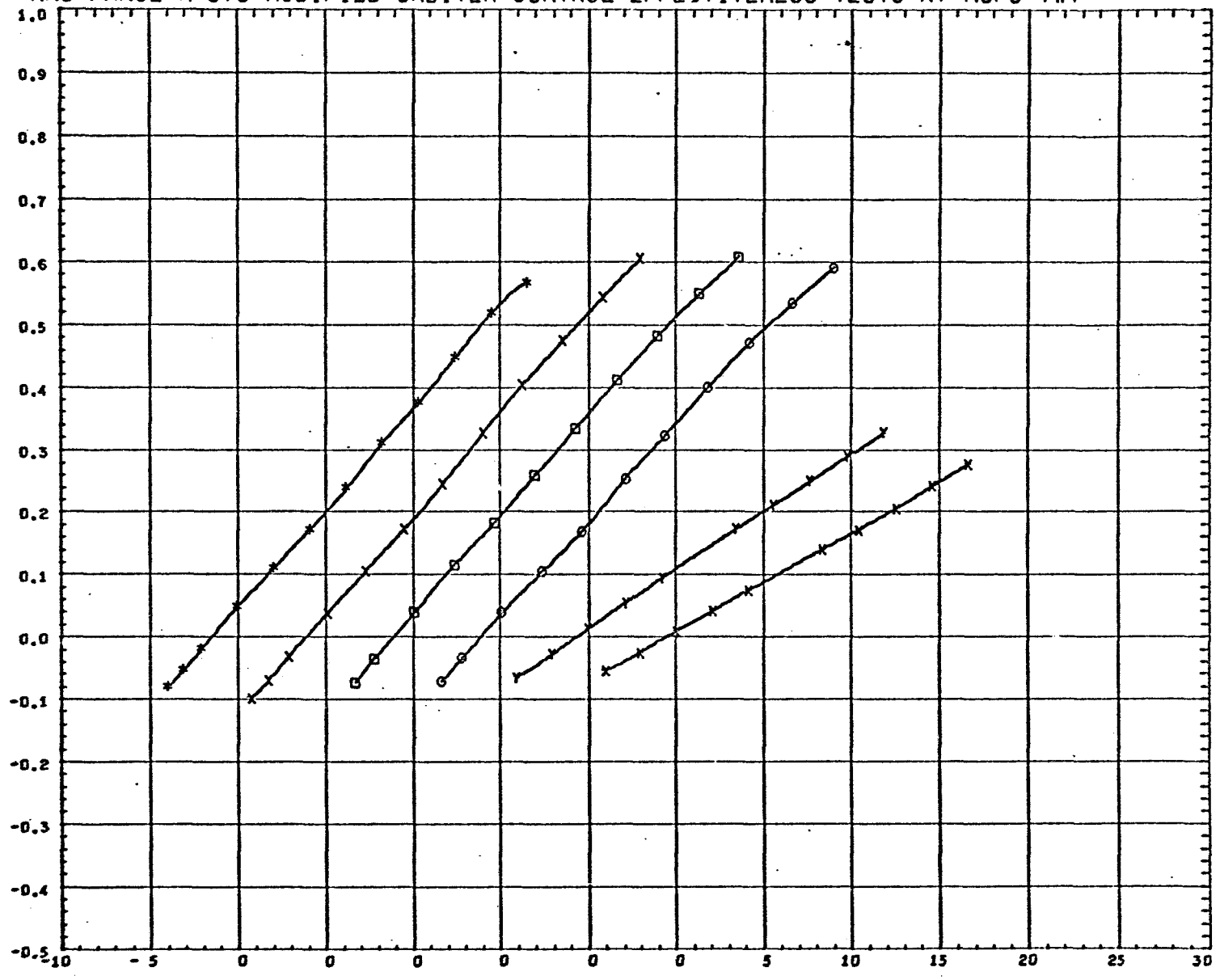


SYMBOL	MACH		PARAMETRIC VALUES		
*	4.960	BETA	0.000	ELEVON	0.000
I		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

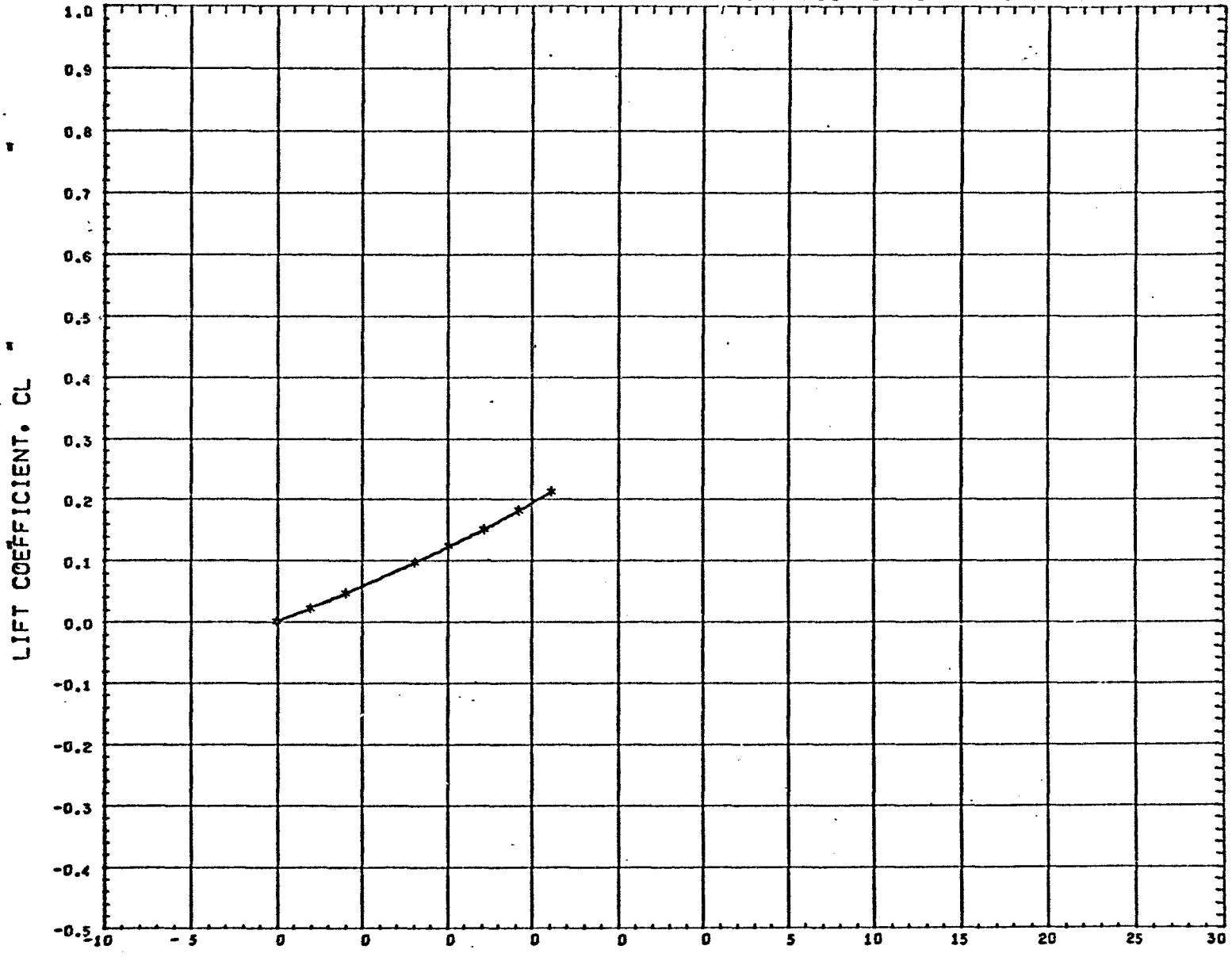
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000
X	0.798	RUDDER	0.000		
⊡	0.996				
⊙	1.199				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

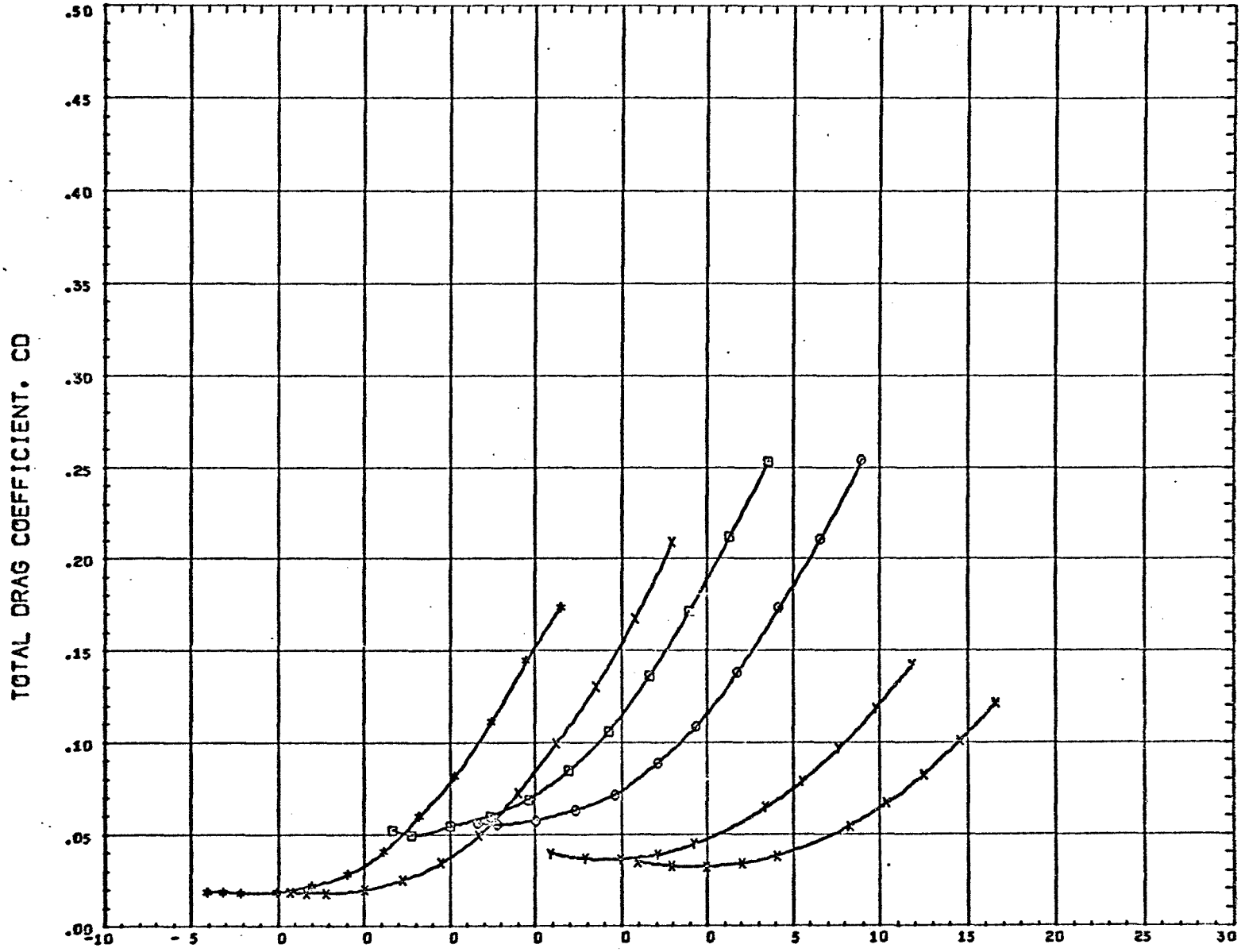


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

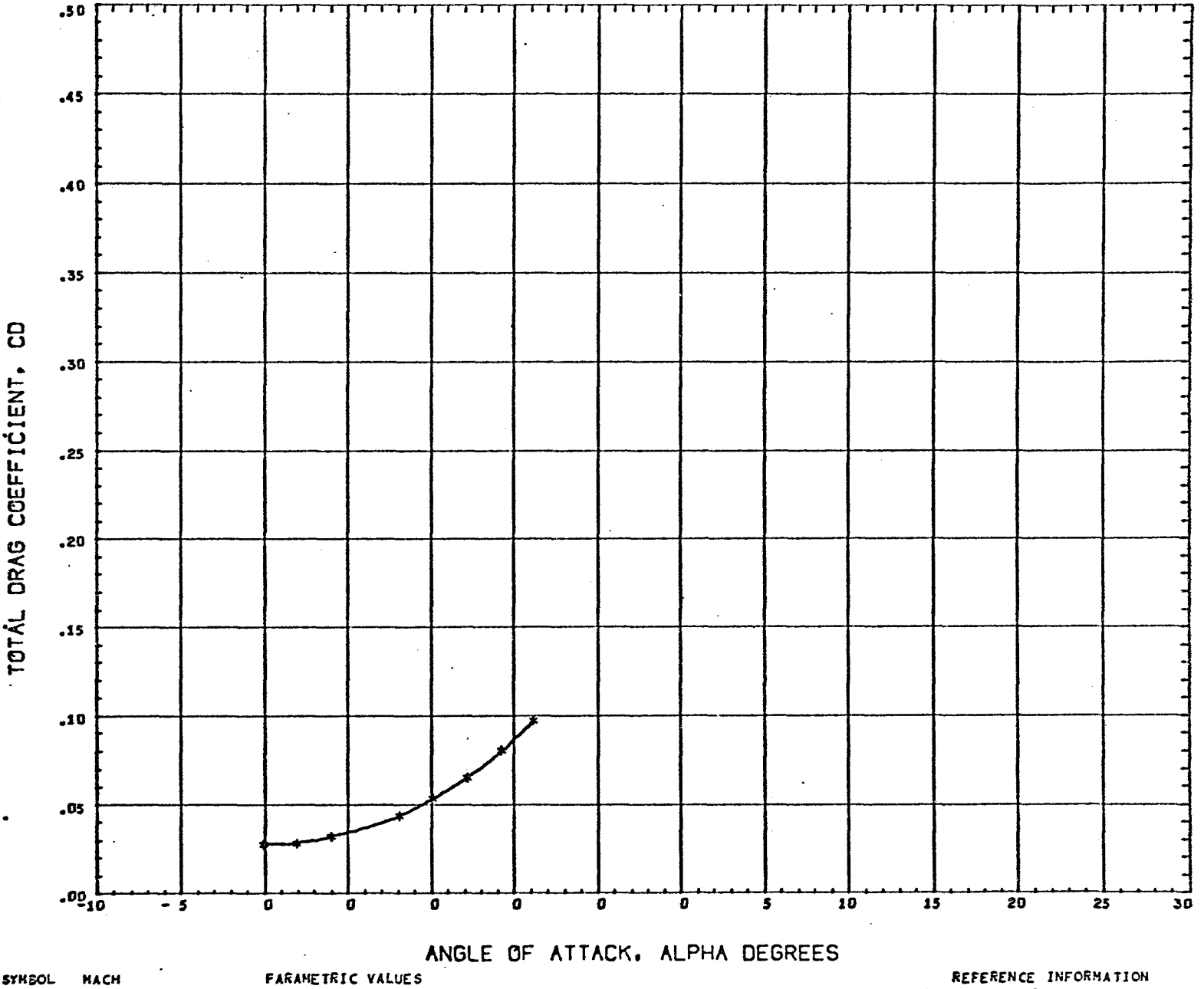
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000
X	0.798	RUDDER	0.000		
⊡	0.996				
⊕	1.199				
Y	2.740				
⊠	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

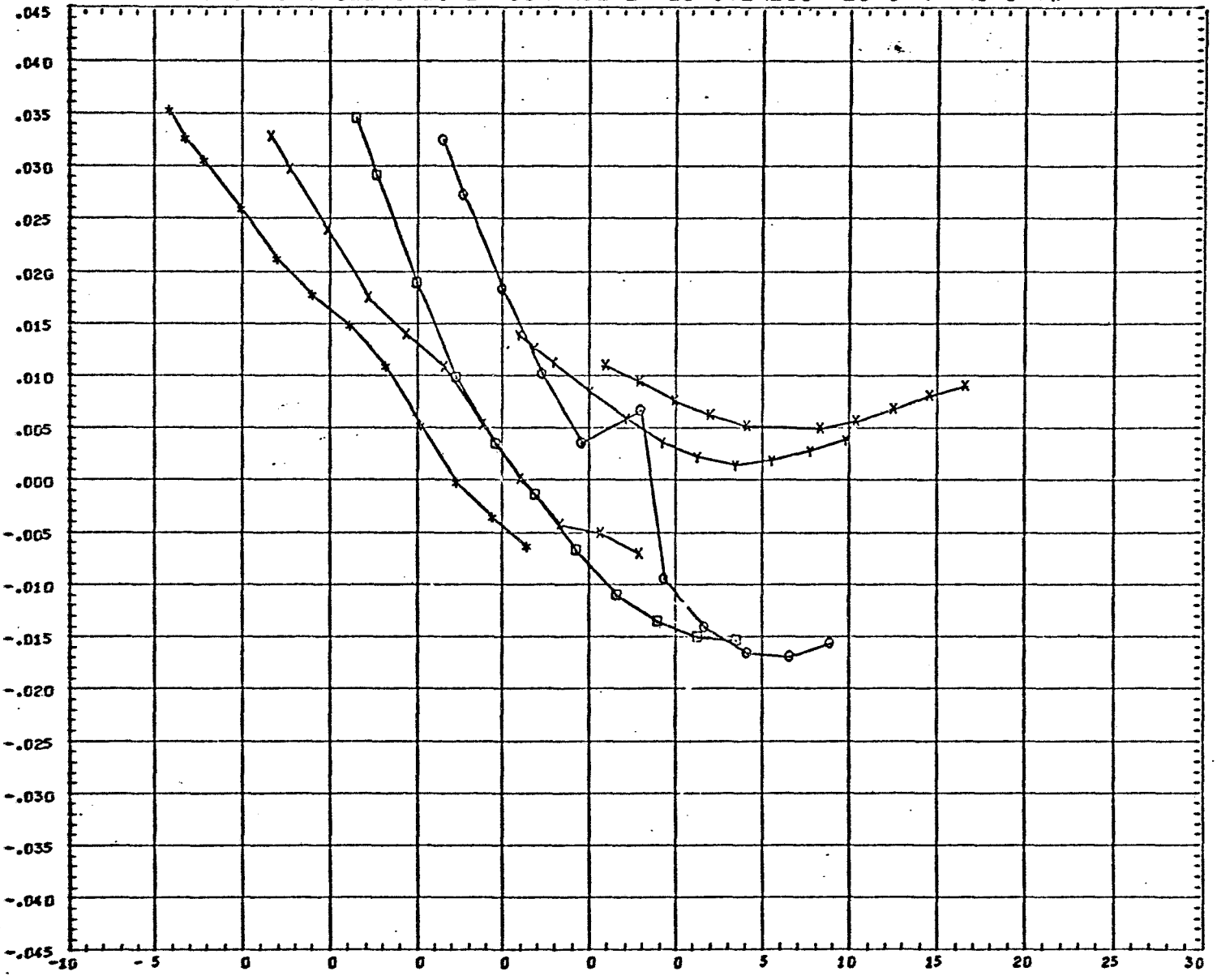


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

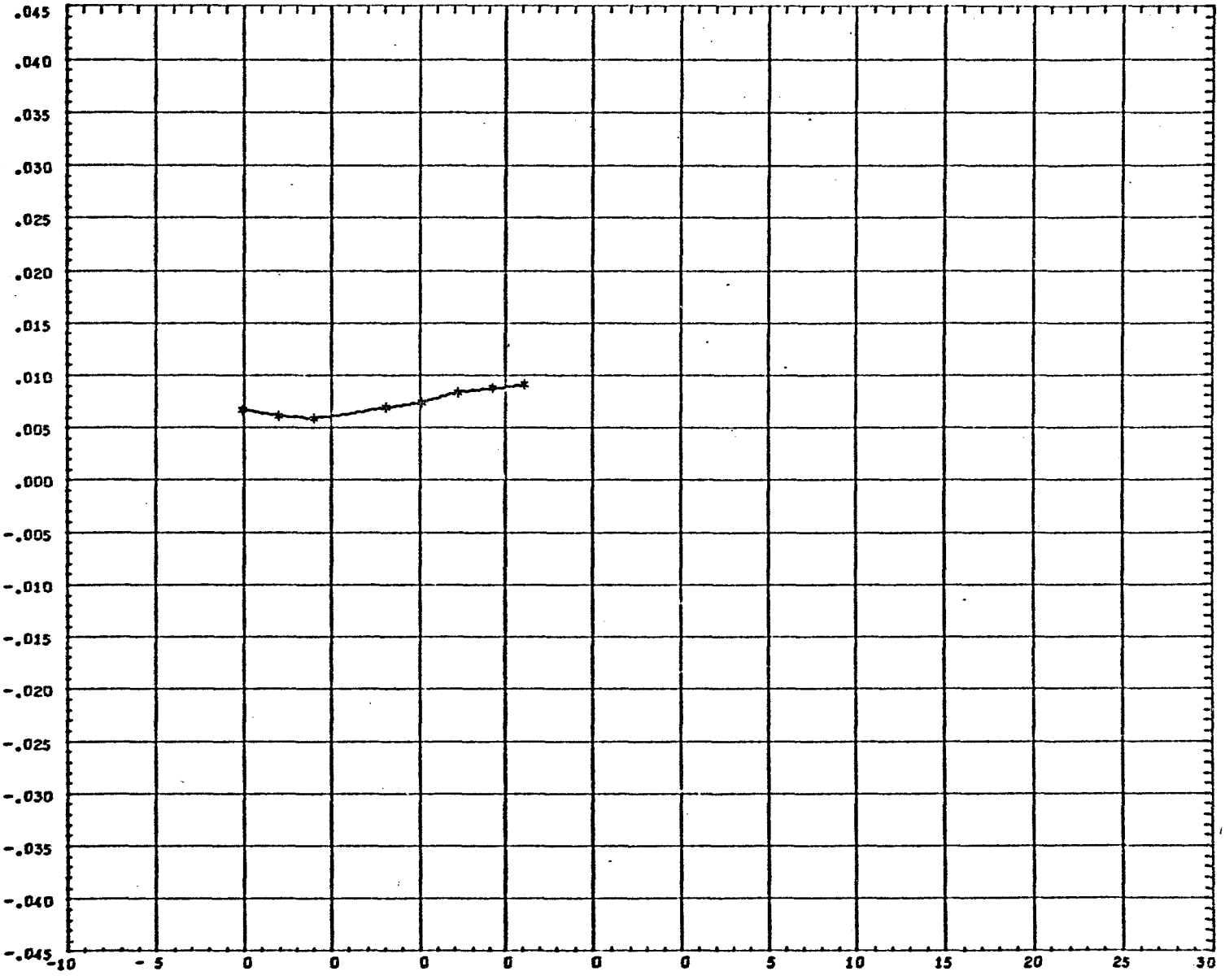
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
□	0.997				
◇	1.211				
▽	2.740				
⊠	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

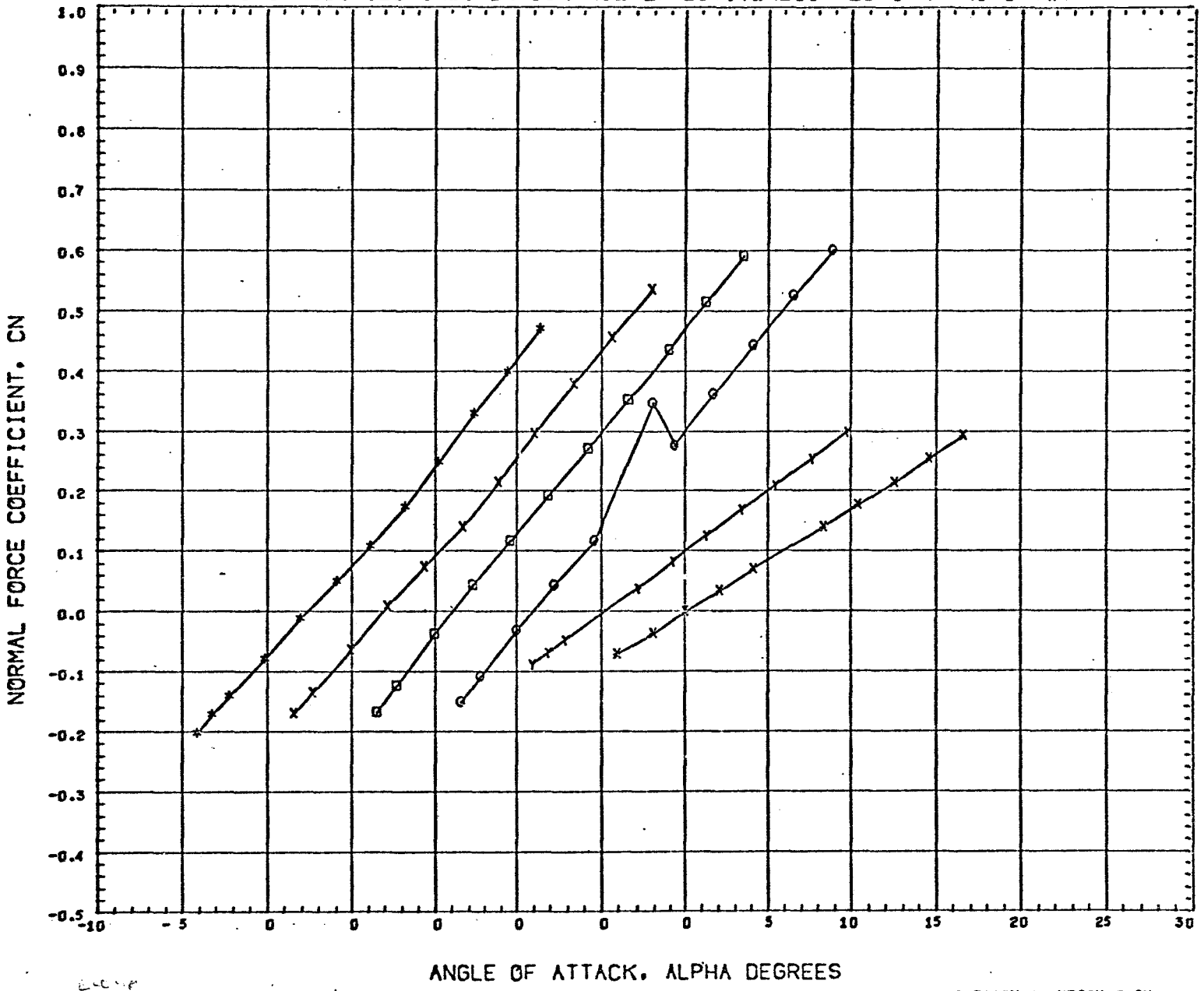


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

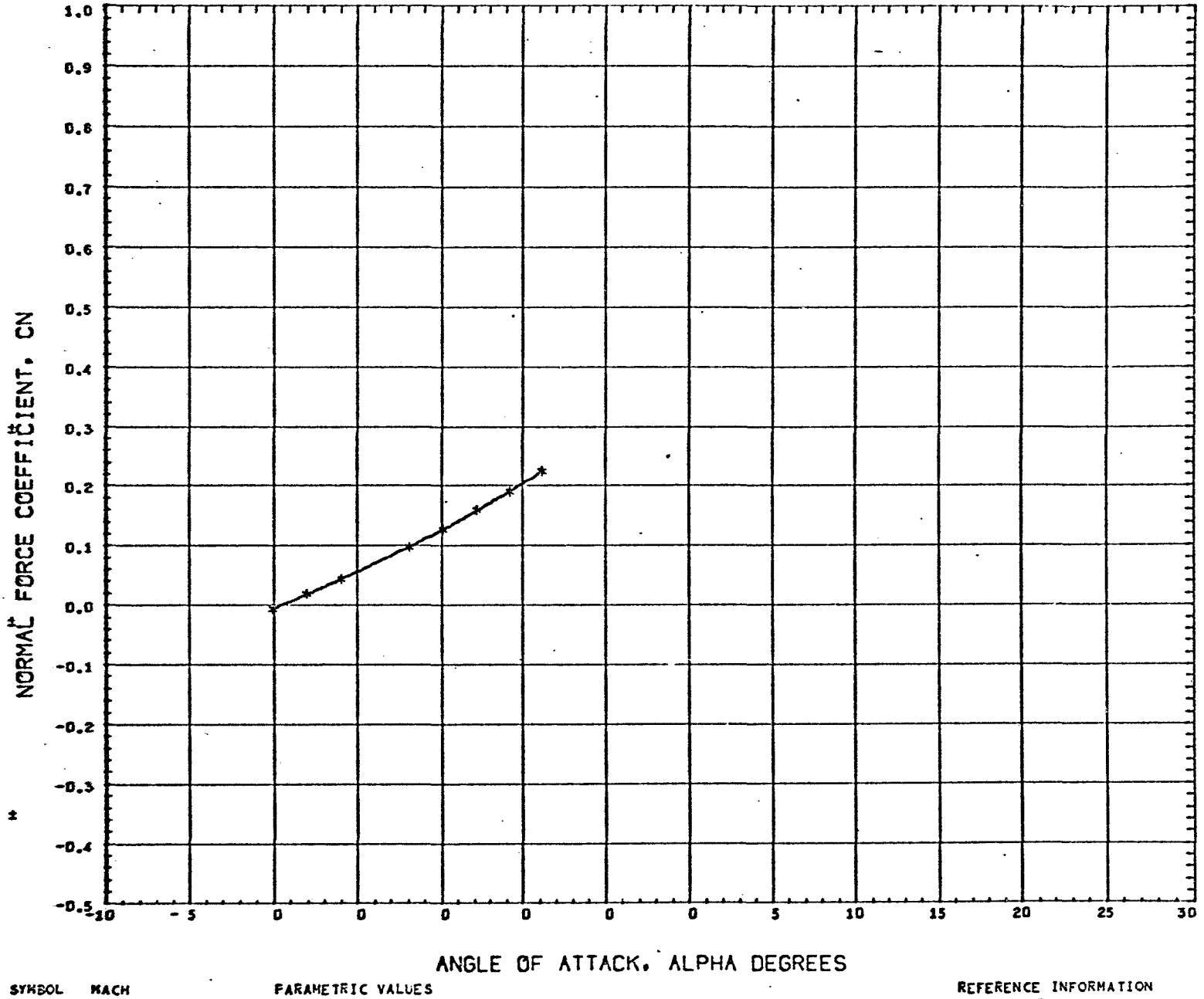
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
□	0.997				
○	1.211				
Y	2.740				
✕	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

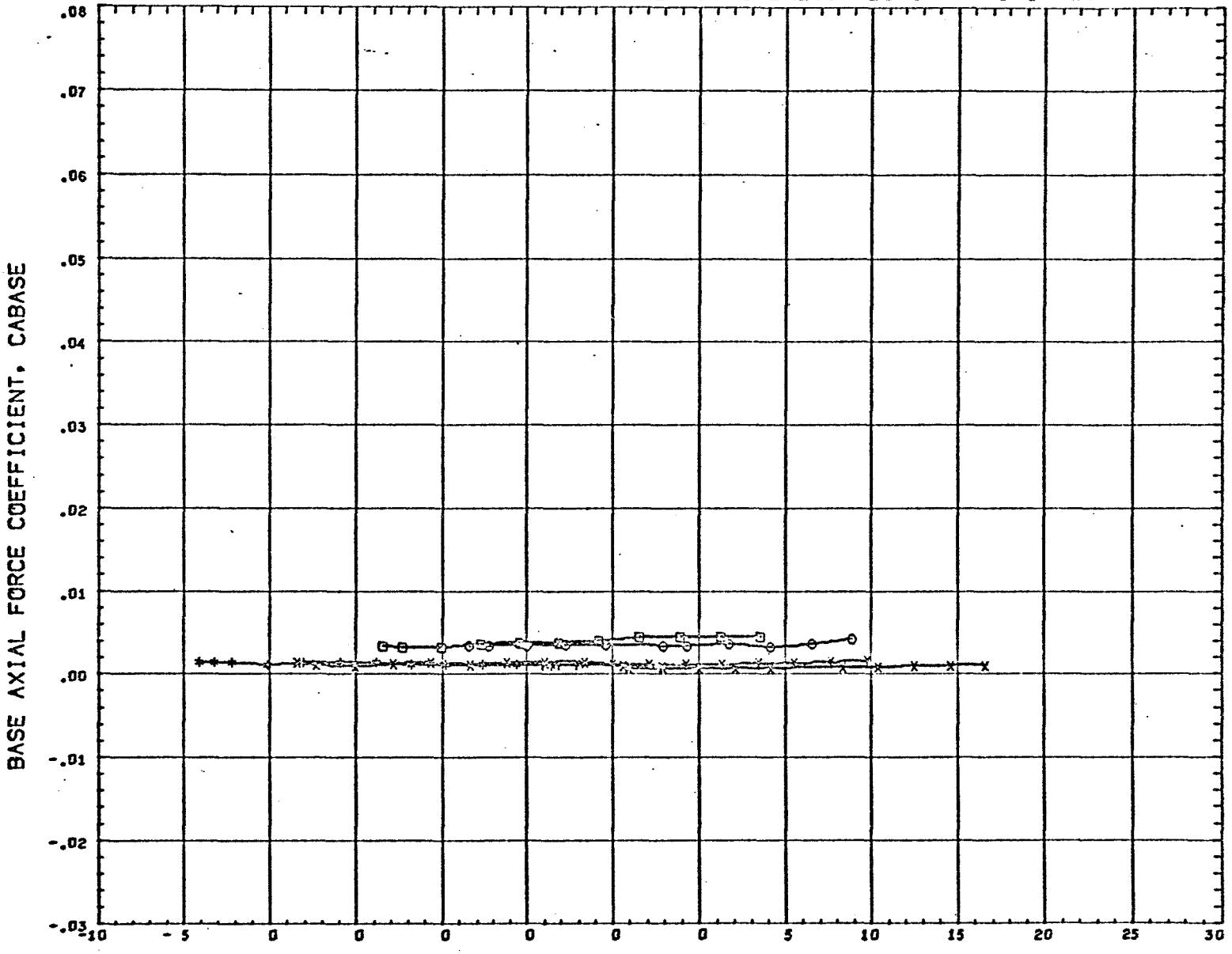


SYMBOL	MACH	PARAMETRIC VALUES			
± *	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

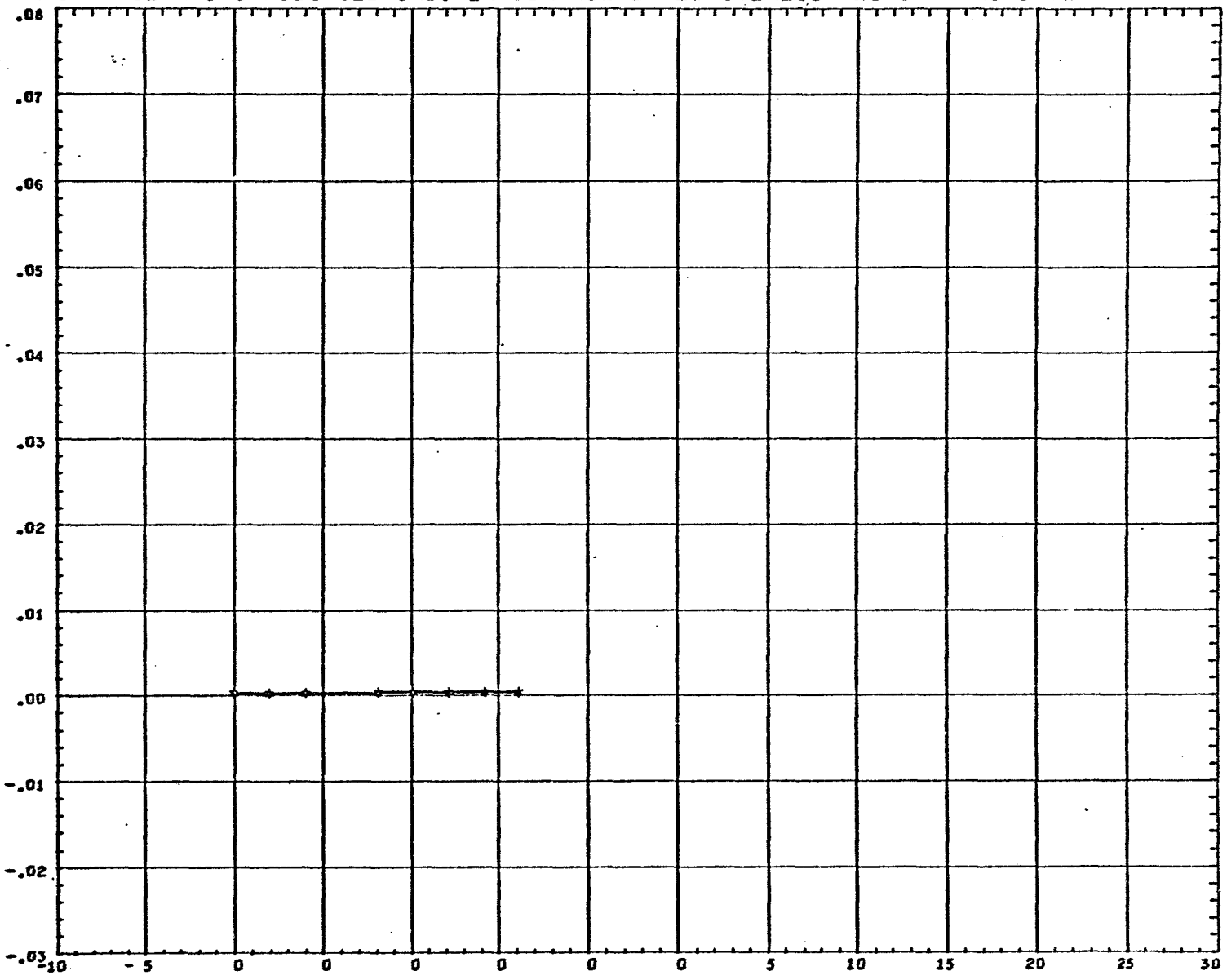
REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
*	0.398	BETA	0.000	ELEVON	- 15.000	REFS	0.116	SQ.FT.
X	0.797	RUDDER	0.000			REFL	0.646	FT.
⊞	0.997					REFB	0.495	FT.
⊙	1.211					XMRP	0.406	
▼	2.740					YMRP	0.000	
⊠	3.479	REFERENCE FILE.				ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

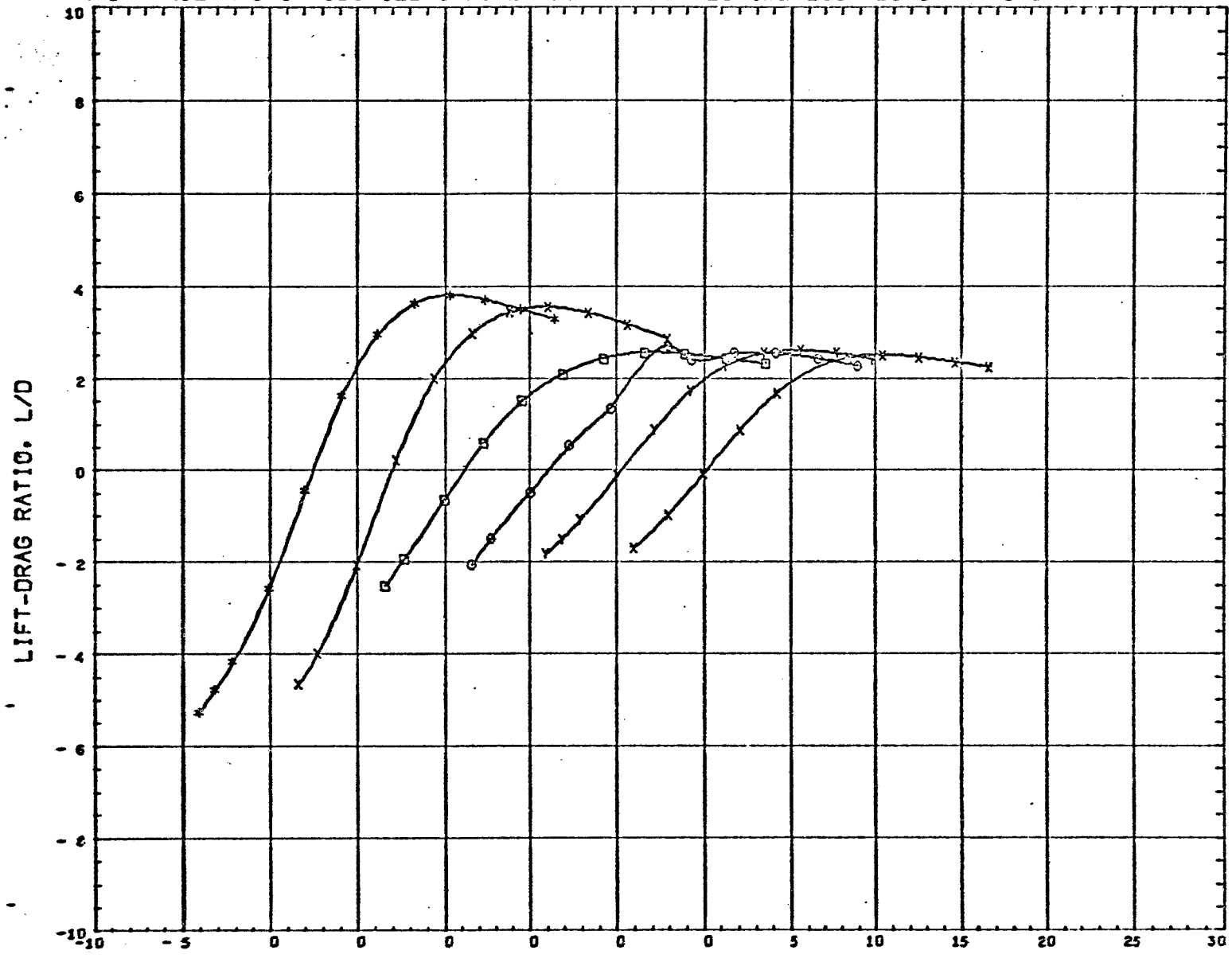


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

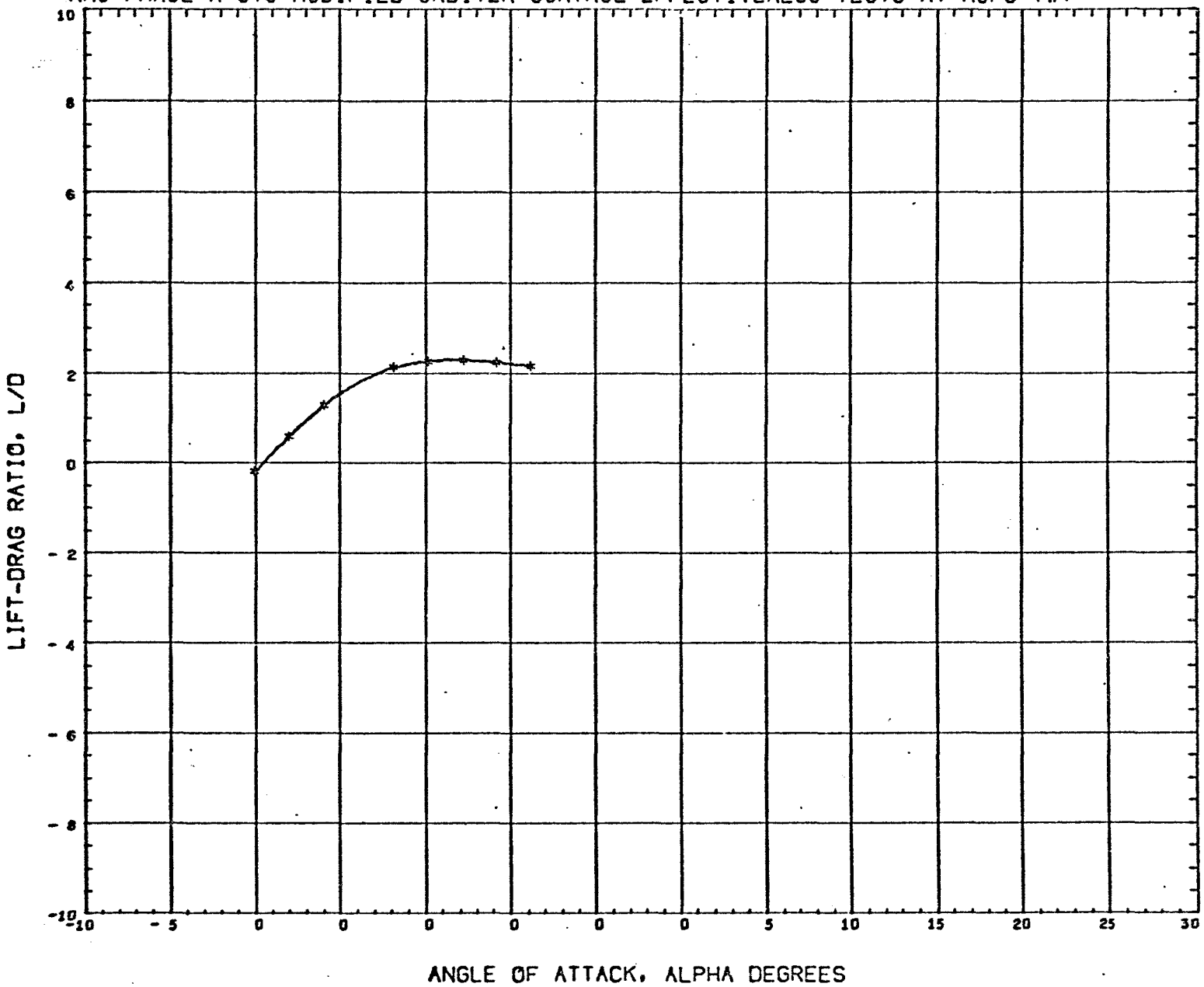
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
⊡	0.997				
⊙	1.211				
Y	2.740				
X	3.479	REFERENCE FILE.			

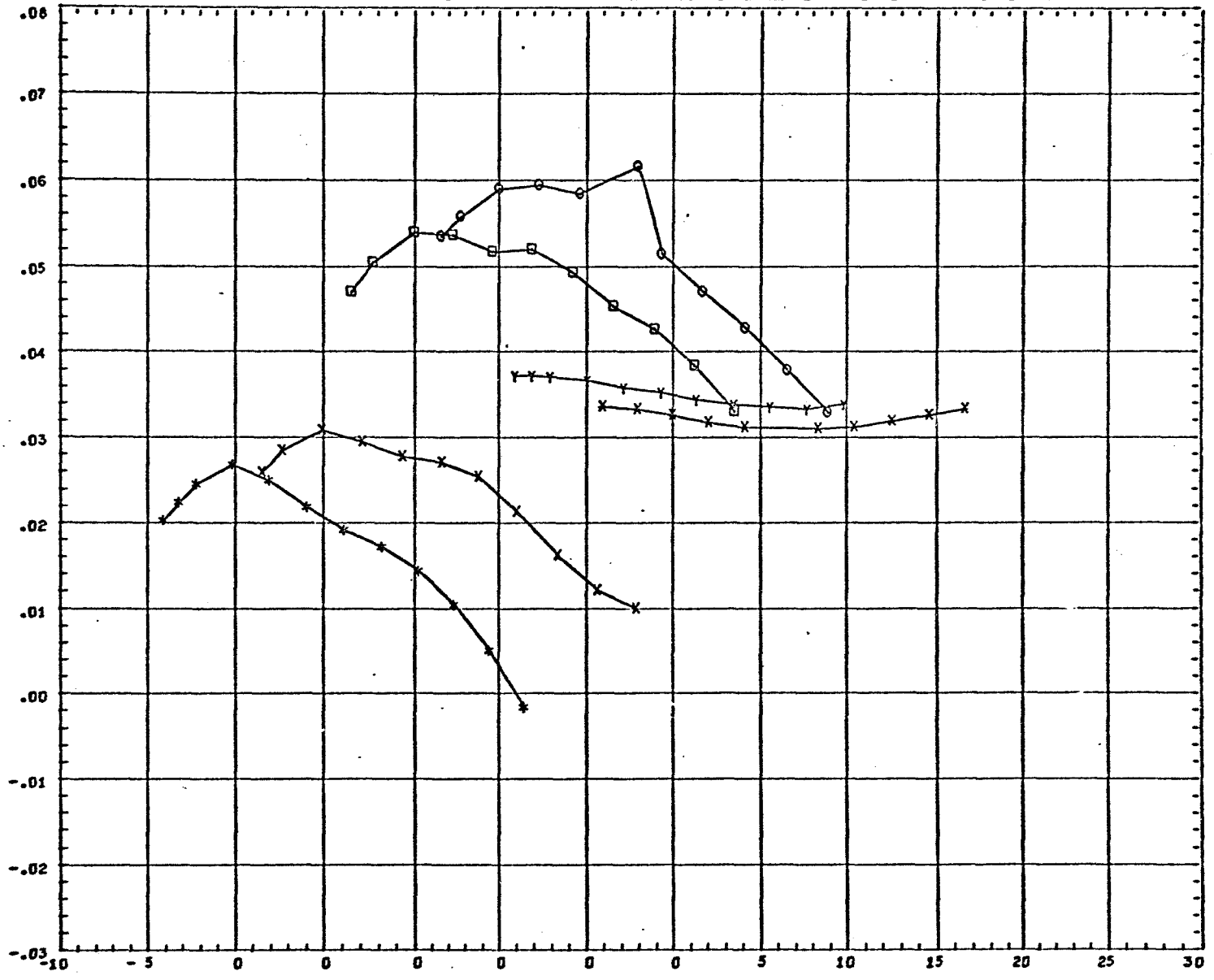
REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.456	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES			REFERENCE INFORMATION		
*	4.960	BETA	0.000	ELEVON	- 15.000	REFS	0.116	SQ.FT.
		RUDDER	0.000			REFL	0.646	FT.
						REFB	0.405	FT.
						XMRP	0.406	
						YMRP	0.000	
		REFERENCE FILE.				ZMRP	0.045	

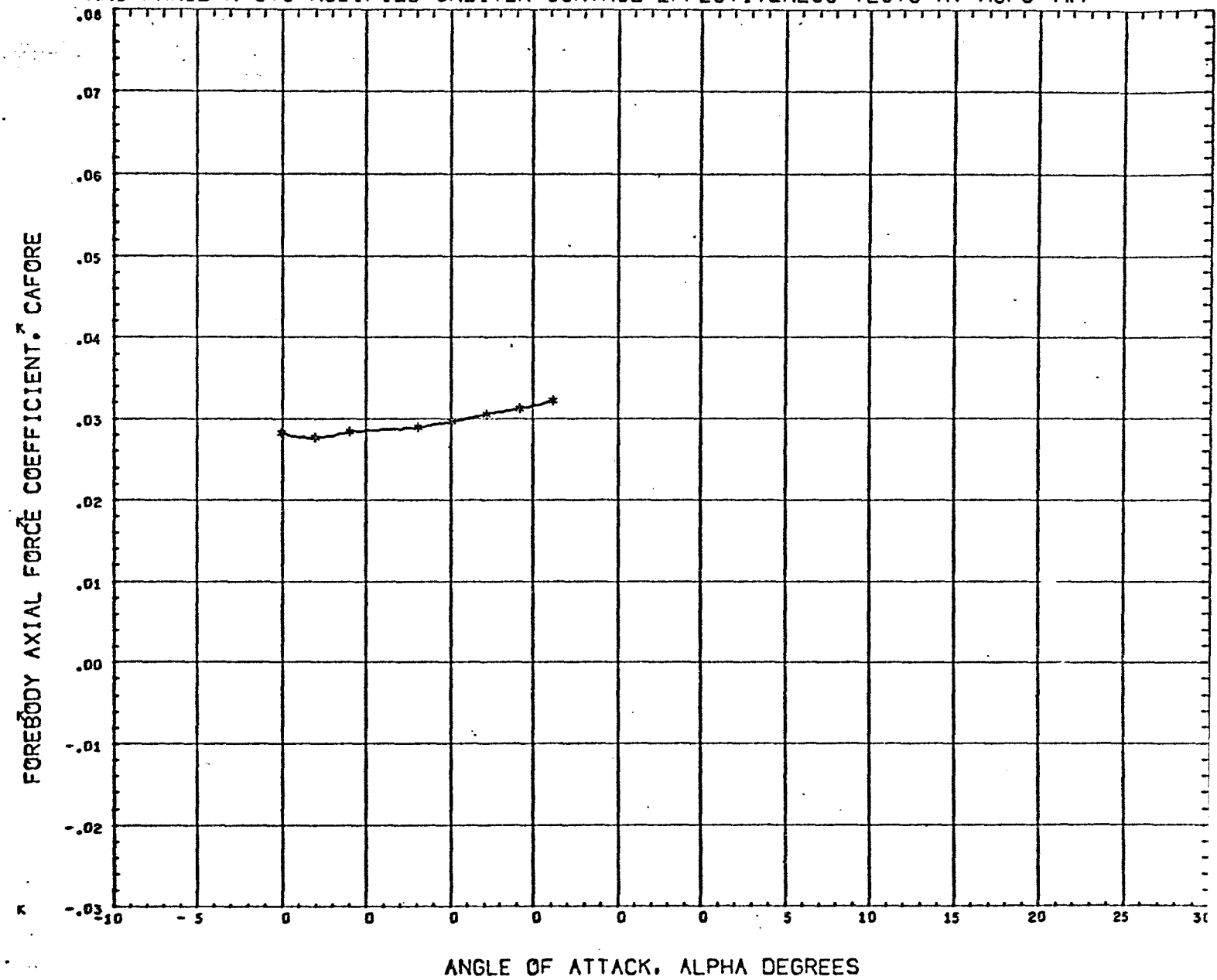
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
⊡	0.997				
⊙	1.211				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

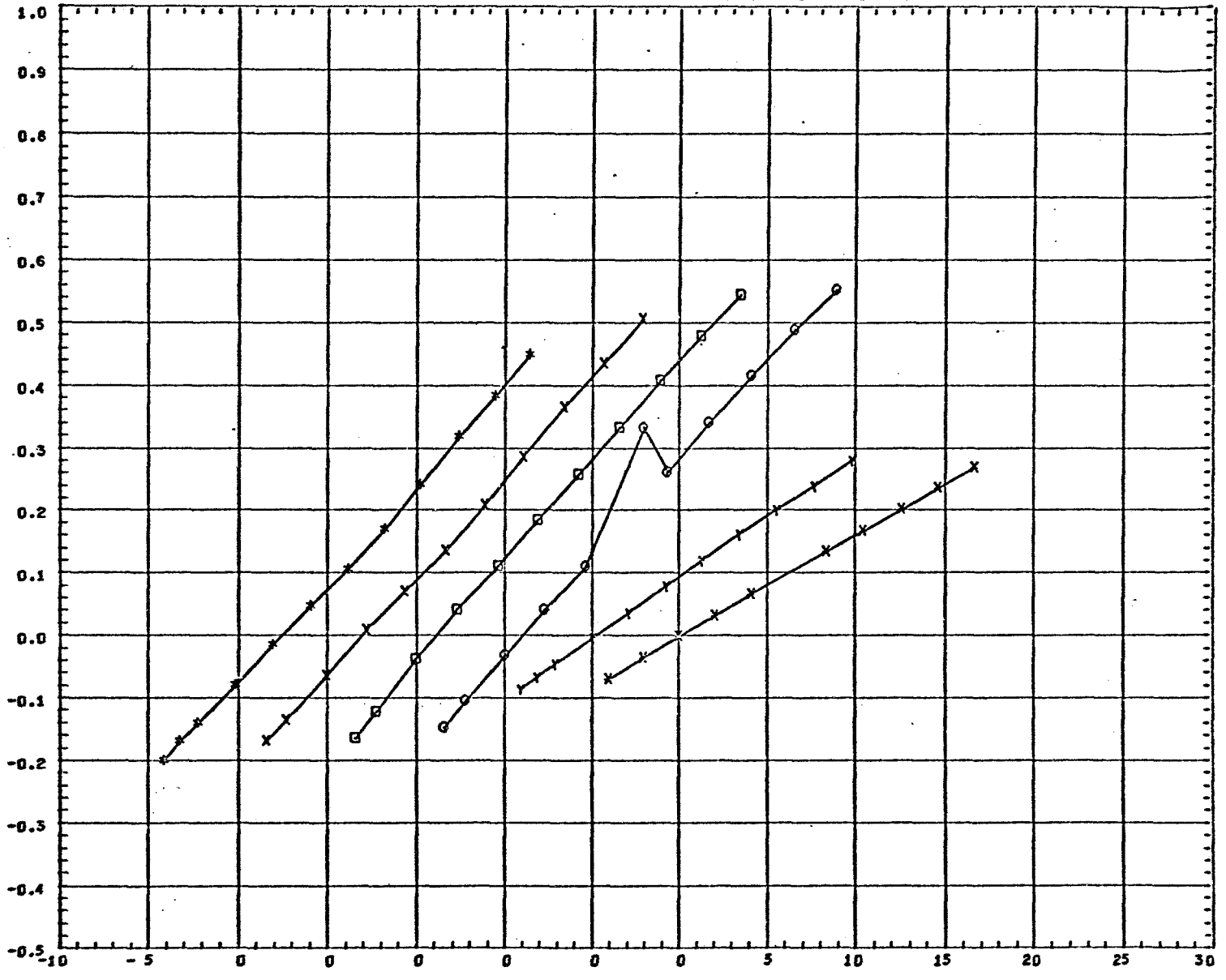


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	-15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

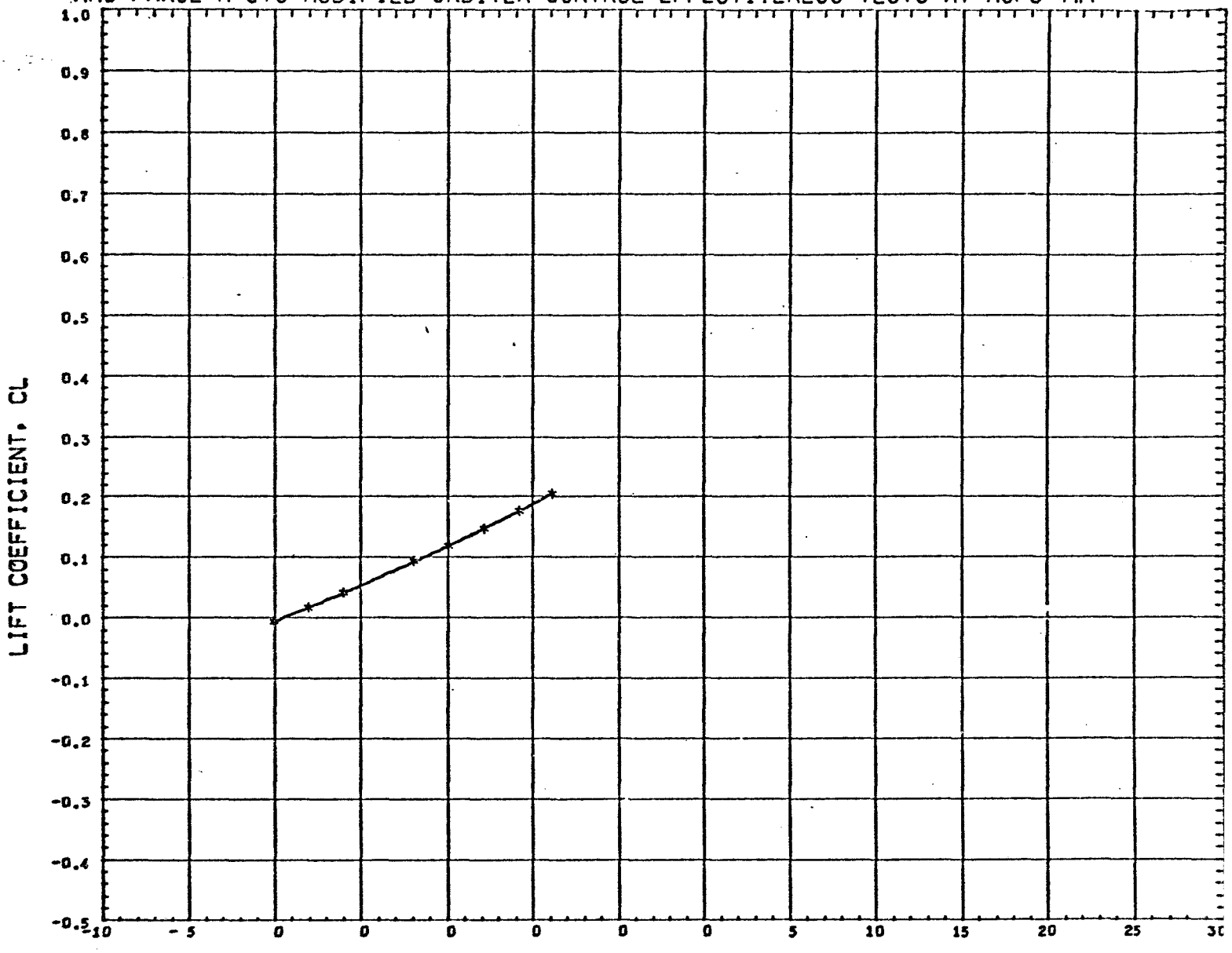
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
□	0.997				
◇	1.211				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

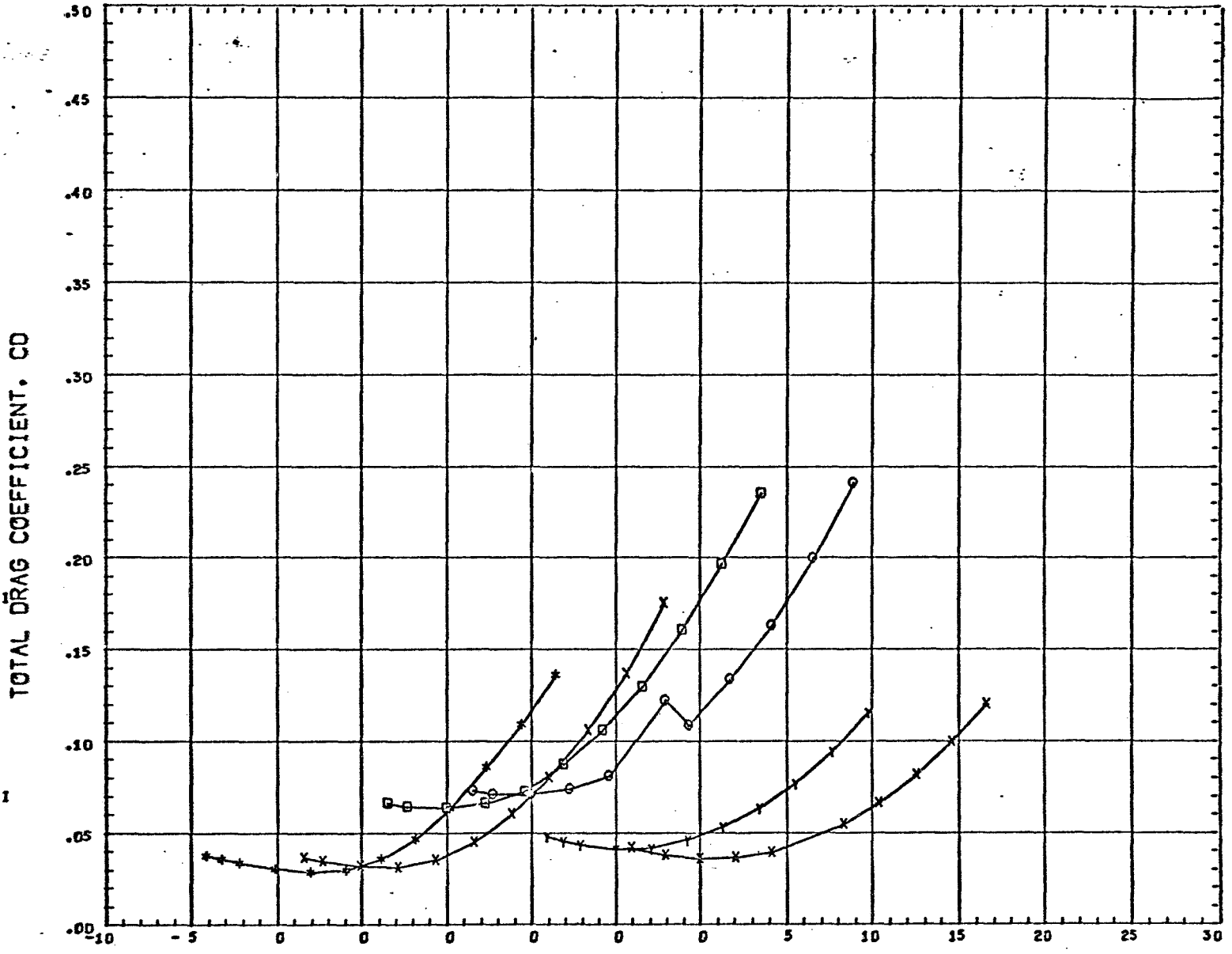


SYMBOL	MACH	PARAMETRIC VALUES			
●	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

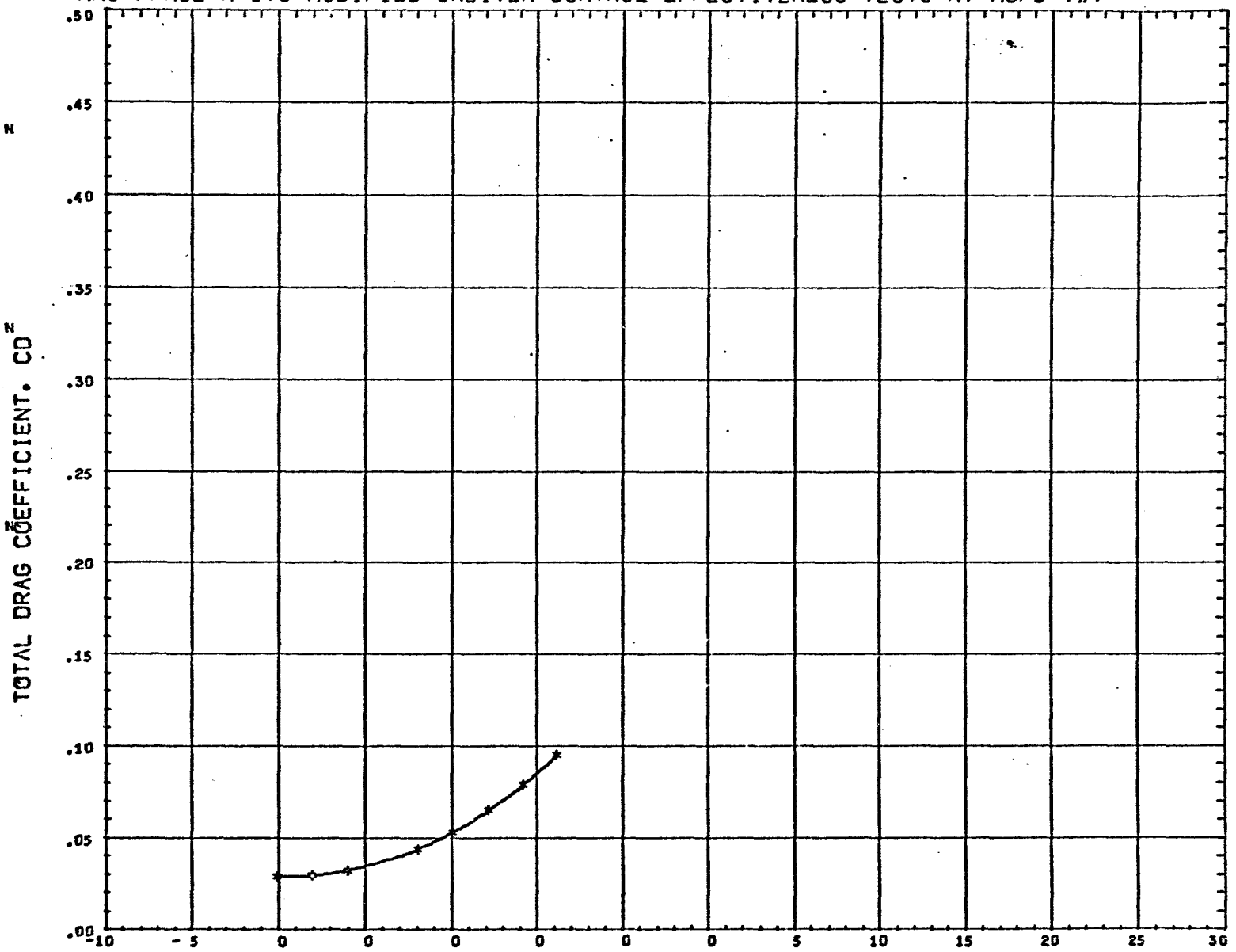
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
⊡	0.997				
⊙	1.211				
▽	2.740				
✱	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

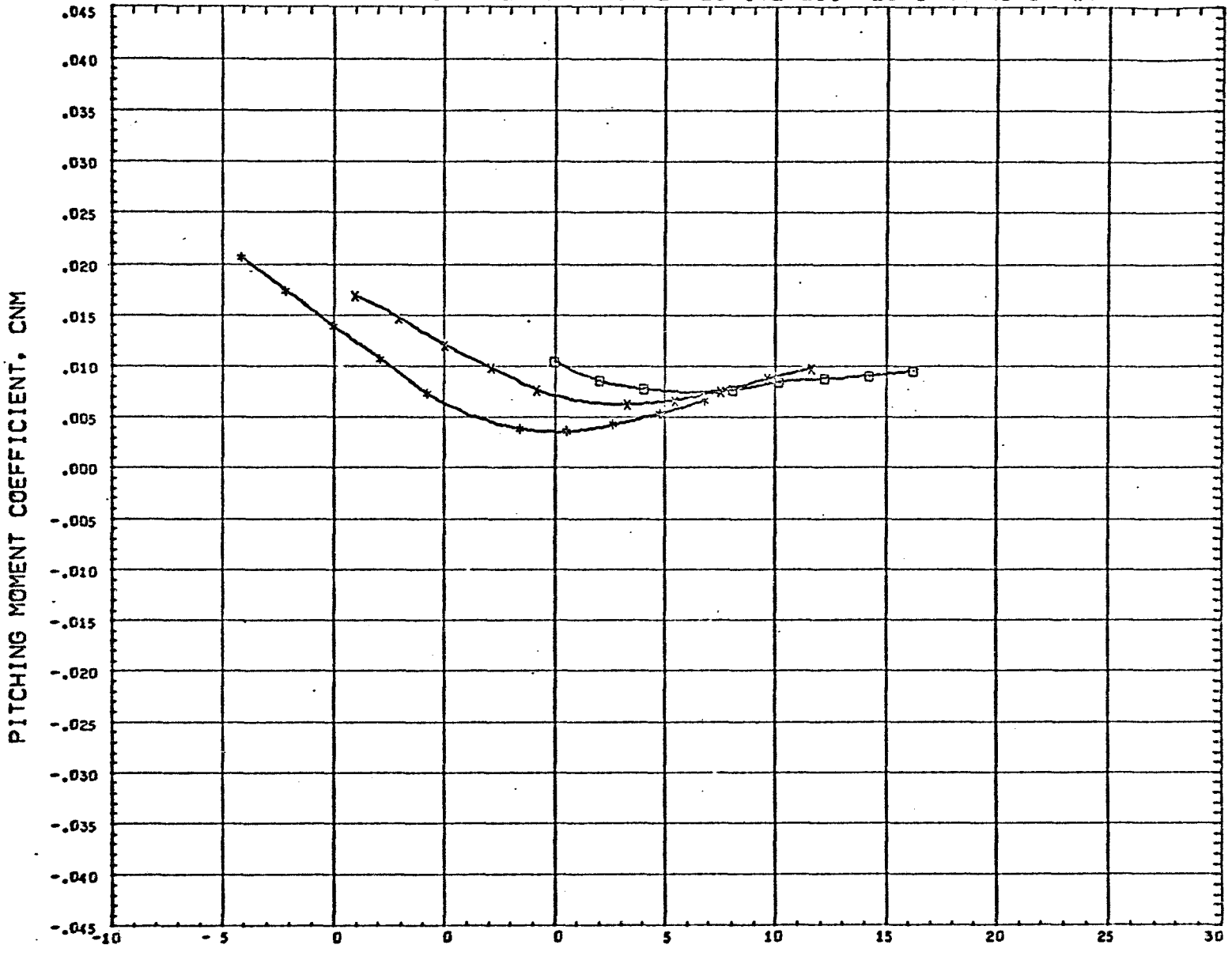


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

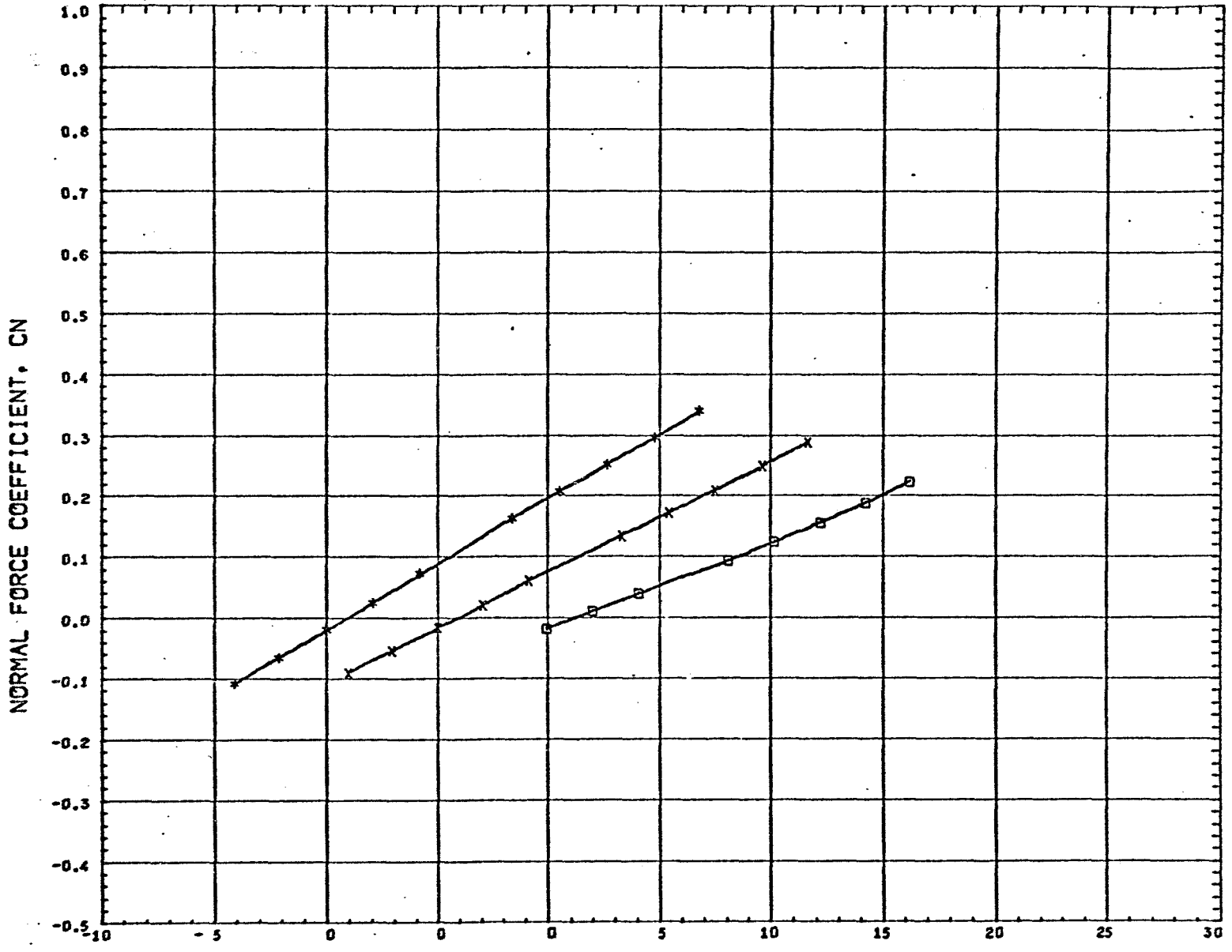


SYMBOL	MACH	PARAMETRIC VALUES			
●	2.740	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊙	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

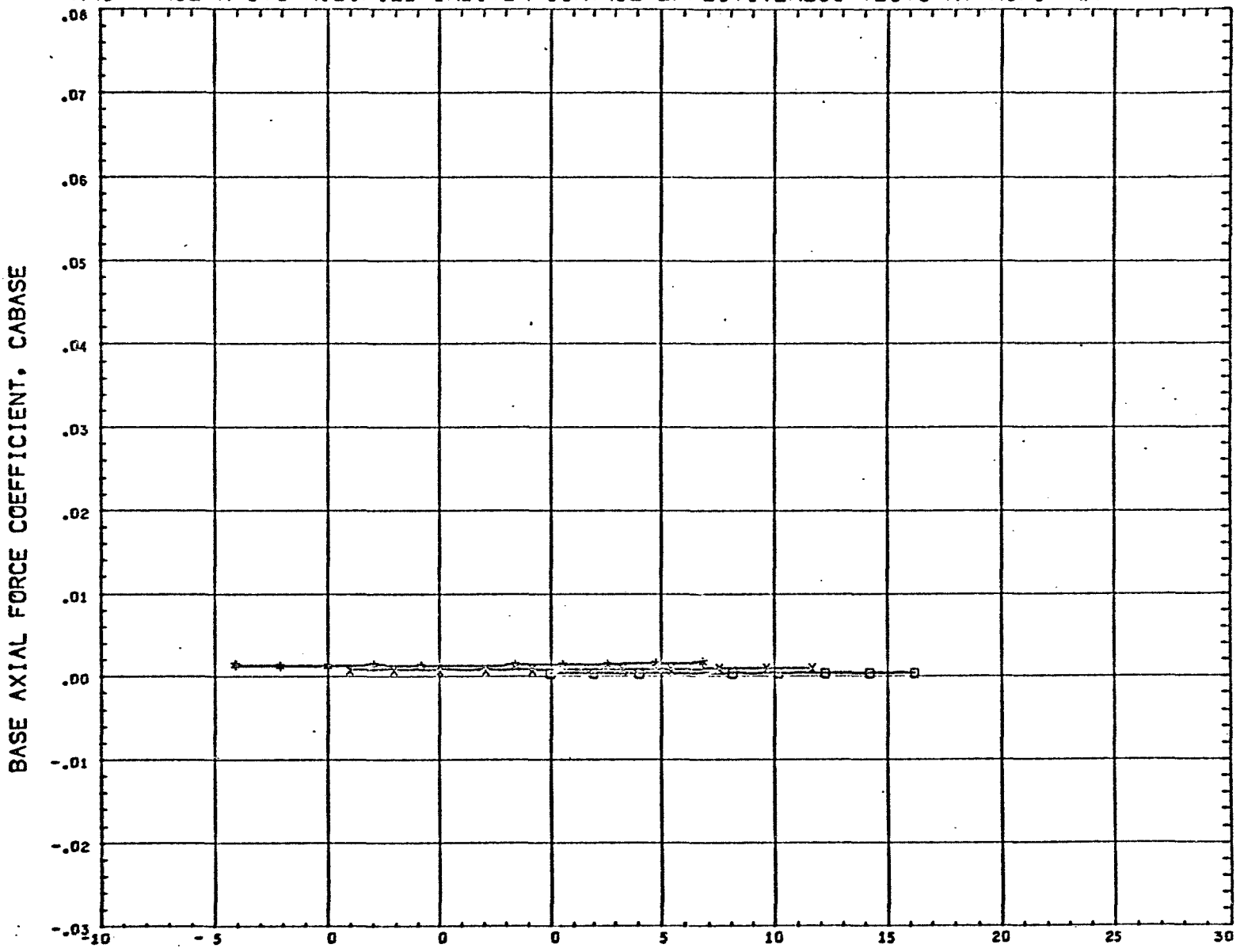


SYMBOL	MACH		PARAMETRIC VALUES		
●	2.749	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.969				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

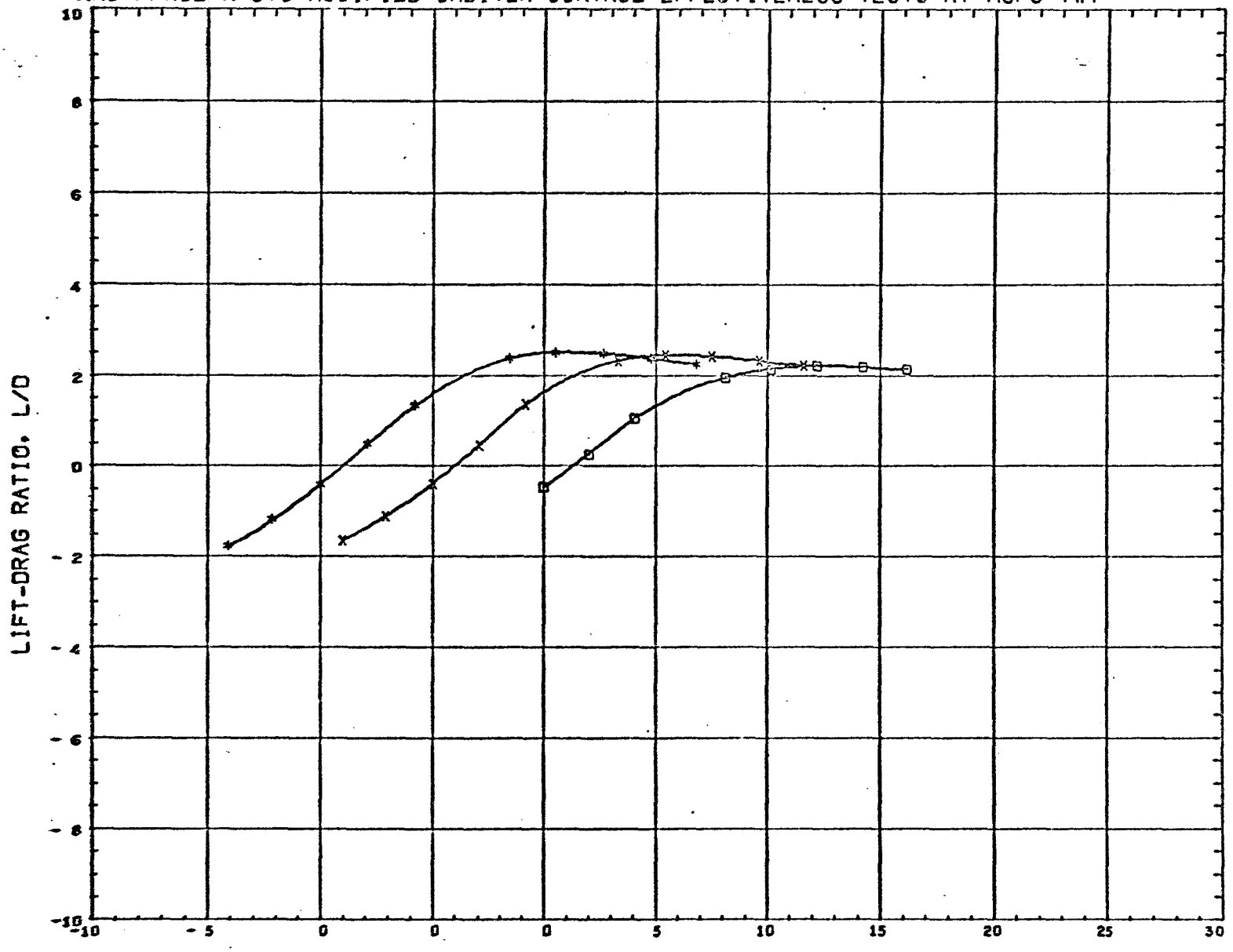


SYMBOL	MACH	PARAMETRIC VALUES			
●	2.749	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.969				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

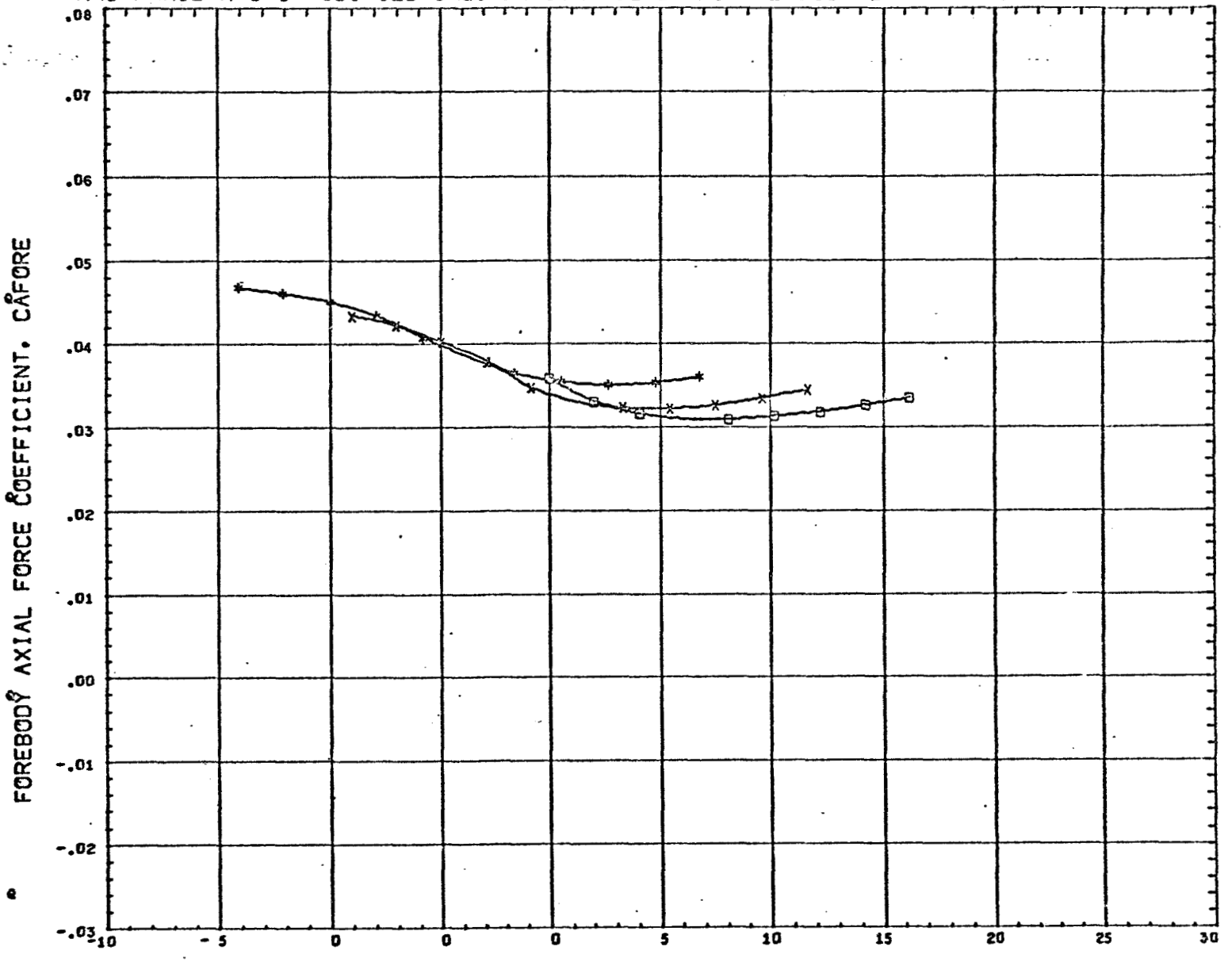


SYMBOL	MACH		PARAMETRIC VALUES		
*	2.749	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.495	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

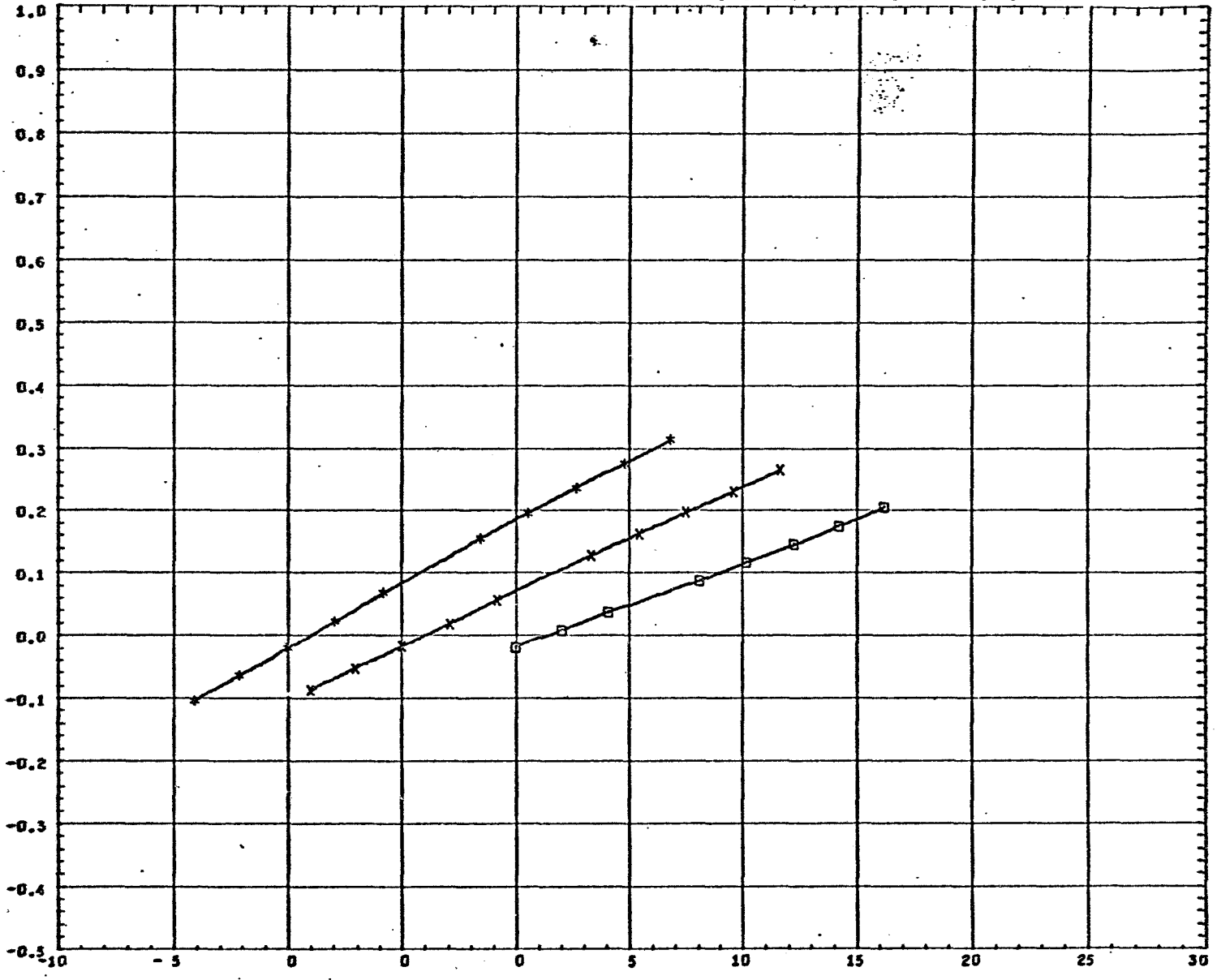


SYMBOL	MACH	PARAMETRIC VALUES			
*	2.740	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

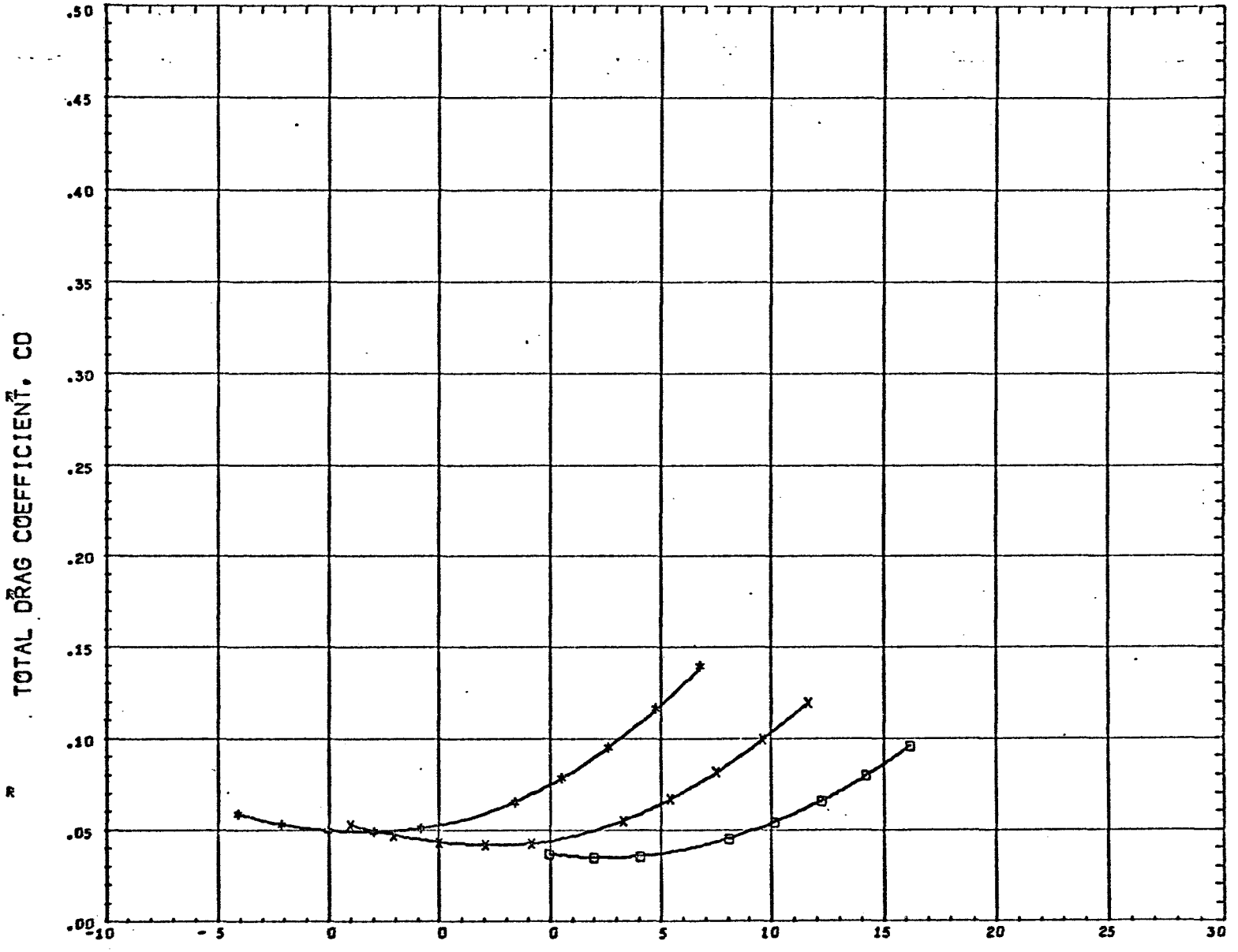


SYMBOL	MACH		PARAMETRIC VALUES		
●	2.749	BETA	0.000	ELEVON	- 30.000
⊕ x	3.479	RUDDER	0.000		
⊡	4.960				

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

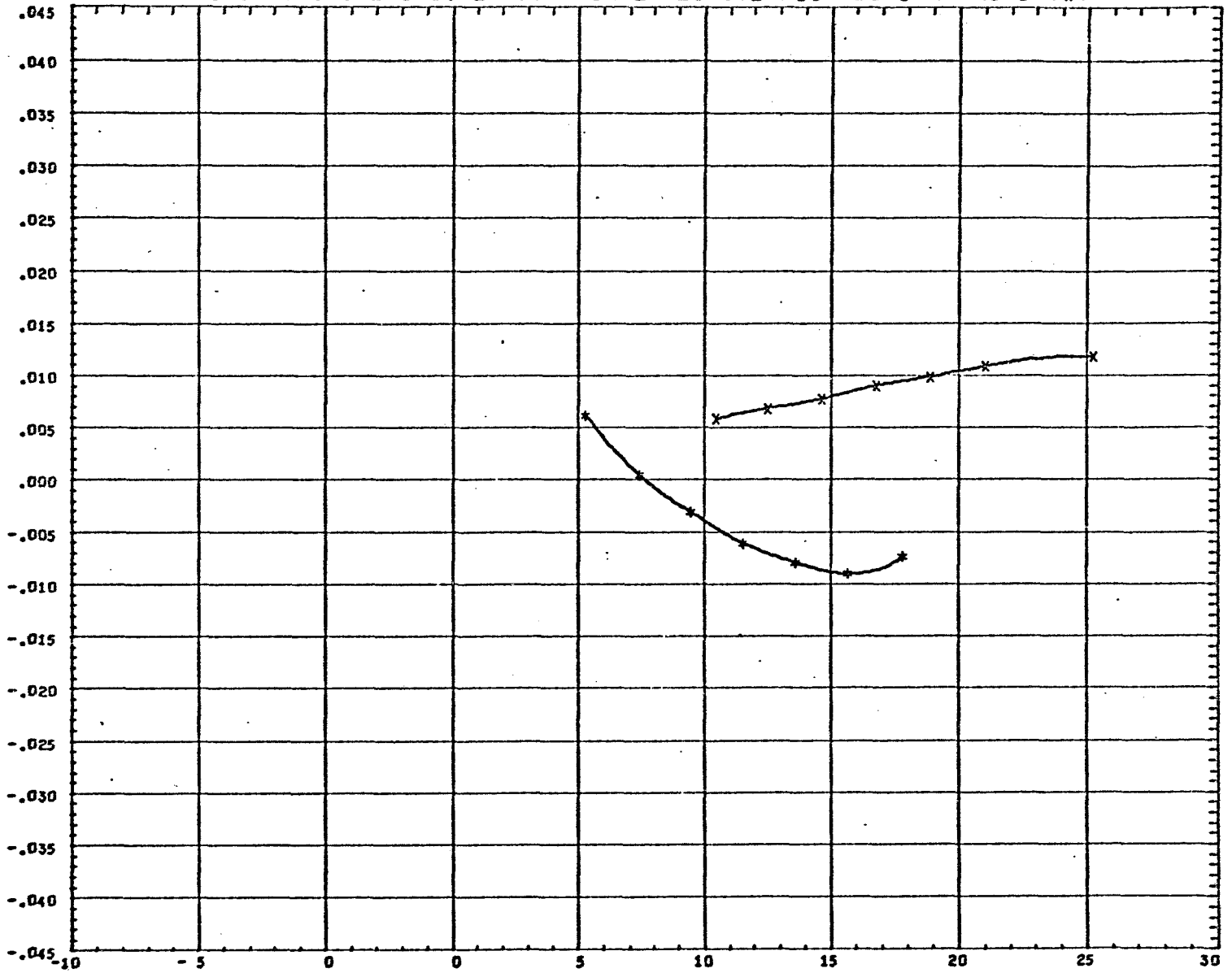


SYMBOL	MACH	PARAMETRIC VALUES			
*	2.740	BETA	0.000	ELEVON	- 30.000
X	3.479	RUDDER	0.000		
G	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



PITCHING MOMENT COEFFICIENT, CNM

ANGLE OF ATTACK, ALPHA DEGREES

SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

REFERENCE FILE.

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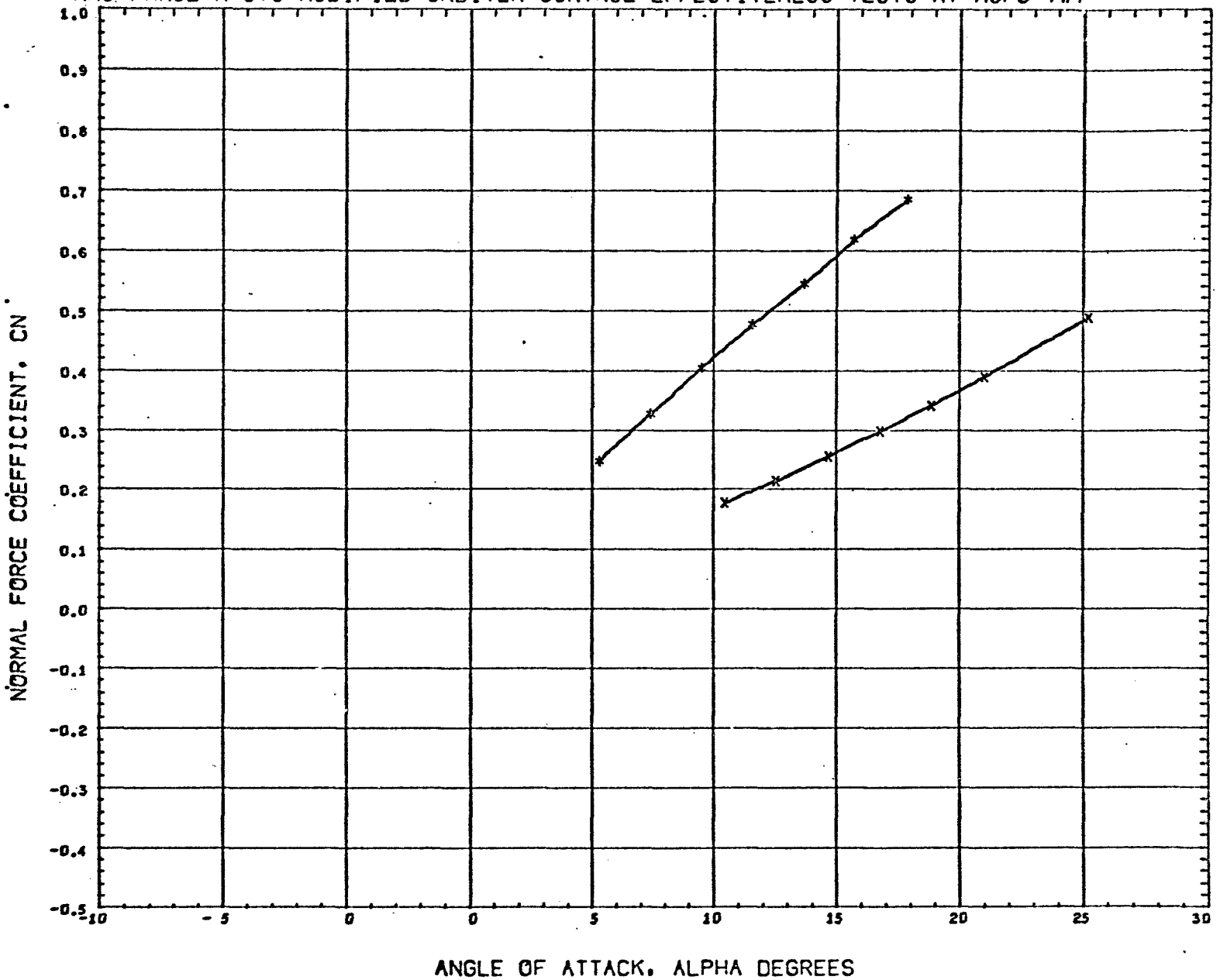
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

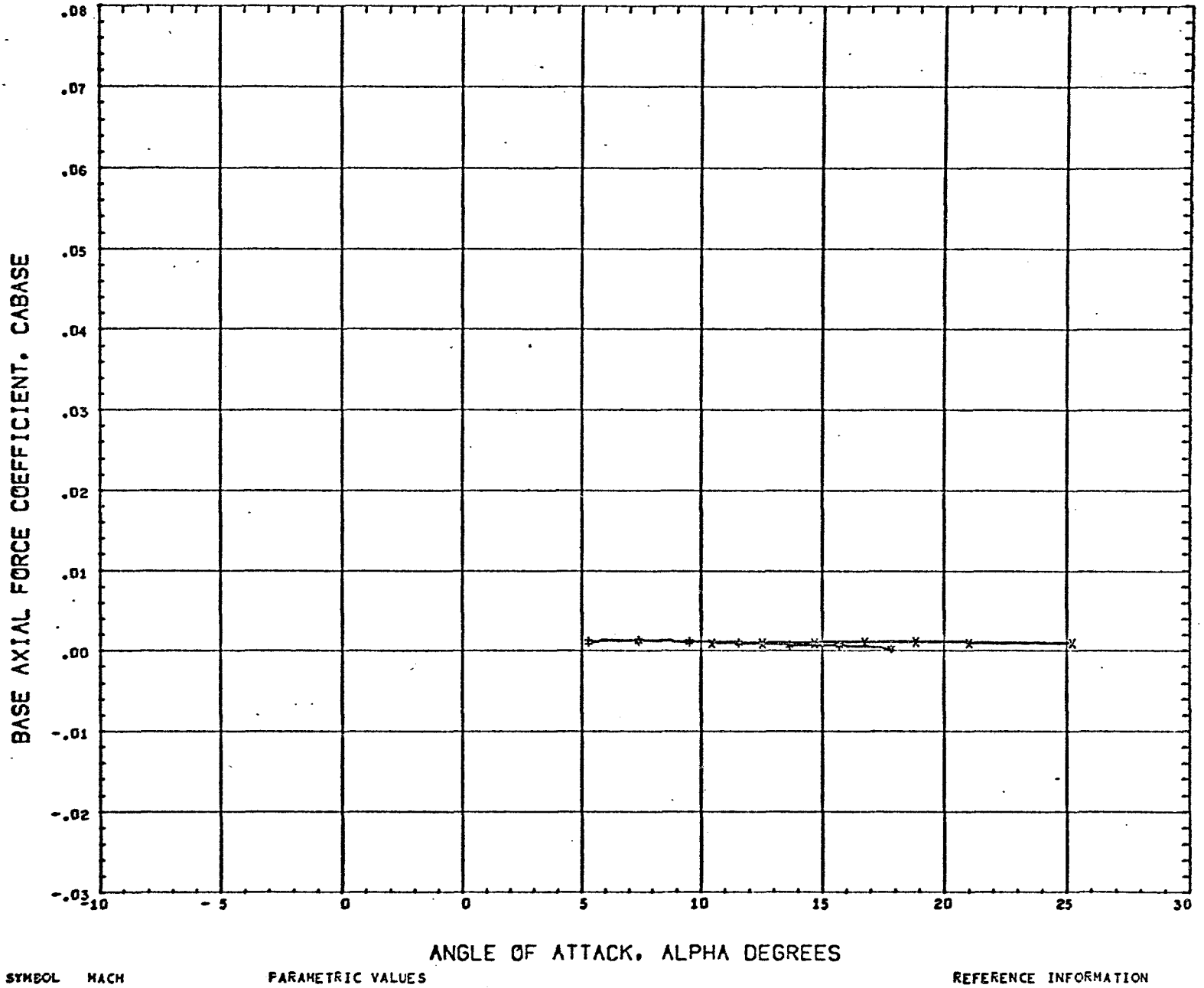


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

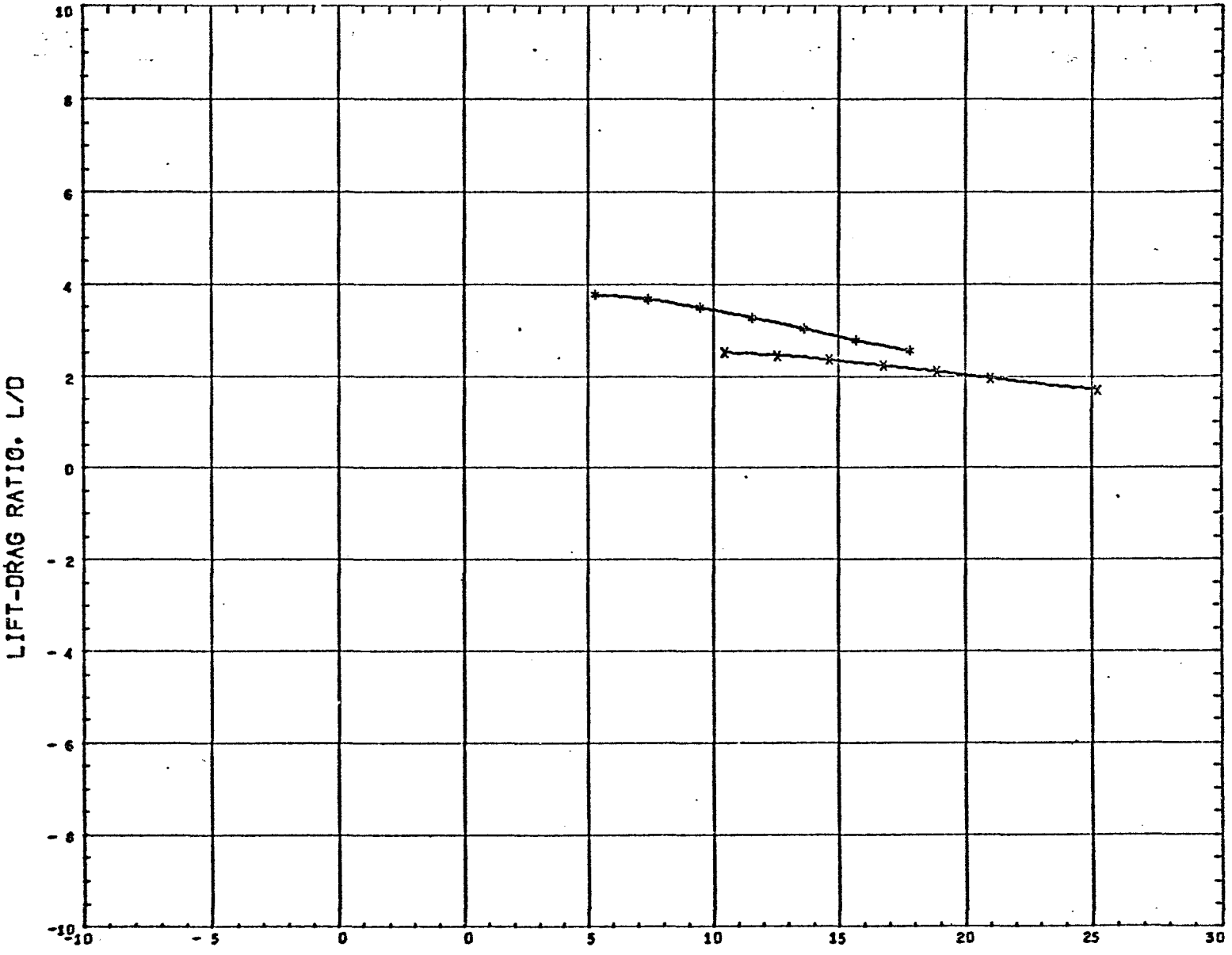


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

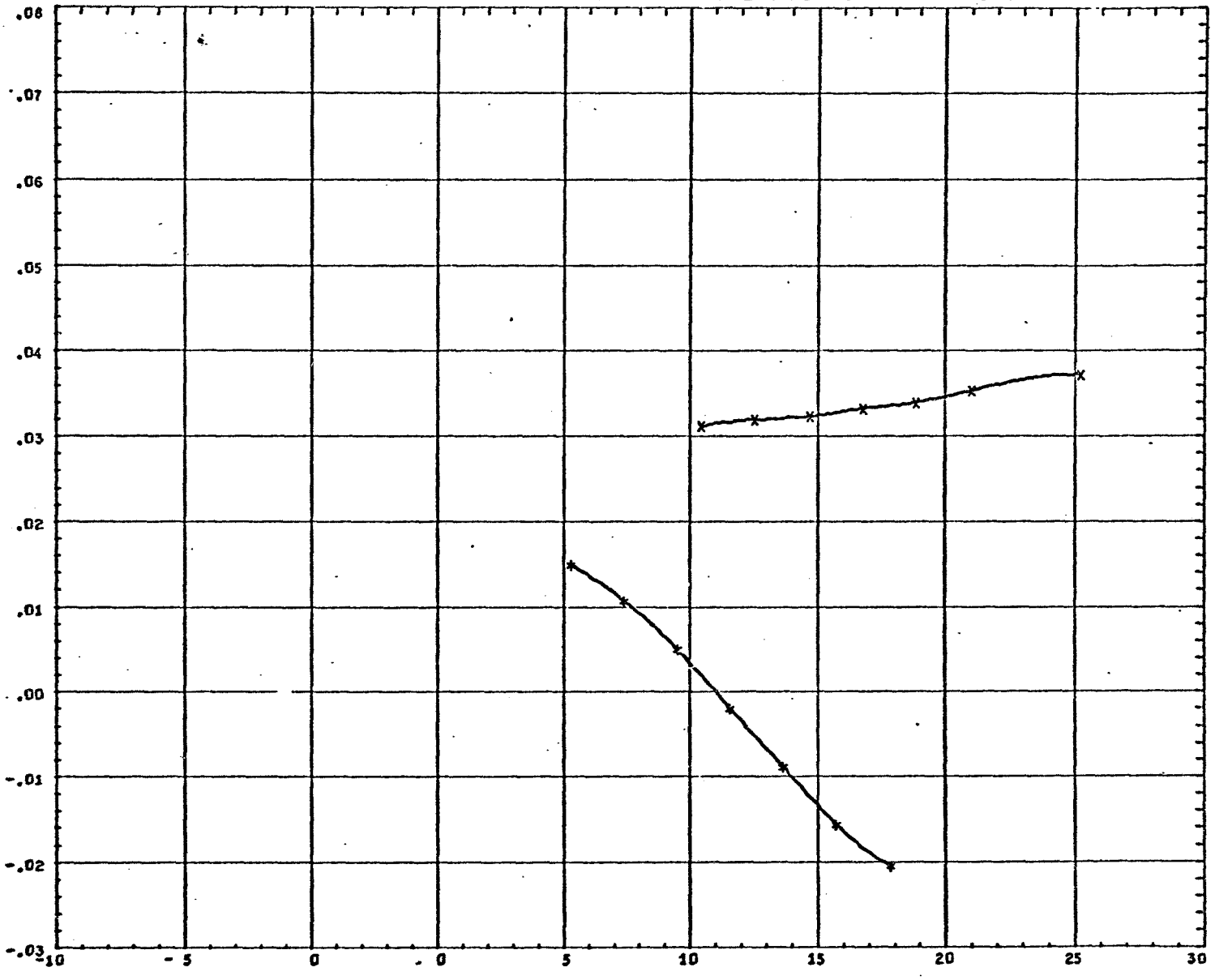


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

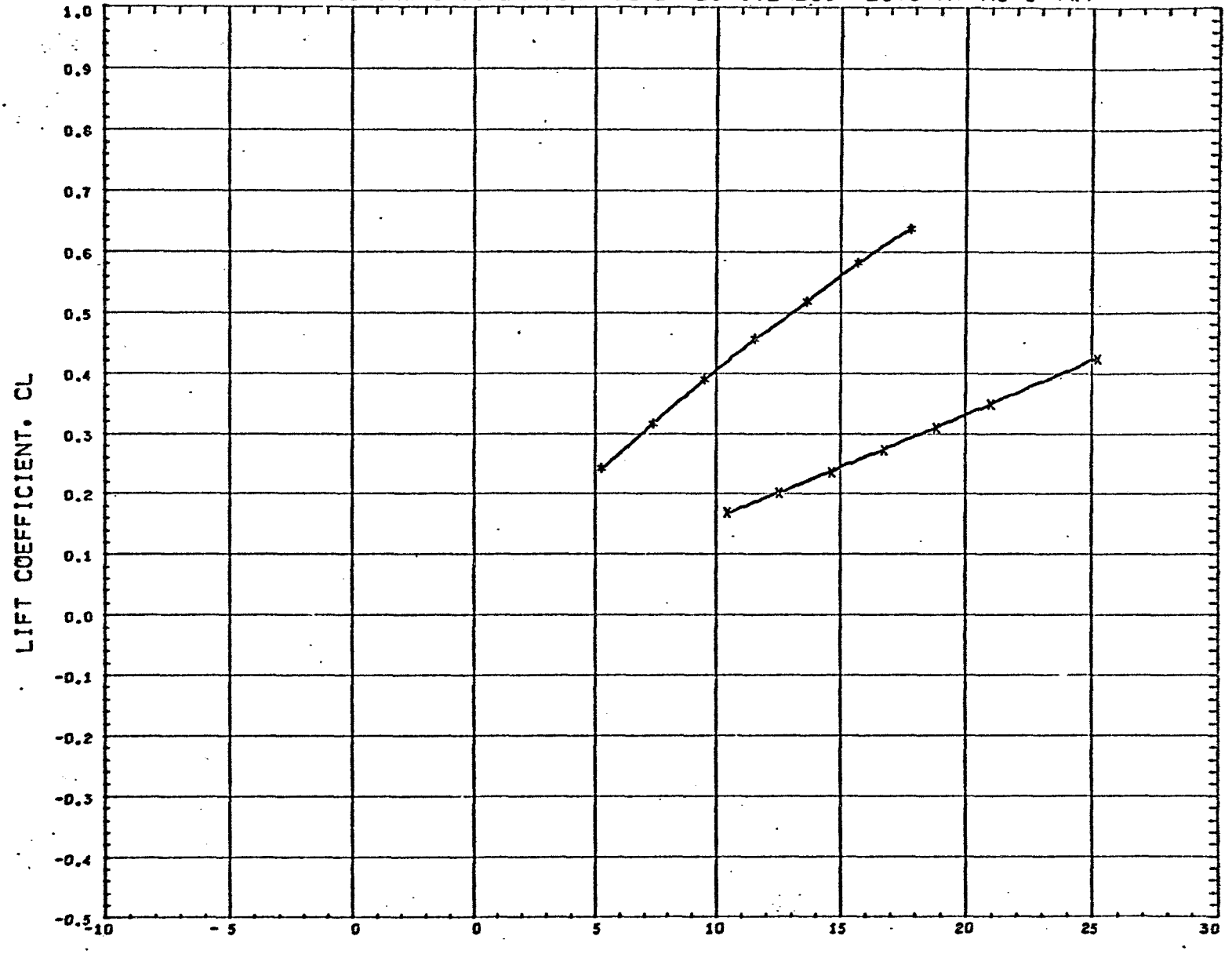


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
X	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

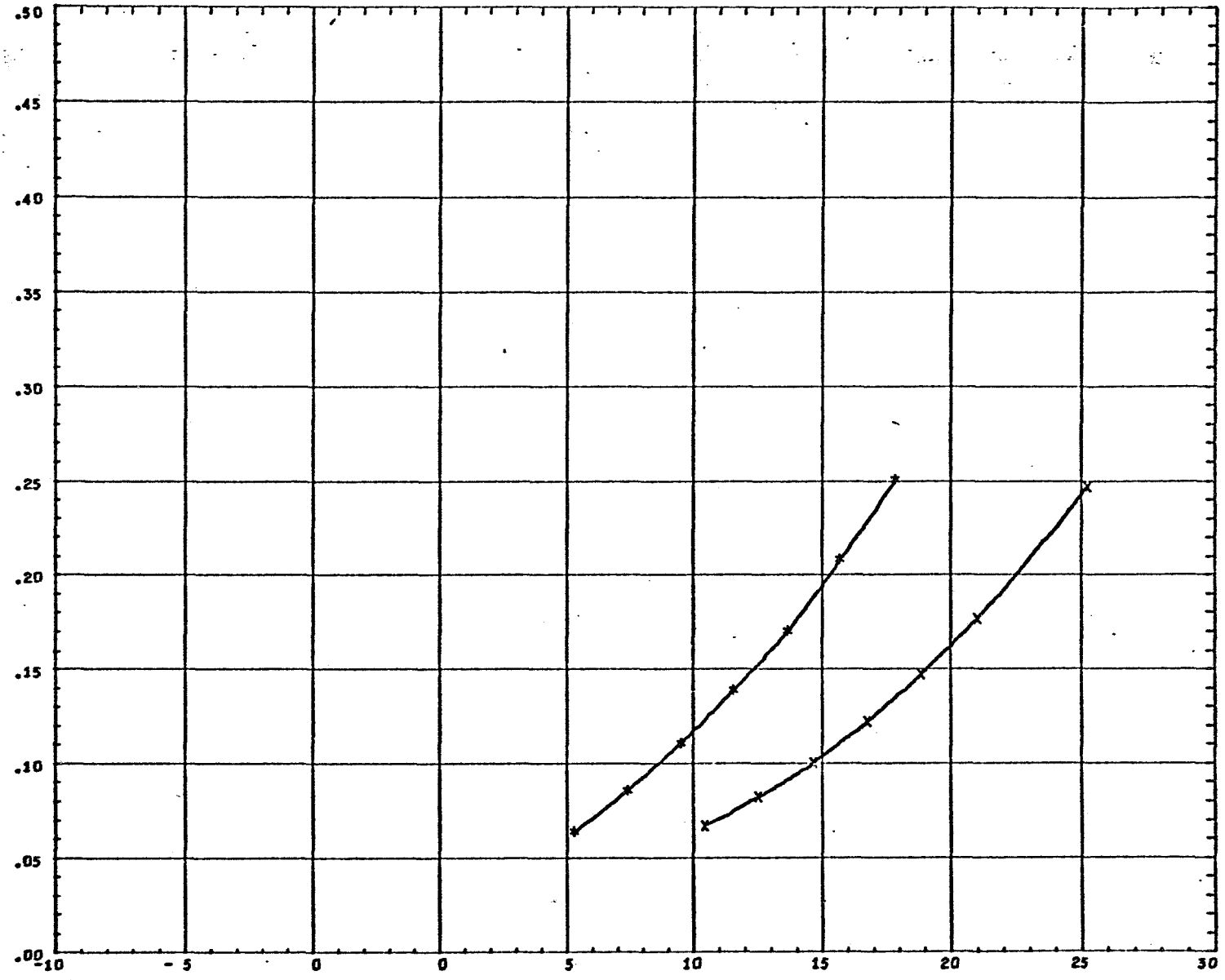


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

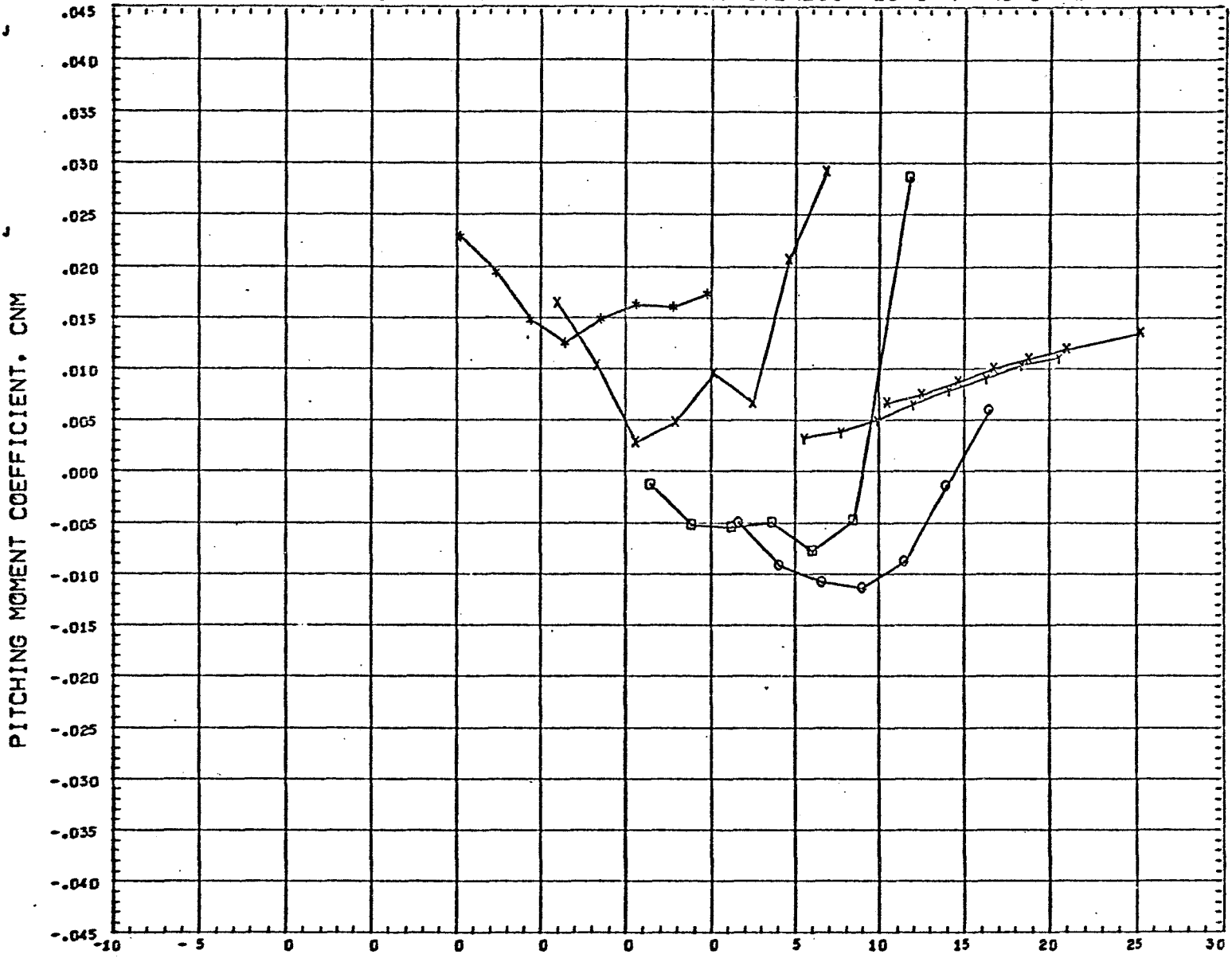


SYMBOL	MACH		PARAMETRIC VALUES		
•	0.393	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

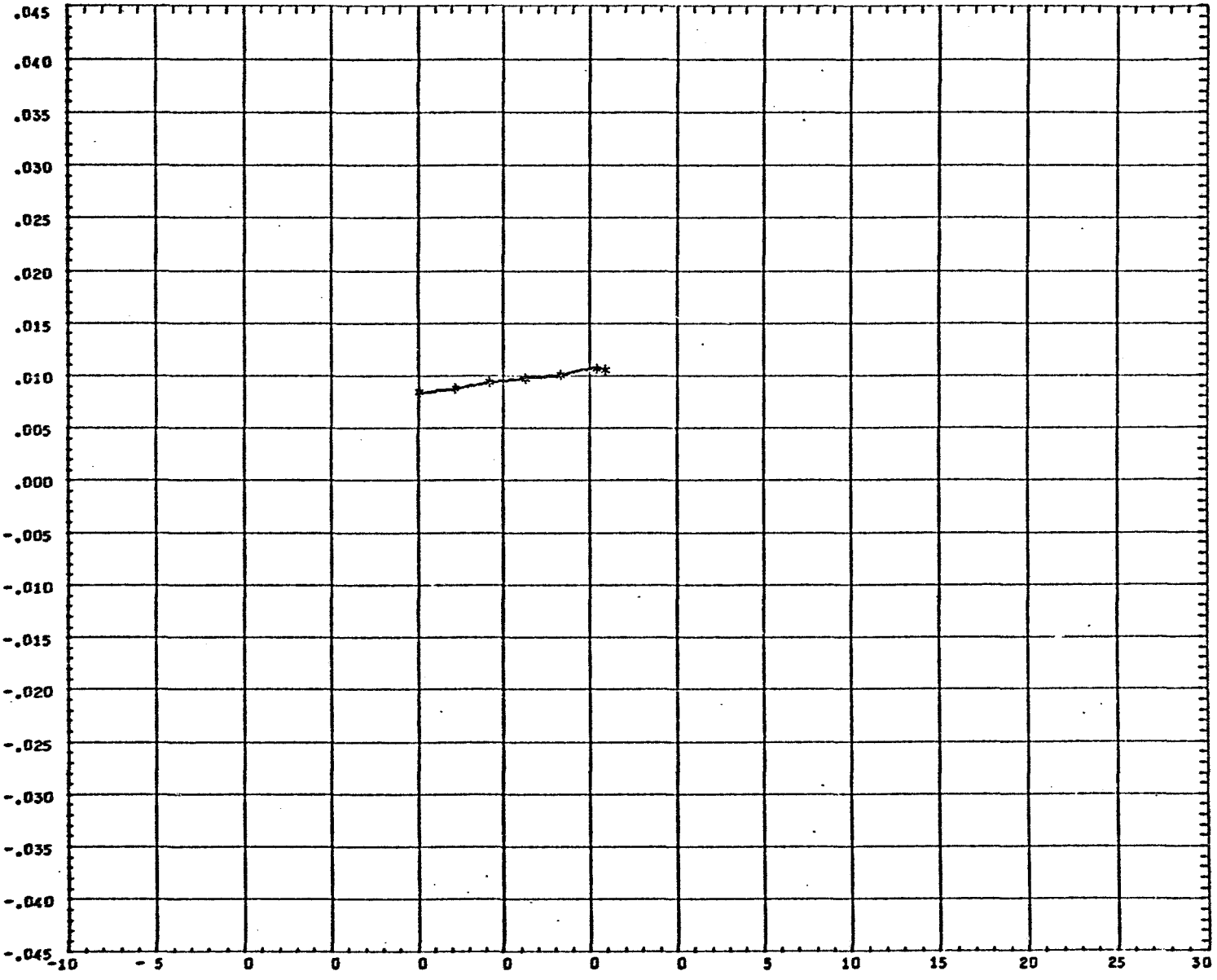
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
●	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
☐	0.995				
◇	1.198				
▽	2.740				
✳	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

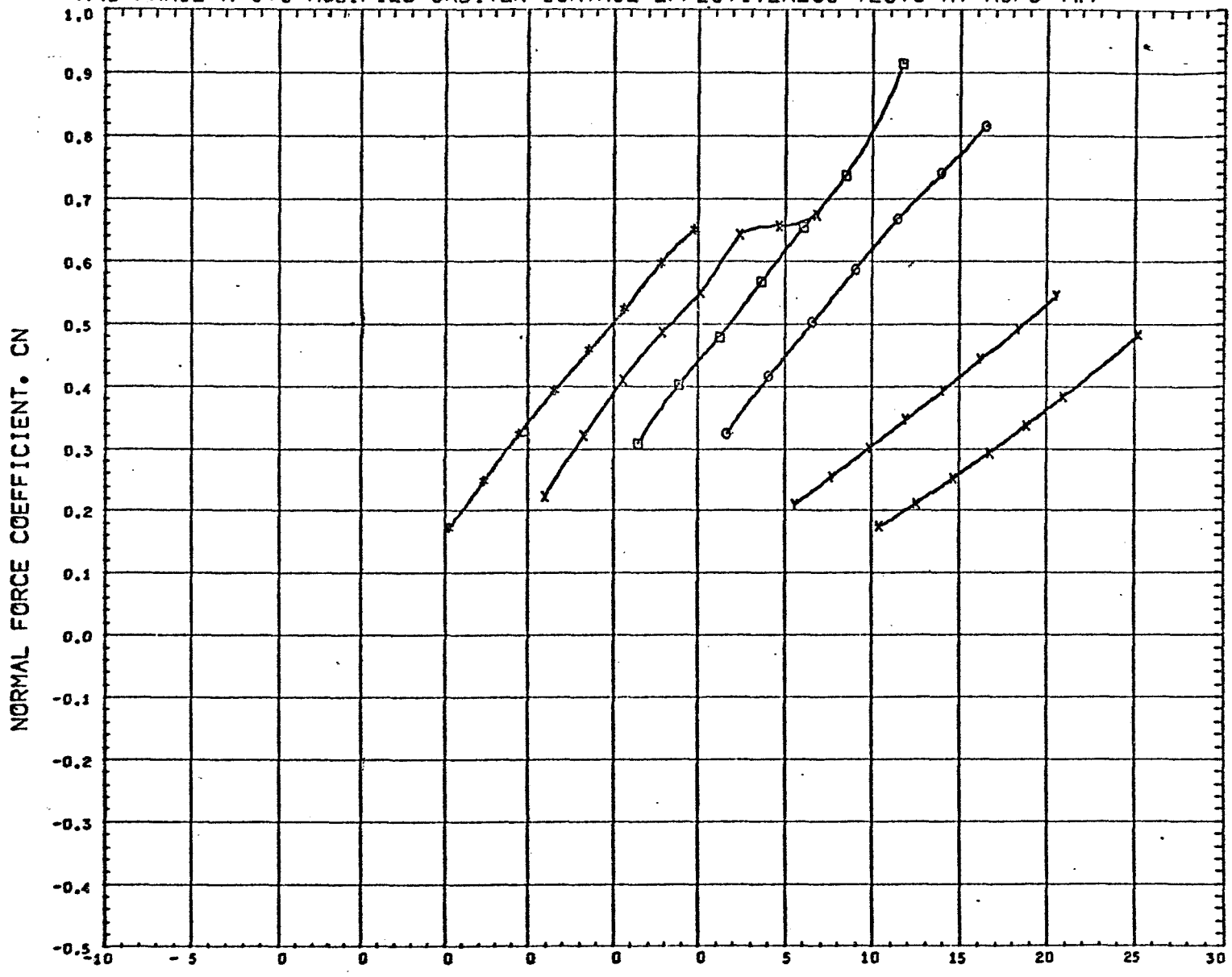


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

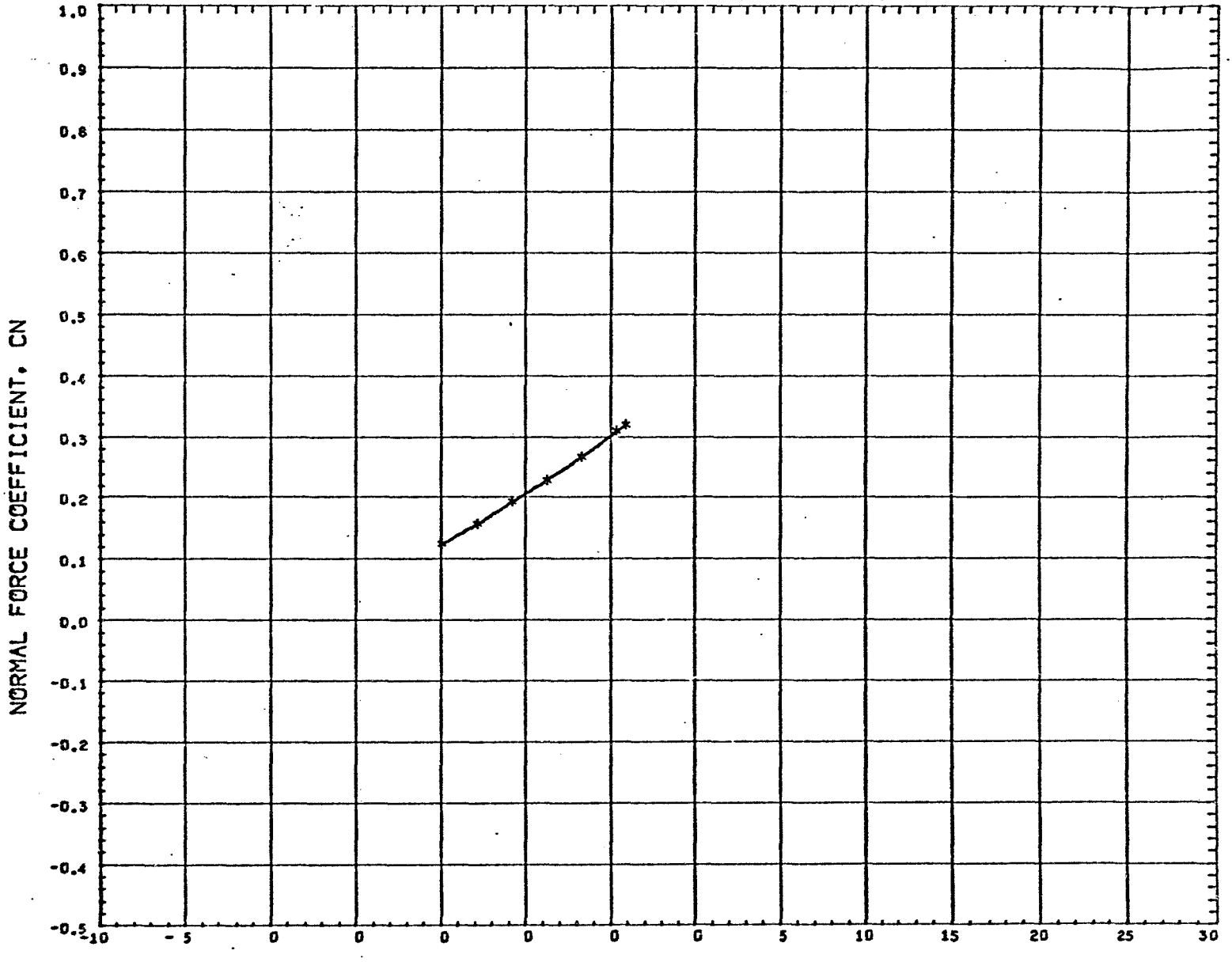
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
⊡	0.995				
⊙	1.198				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.046	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

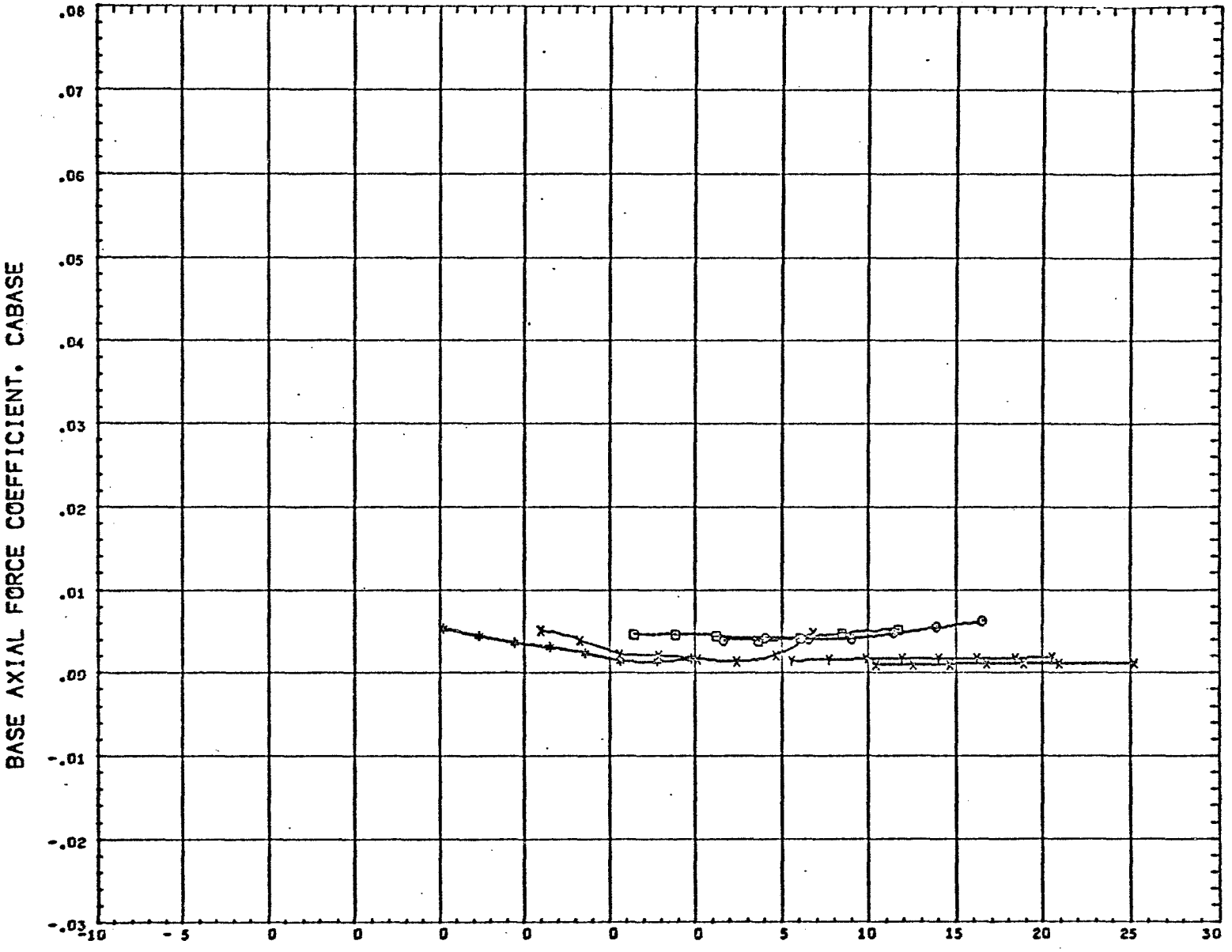


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	-30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.455	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

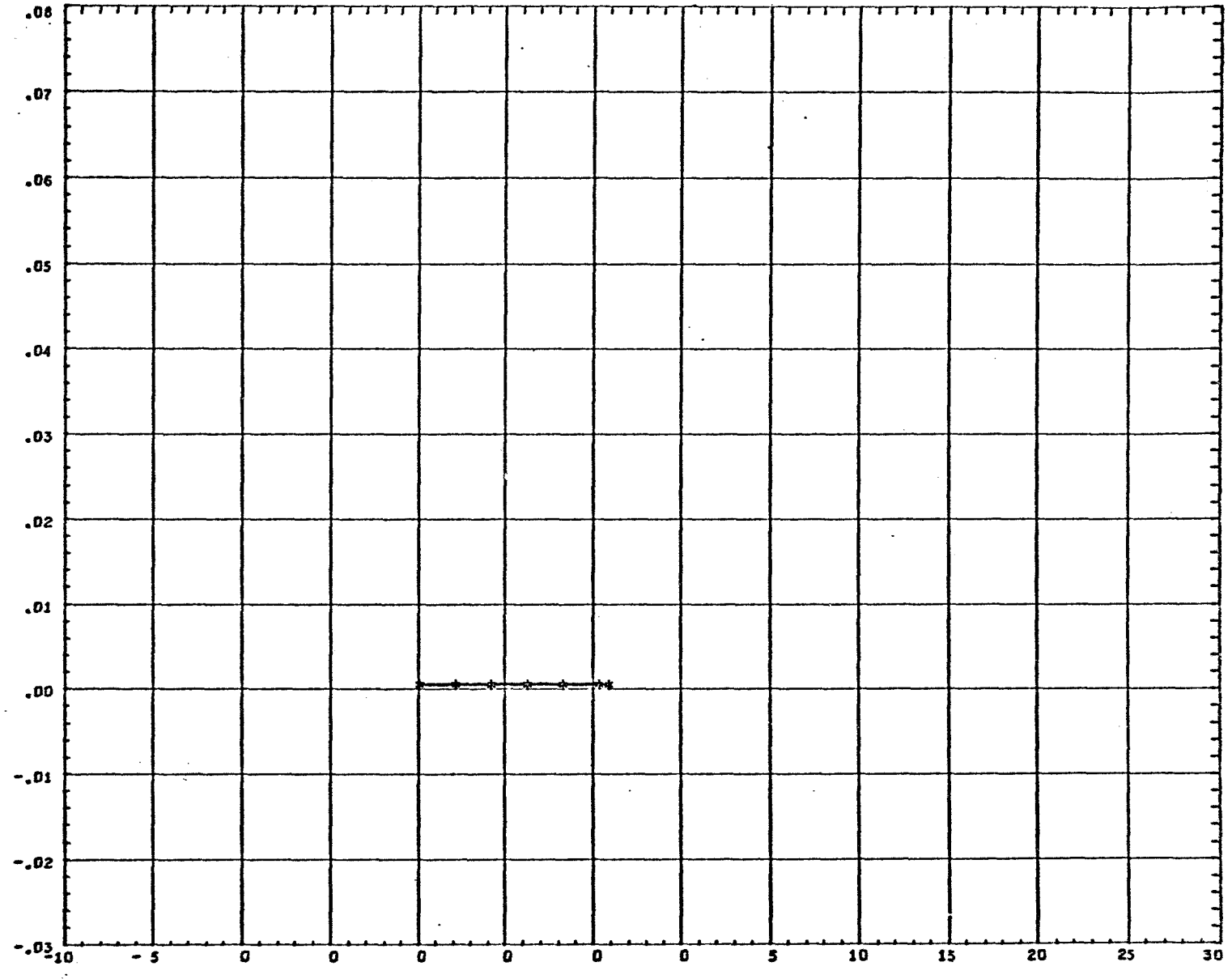
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 30.000
x	0.794	RUDDER	0.000		
⊡	0.995				
⊙	1.198				
Y	2.760				
⊠	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

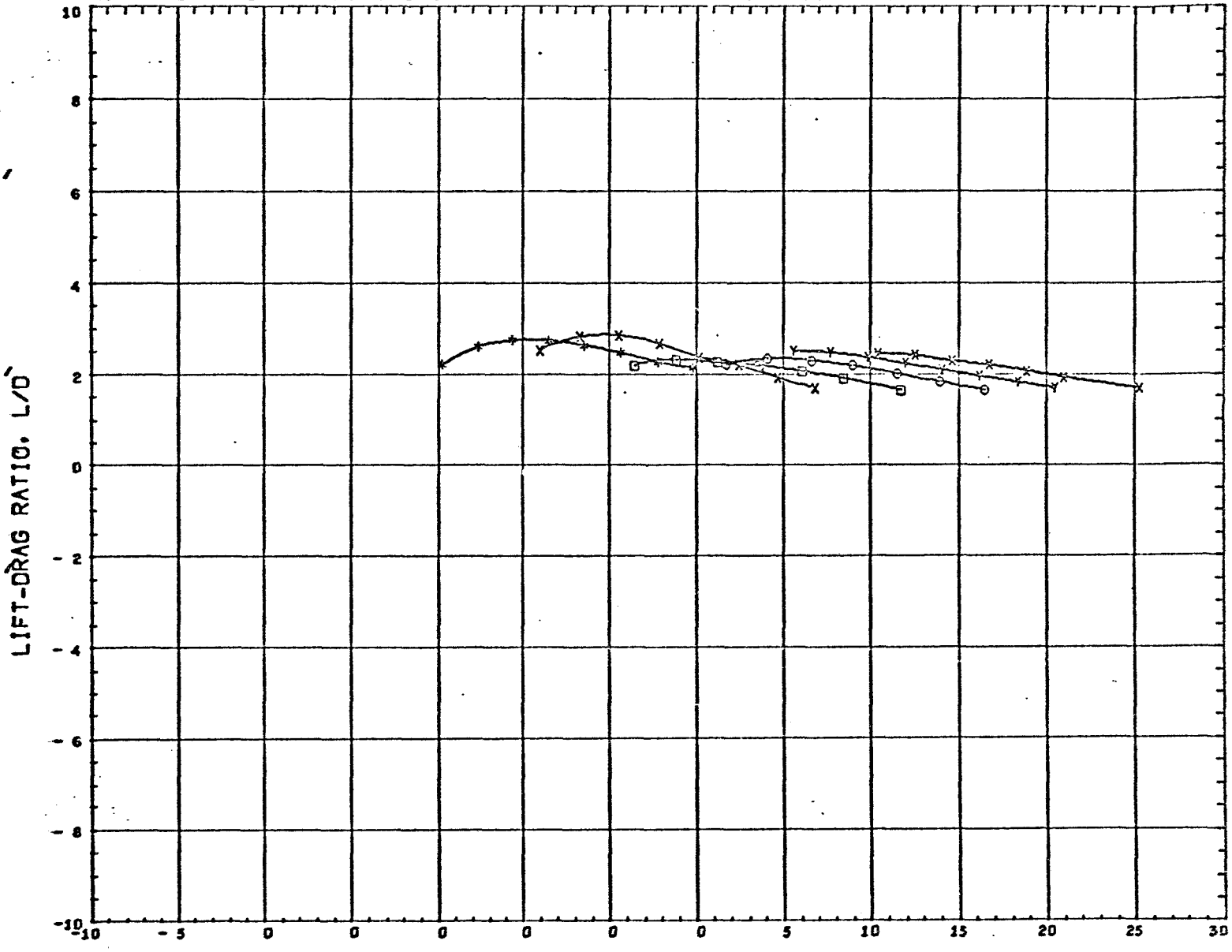


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

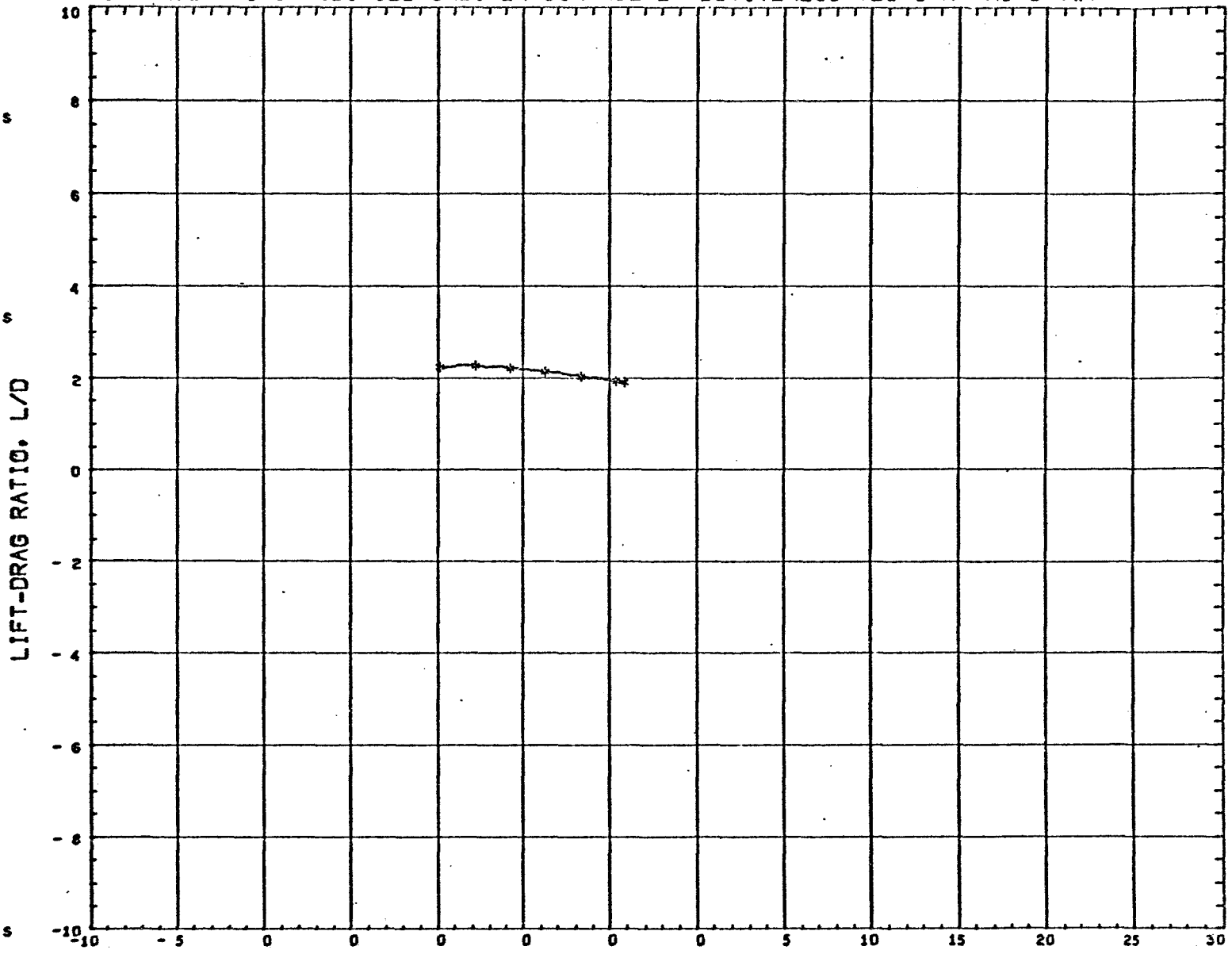
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
⊡	0.995				
⊙	1.198				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

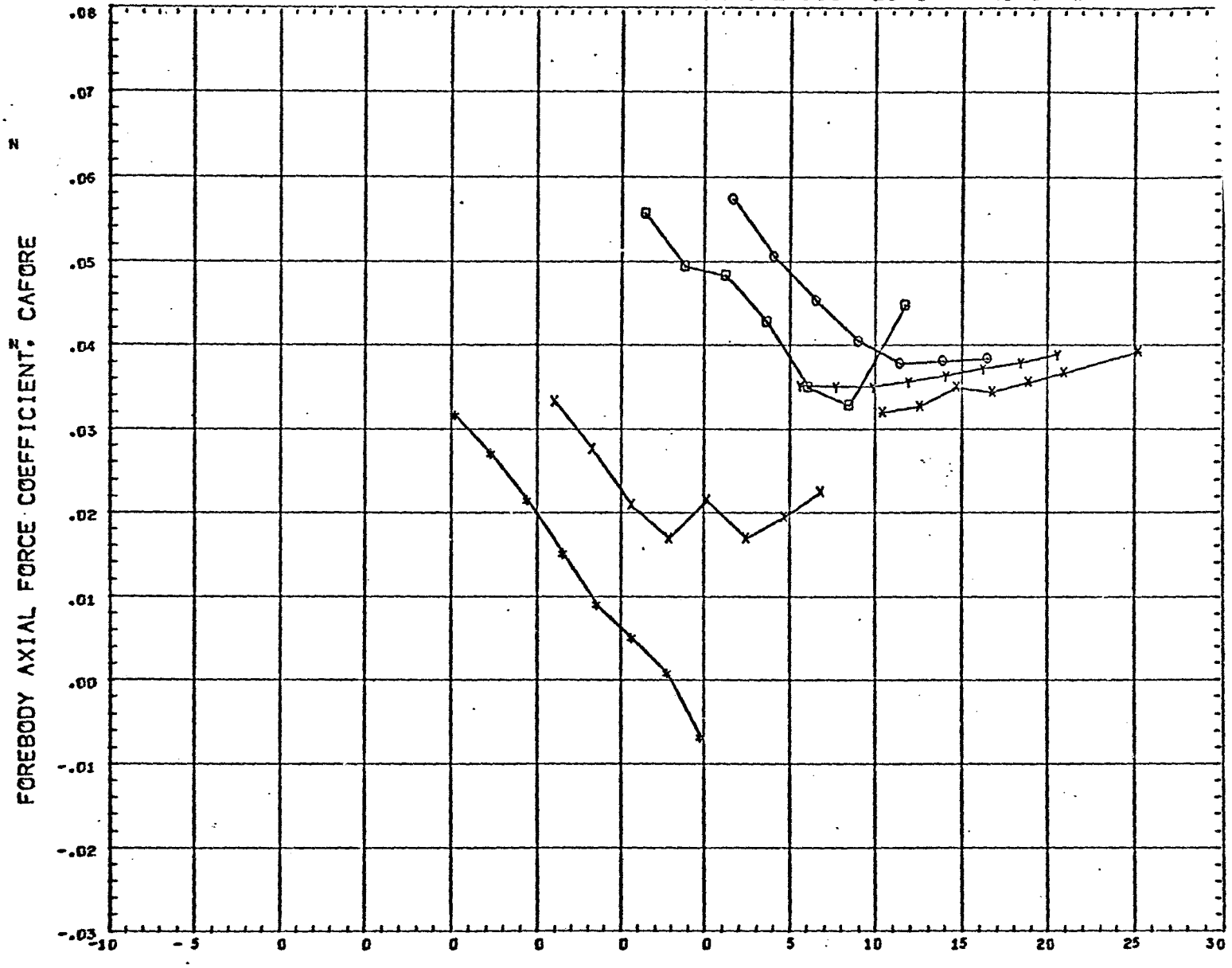


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	-30.000
		RUDDER	0.000		

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

S REFERENCE FILE.

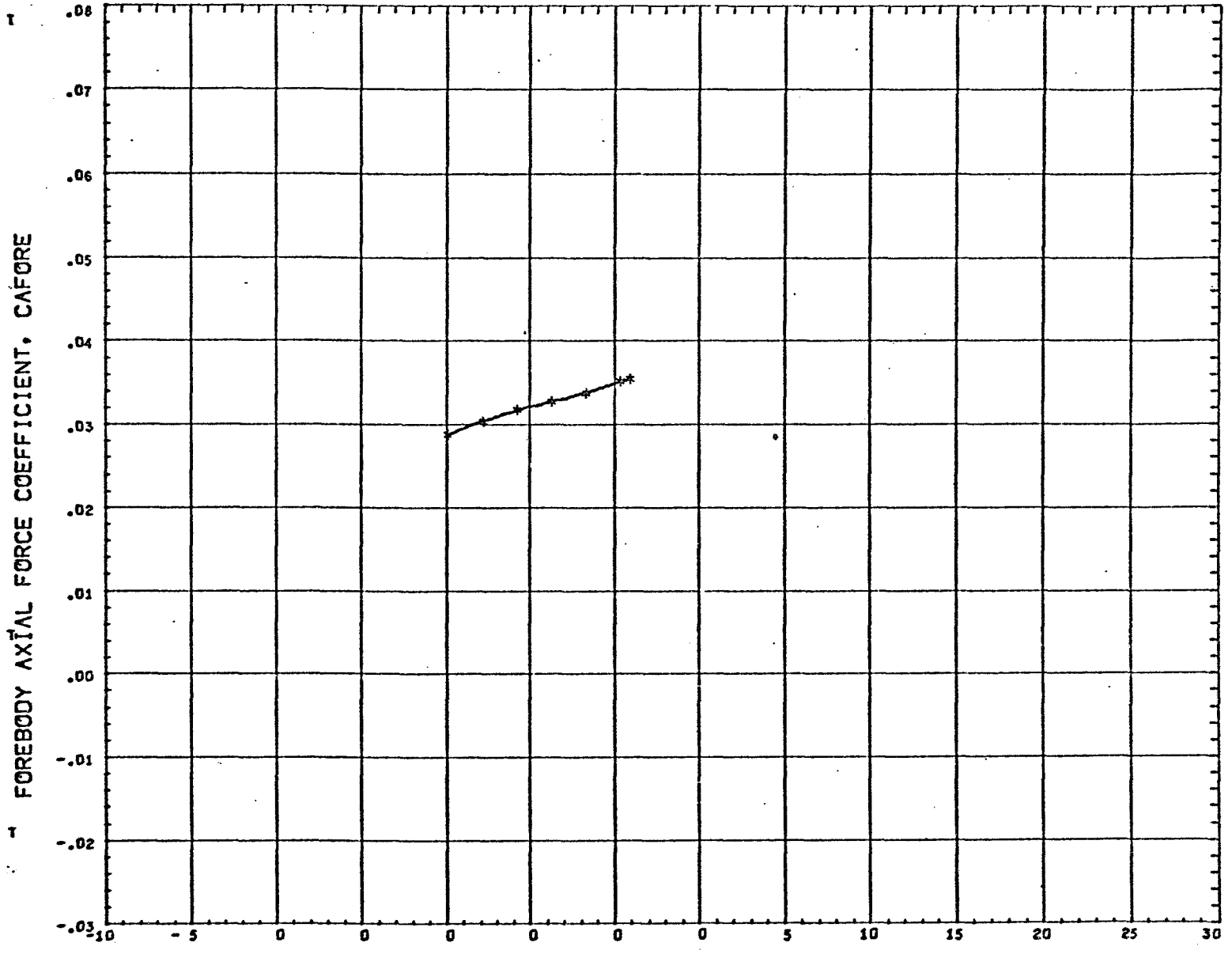
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
●	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
⊡	0.995				
⊙	1.198				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

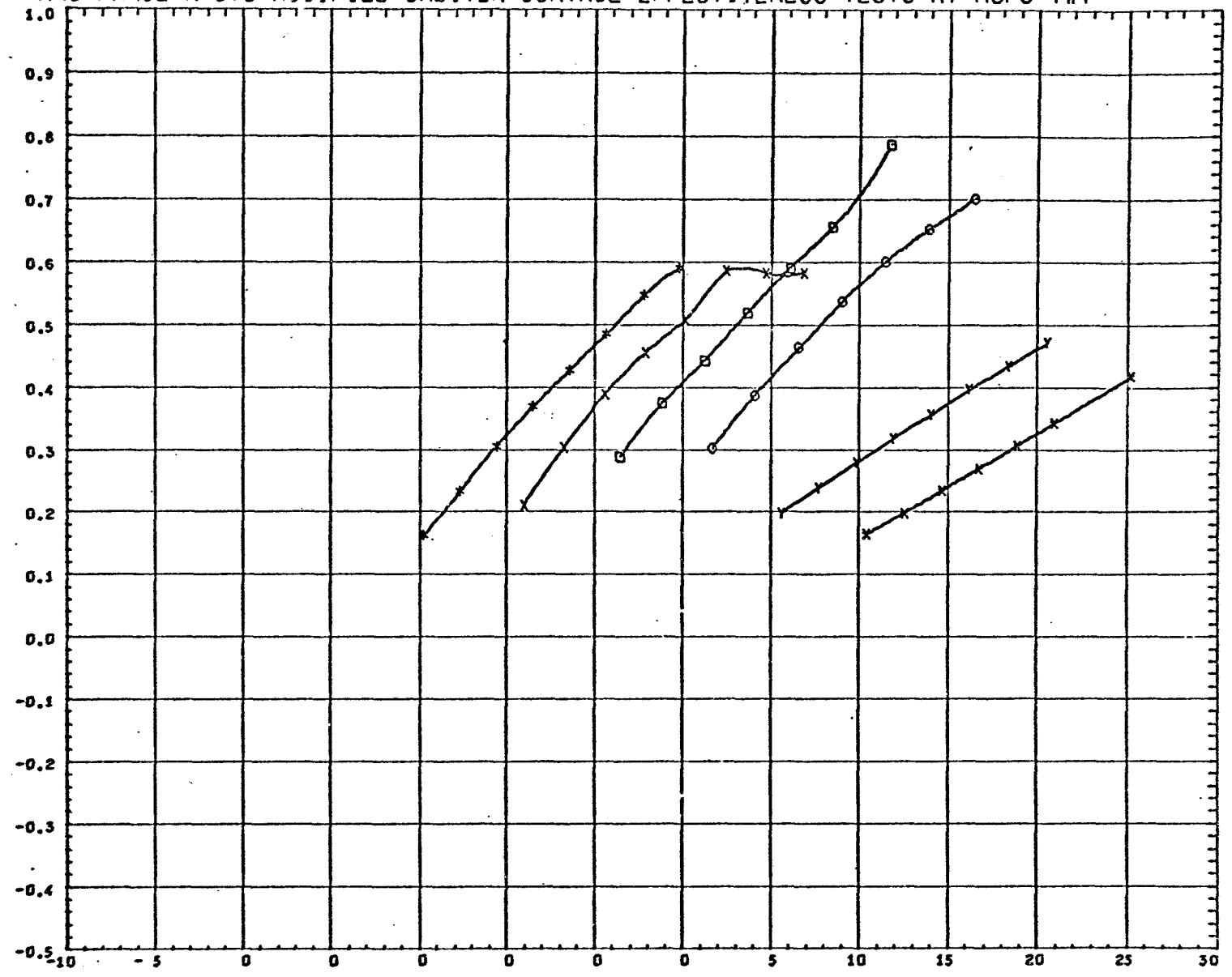


SYMBOL	MACH	PARAMETRIC VALUES			
T *	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

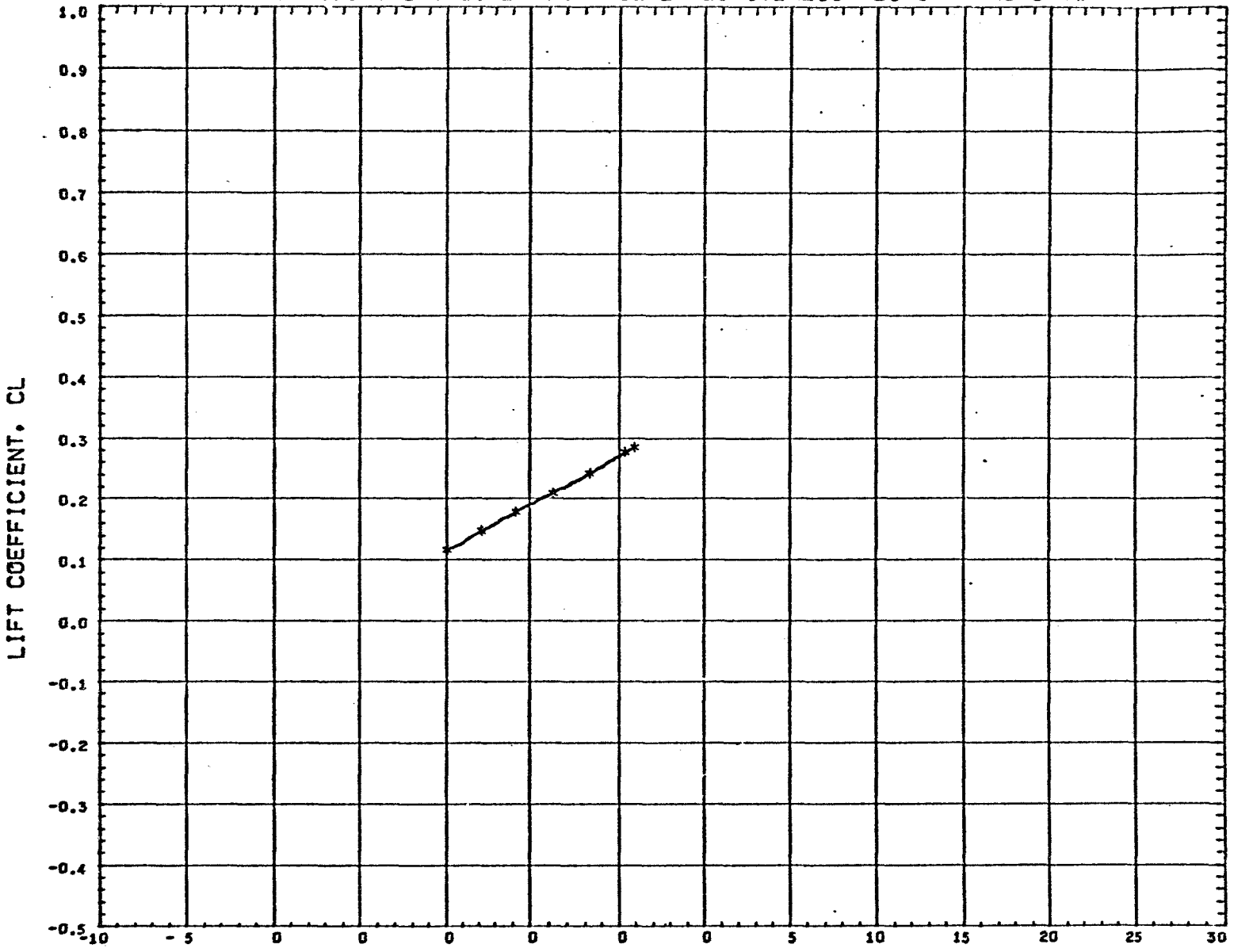
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 30.000
x	0.794	RUDDER	0.000		
⊕	0.995				
⊙	1.198				
▼	2.740				
✖	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

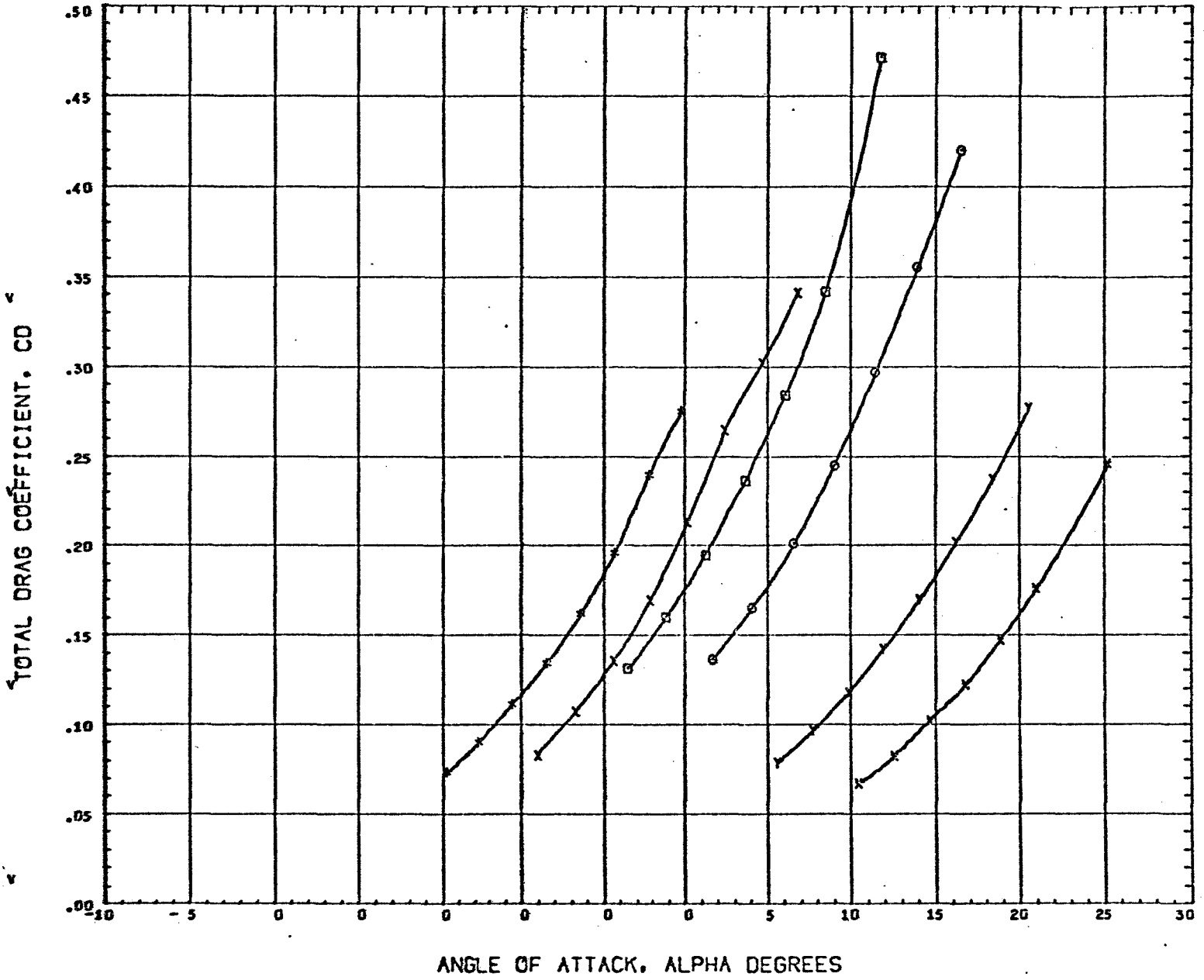


SYMBOL	MACH		PARAMETRIC VALUES		
●	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

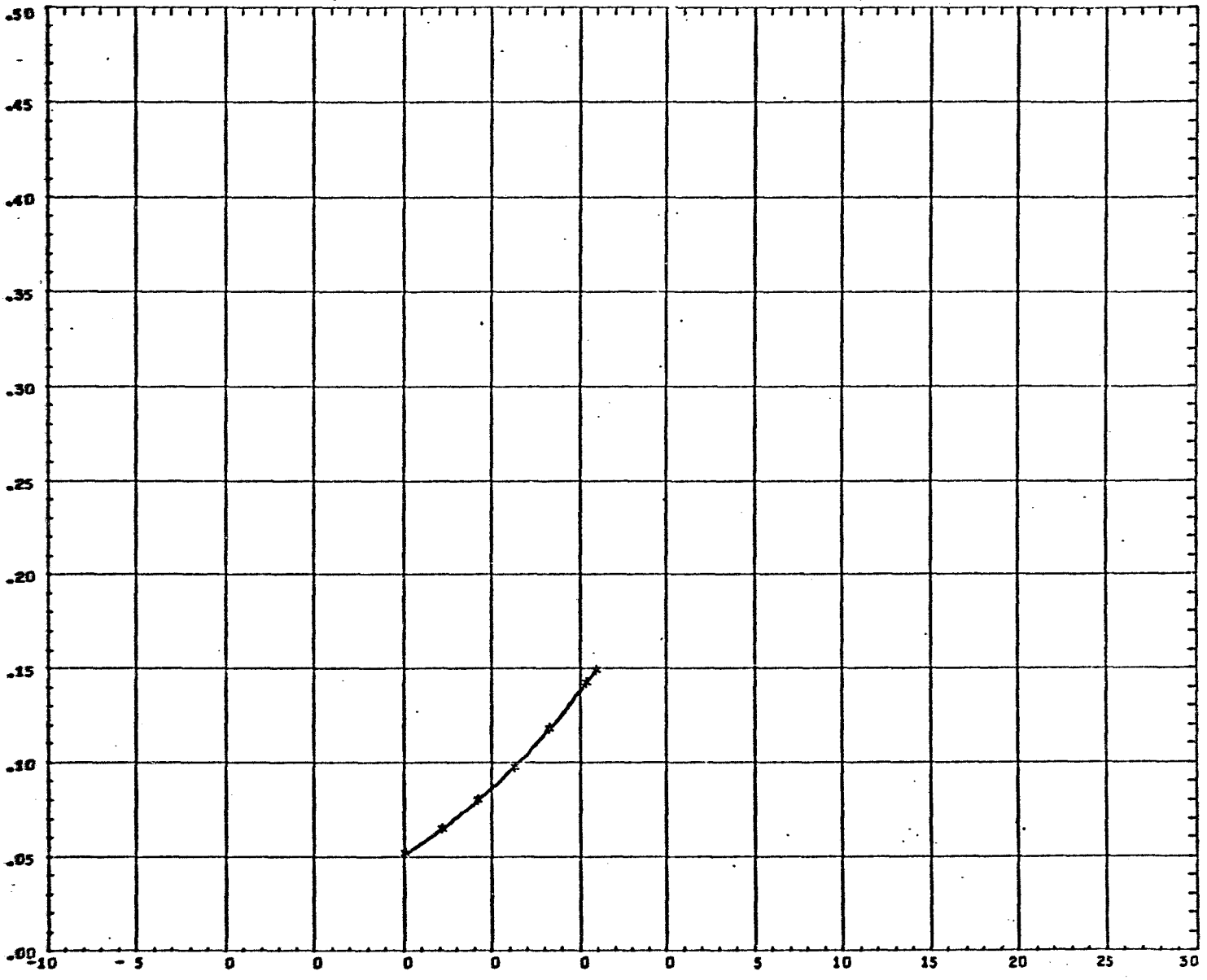
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 30.000
x	0.794	RUDDER	0.000		
⊡	0.995				
⊕	1.198				
V	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

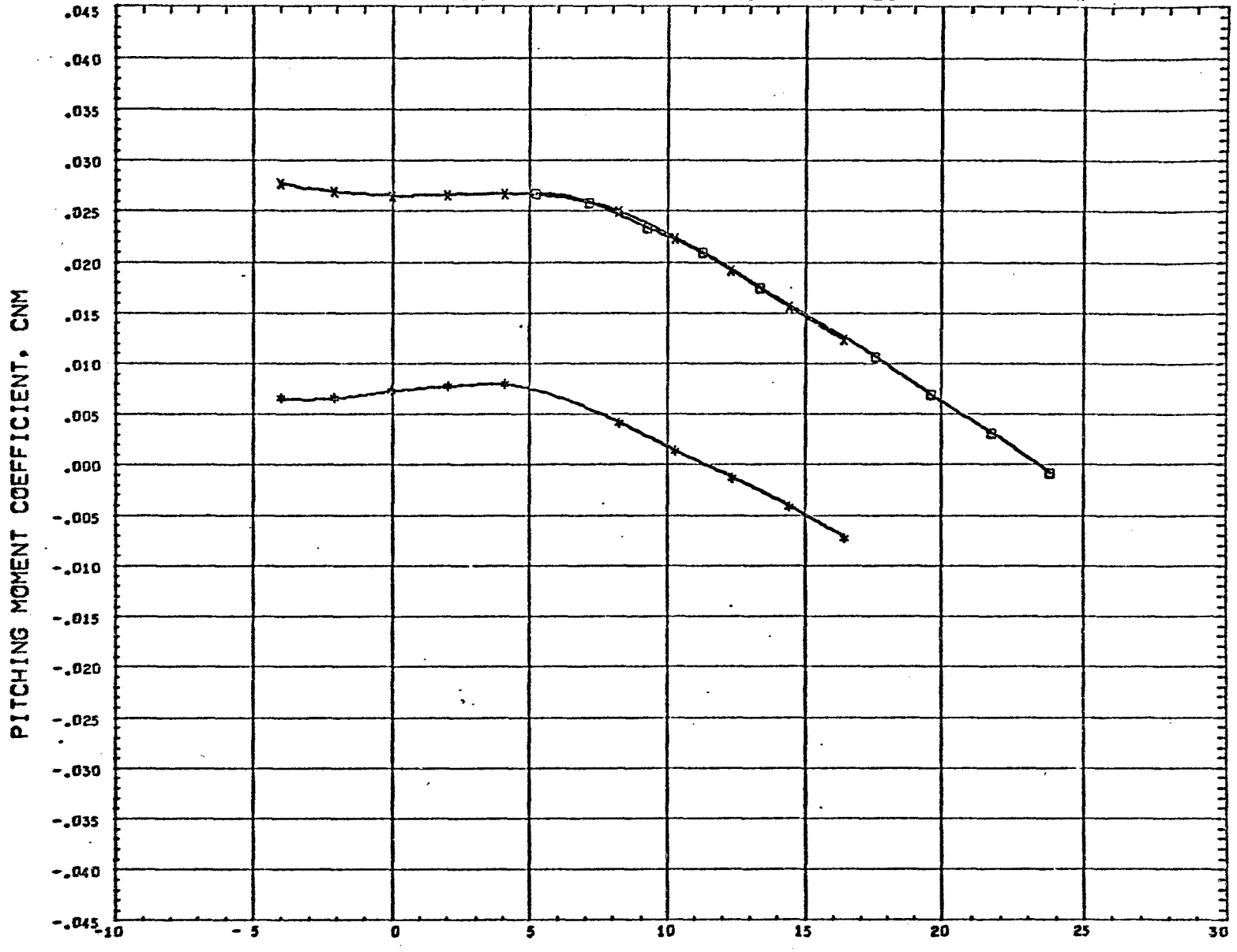


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

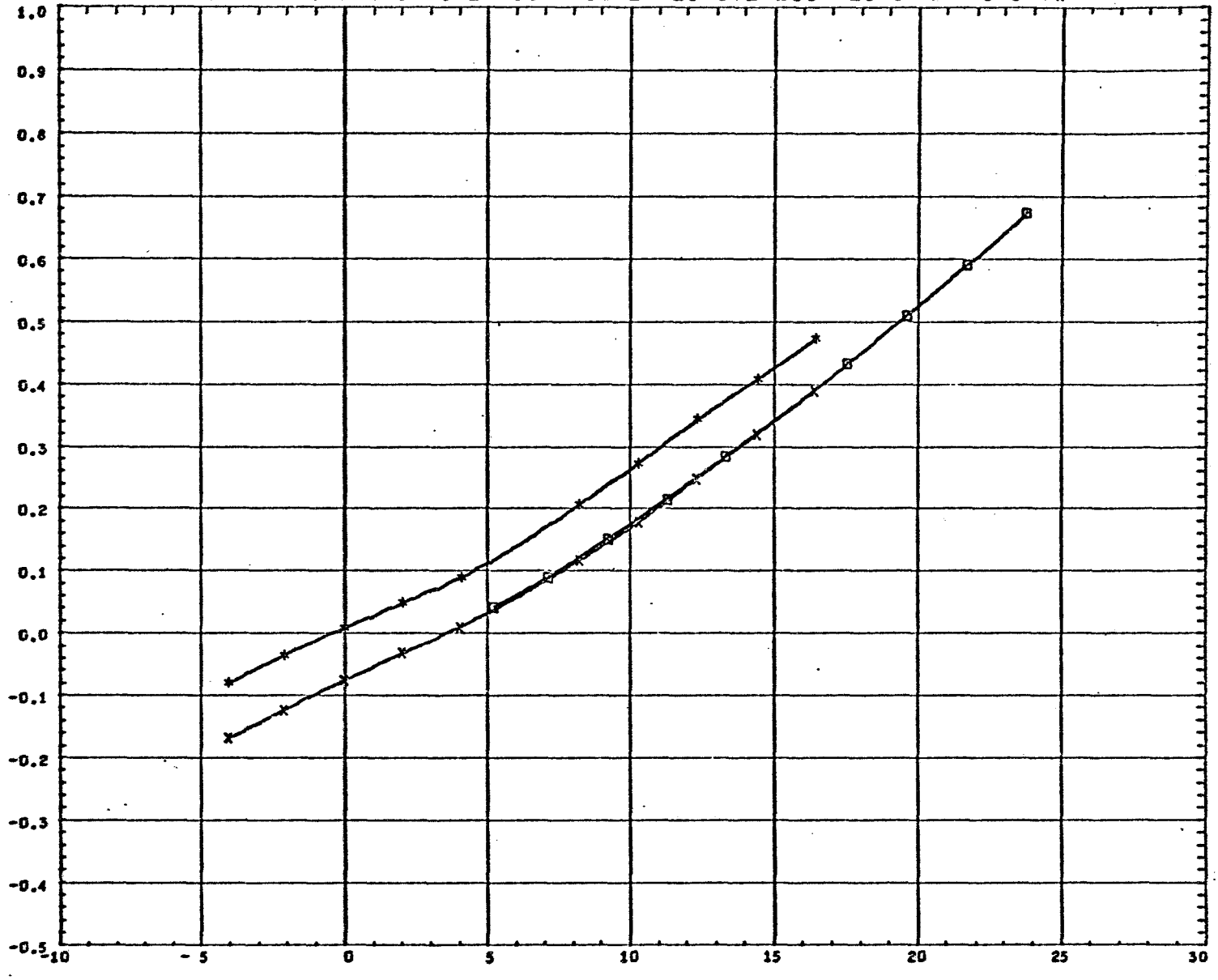


SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0		(R17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(B17022)	02 JUL 70	
B	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(B17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

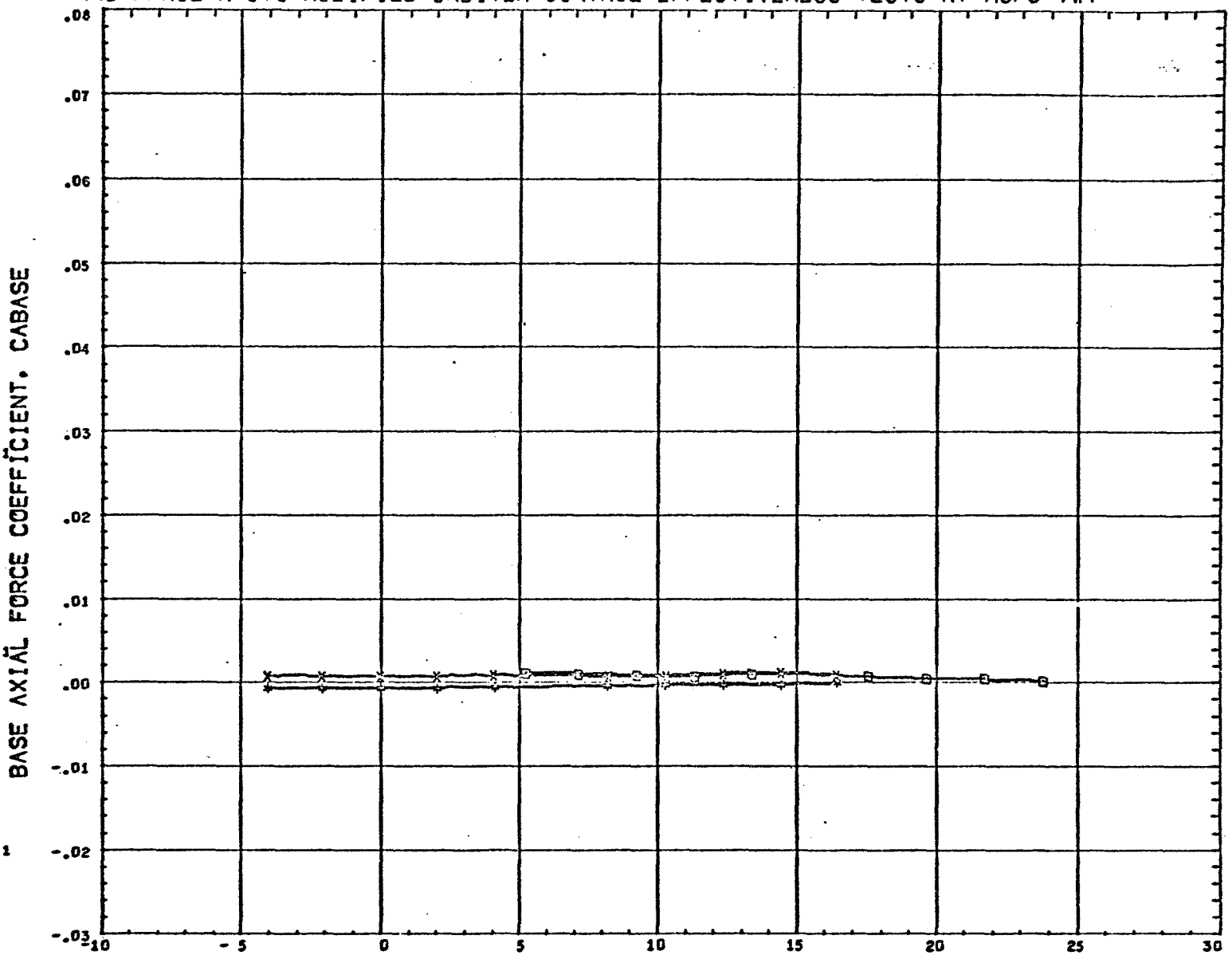


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MCO ORB B2W2E1 DEL E0	(817021)	02 JUL 70	0.395
X	MSFC 453 MMC MCO ORB B2W2E1 E=-15	(817022)	02 JUL 70	
⊡	MSFC 453 MMC MCO ORB B2W2E1 E=-15	(817023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

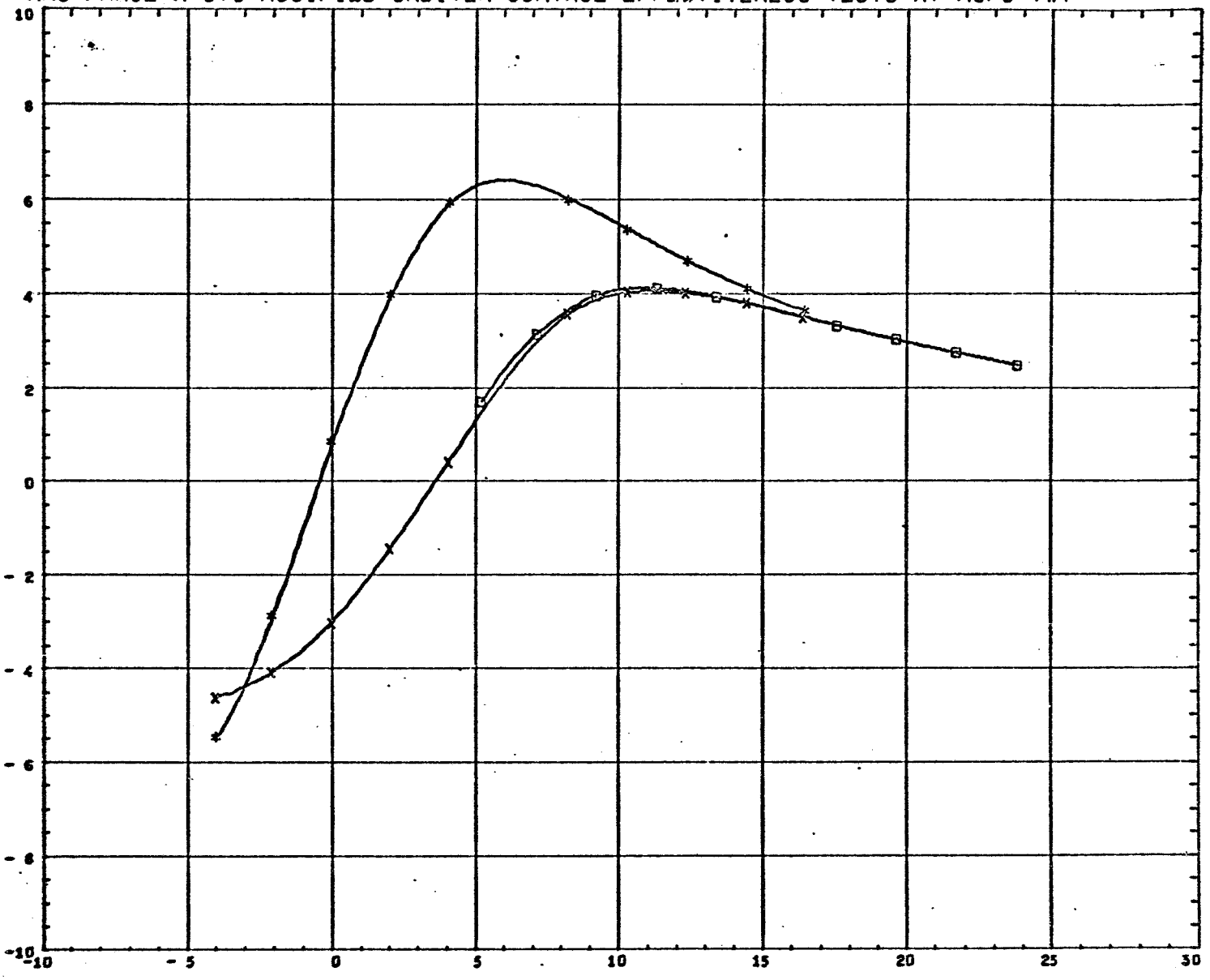


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0	(R17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17022)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

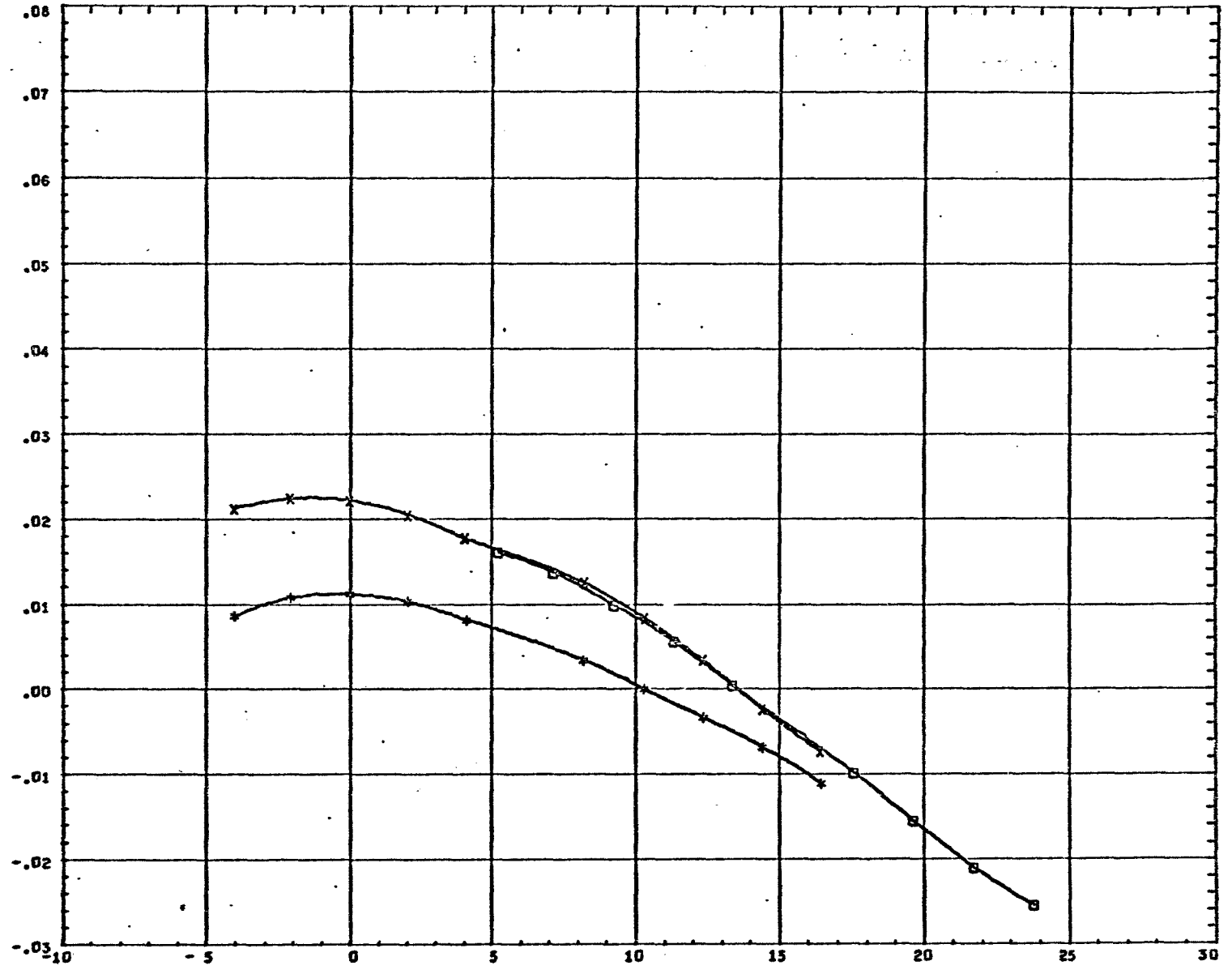


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0	(R17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17022)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

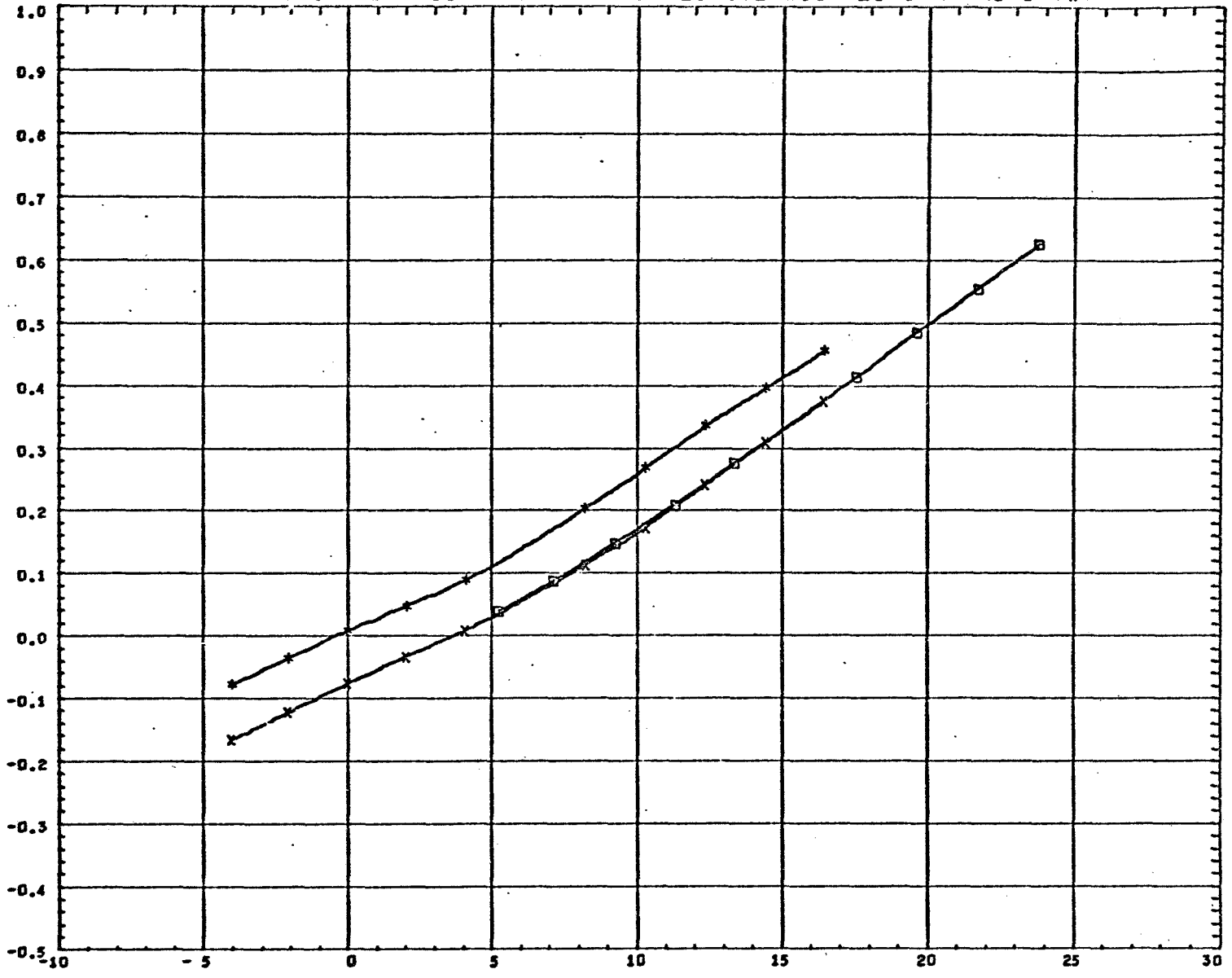


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0	(R17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17022)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(B17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

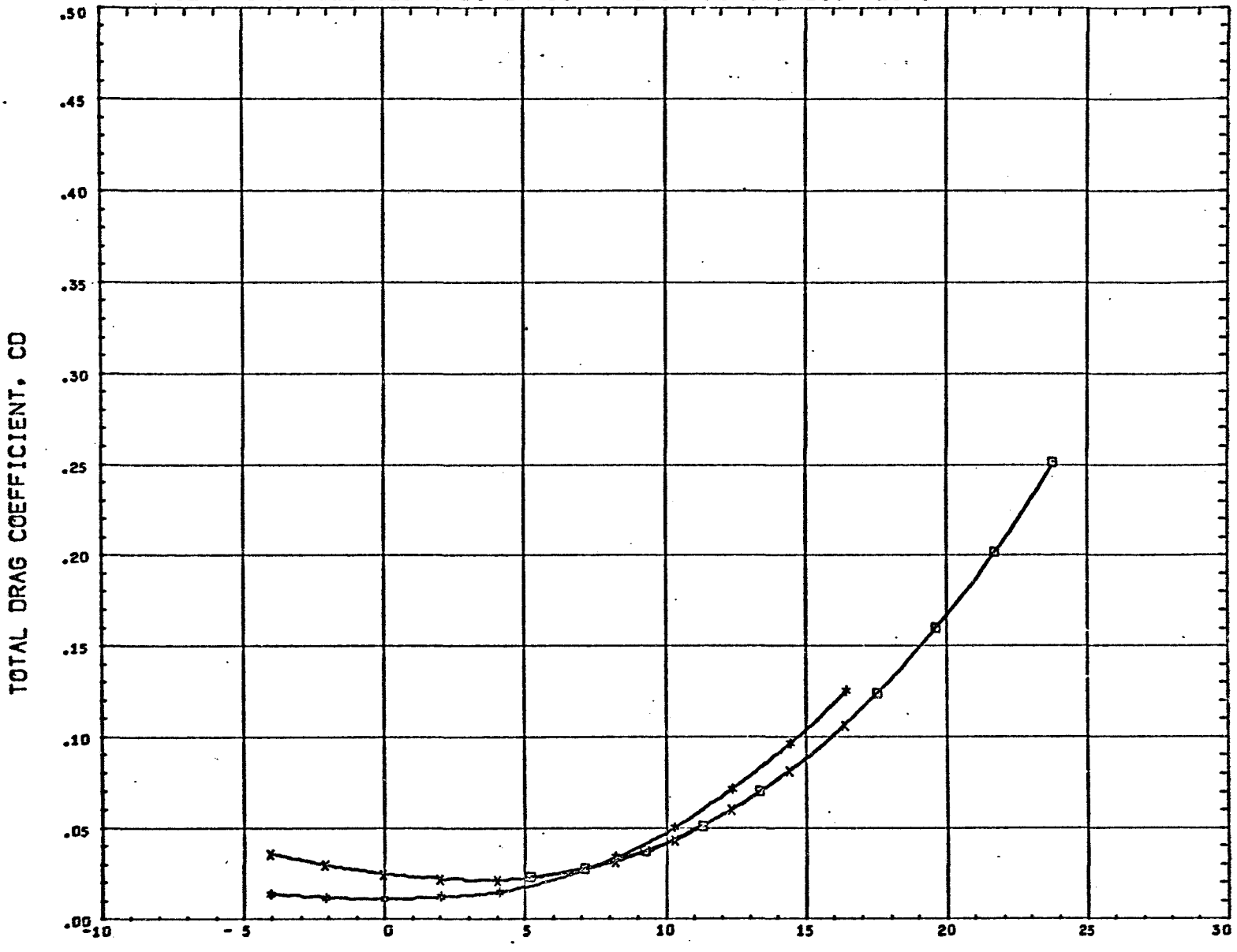


SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0		(S17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(T17022)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(T17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

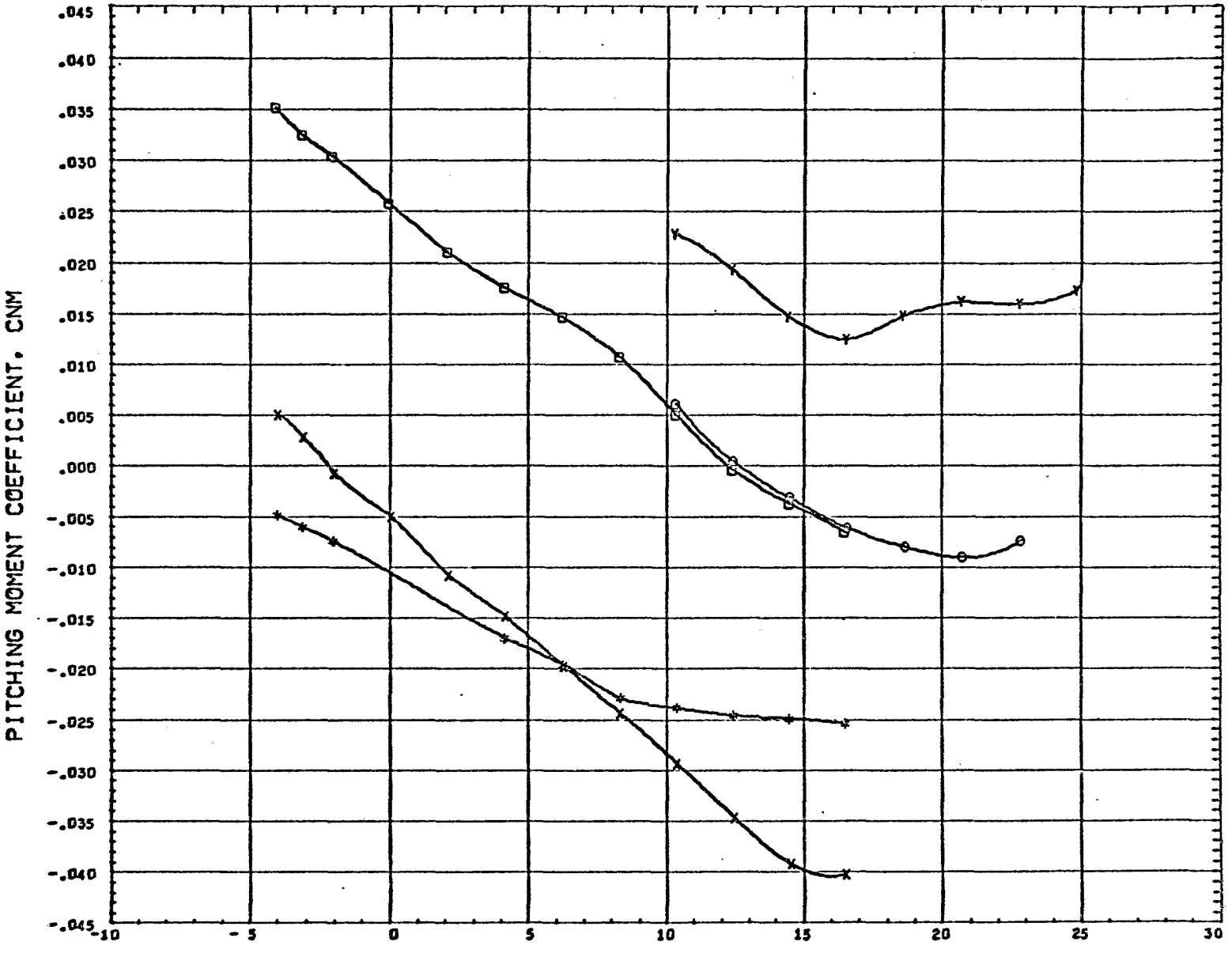


SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0		(S17021)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(T17022)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(T17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

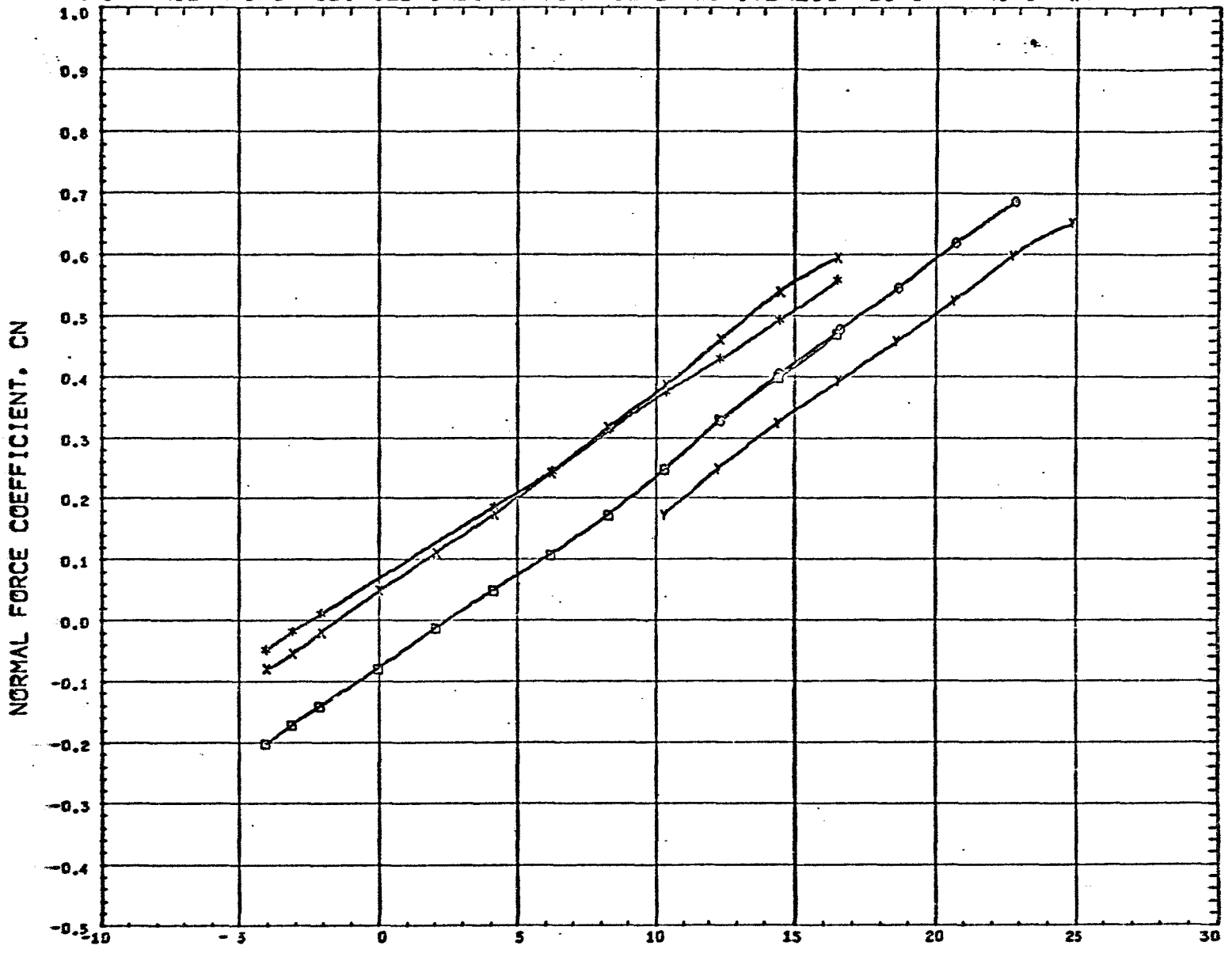


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

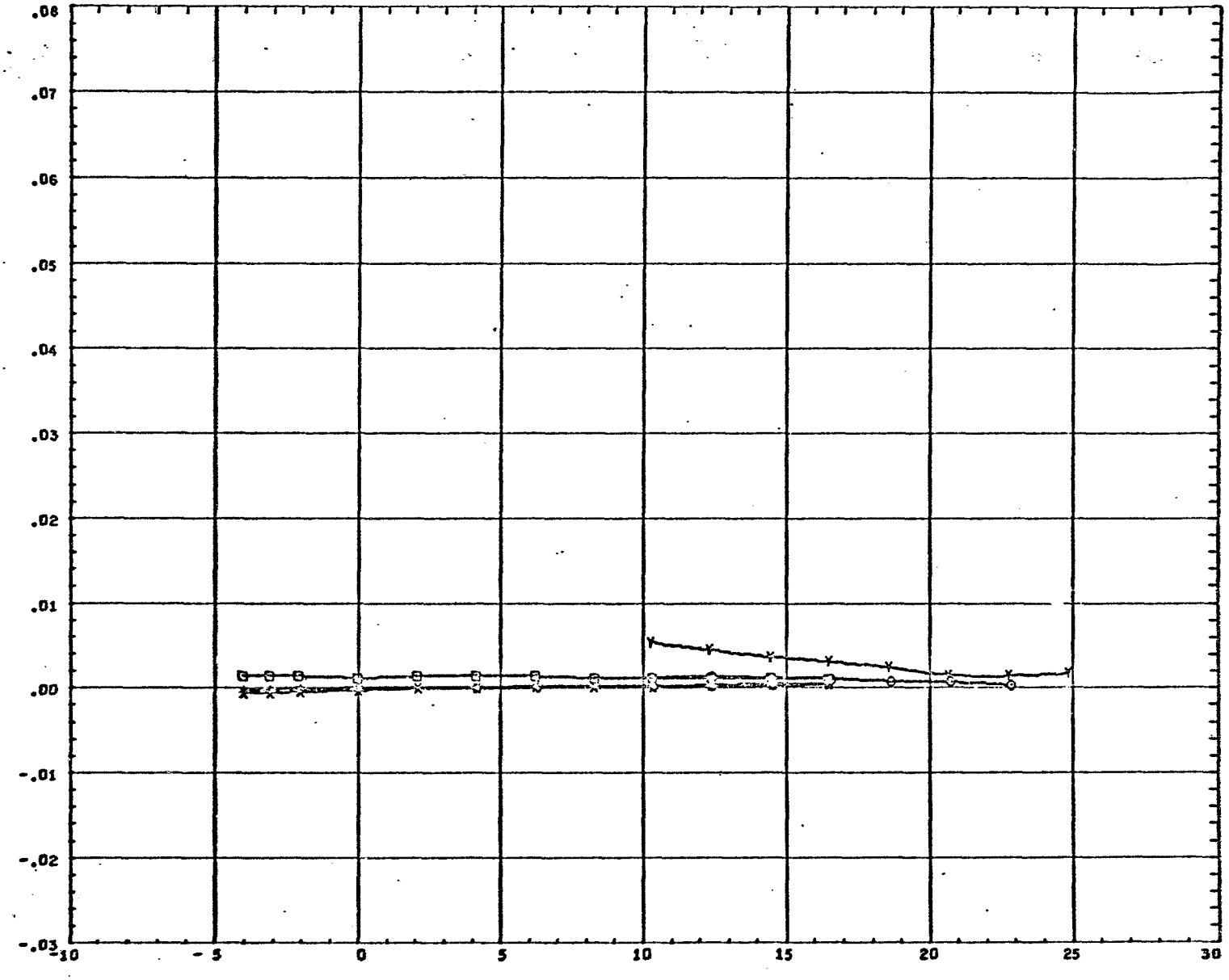


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
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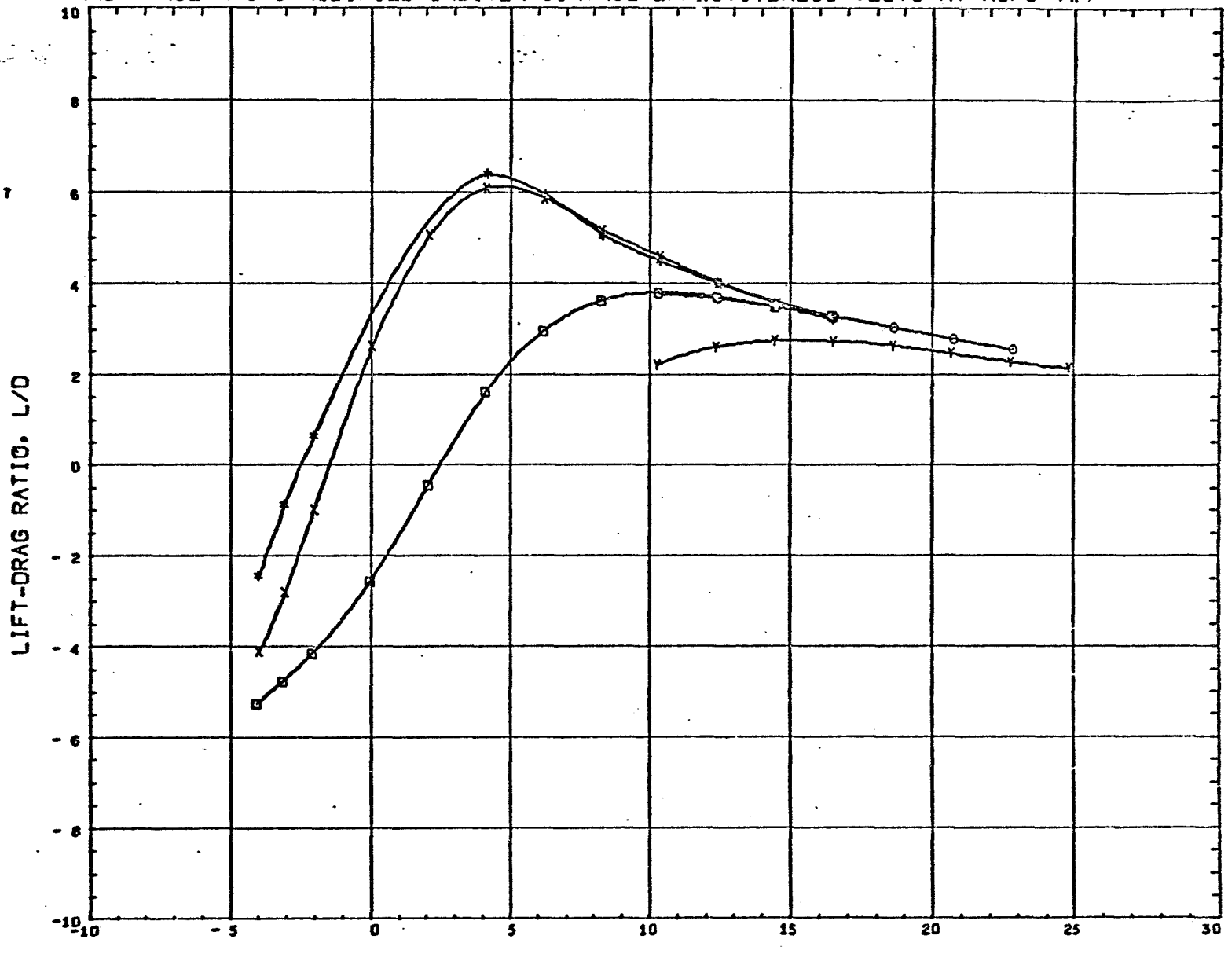
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

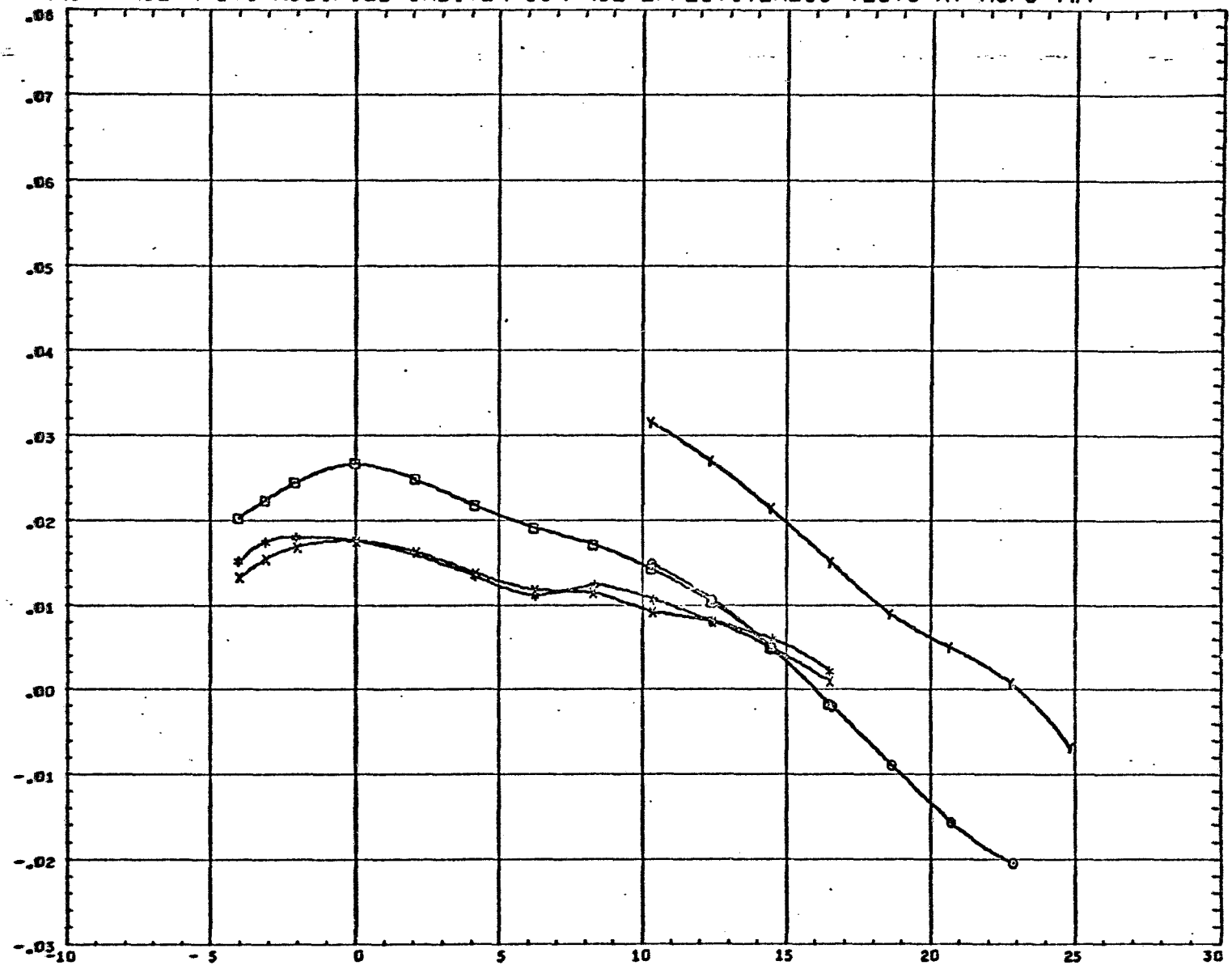


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
●	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

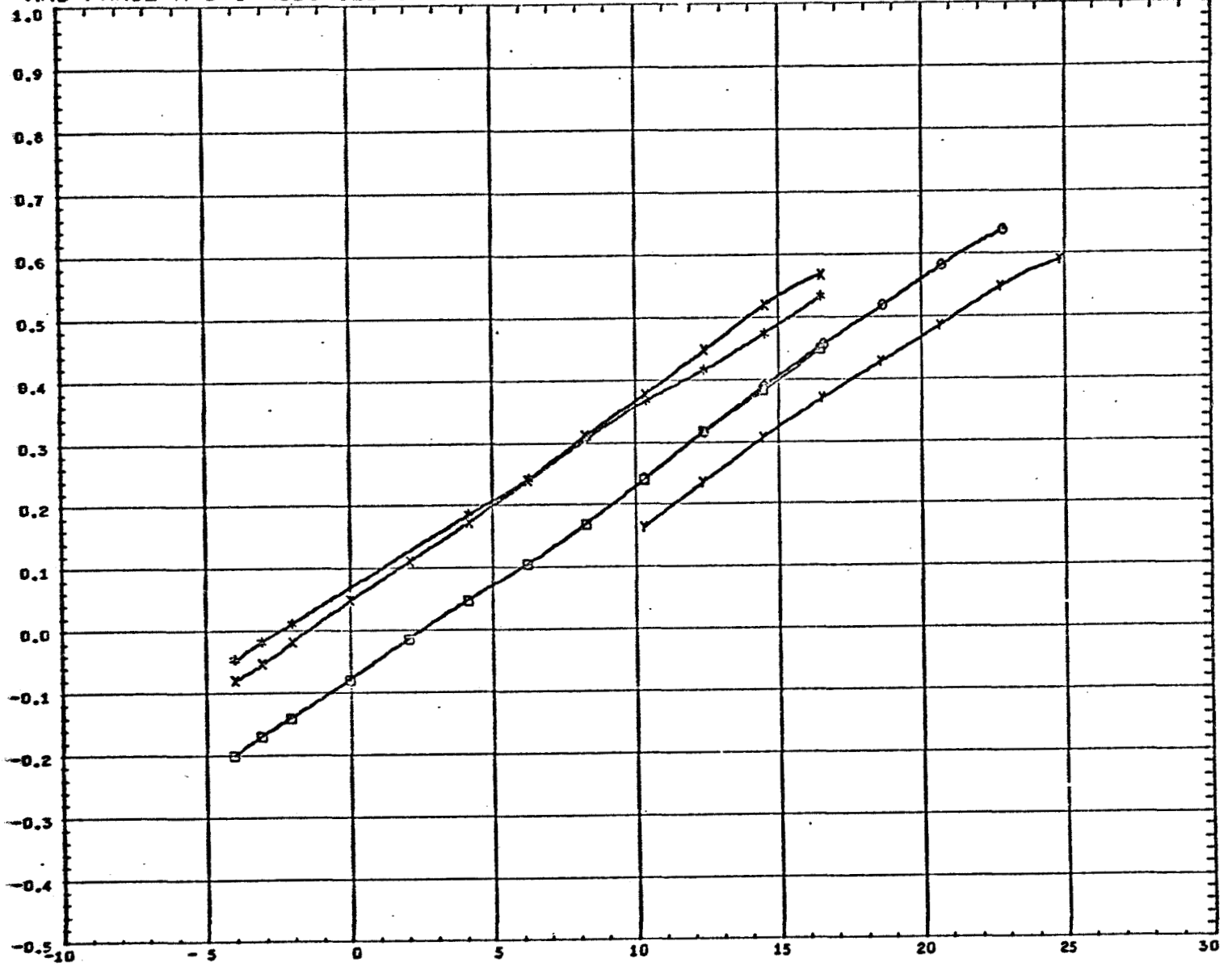


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

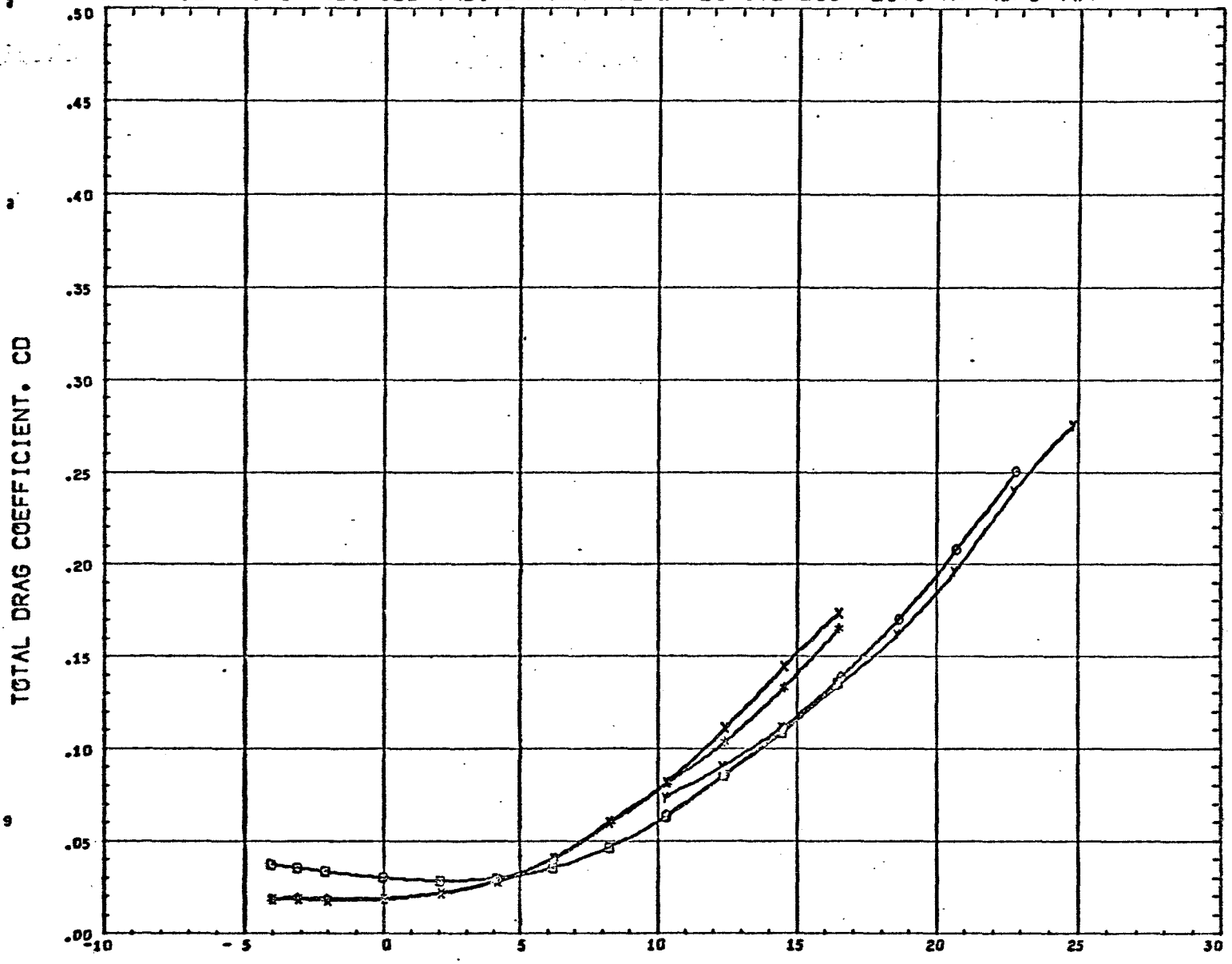


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(T17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(T17025)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17026)	02 JUL 70	
◇	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(T17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

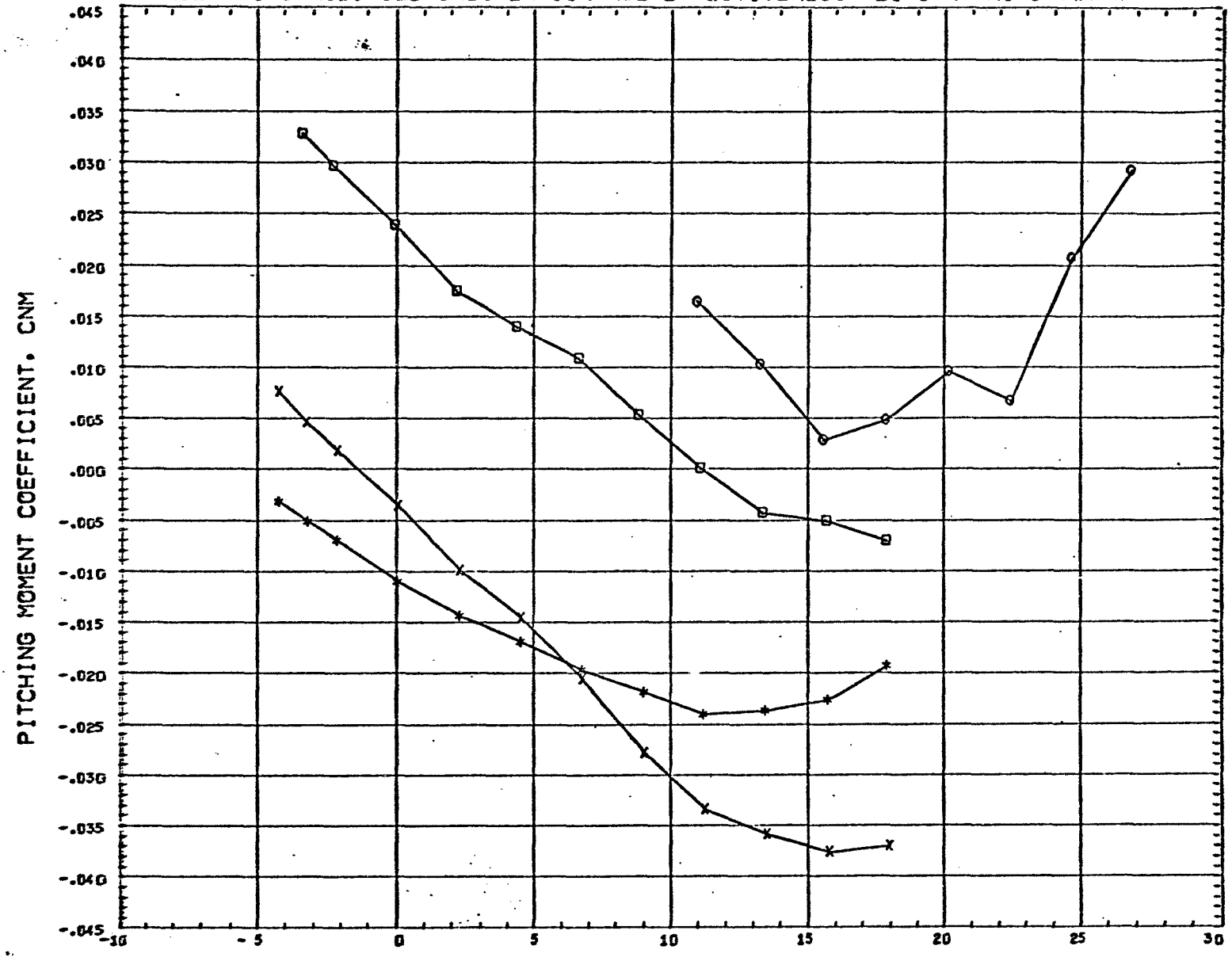


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(T17024)	02 JUL 70	0.395
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(T17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(T17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

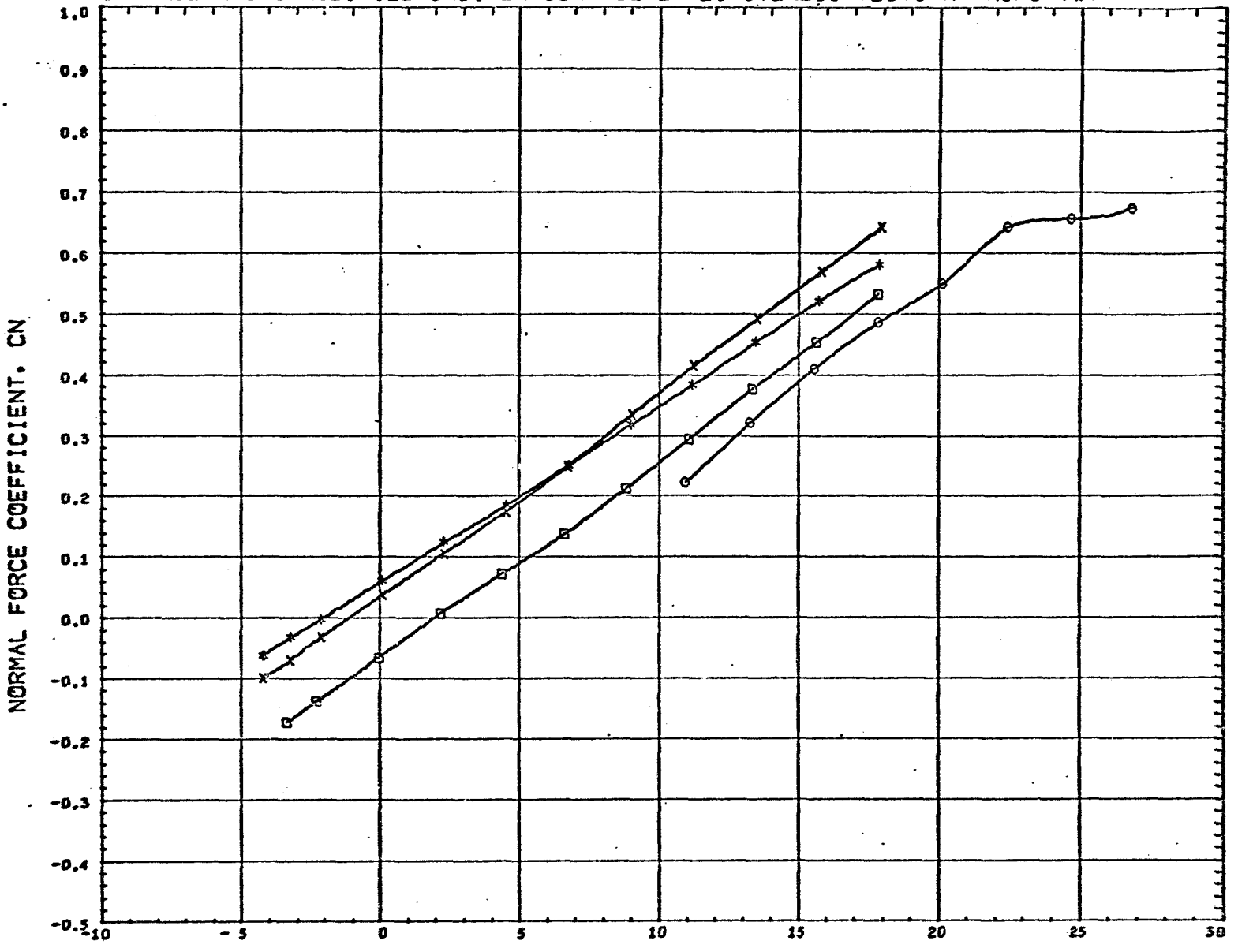


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	06 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	06 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

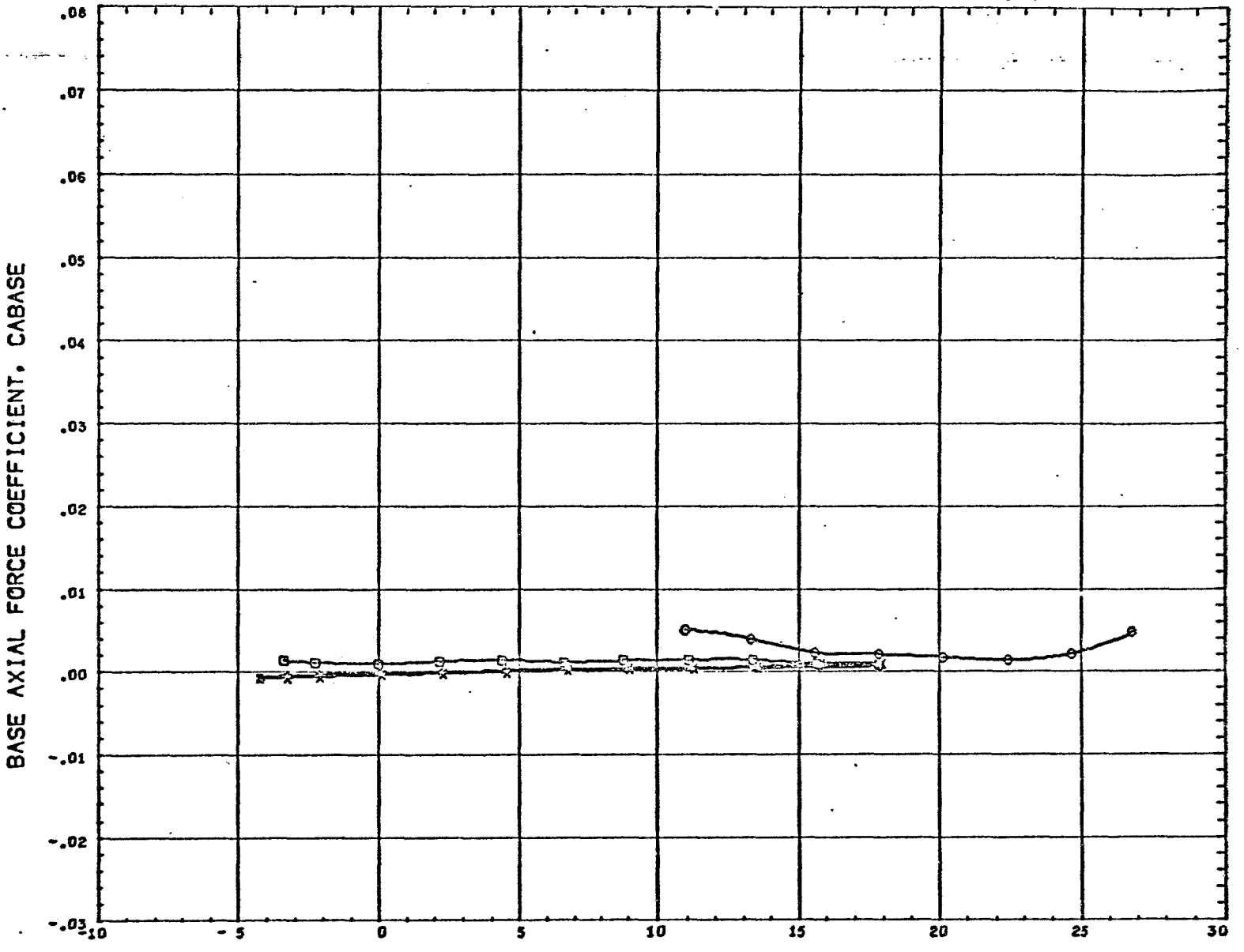


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

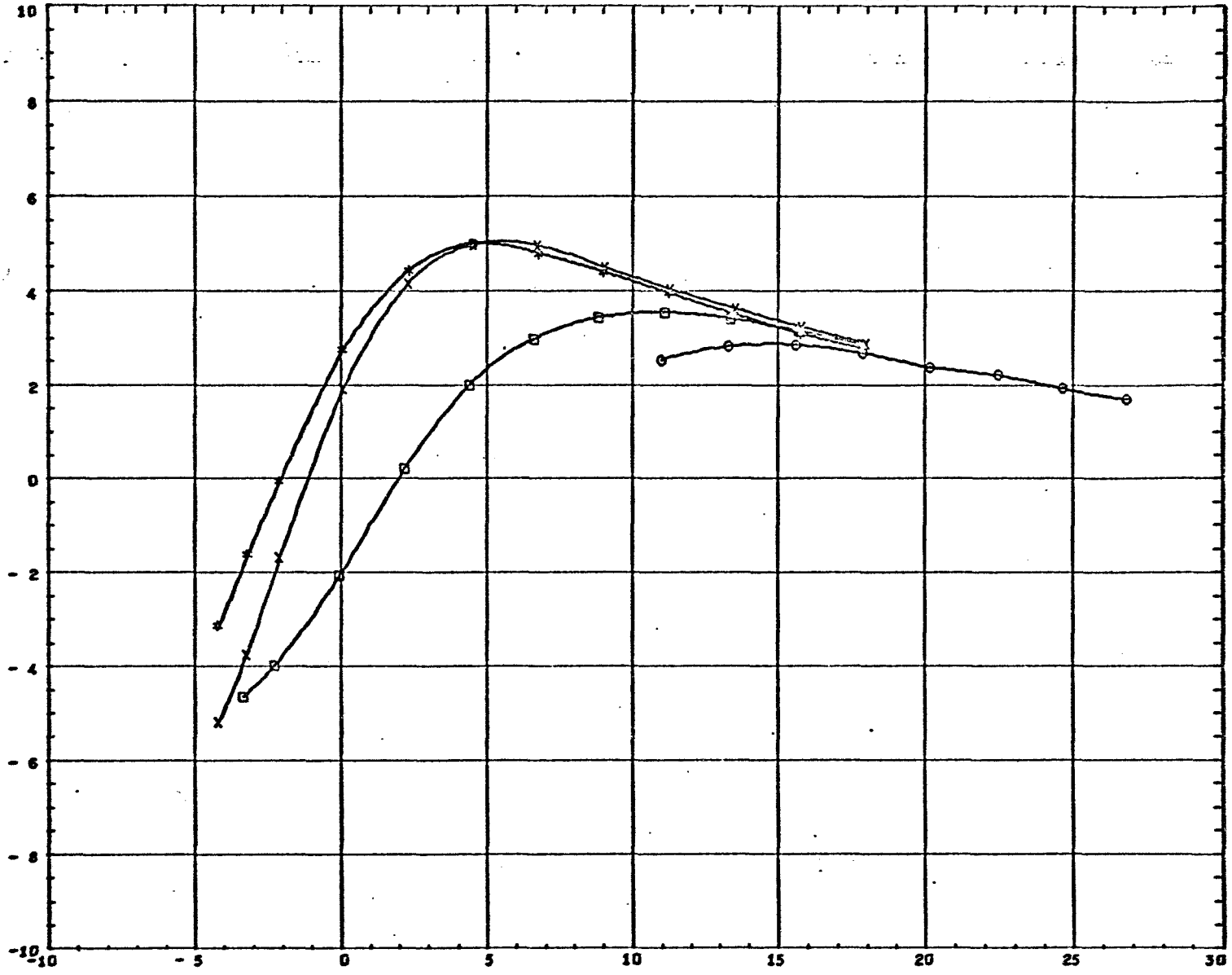


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
●	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
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ZMRP	0.045	

REFERENCE FILE.

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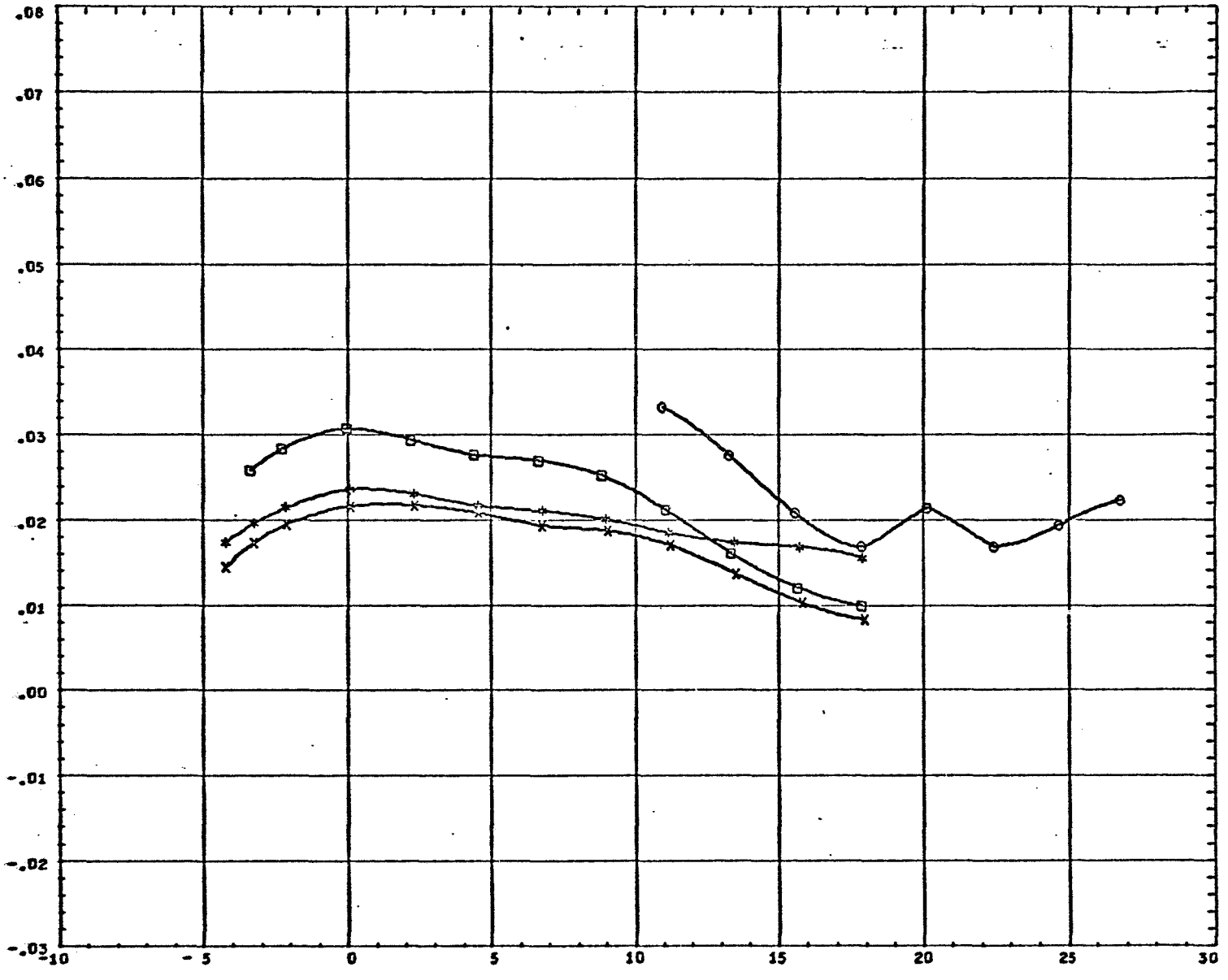

SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
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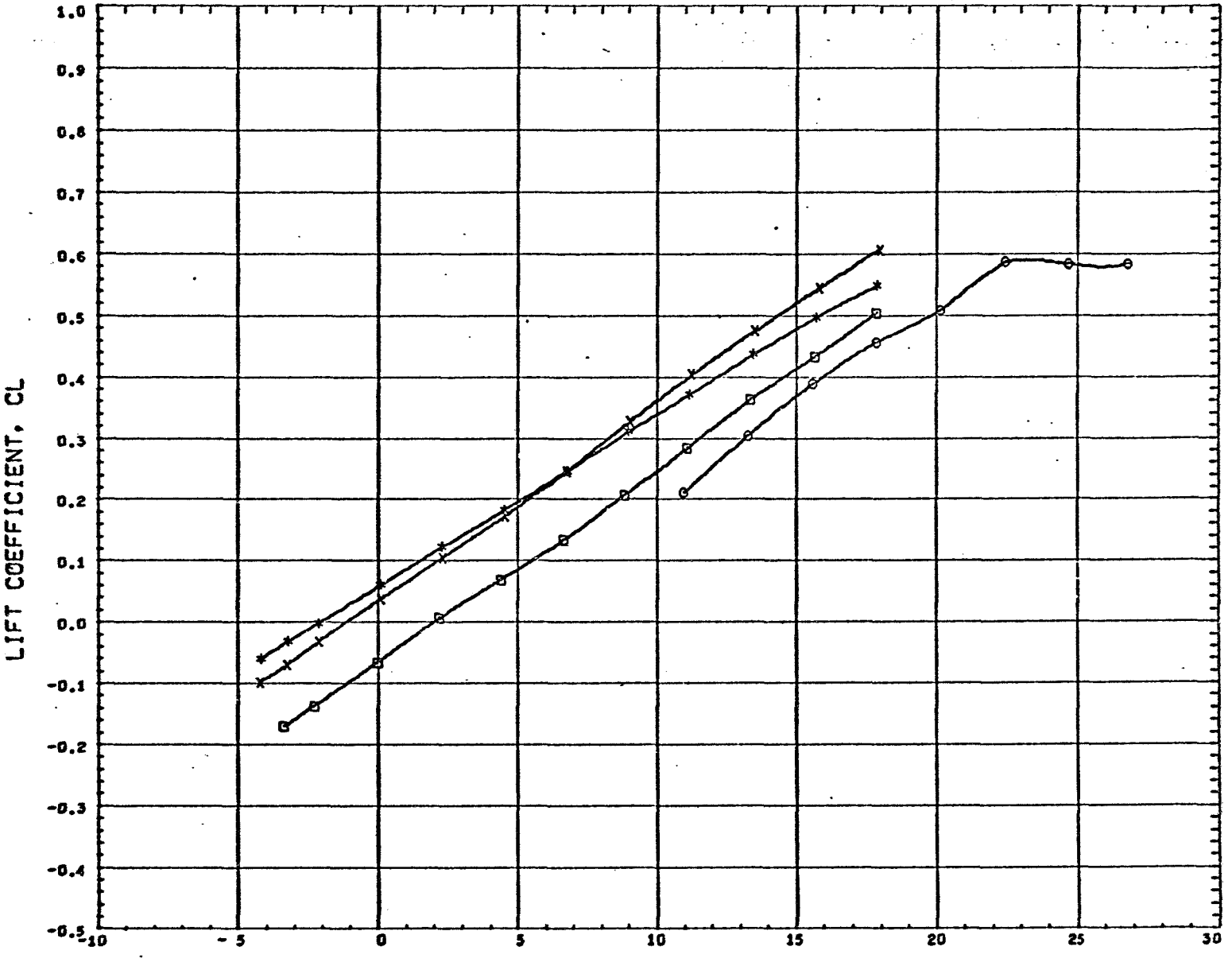
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

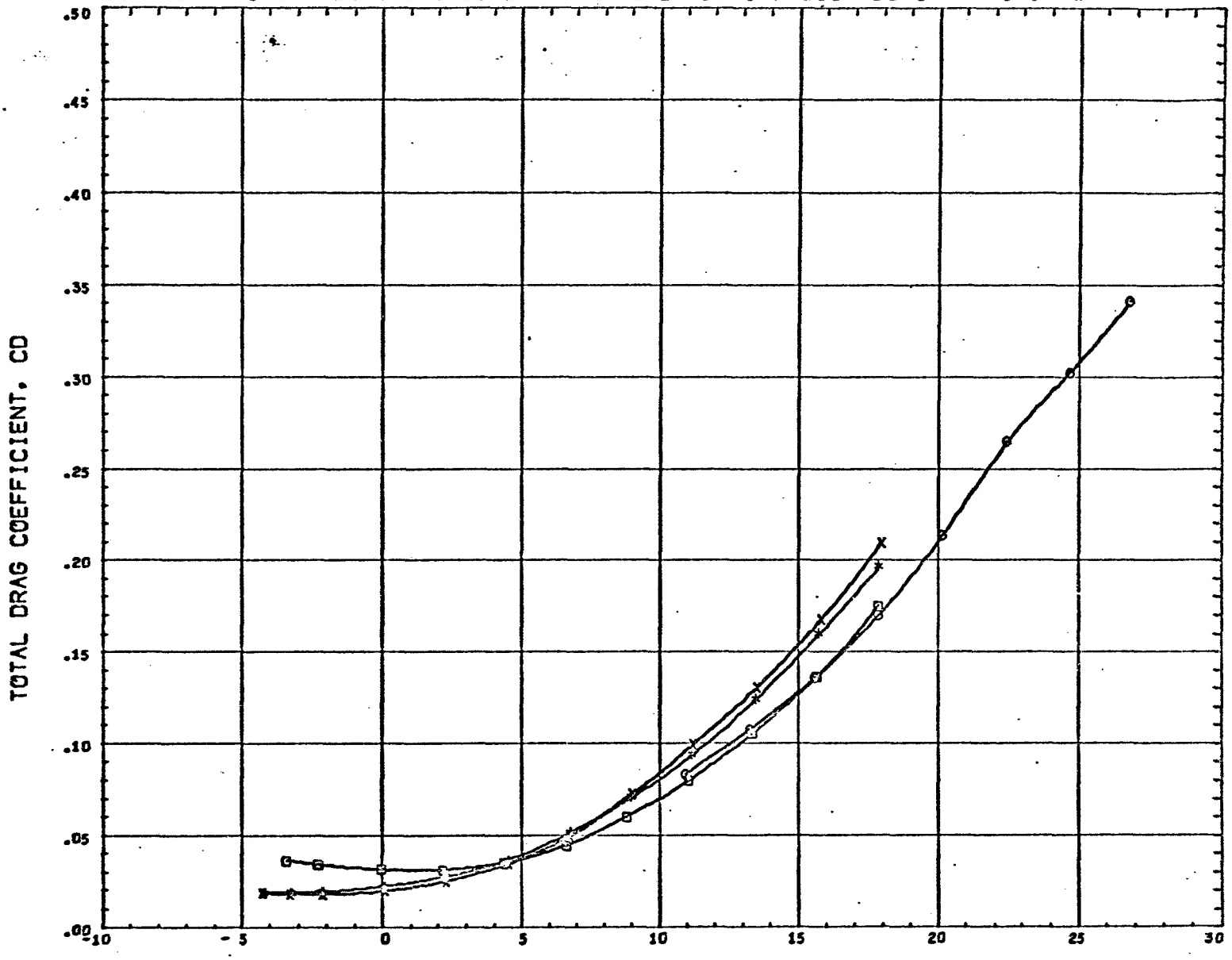


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(U17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(U17025)	02 JUL 70	
☐	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(U17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(U17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

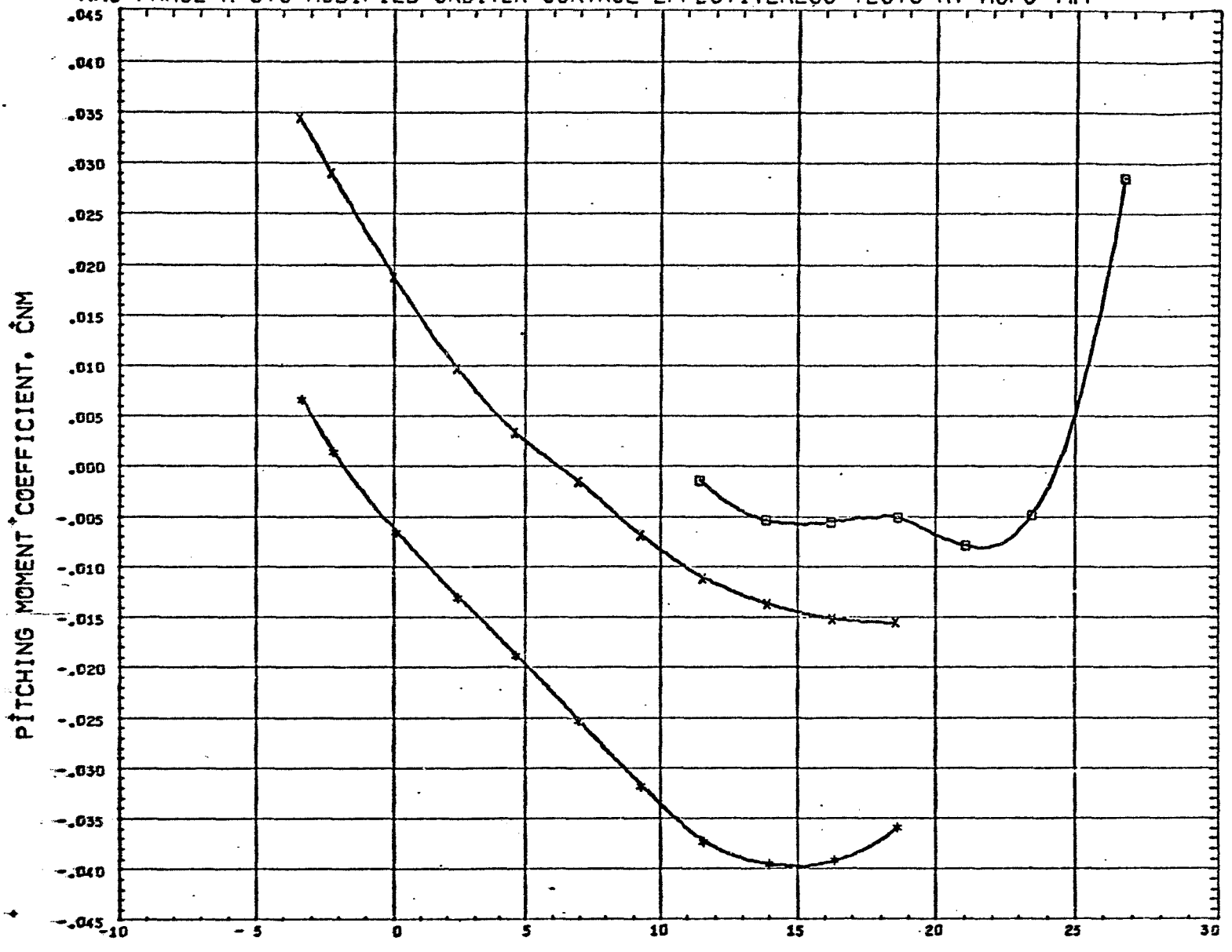


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(U17024)	02 JUL 70	0.794
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(U17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(U17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(U17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(D17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

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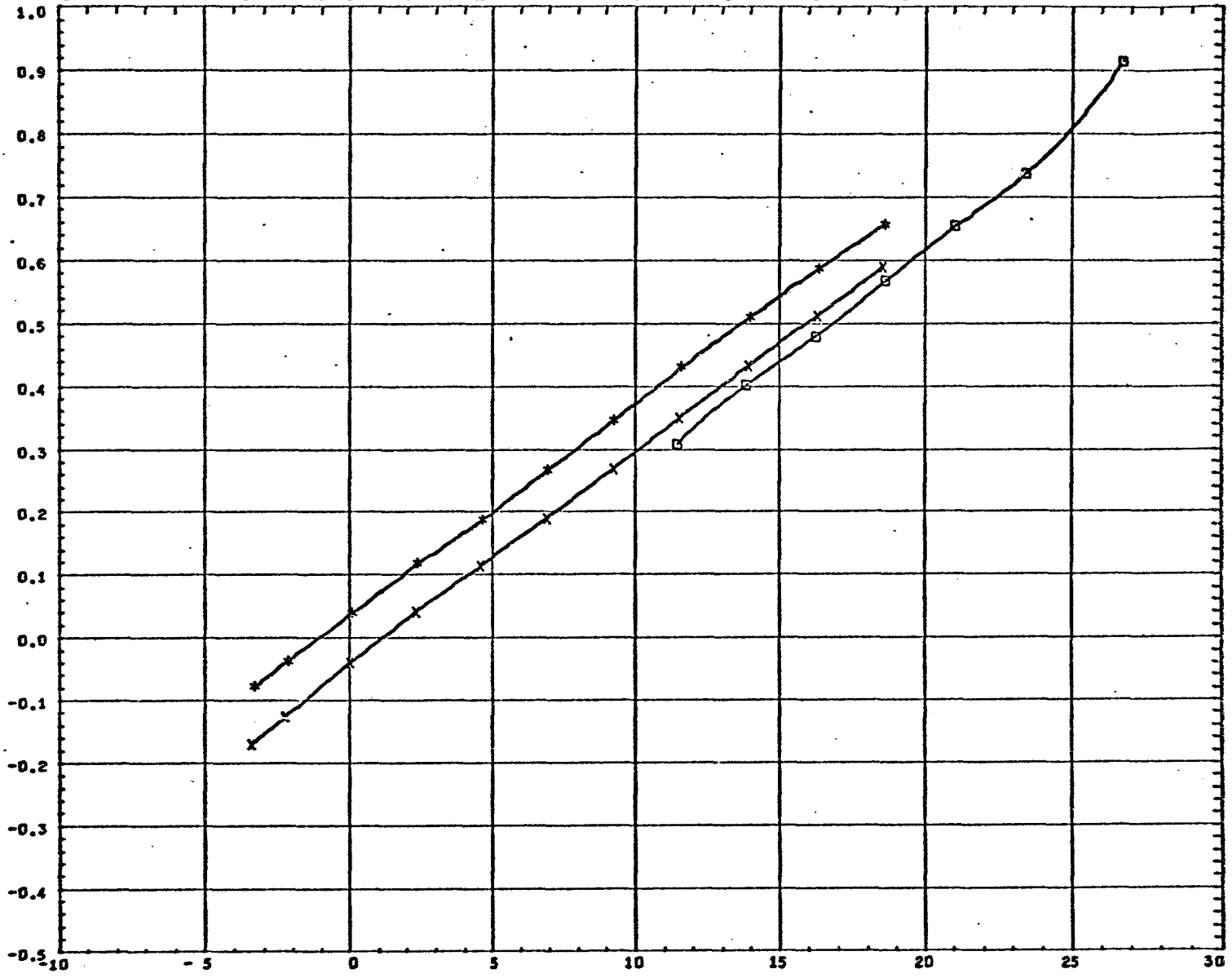
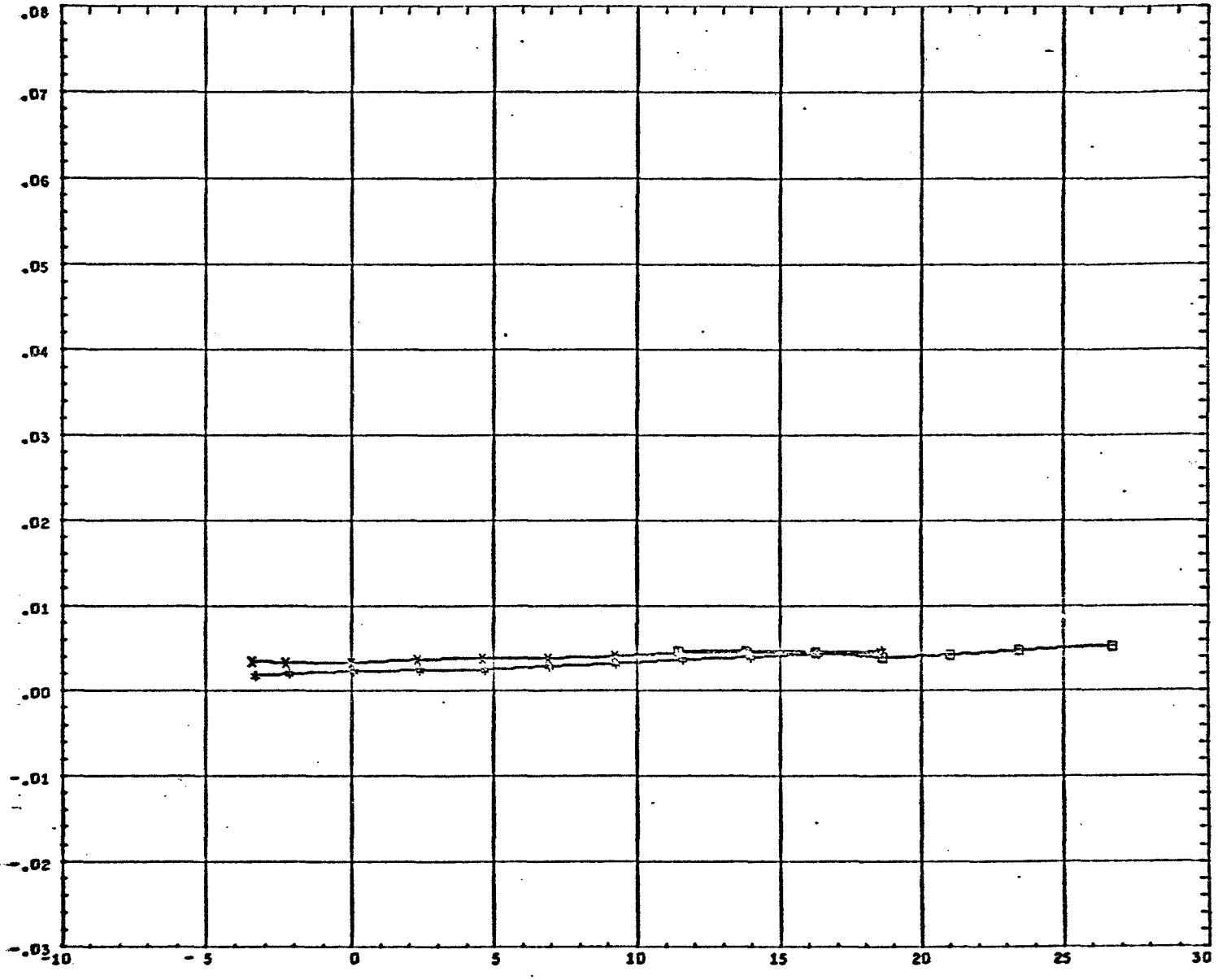


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(D17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.495	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

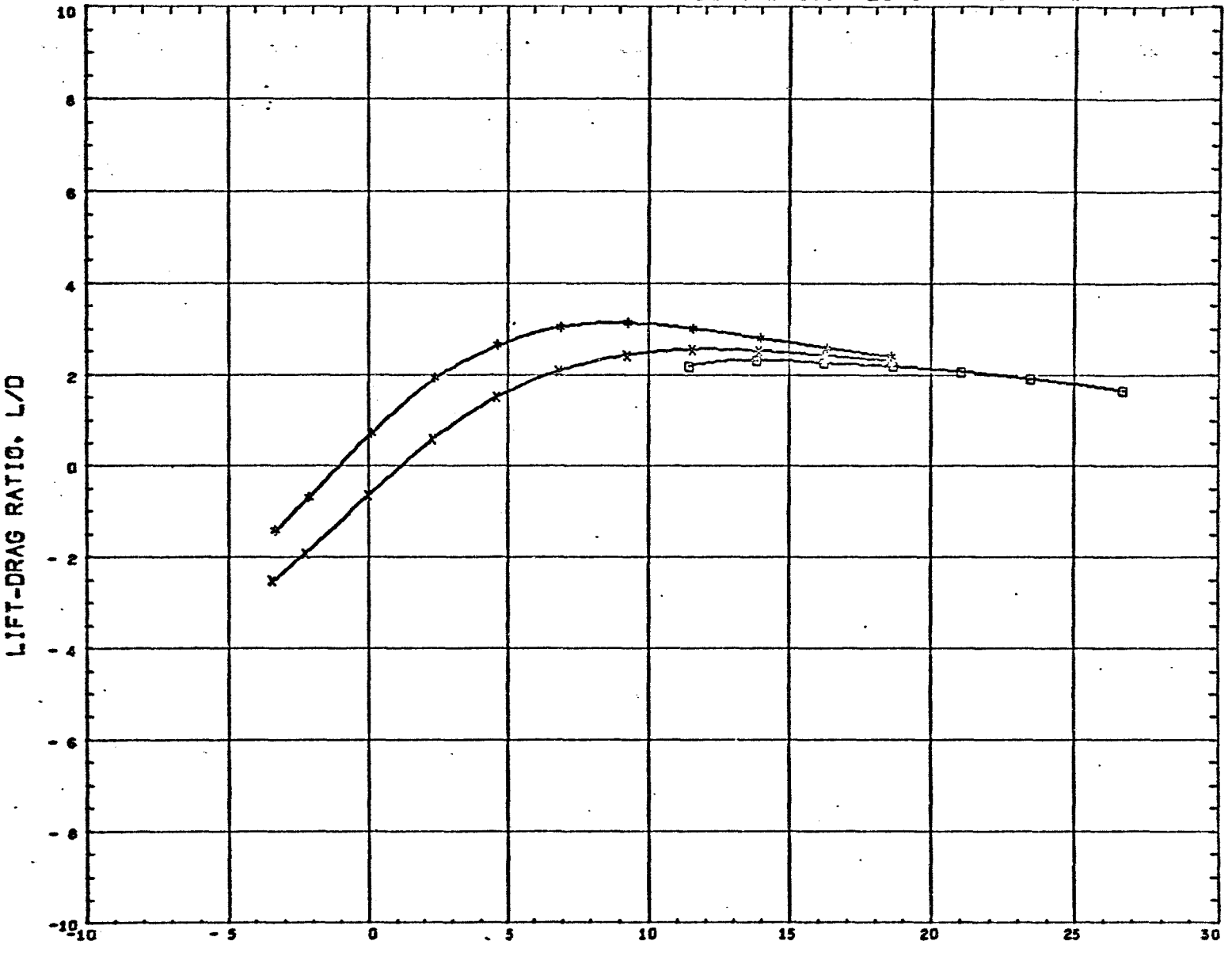


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(D17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
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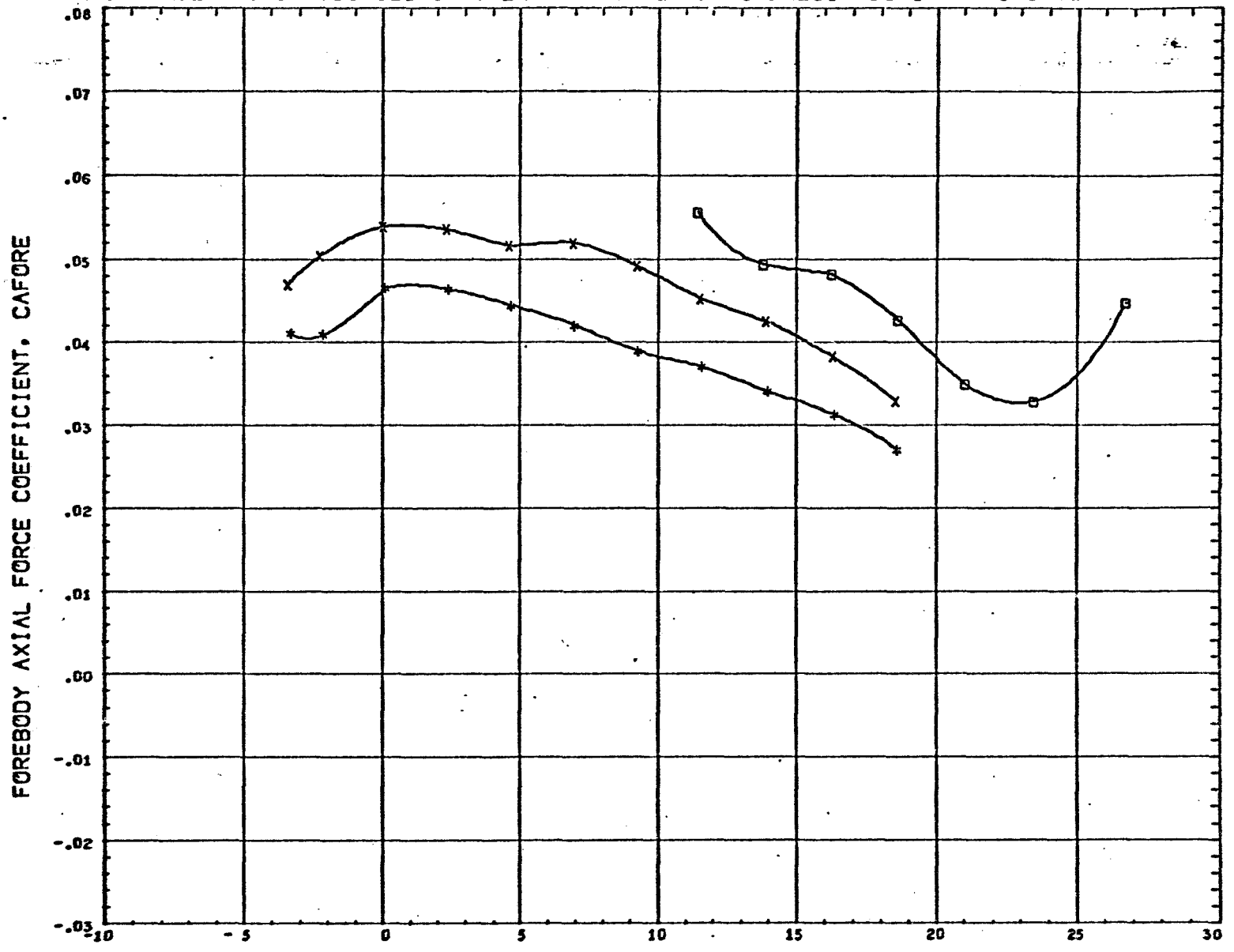
REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(D17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
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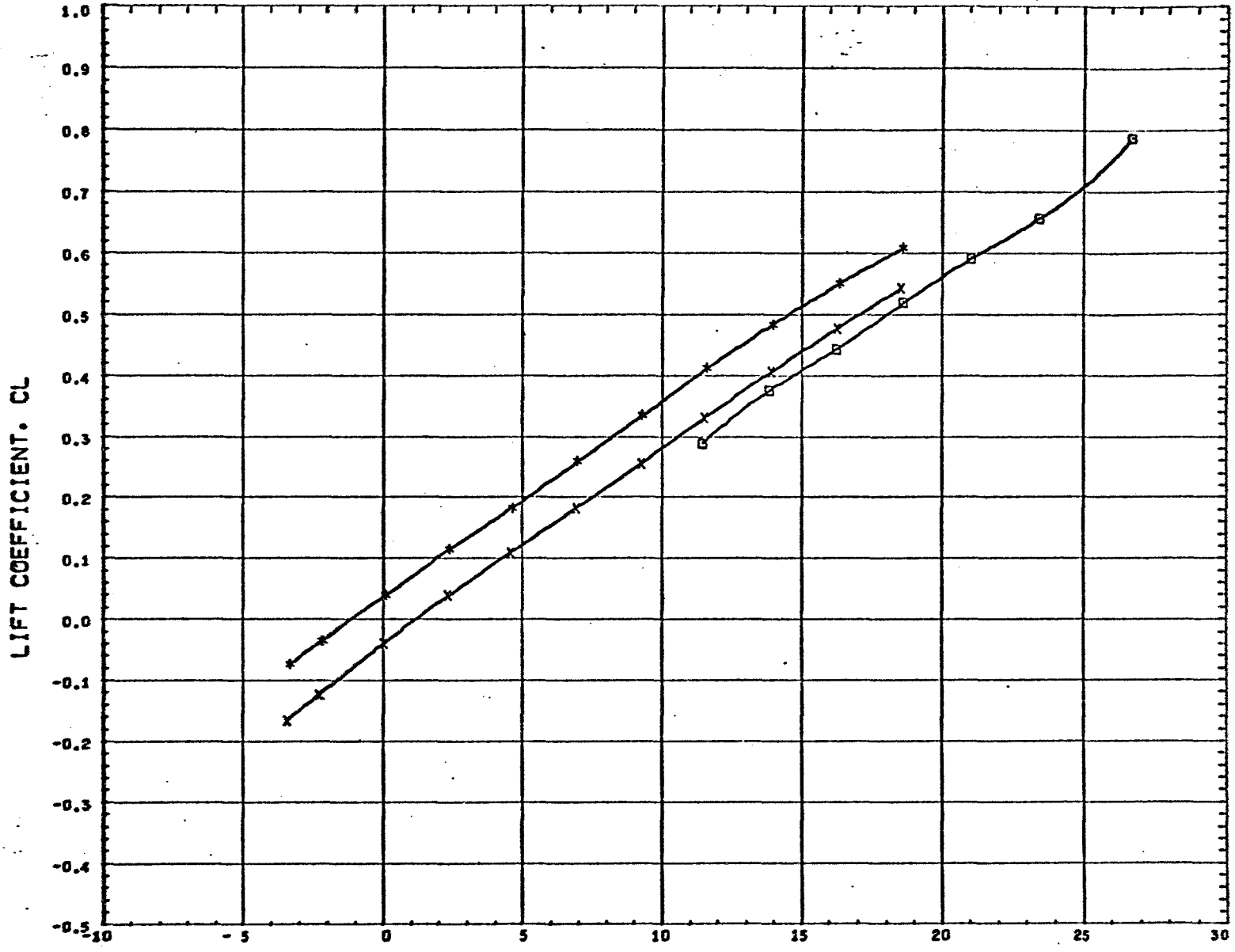
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(V17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(V17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(V17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.495	FT.
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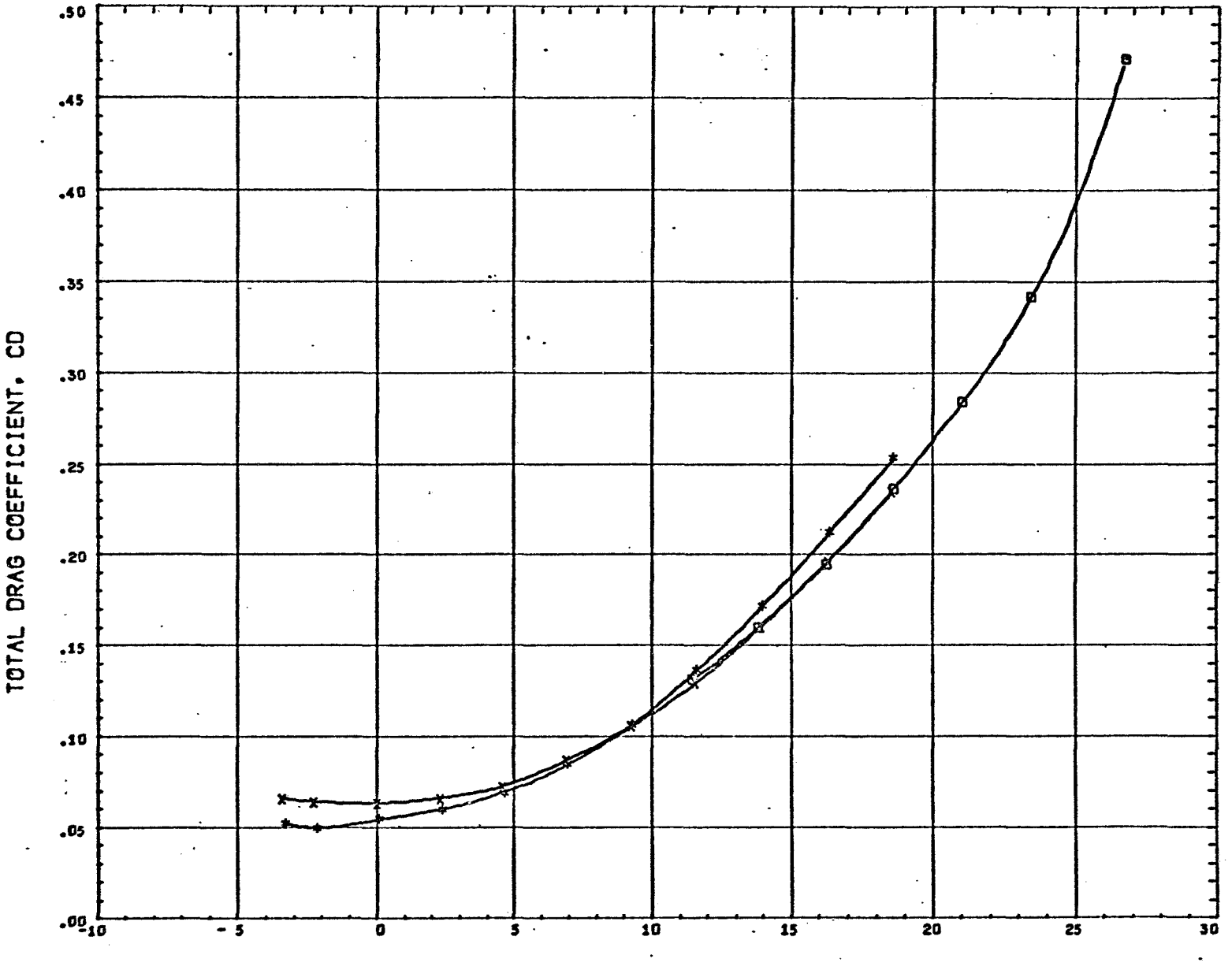
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(V17025)	02 JUL 70	0.995
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(V17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(V17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
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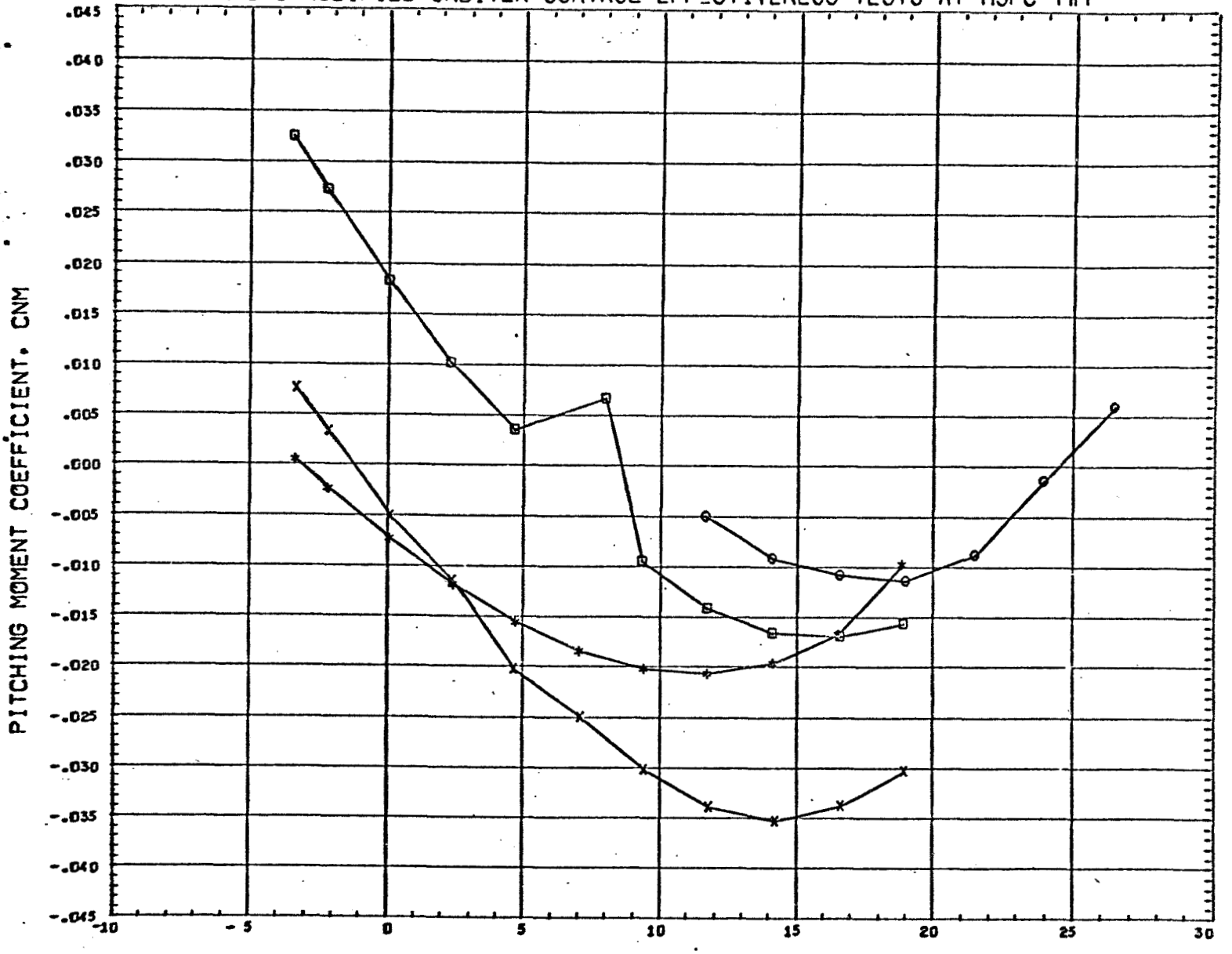
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION
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X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30

DATA SET	DATE	MACH NUMBER
(E17024)	06 JUL 70	1.198
(E17025)	06 JUL 70	
(E17026)	06 JUL 70	
(E17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
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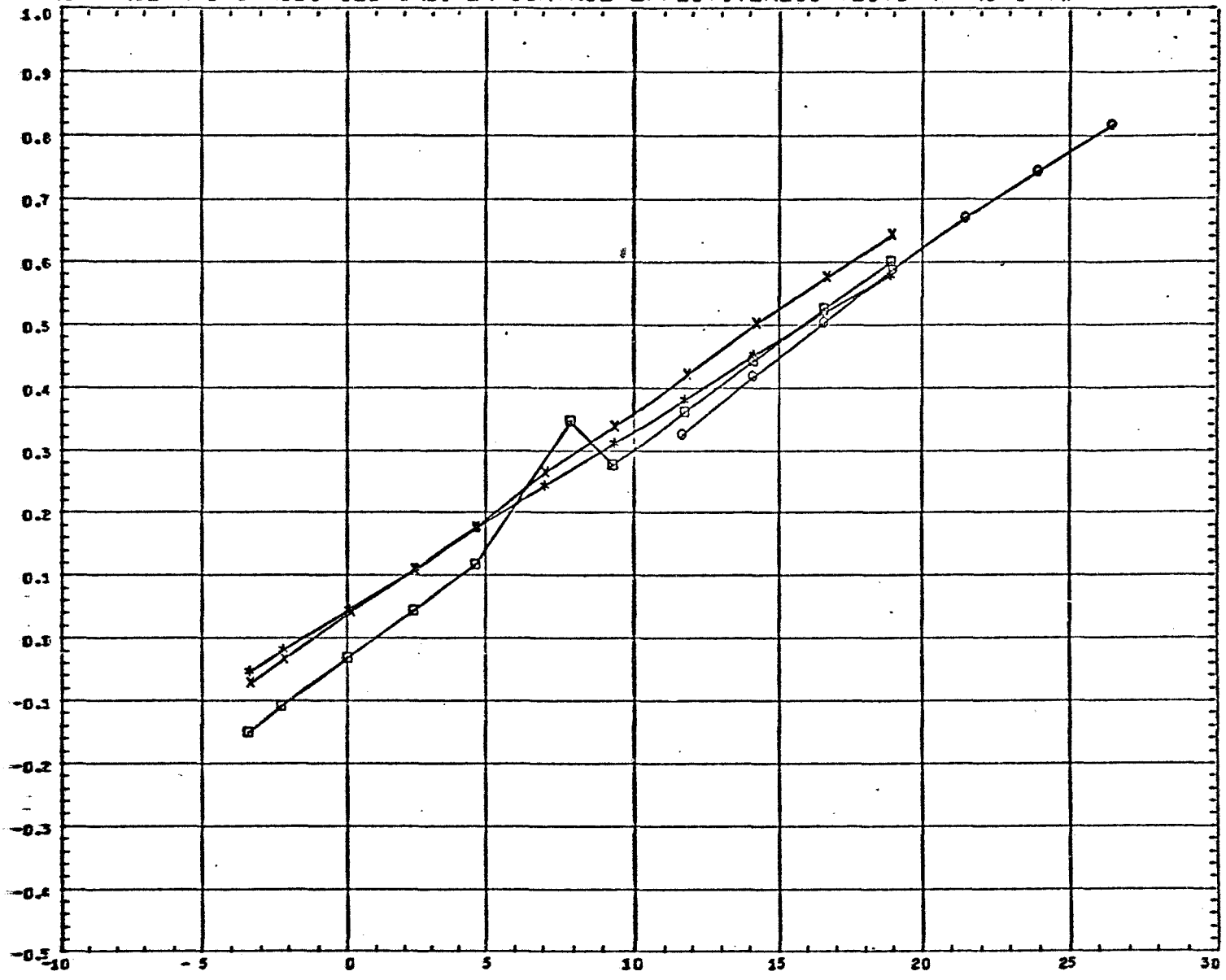
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(E17024)	06 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(E17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(E17026)	06 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(E17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
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REFERENCE FILE.

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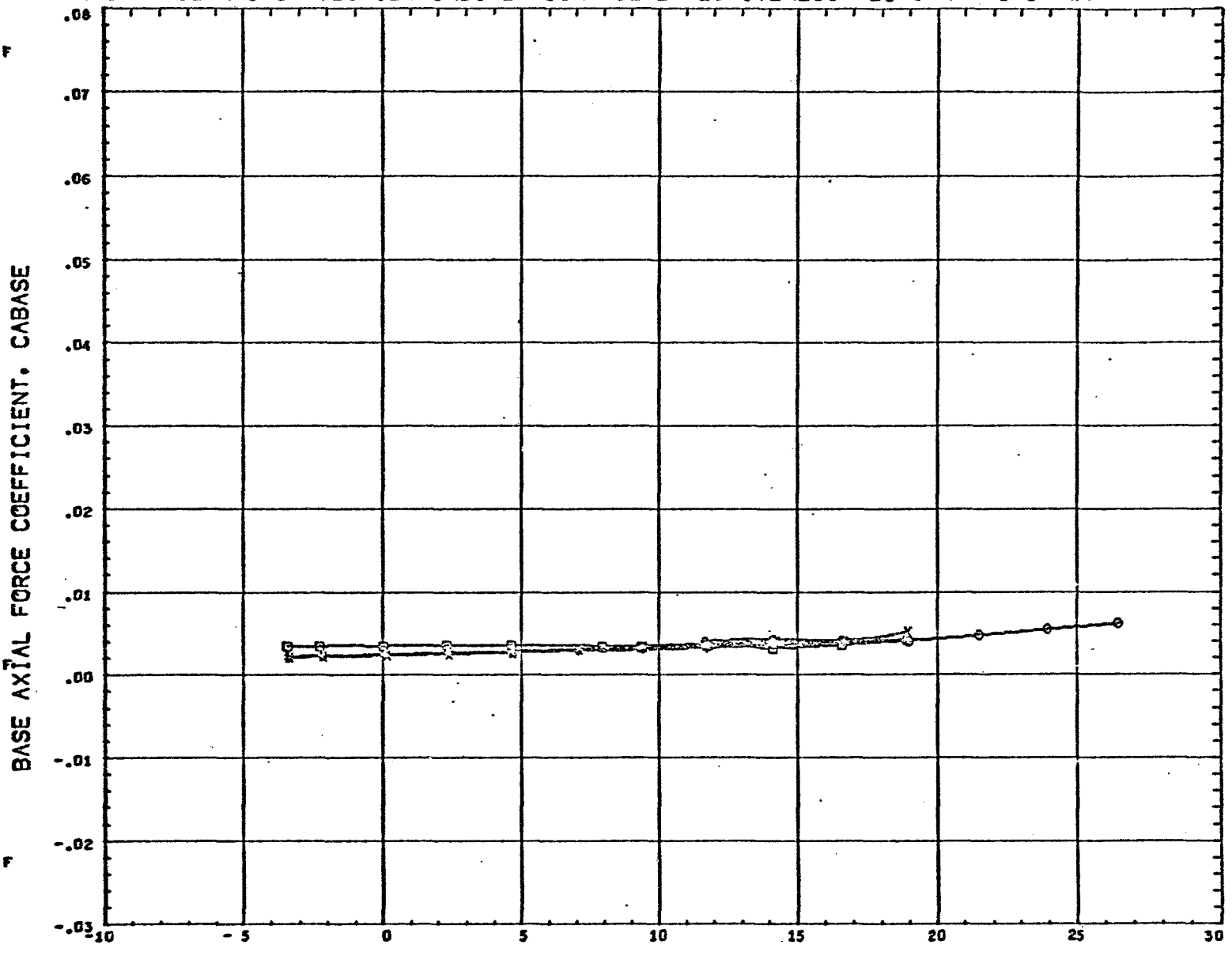

SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
●	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(E17024)	02 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(E17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(E17026)	02 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(E17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
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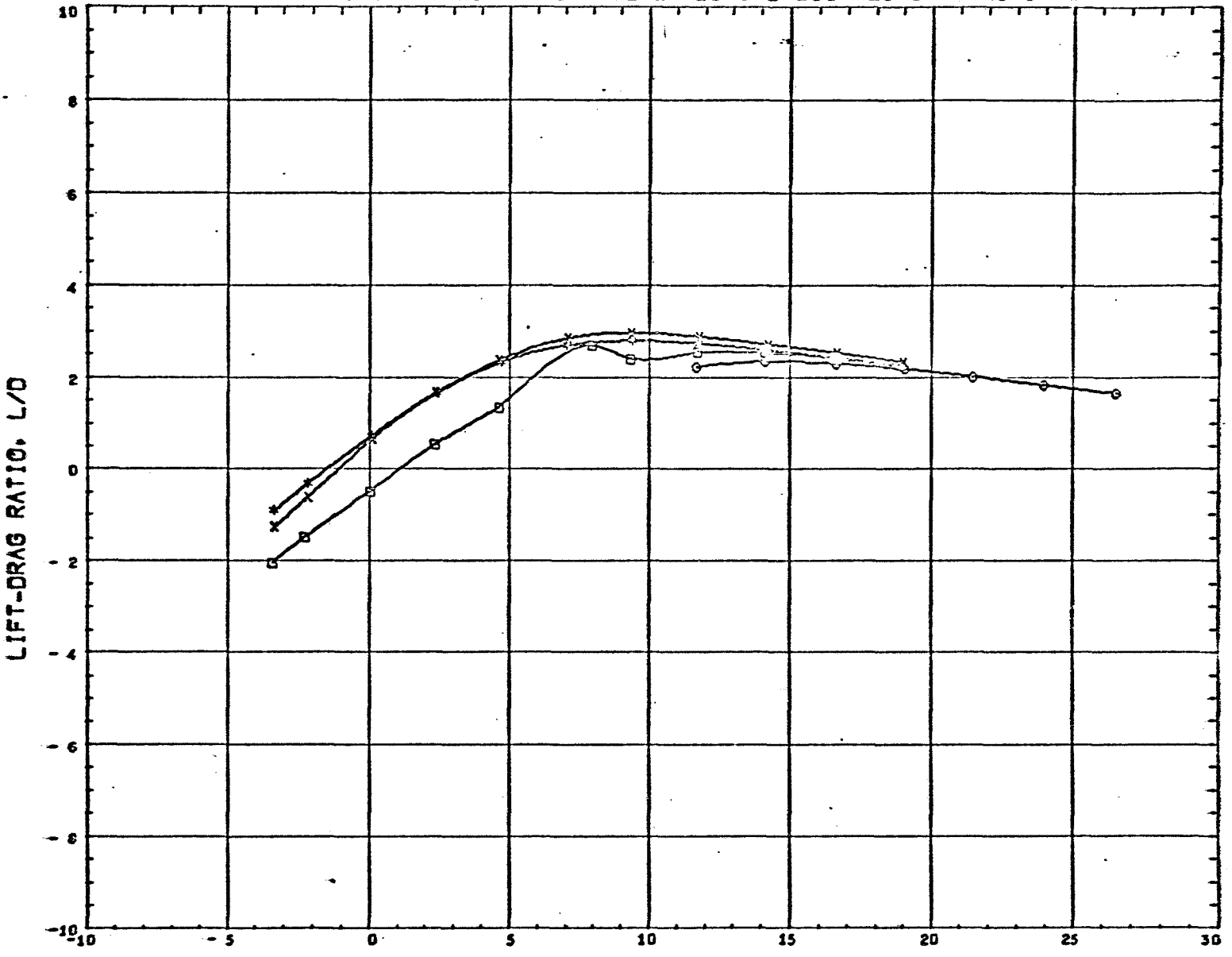
REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(E17024)	02 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(E17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(E17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(E17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
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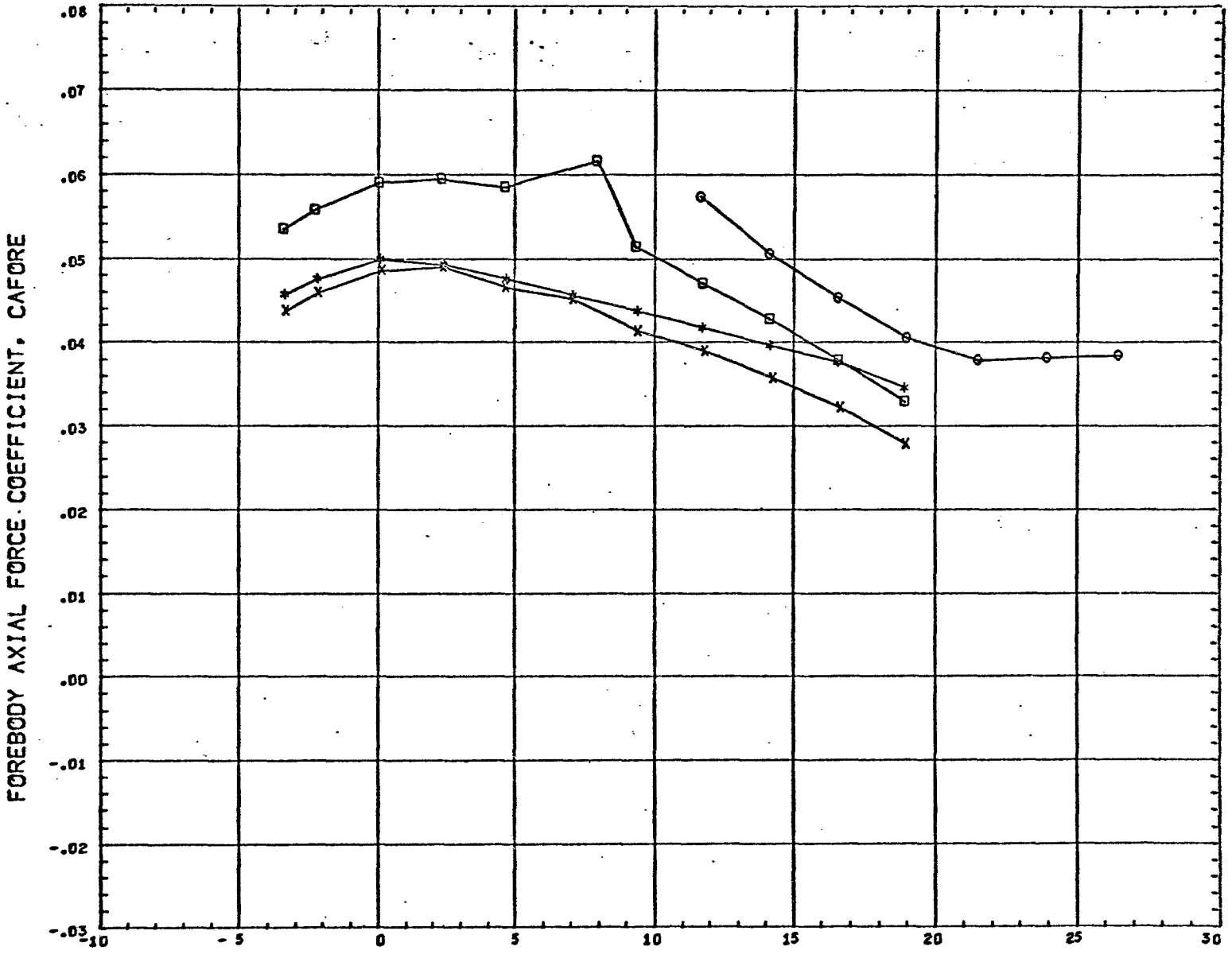

SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(E17024)	06 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(E17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(E17026)	06 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(E17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
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XMRP	0.406	
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ZMRP	0.045	

REFERENCE FILE.

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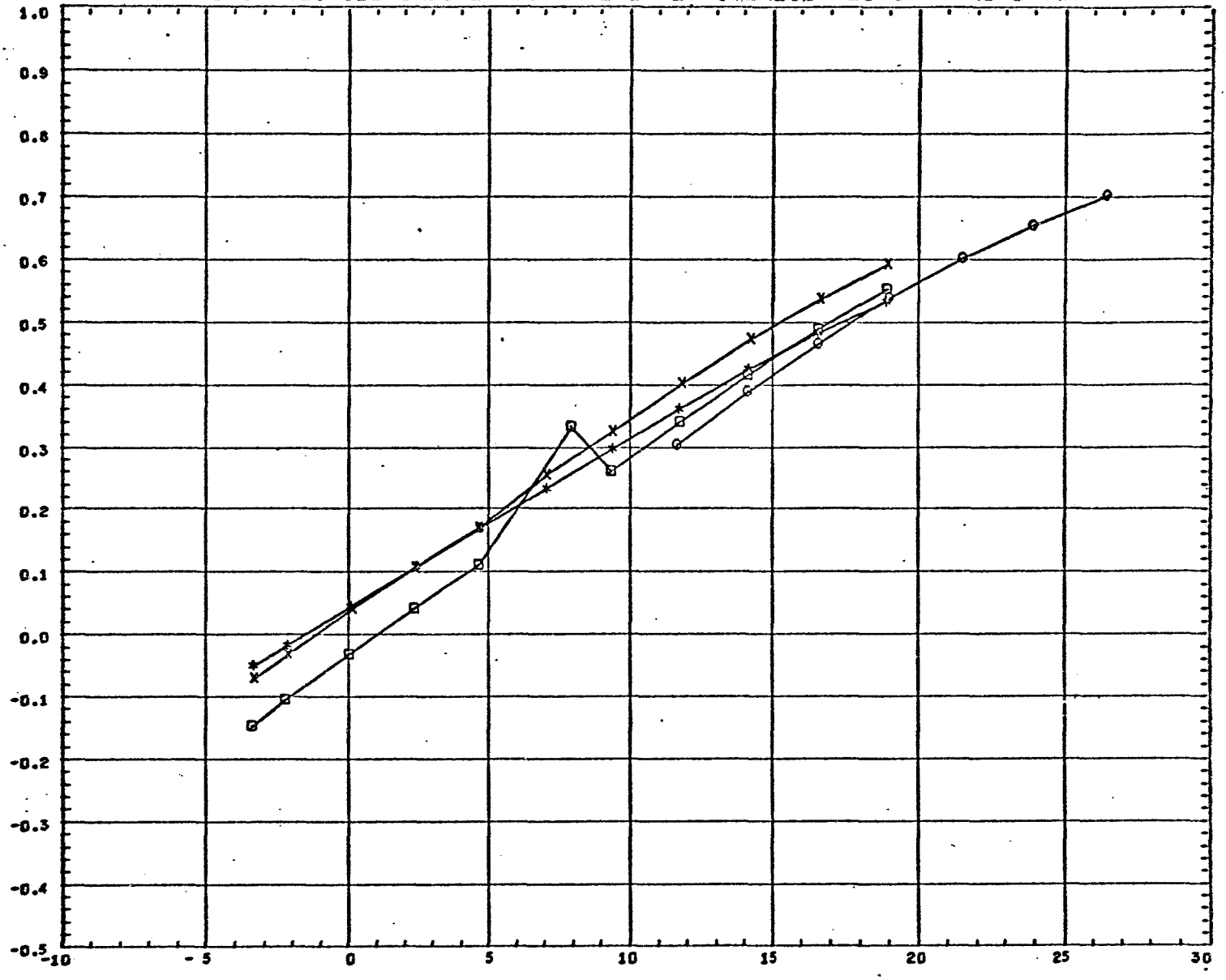
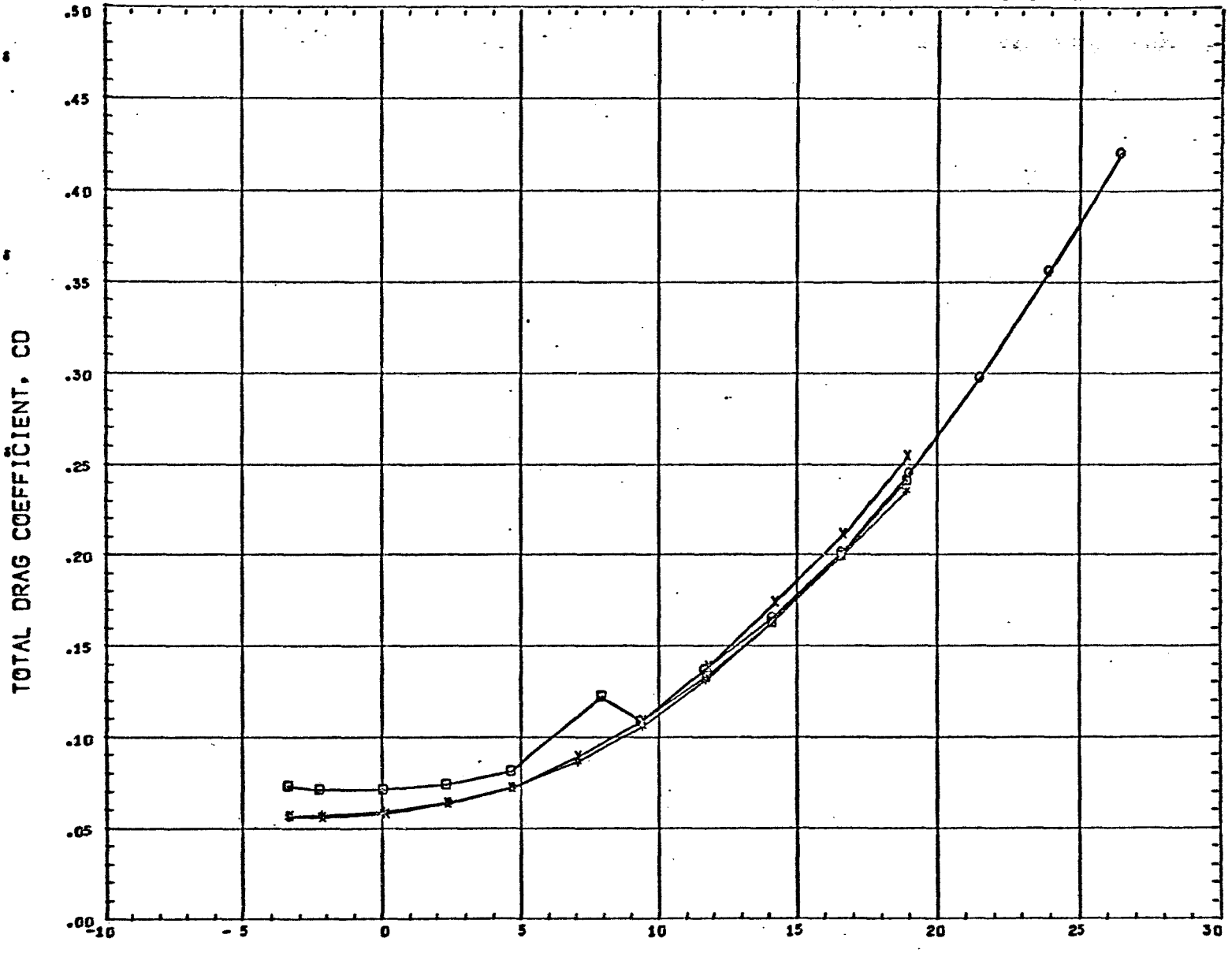


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(W17024)	06 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(W17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(W17026)	06 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(W17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

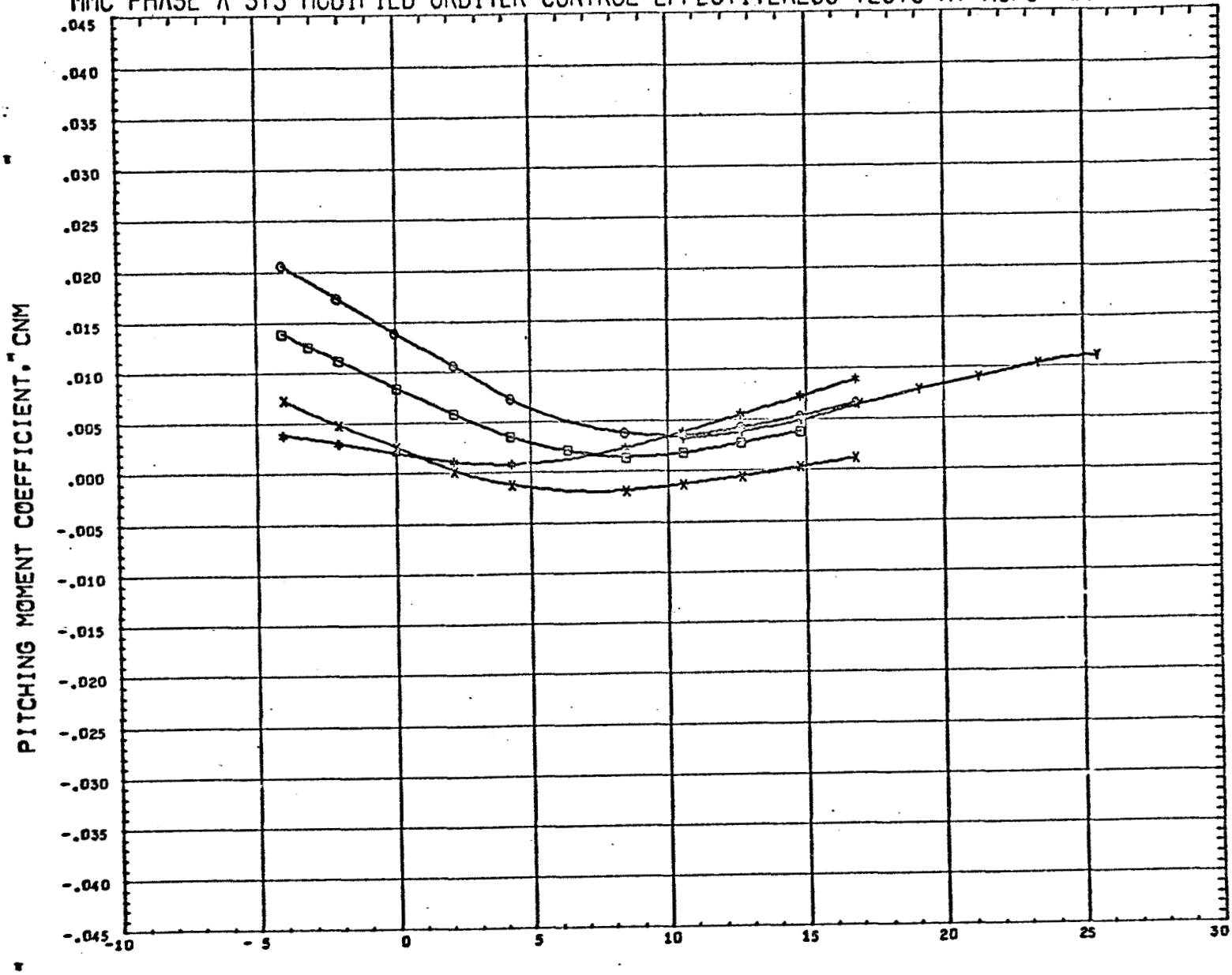


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(W17024)	06 JUL 70	1.198
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(W17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(W17026)	06 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(W17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



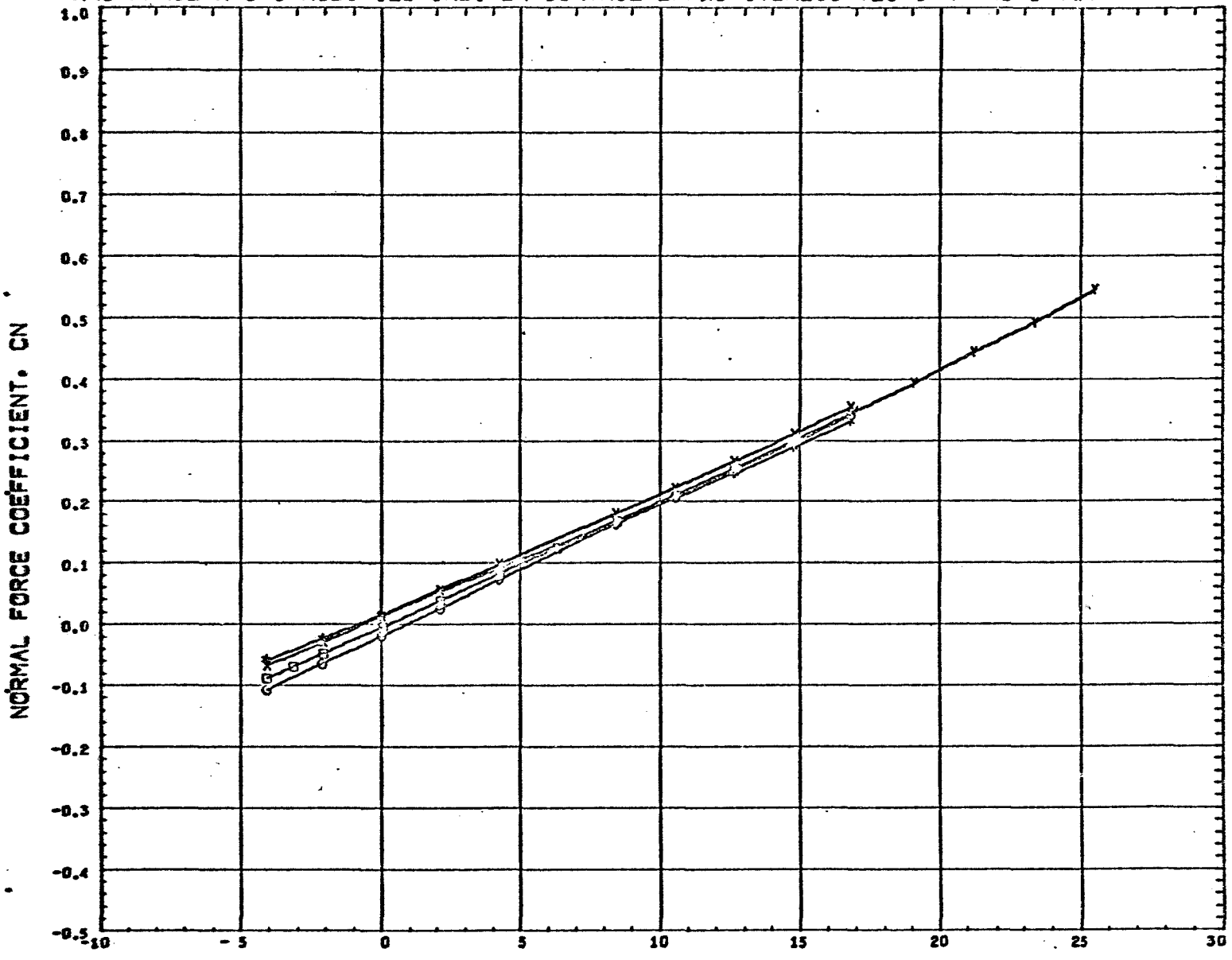
SYMBOL	CONFIGURATION DESCRIPTION	
*	MSFC 453 MMC MOD ORB B2W2T1R1	E=OFF
X	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=0
B	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-15
G	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30

REFERENCE FILE.

DATA SET	DATE	MACH NUMBER
(F17024)	02 JUL 70	2.740
(F17025)	02 JUL 70	
(F17026)	02 JUL 70	
(F17027)	02 JUL 70	
(F17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

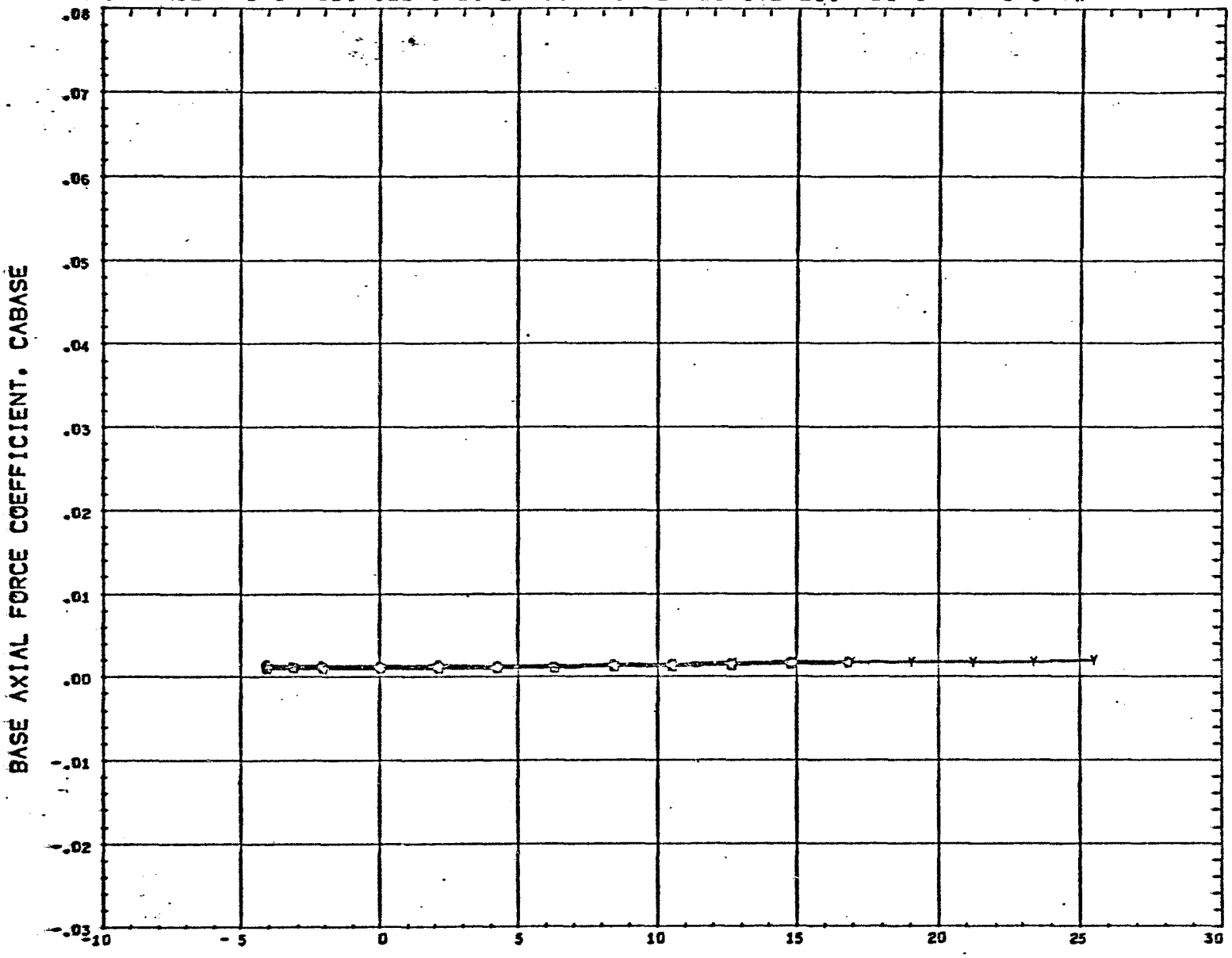


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(F17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(F17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(F17026)	02 JUL 70	
⊕	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

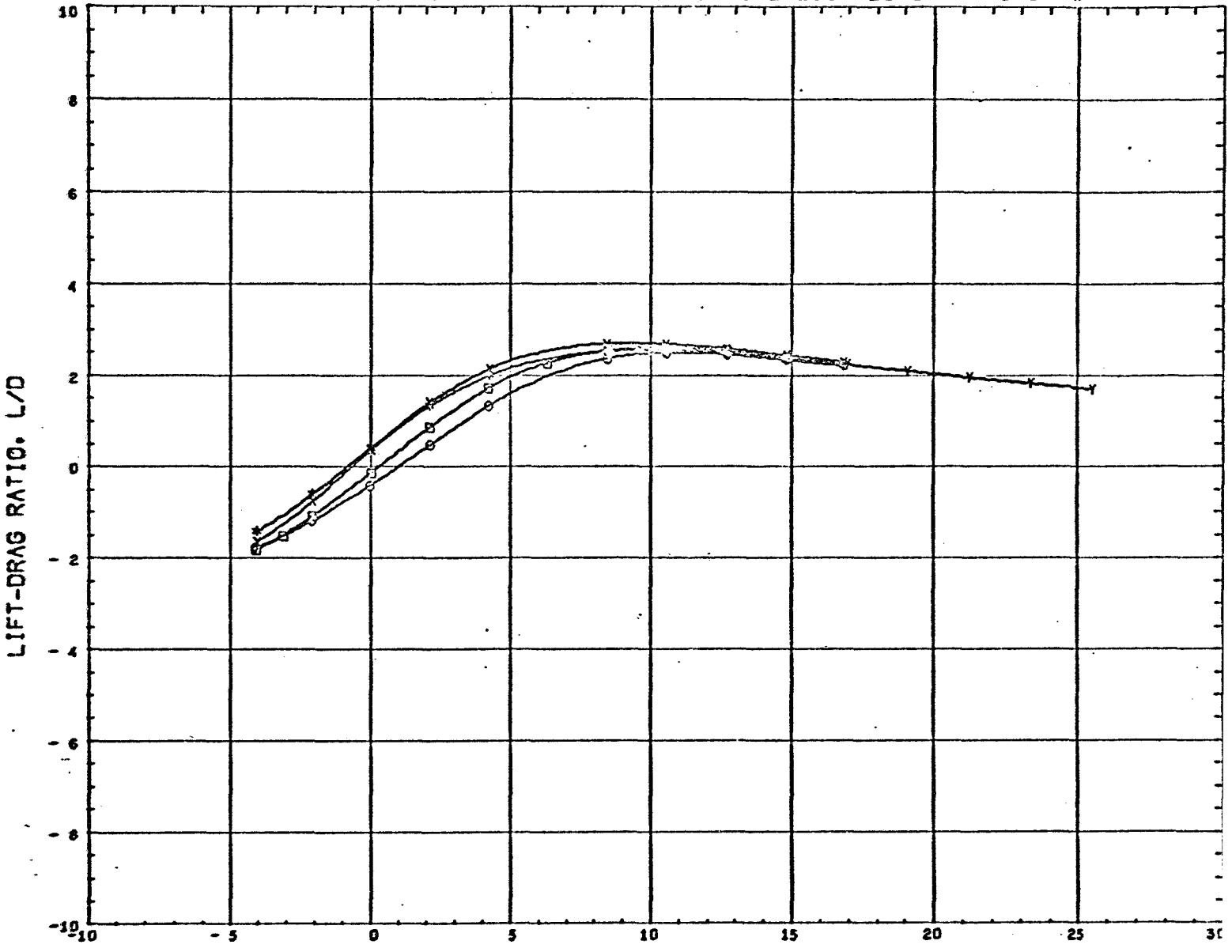


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(F17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(F17025)	02 JUL 70	
⊕	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(F17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

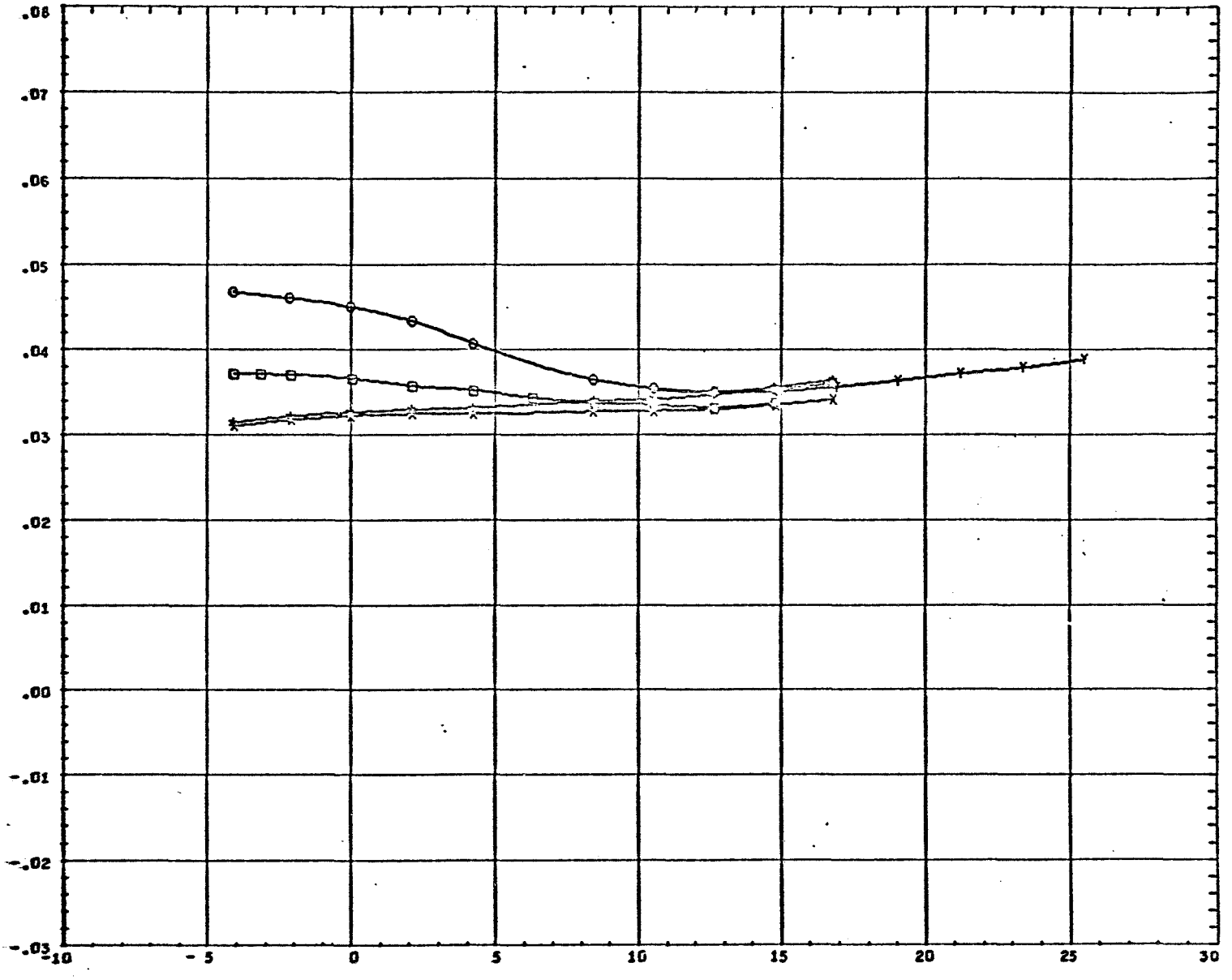


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(F17024)	02 JUL 70	2.749
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(F17025)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(F17026)	02 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17027)	02 JUL 70	
▽	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

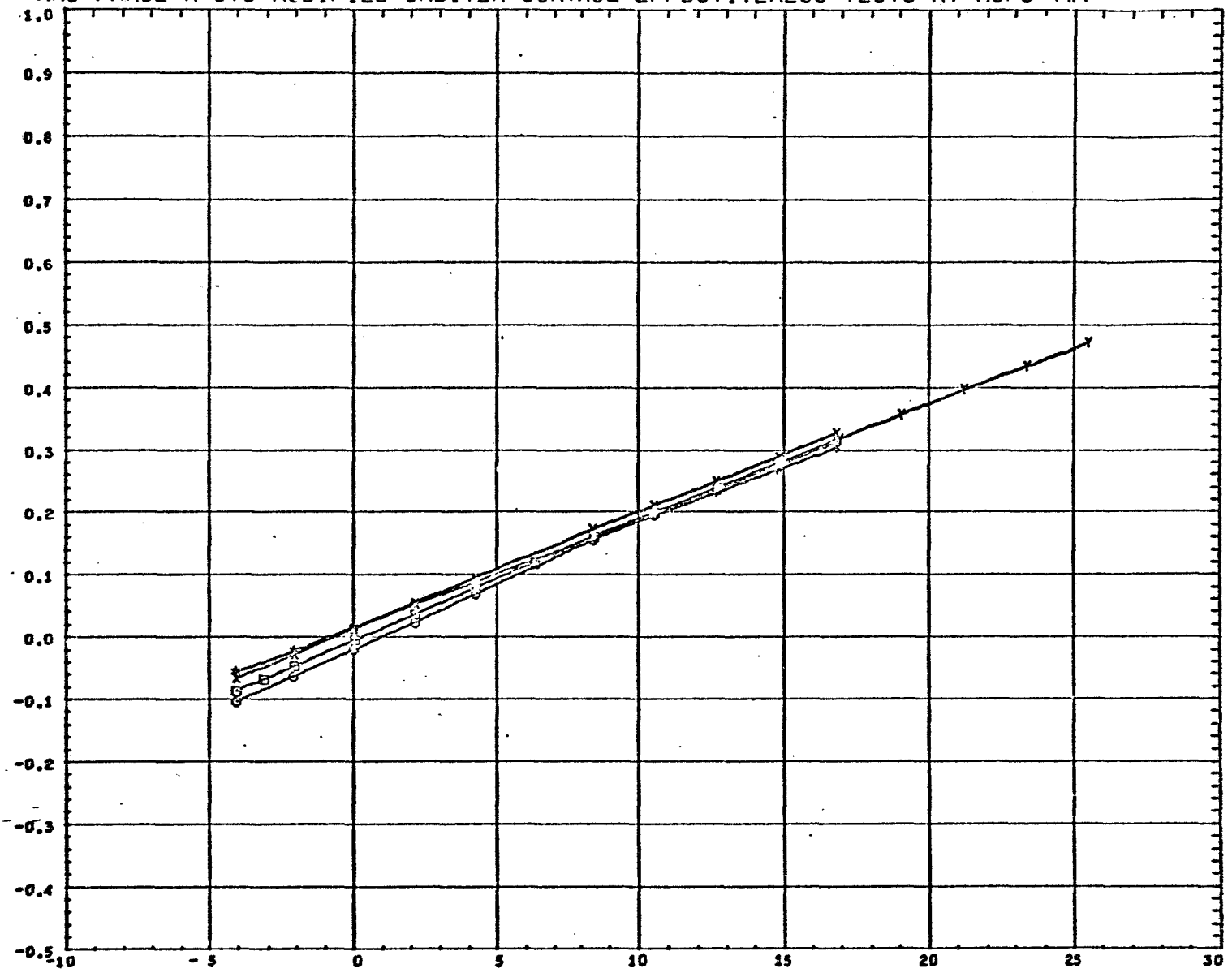


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(F17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(F17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(F17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

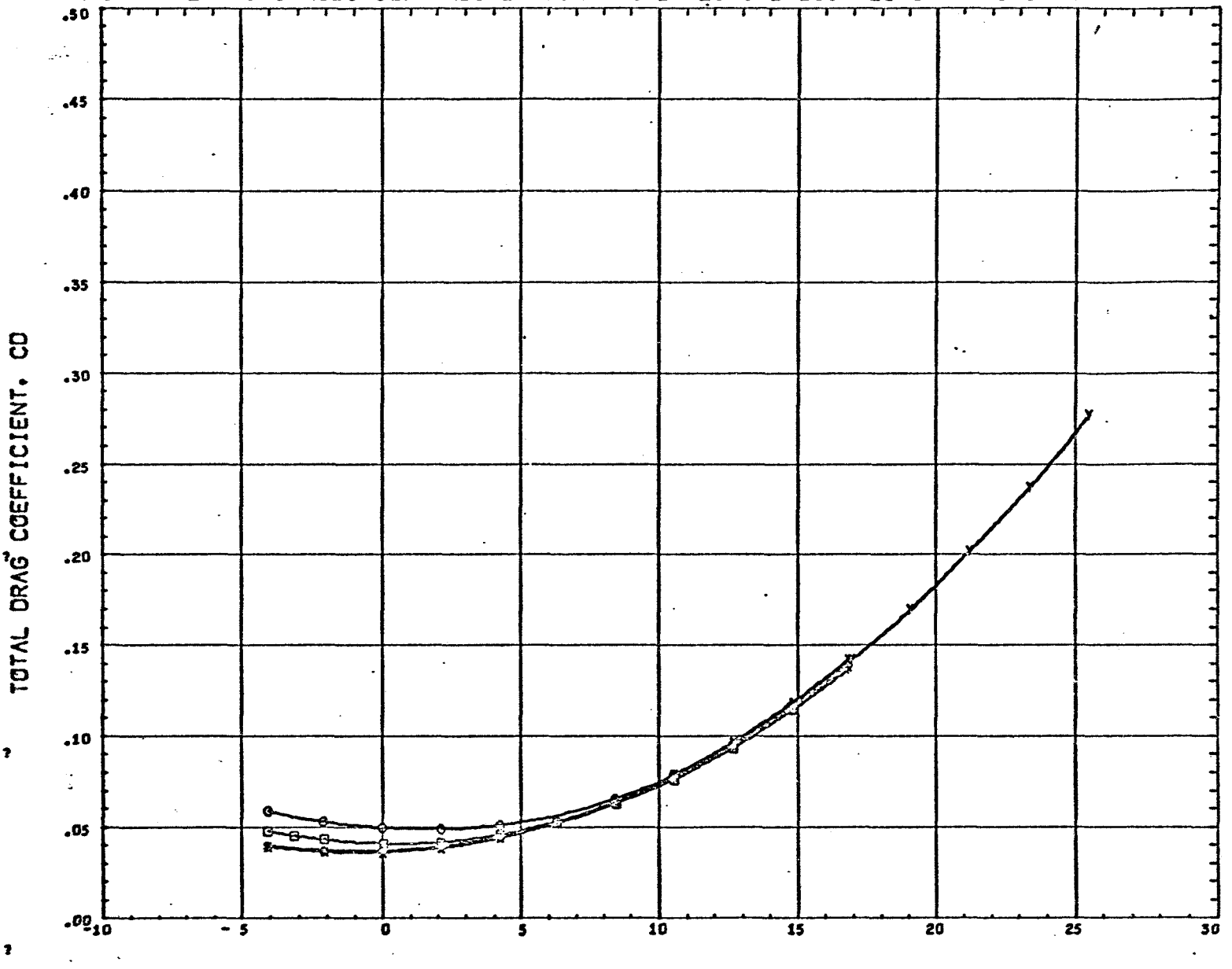


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(X17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(X17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(X17026)	02 JUL 70	
⊕	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.495	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

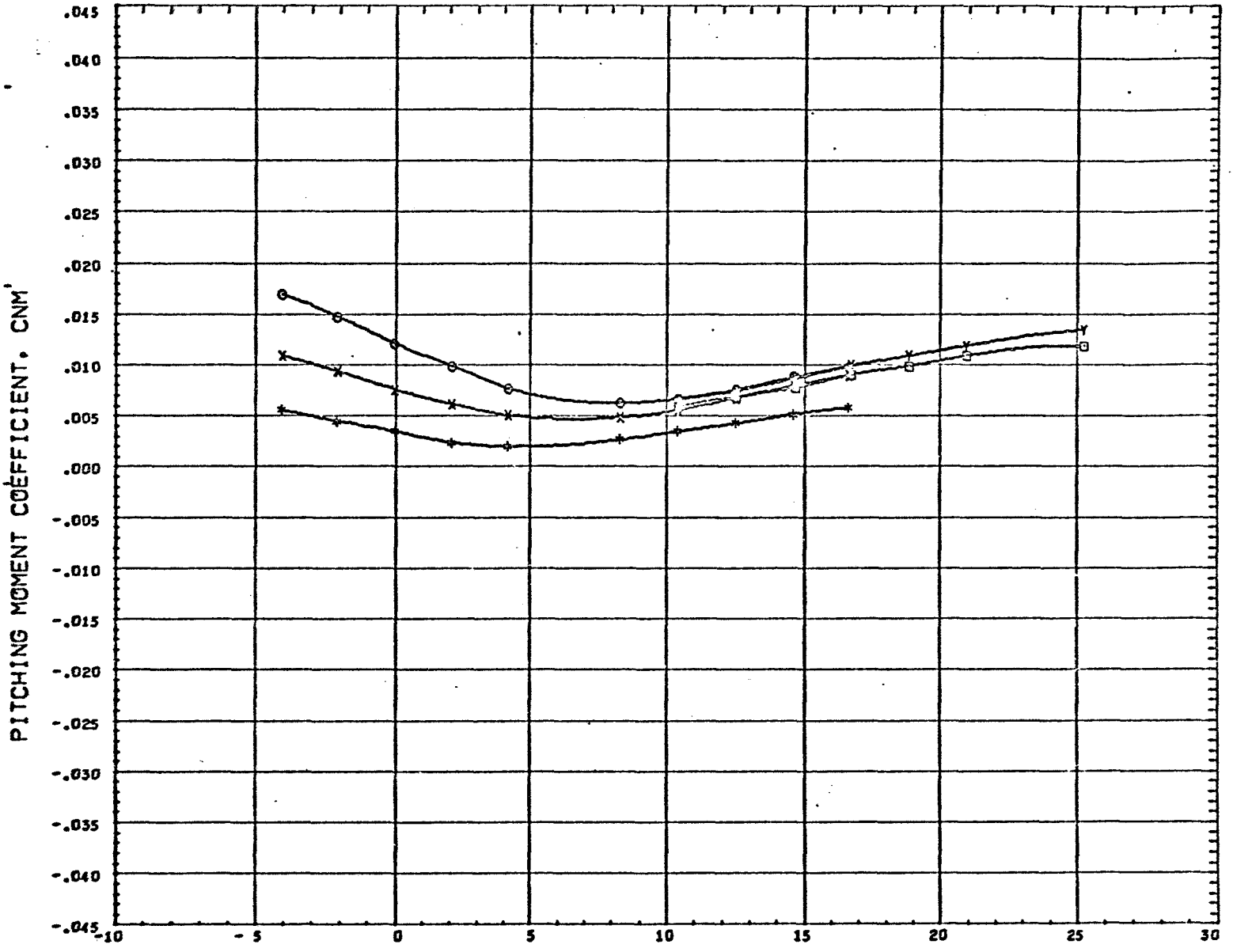


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(X17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(X17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(X17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

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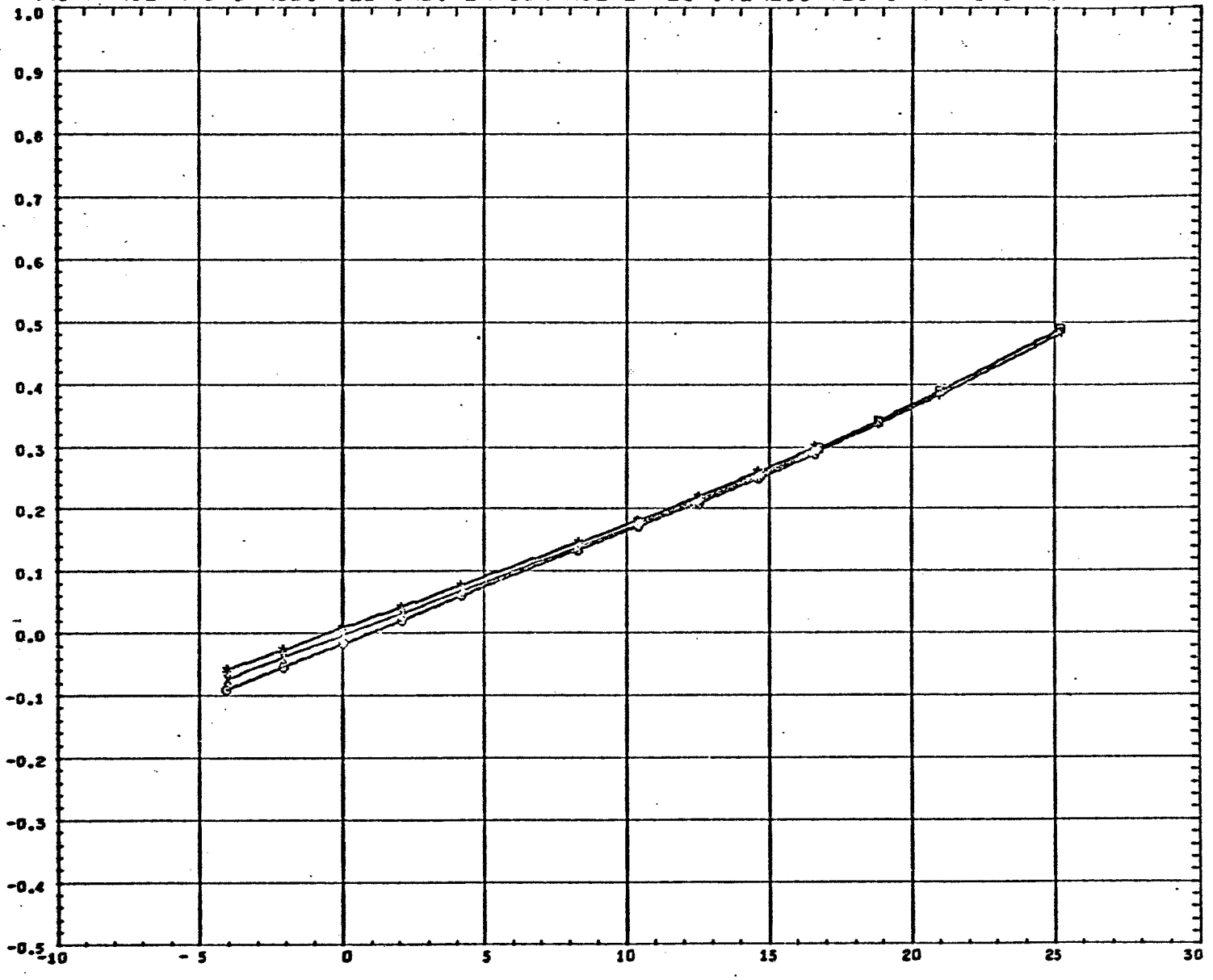
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

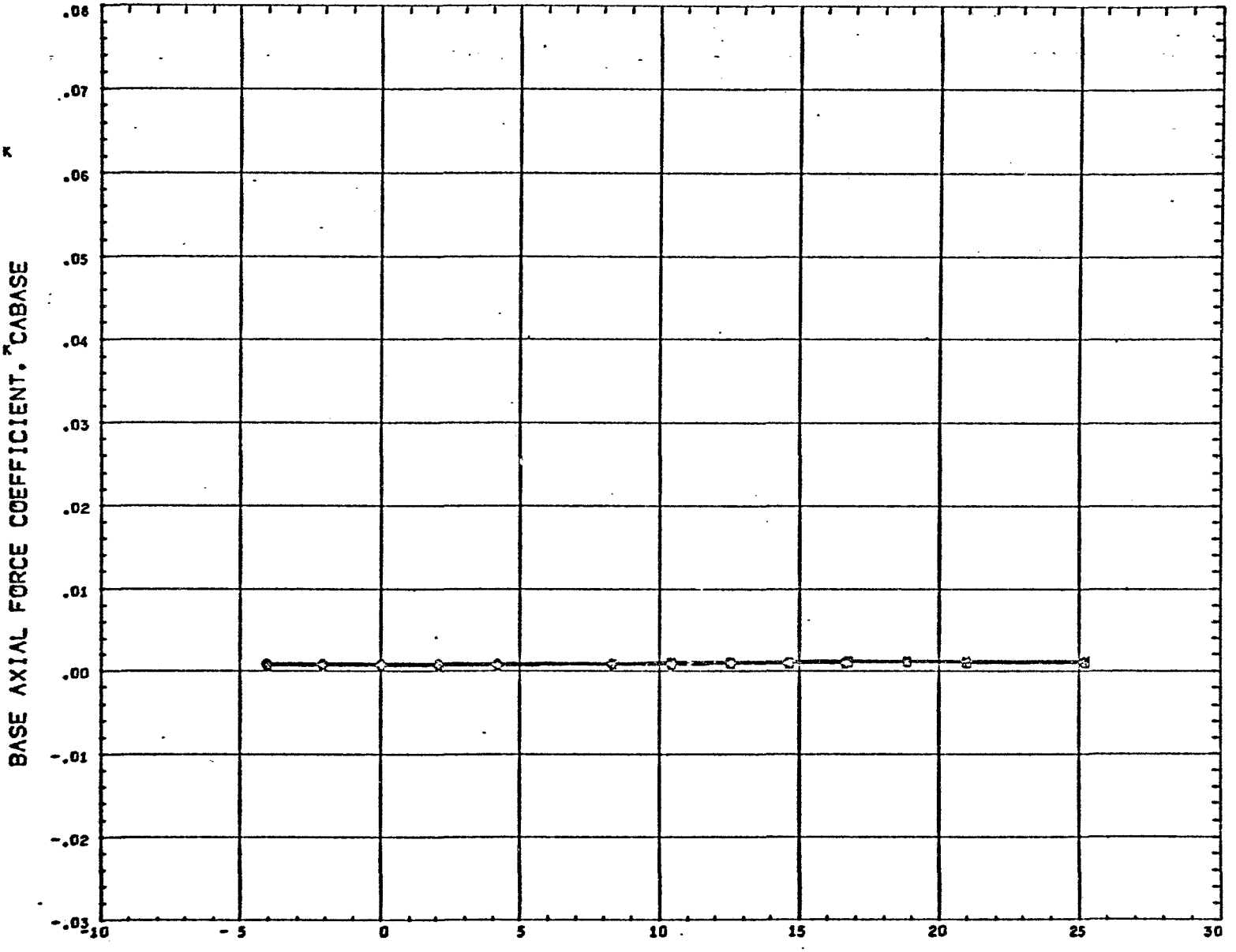


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

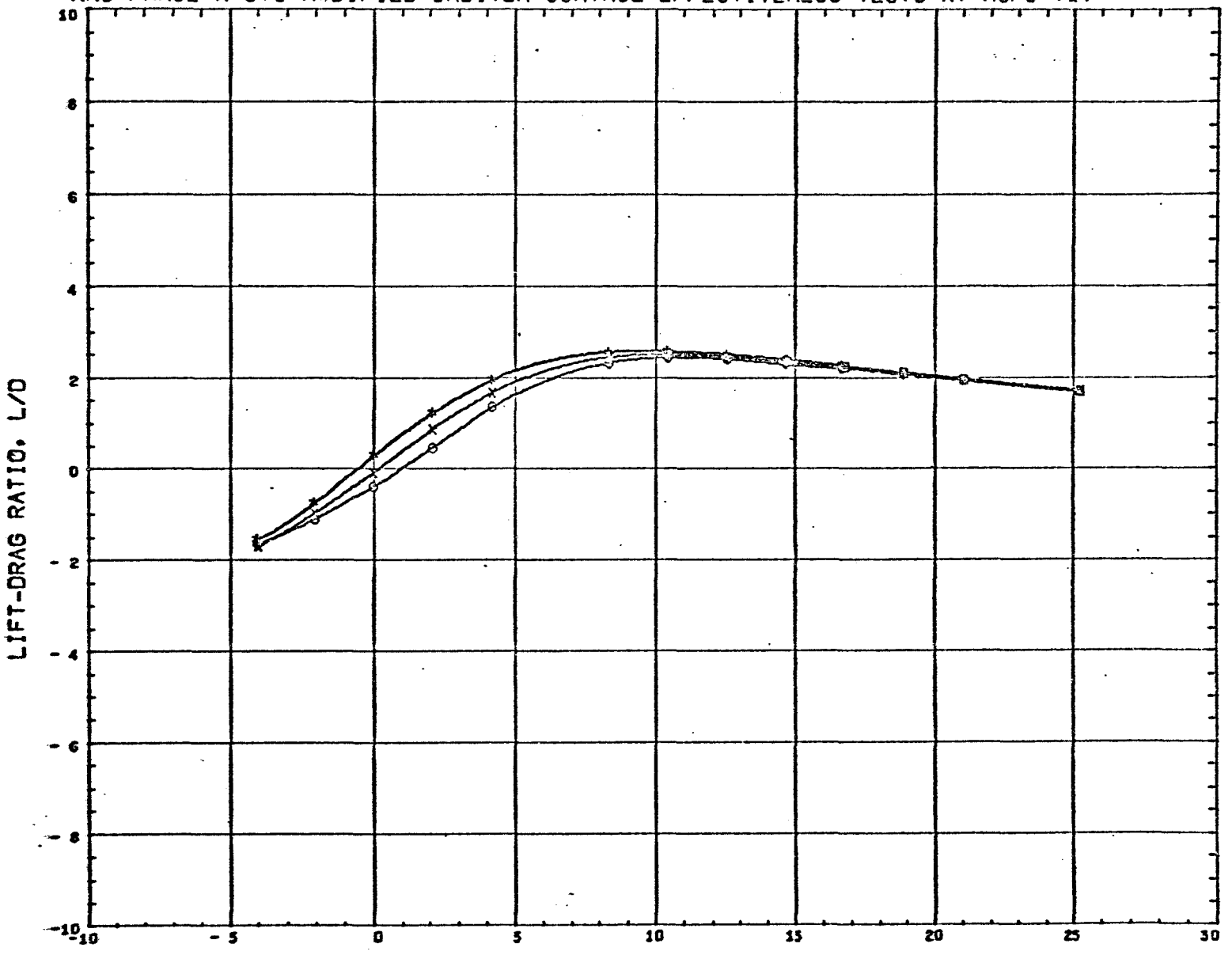


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
▽	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
⊟	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
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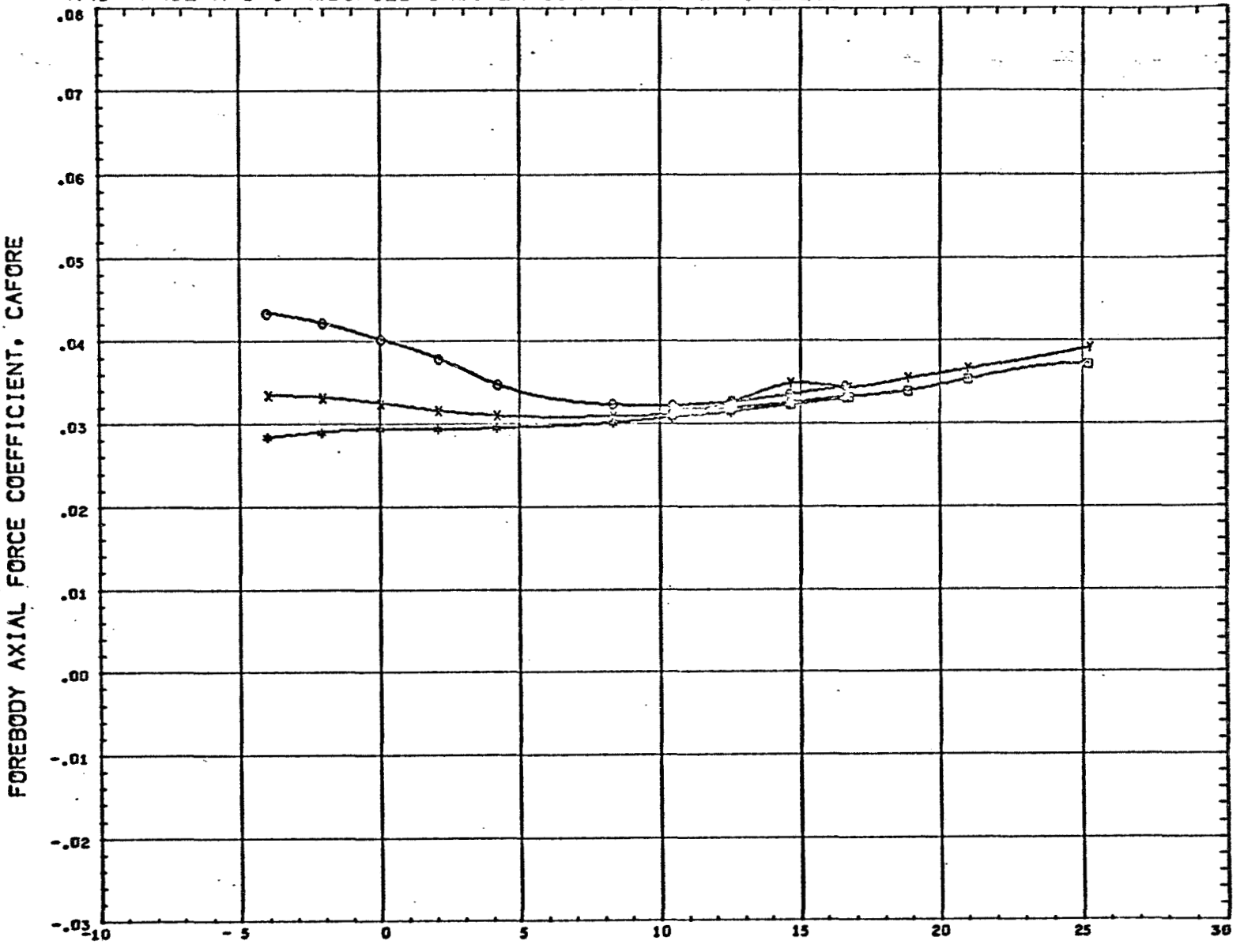
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

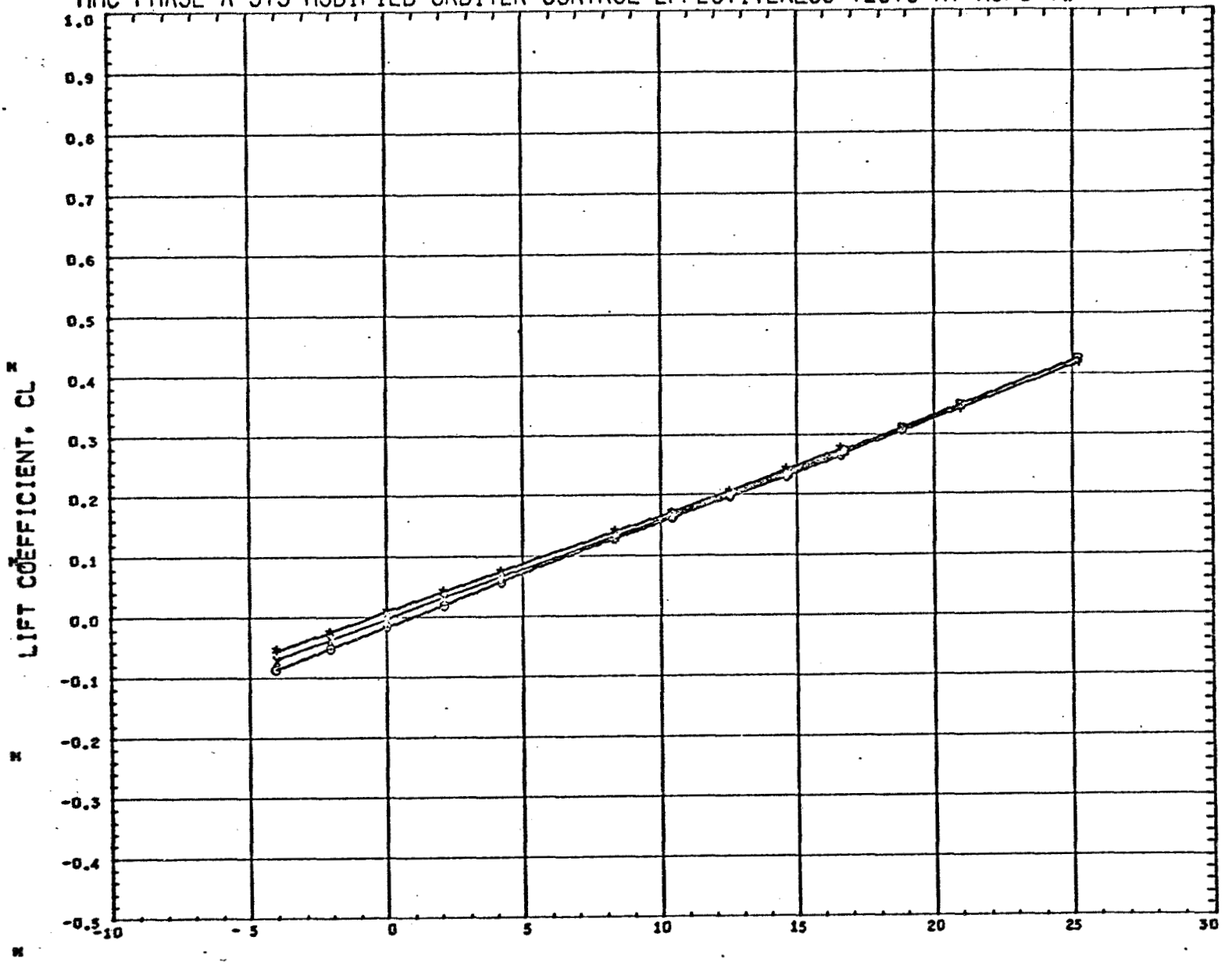


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Y17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17026)	02 JUL 70	
☐	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17028)	02 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.456	
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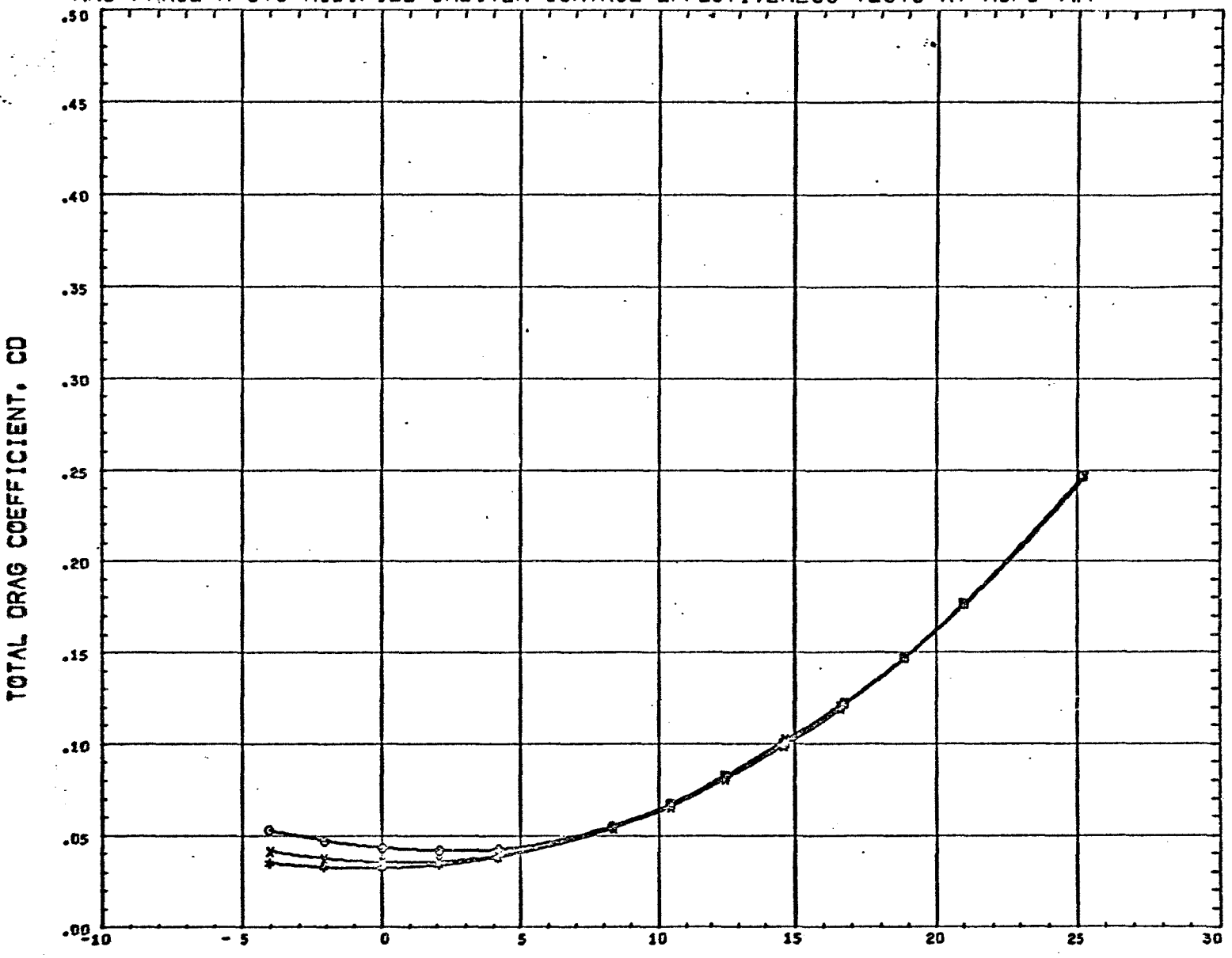
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

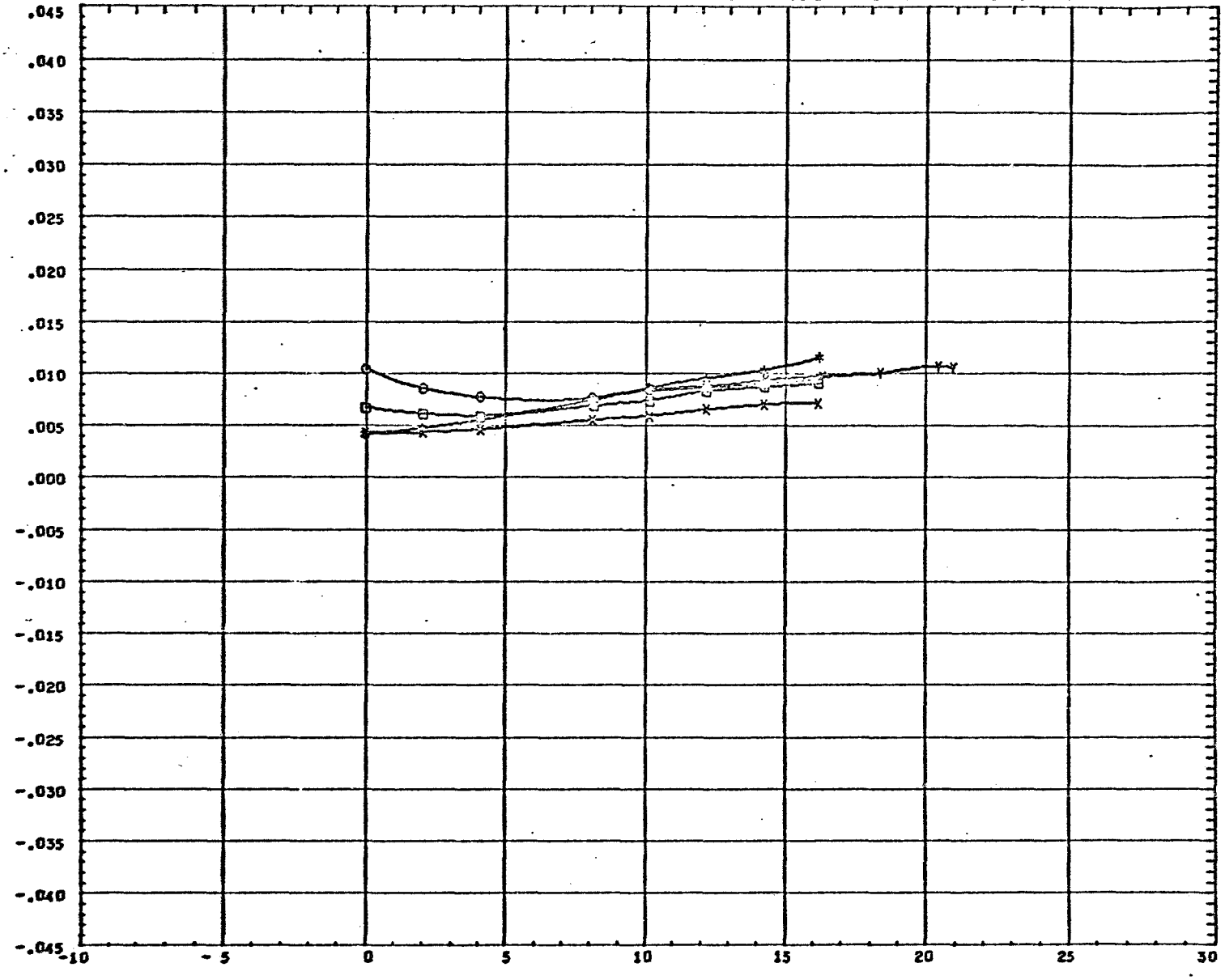


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Y17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17028)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

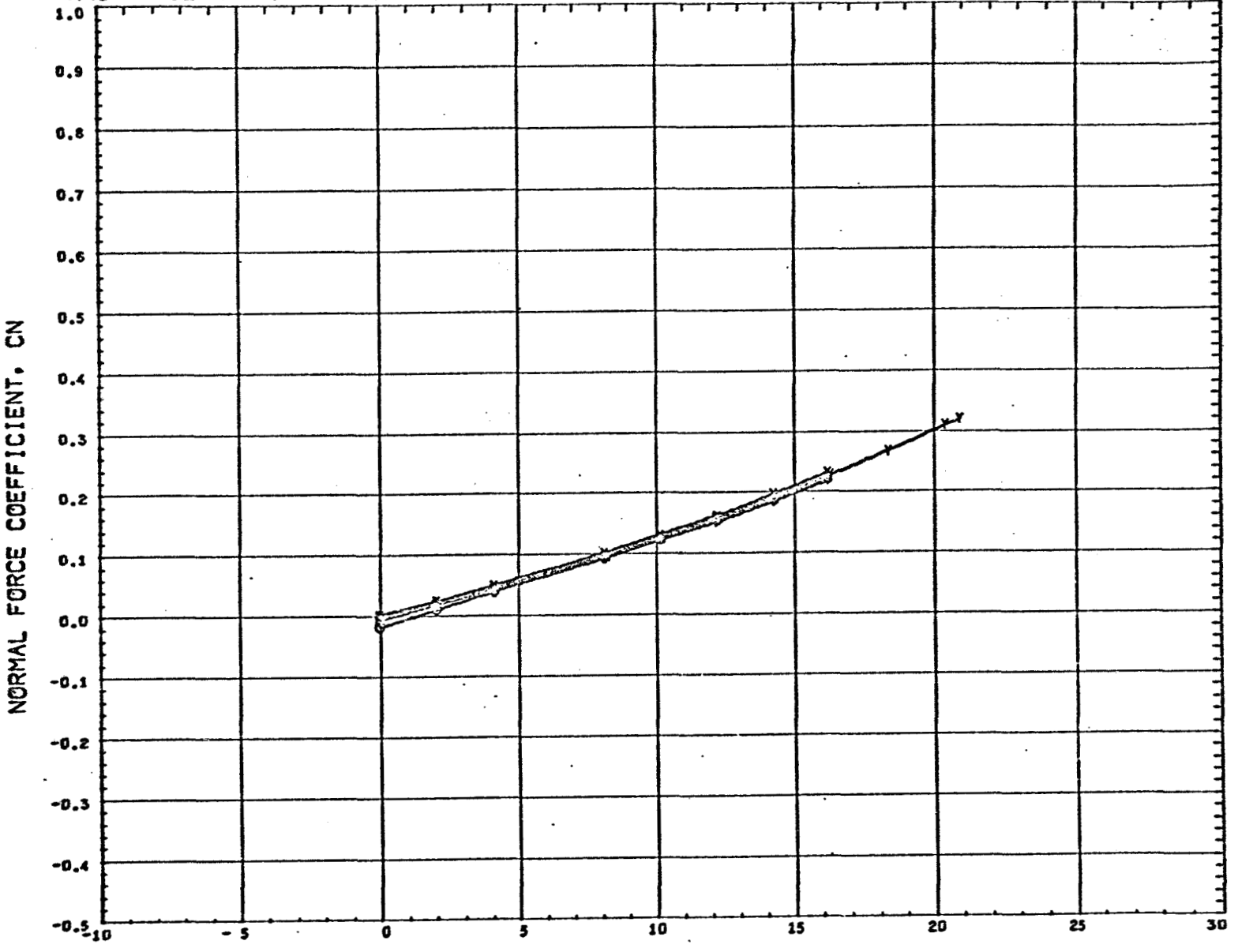


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(H17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(H17025)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(H17026)	02 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1	E=OFF	(H17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=0	(H17025)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-15	(H17026)	02 JUL 70	
◇	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30	(H17027)	02 JUL 70	
V	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30	(H17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
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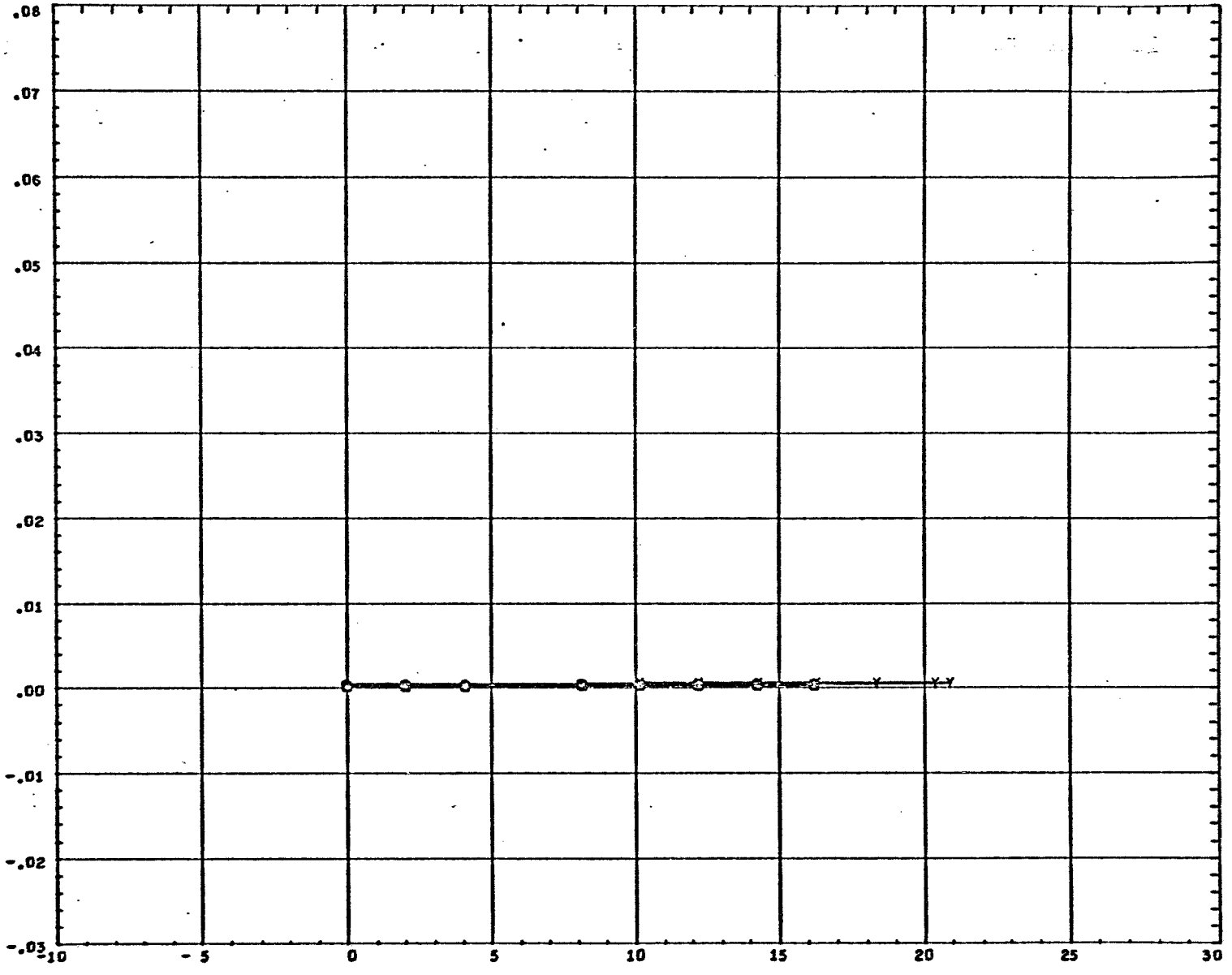
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



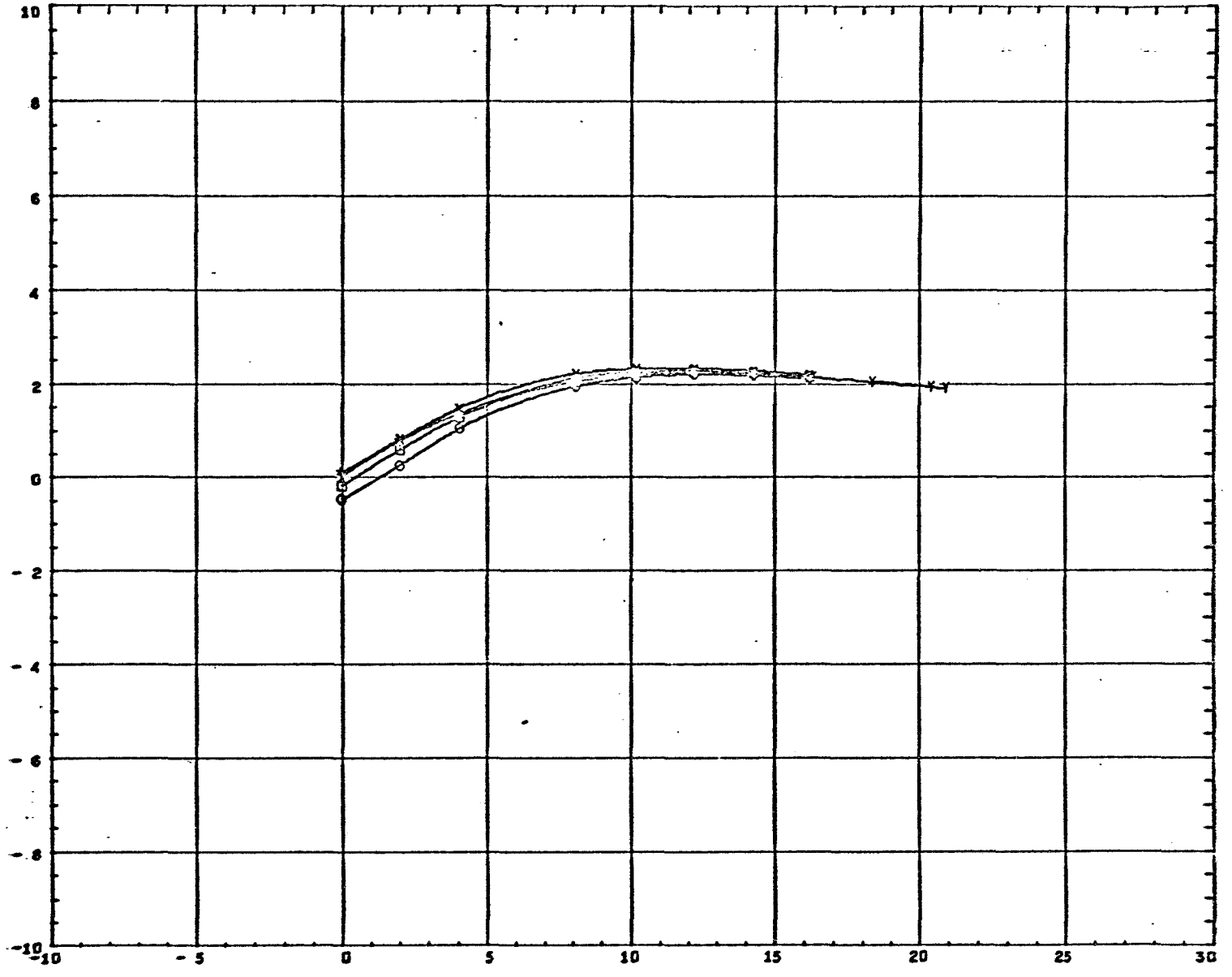
SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(H17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(H17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(H17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-39	(H17029)	02 JUL 70	

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

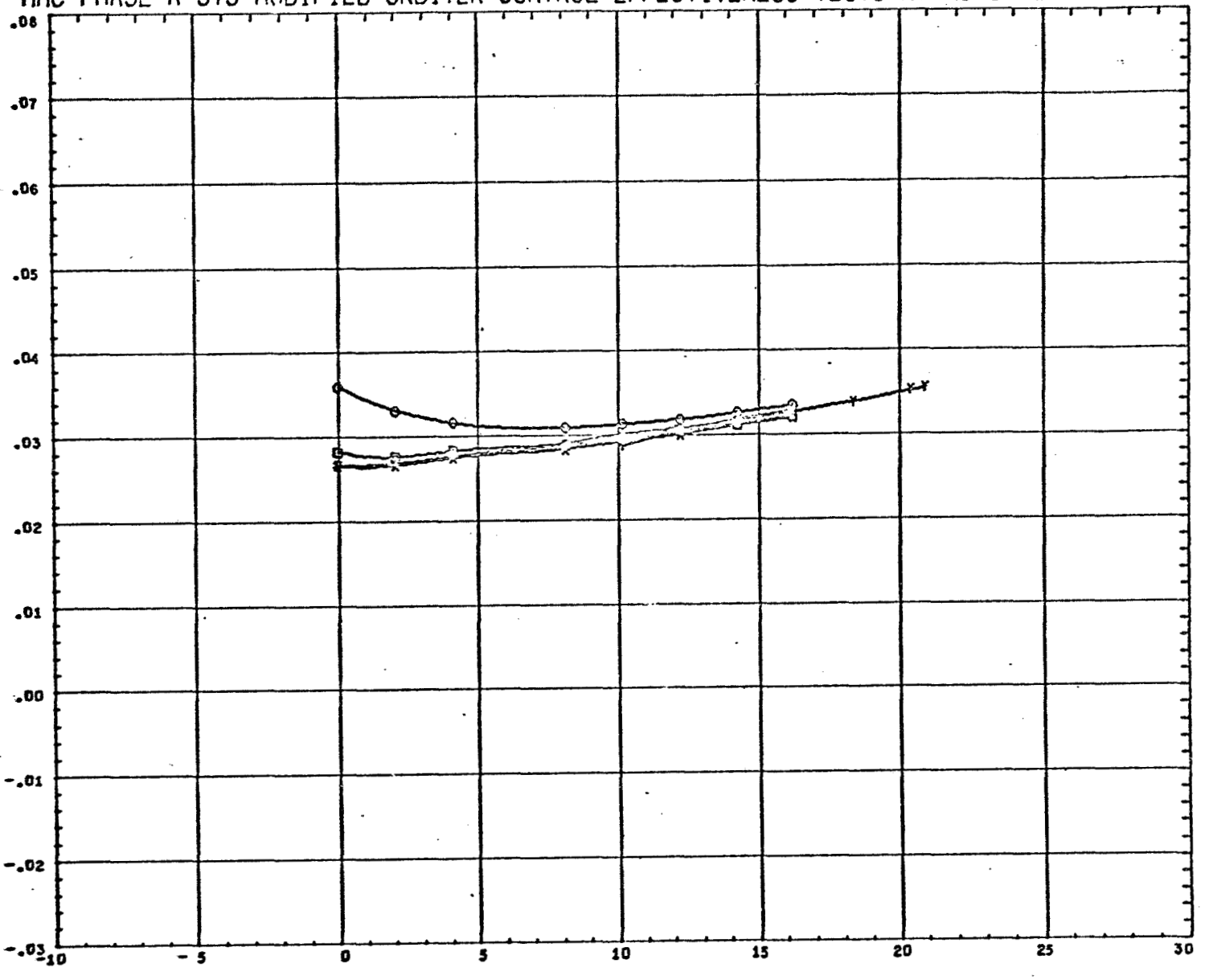


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
●	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(H17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(H17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(H17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

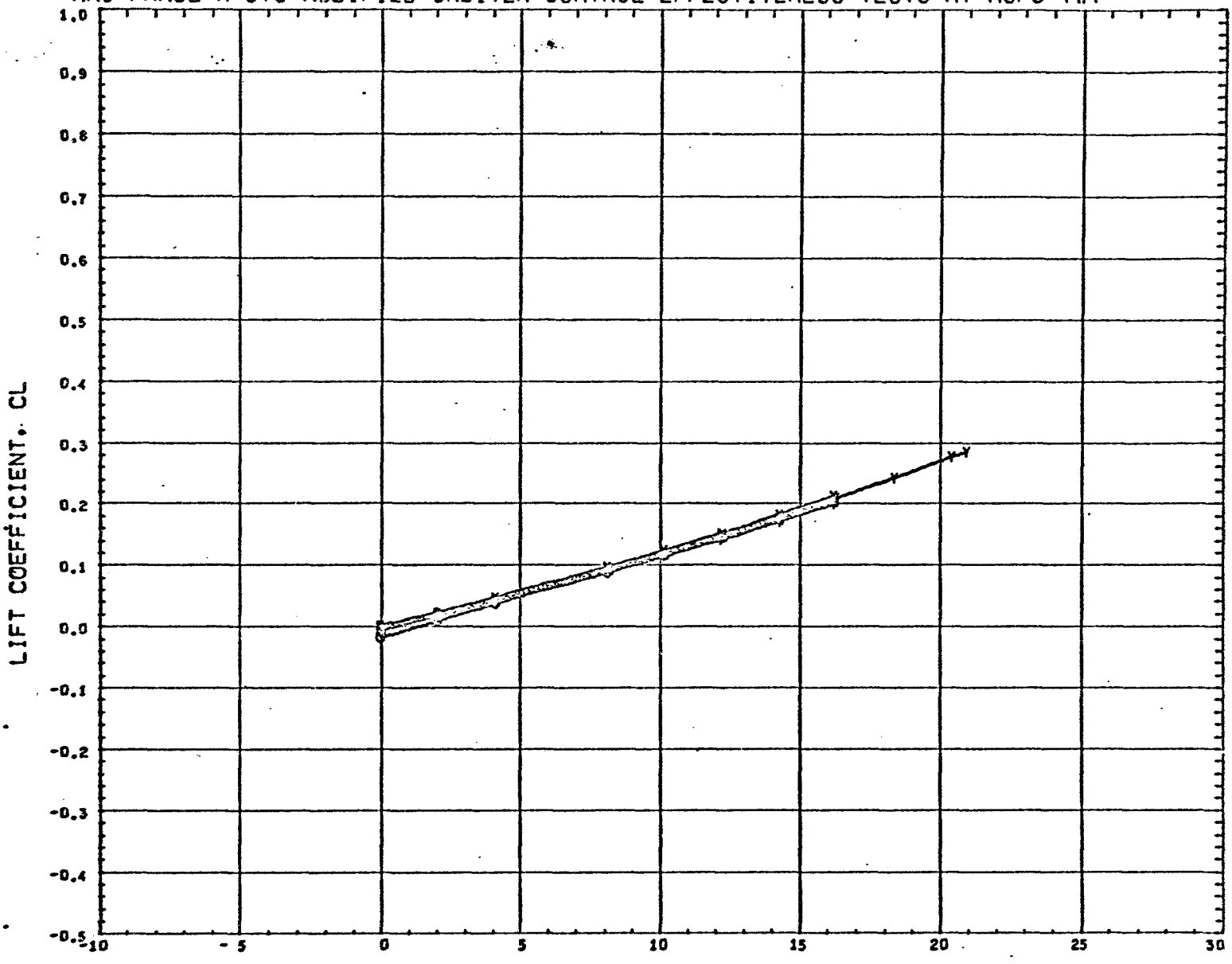
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER	REFERENCE INFORMATION		
*	MSFC 453 MMC MOD ORB B2W2T1R1	E=OFF	(H17024)	02 JUL 70	4.960	REFS	0.116	SQ.FT.
X	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=0	(H17025)	02 JUL 70		REFL	0.646	FT.
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-15	(H17026)	02 JUL 70		REFB	0.405	FT.
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30	(H17027)	02 JUL 70		XMRP	0.436	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30	(H17029)	02 JUL 70		YMRP	0.000	
						ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

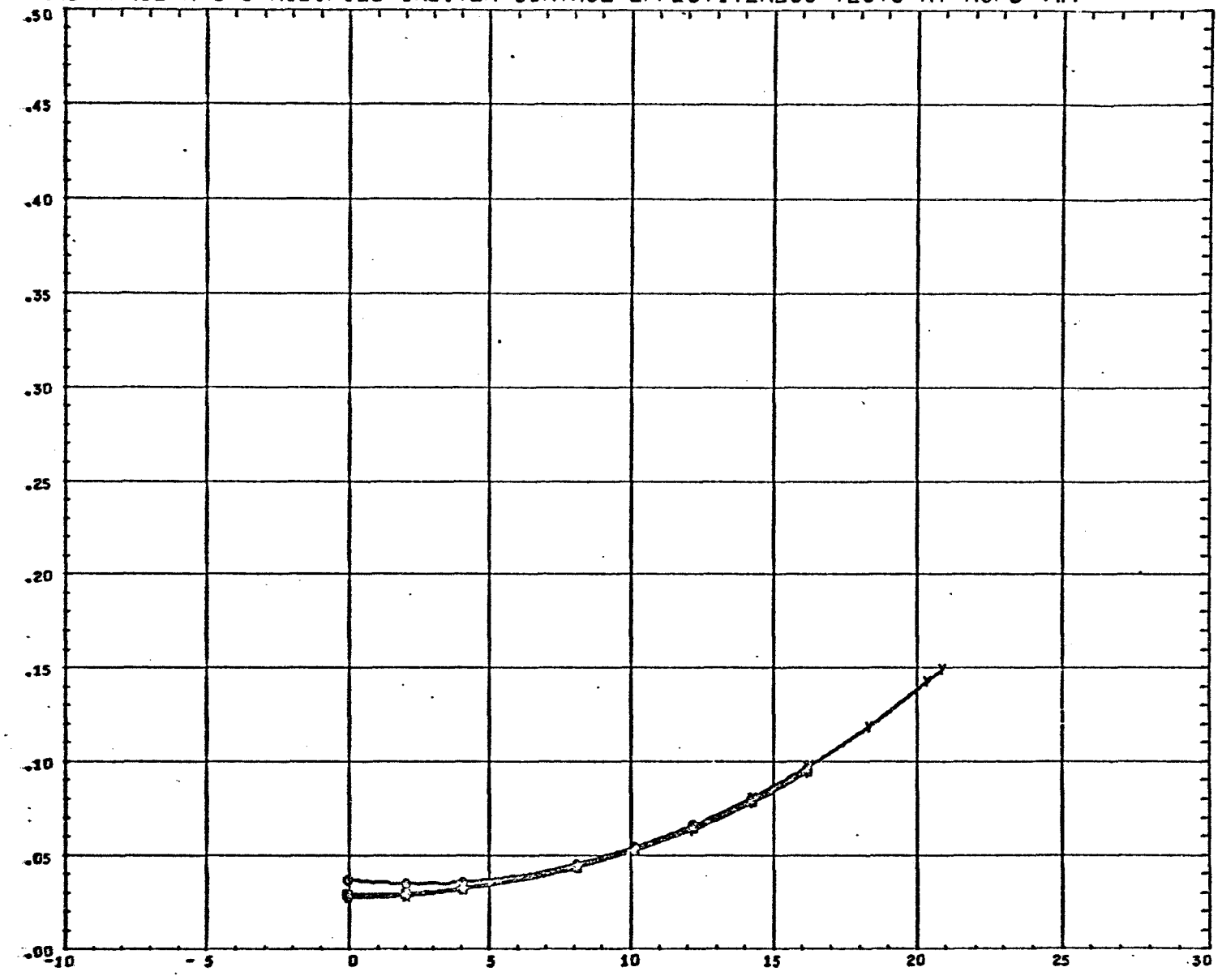


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(Z17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Z17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Z17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17027)	02 JUL 70	
▽	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



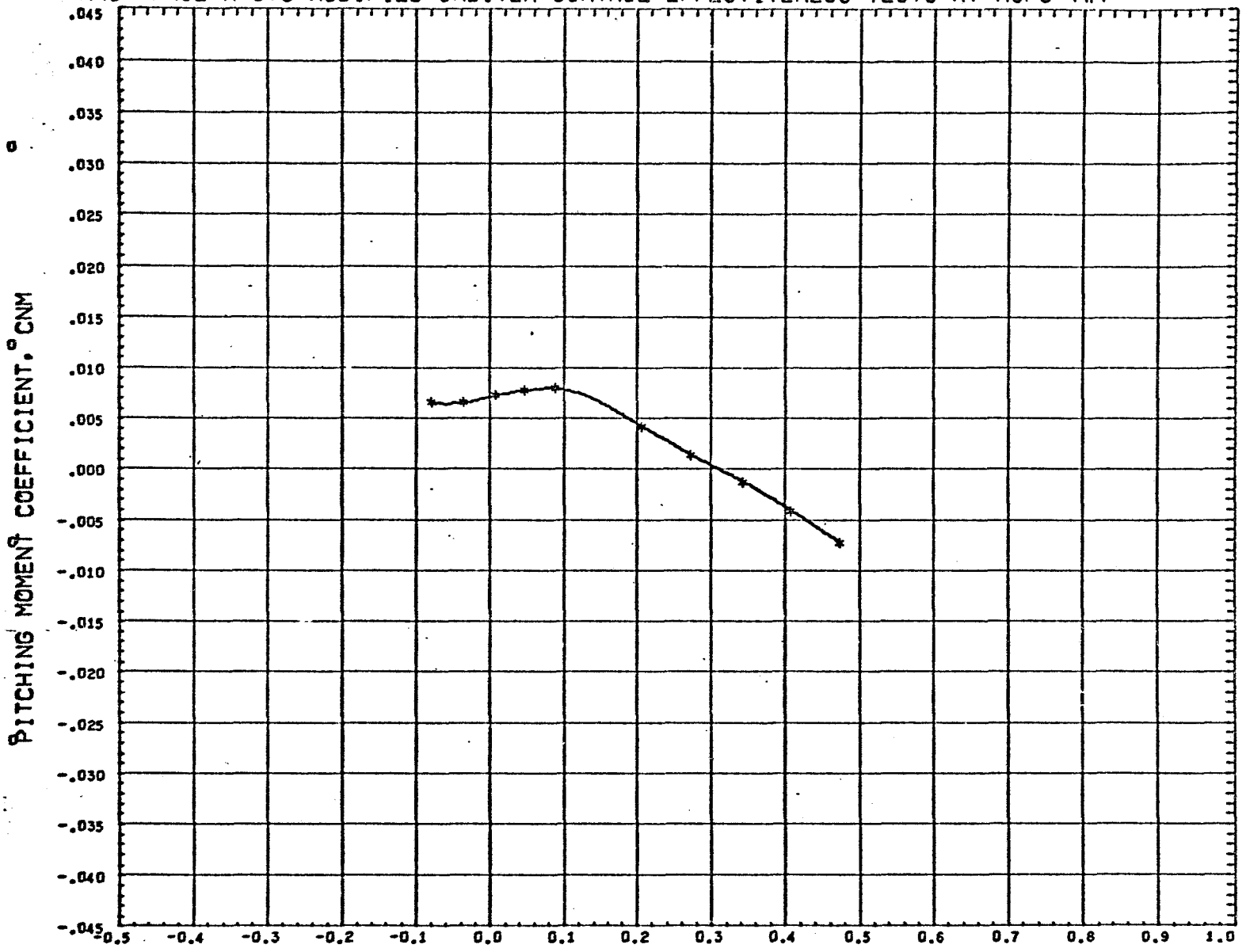
SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(Z17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Z17025)	02 JUL 70	
B	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Z17026)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17029)	02 JUL 70	

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



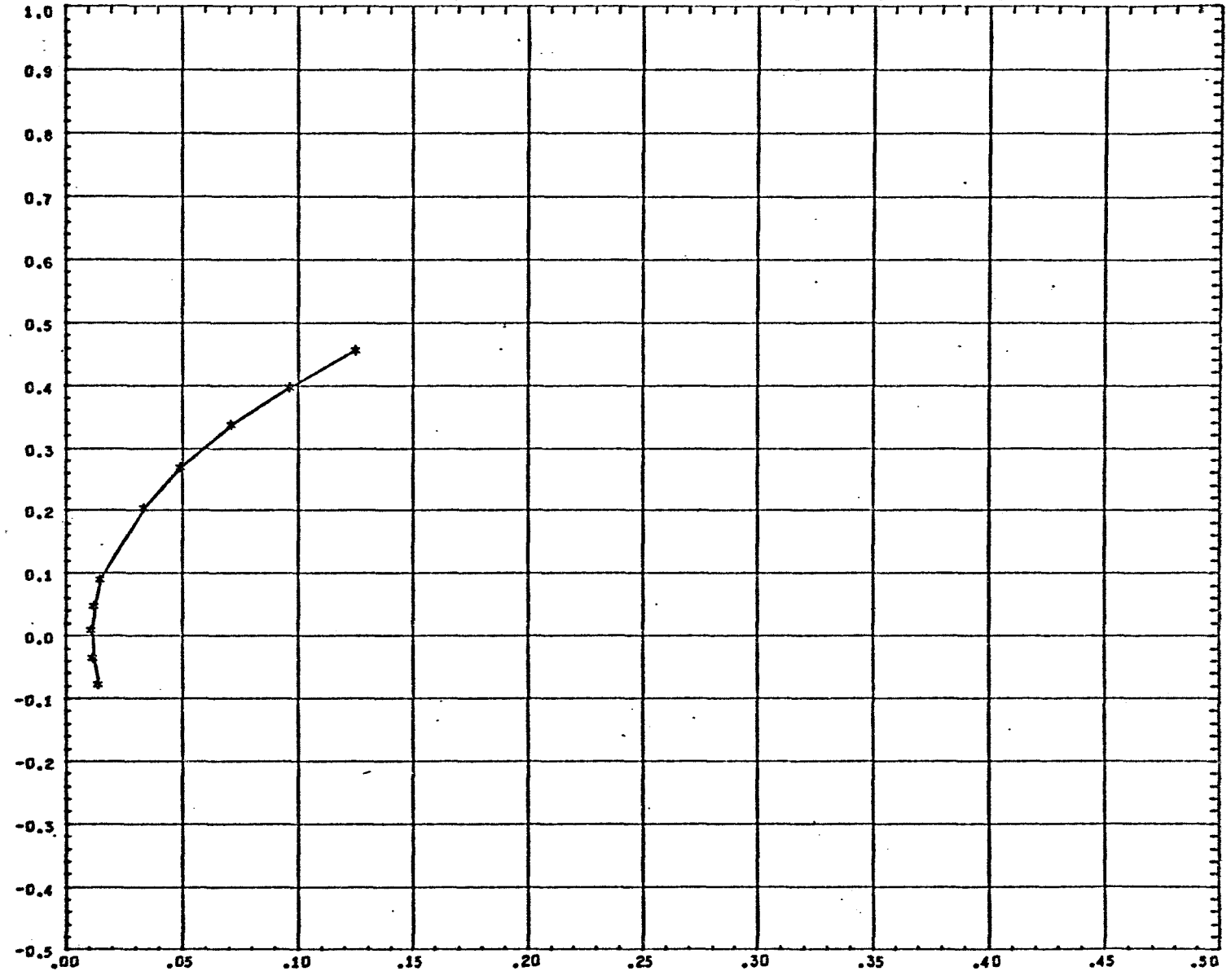
SYMBOL	MACH		PARAMETRIC VALUES		
●	0.396	BETA	0.000	ELEVON	0.000

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E0 (R17021) 02 JUL 70 PAGE 141

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

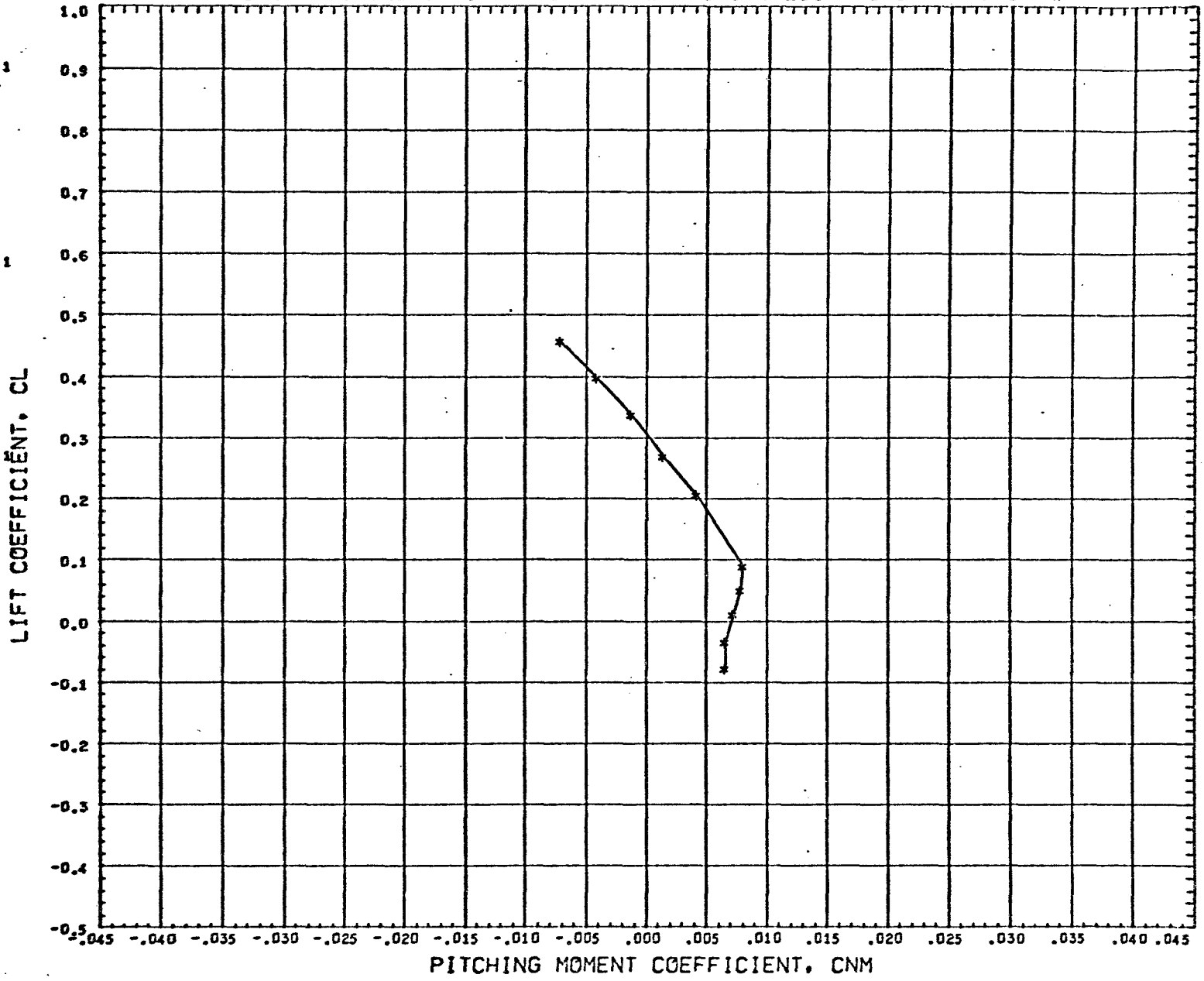


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.396	BETA	0.000	ELEVON	0.000

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

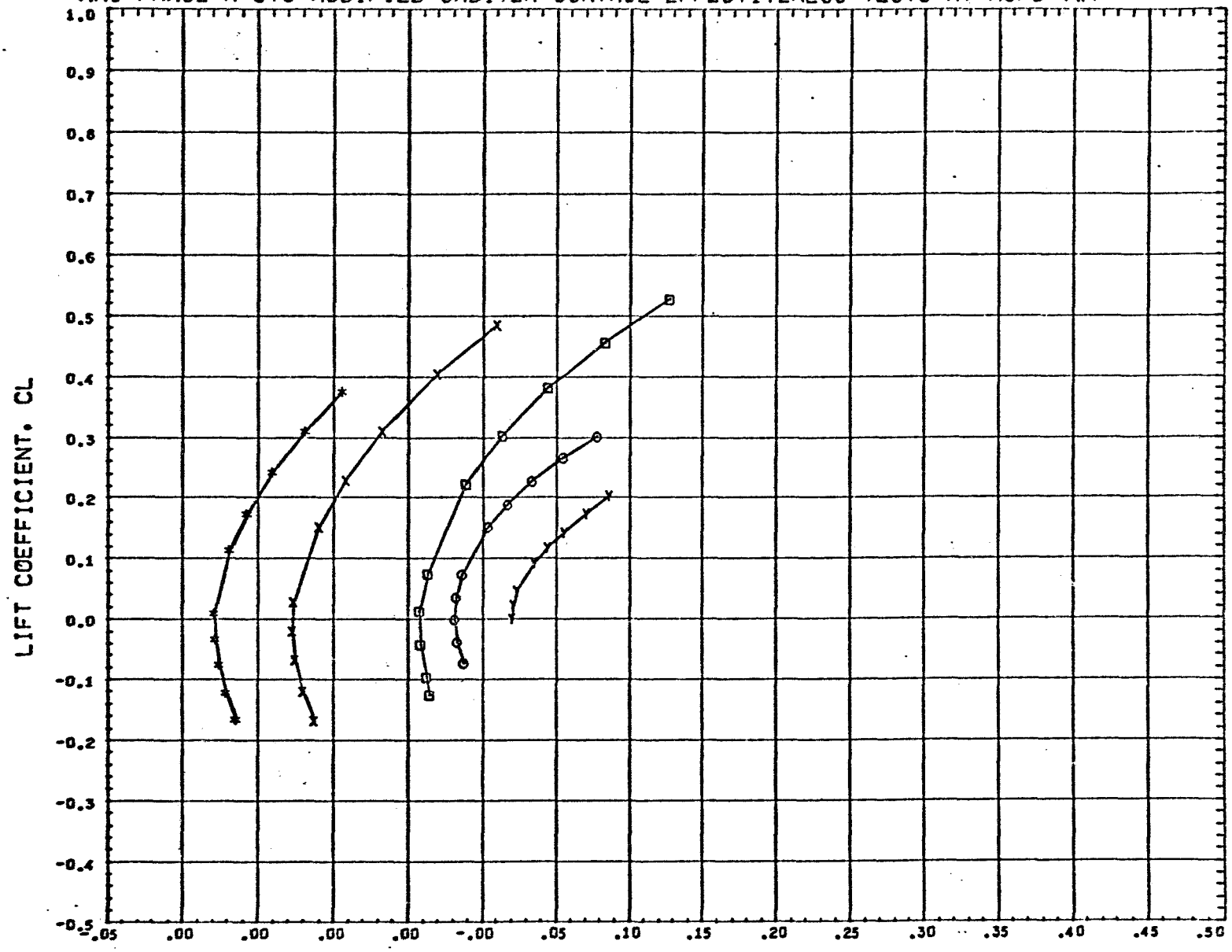
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

SYMBOL	MACH	PARAMETRIC VALUES			
*	0.397	BETA	0.000	ELEVON	- 15.000
X	0.797				
⊡	1.199				
⊙	2.740				
▽	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH
*	0.397
x	0.797
⊡	1.199
⊙	2.740
Y	4.960

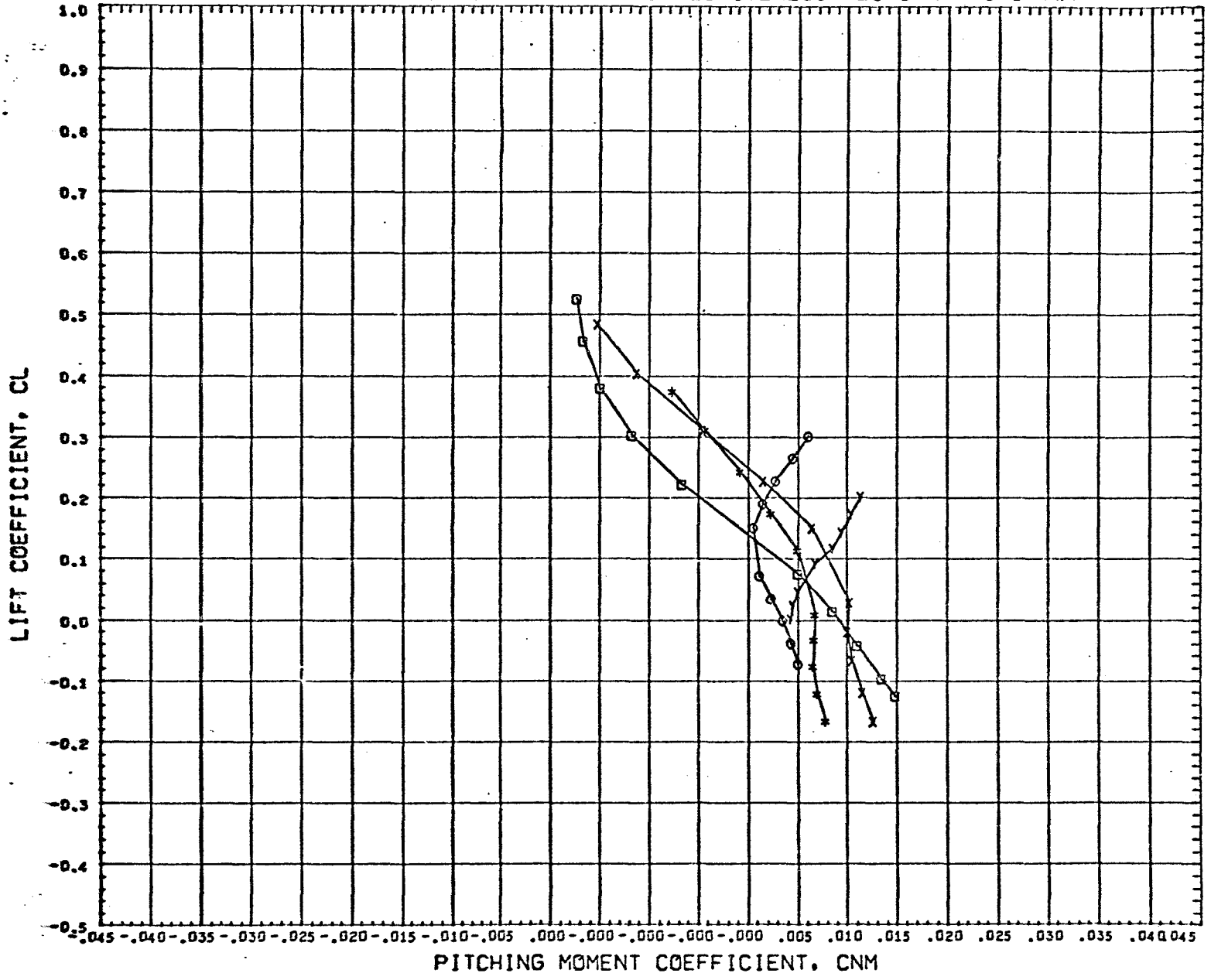
PARAMETRIC VALUES

BETA 0.000 ELEVON - 15.000

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH
*	0.397
x	0.797
⊡	1.199
⊙	2.749
▼	4.960

PARAMETRIC VALUES

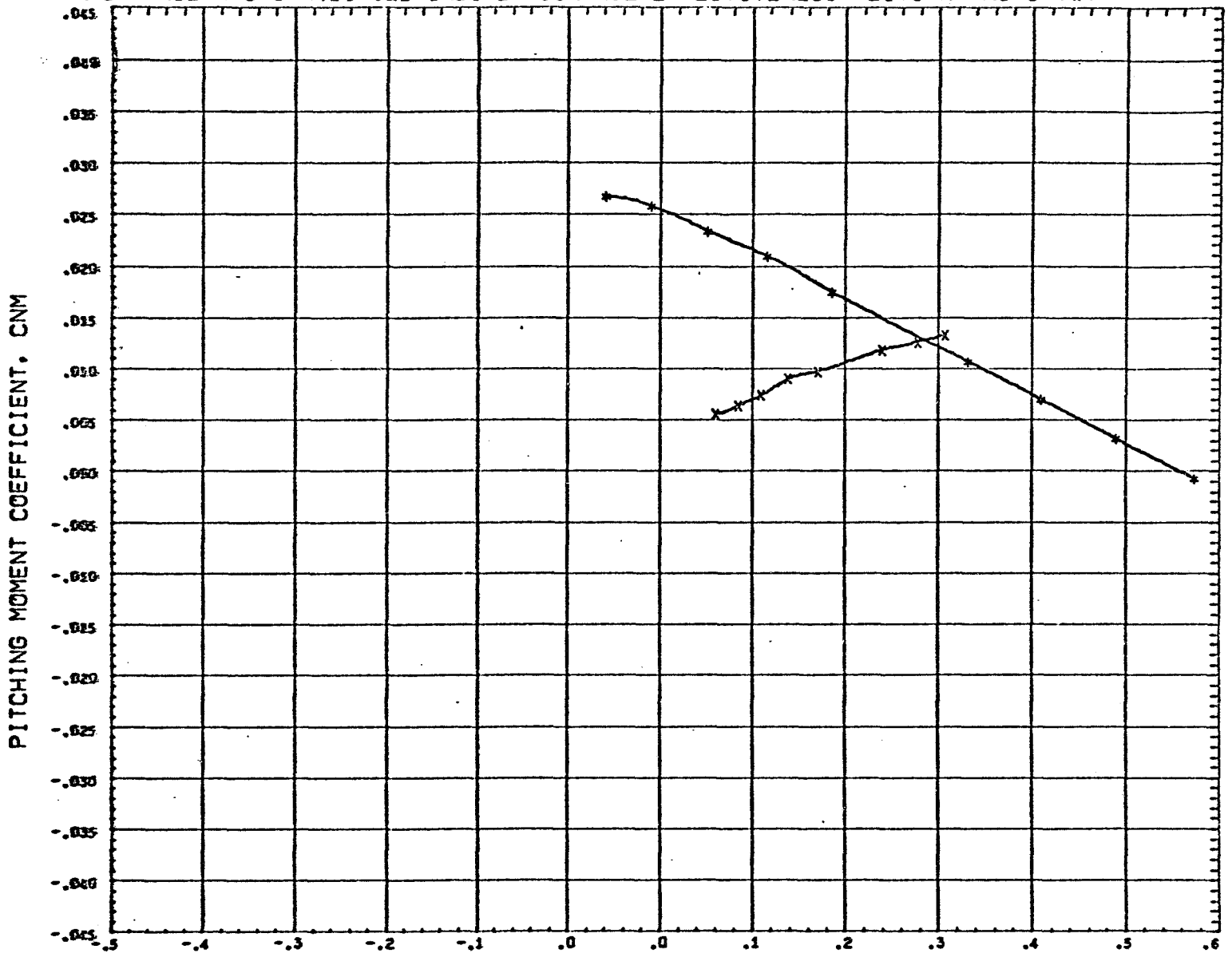
BETA 0.000 ELEVON - 15.000

REFERENCE FILE.

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 15.000
x	4.960				

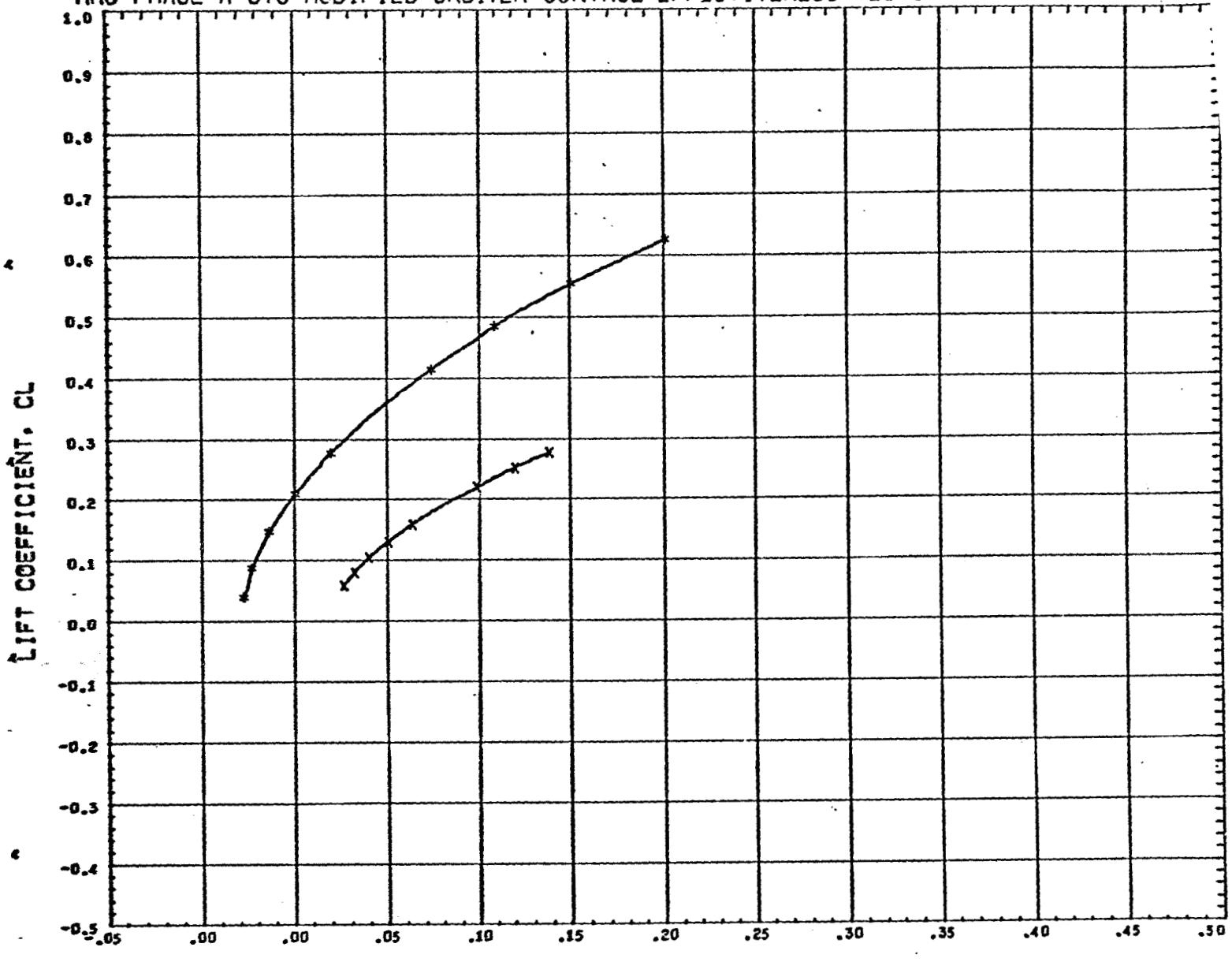
REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MSFC 453 MMC MOD ORB B2W2E1 DEL E-15 R0 (R17023) 02 JUL 70 PAGE 147

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



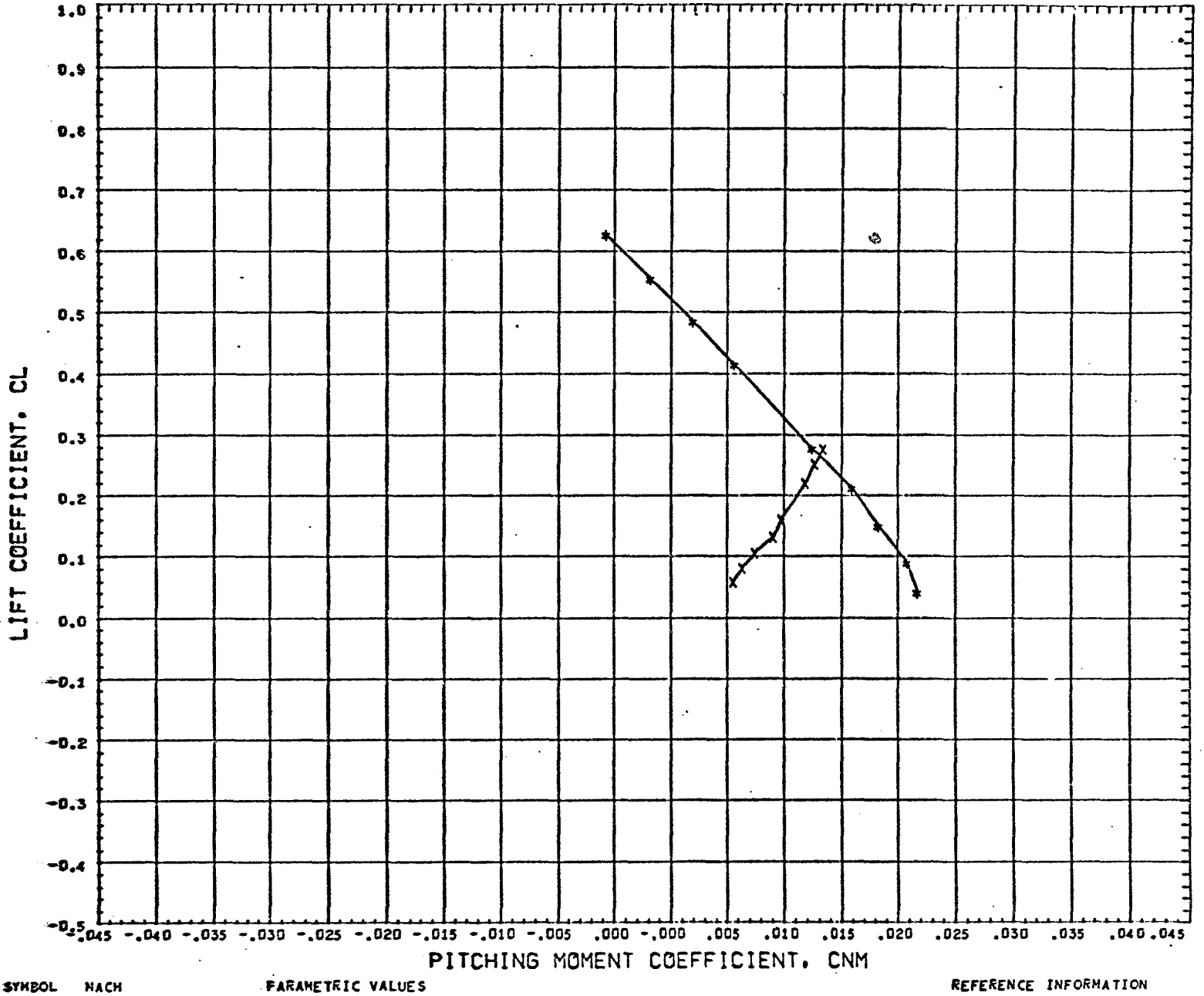
SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 15.000
x	4.960				

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

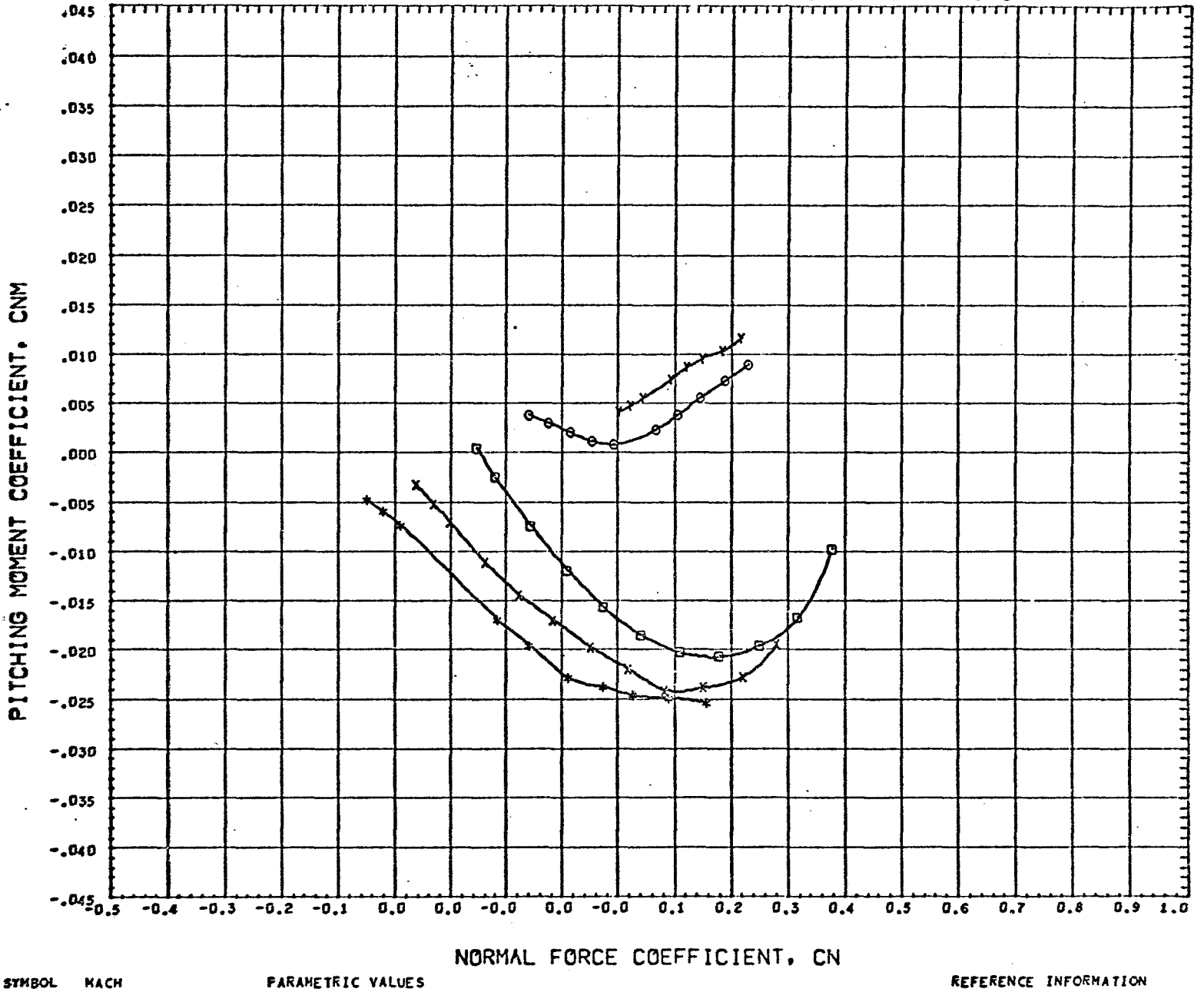
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			REFERENCE INFORMATION		
*	0.395	BETA	0.000	ELEVON - 15.000	REFS	0.116	SQ.FT.
x	4.960				REFL	0.646	FT.
					REFB	0.405	FT.
					XMRP	0.406	
					YMRP	0.000	
					ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

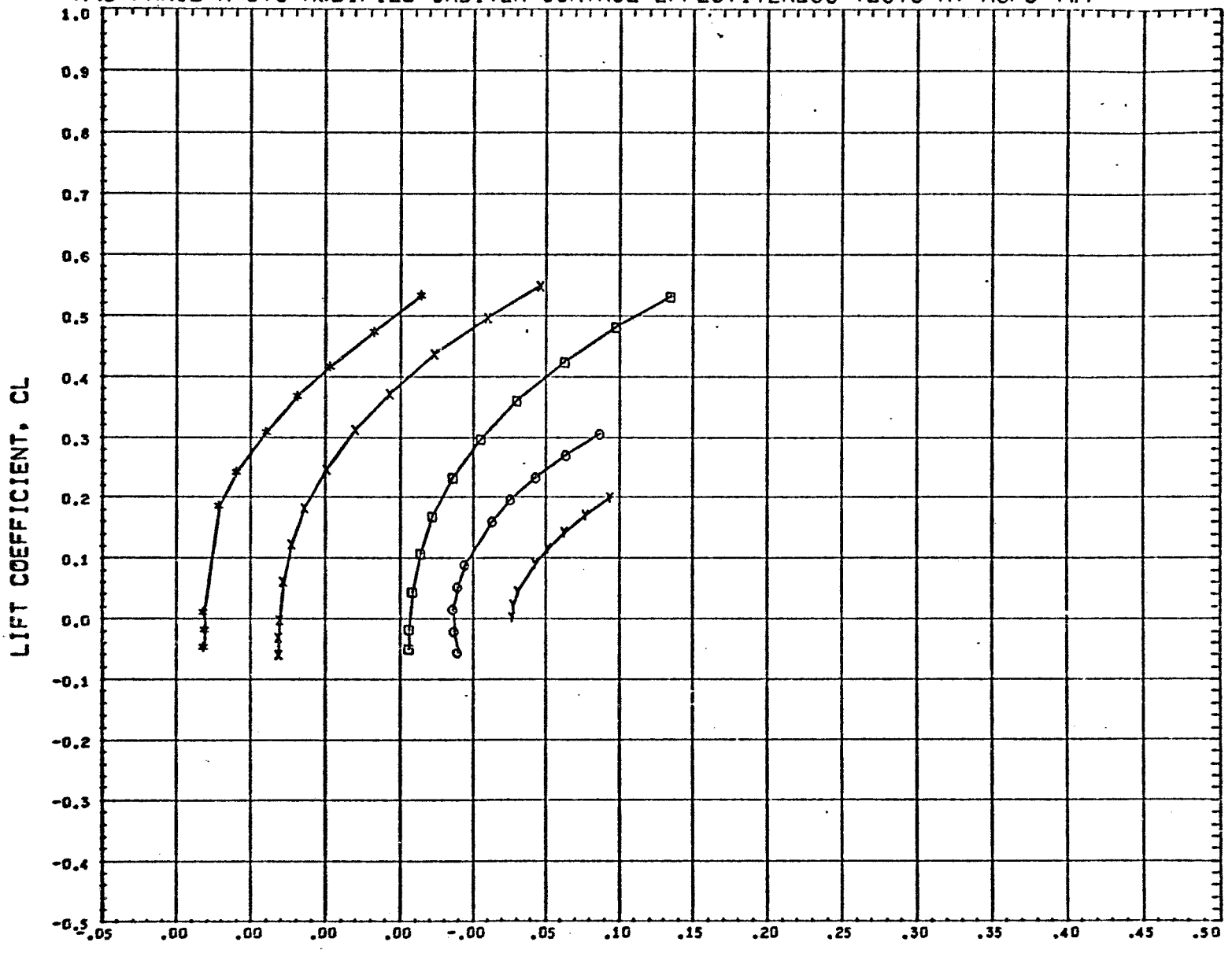


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
⊡	1.199				
⊕	2.740				
▽	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

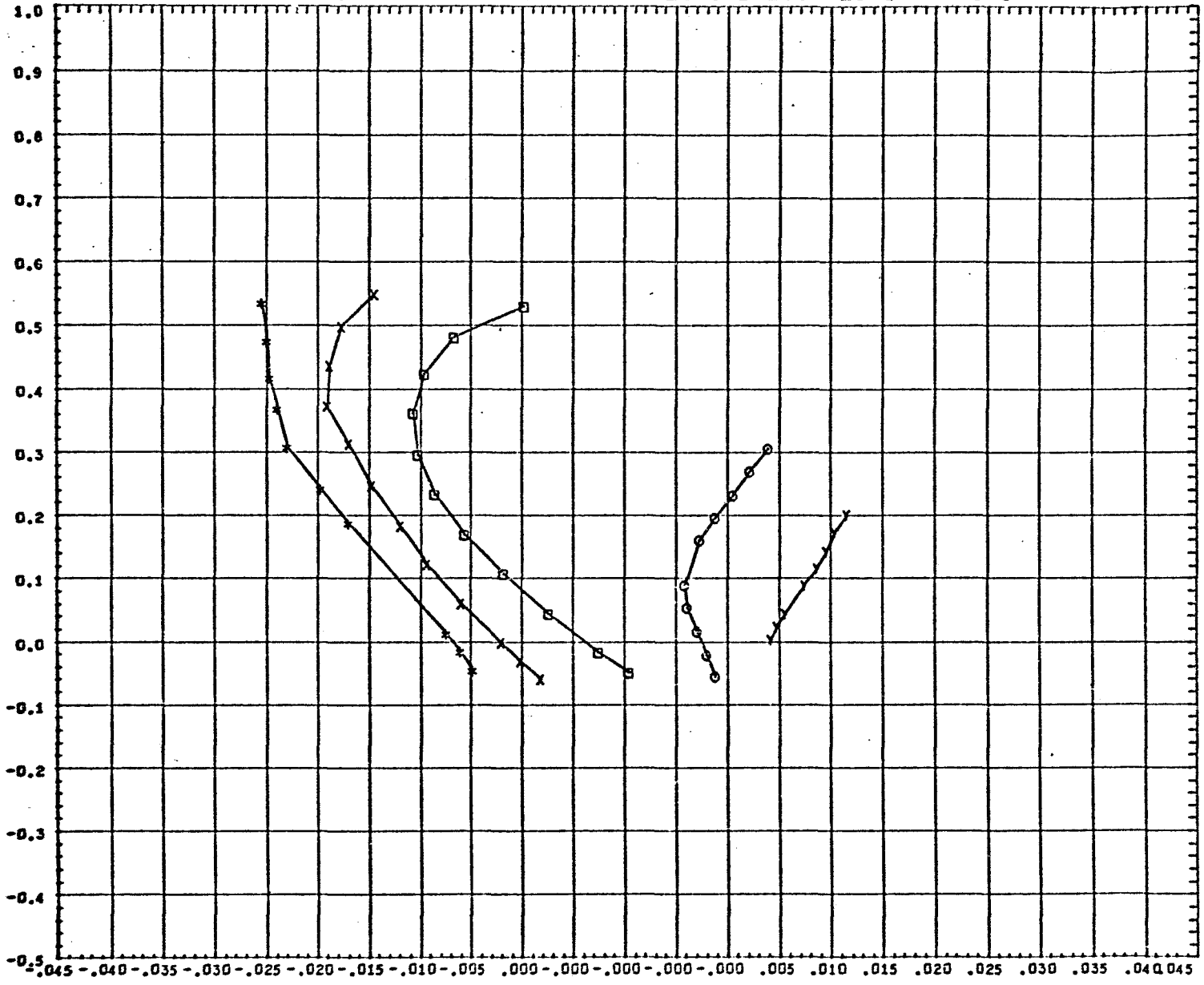


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
X	0.797				
⊡	1.199				
⊙	2.740				
Y	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

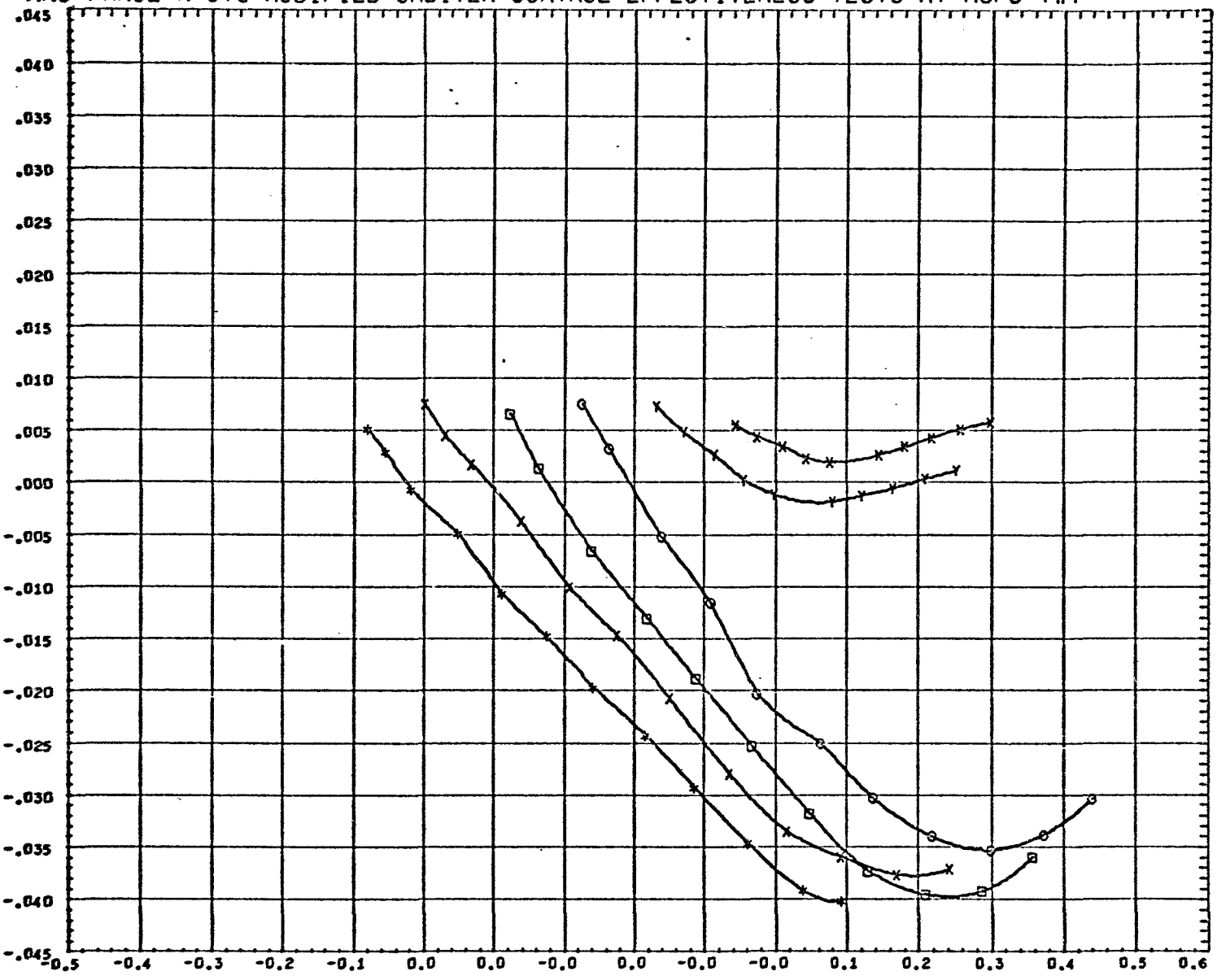


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	RUDDER	0.000
x	0.797				
⊡	1.199				
⊙	2.749				
▽	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFS	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

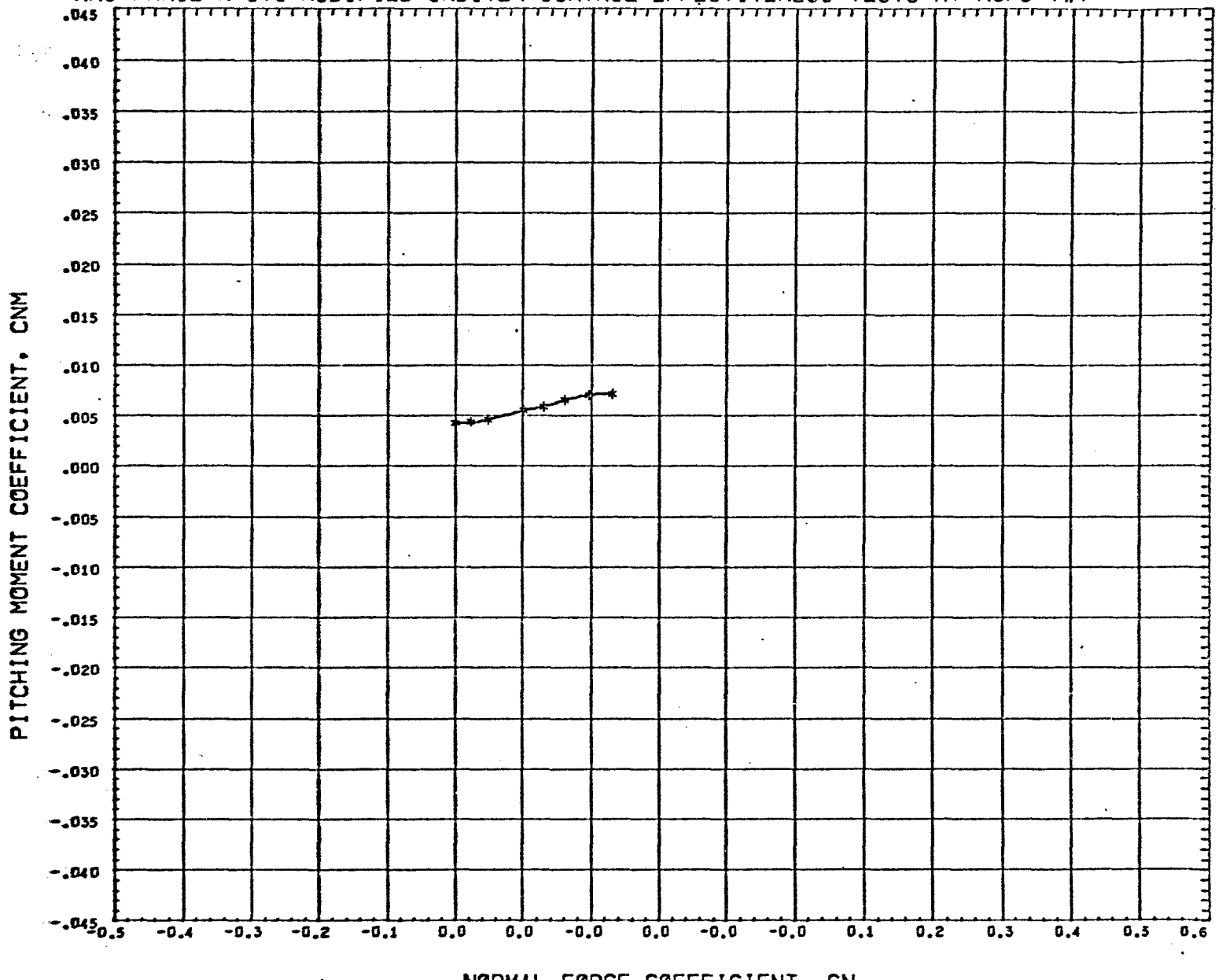


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.396	BETA	0.000	ELEVON	0.000
X	0.796	RUDDER	0.000		
⊞	0.996				
⊕	1.199				
Y	2.740				
⊠	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MSFC 453 MMC MOD ORB B2W2T1E1R1 DEL E0 R0 (R17025) 02 JUL 70 PAGE 153

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

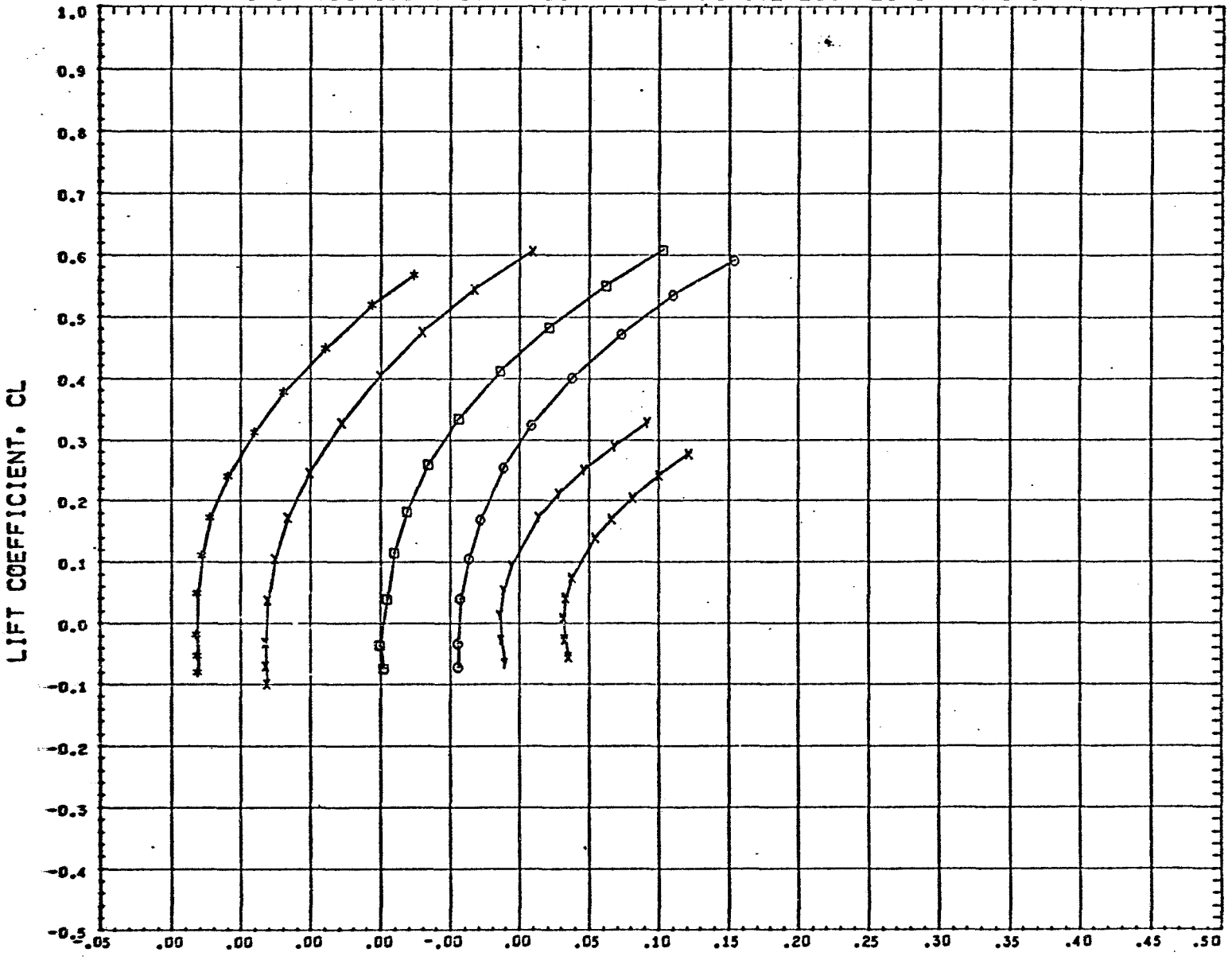


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

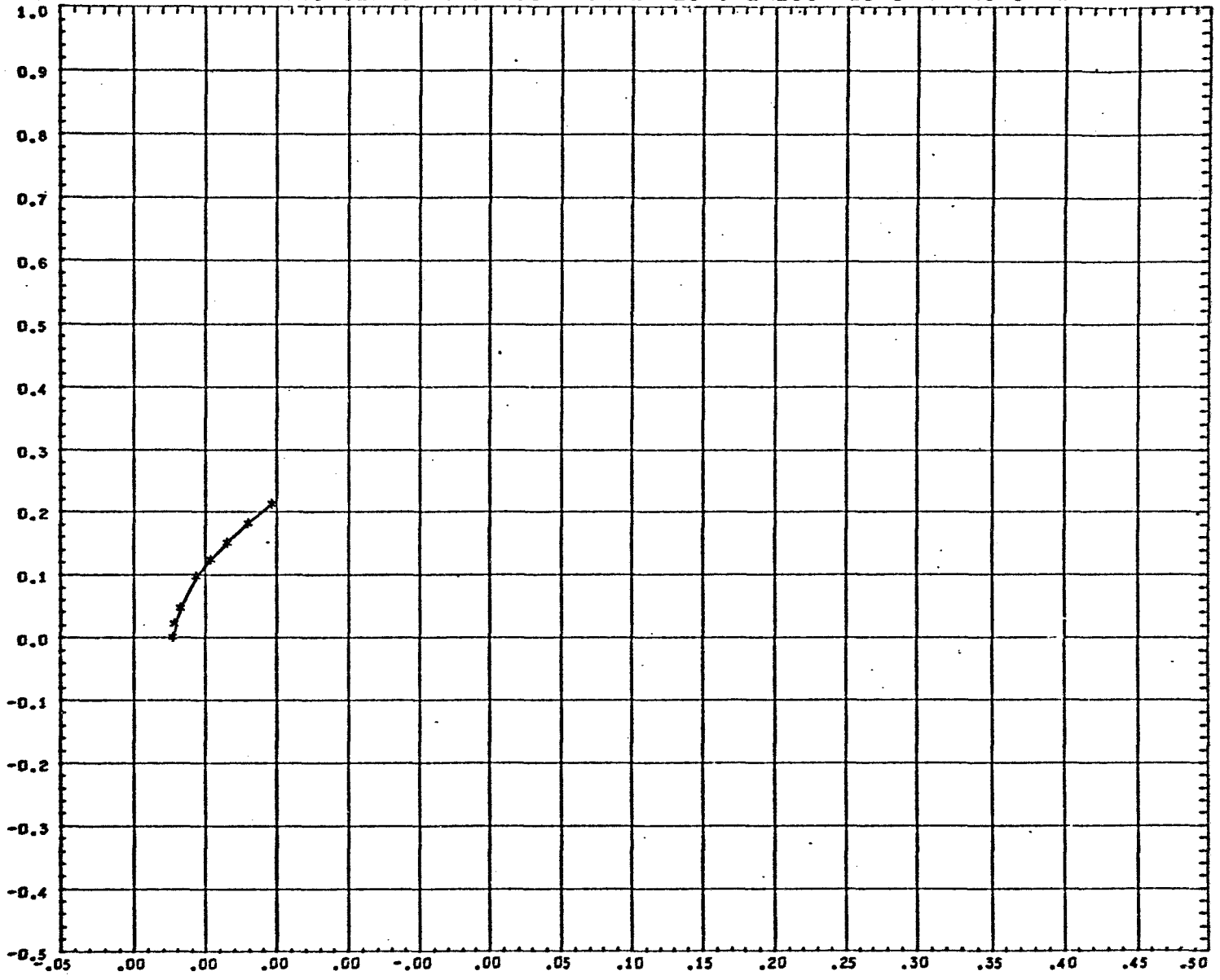
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
●	0.396	BETA	0.000	ELEVON	0.000
x	0.798	RUDDER	0.000		
⊡	0.996				
⊙	1.199				
Y	2.740				
x	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

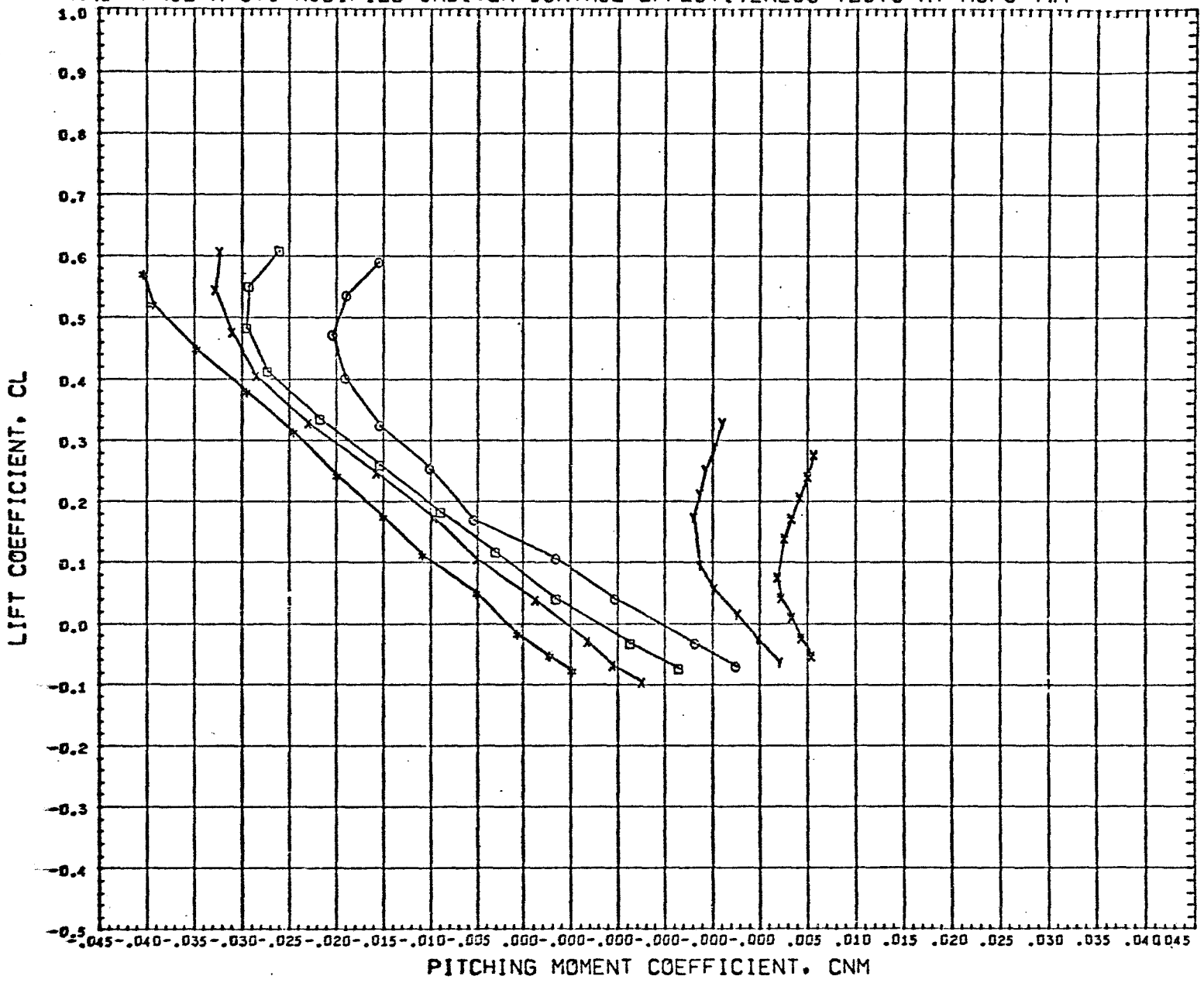


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

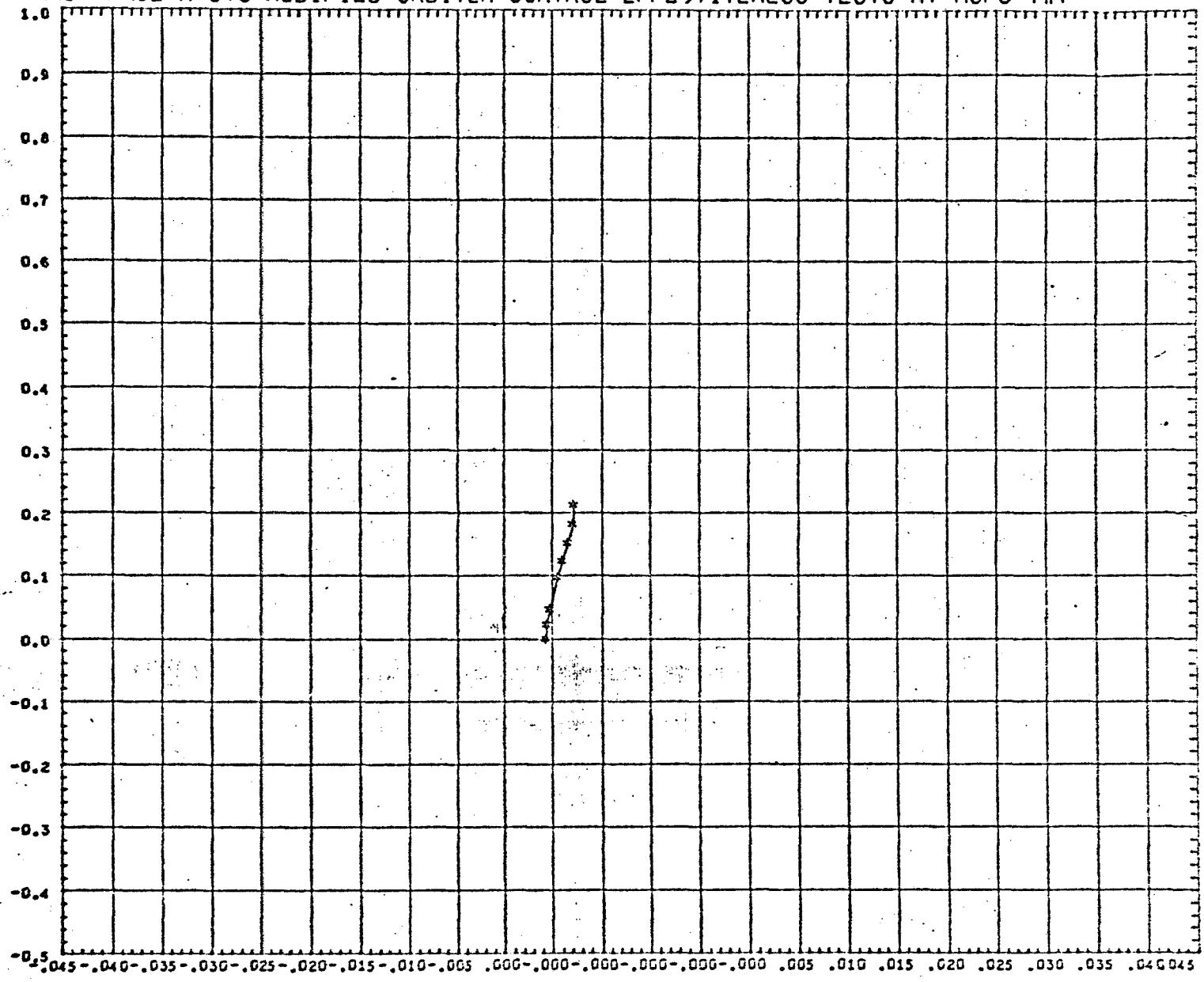
REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES				REFERENCE INFORMATION		
*	0.396	BETA	0.000	ELEVON	0.000	REFS	0.116	SQ.FT.
x	0.798	RUDDER	0.000			REFL	0.646	FT.
⊡	0.996					REFB	0.405	FT.
⊕	1.199					XMRP	0.406	
Y	2.740					YMRP	0.000	
⊠	3.479	REFERENCE FILE.				ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

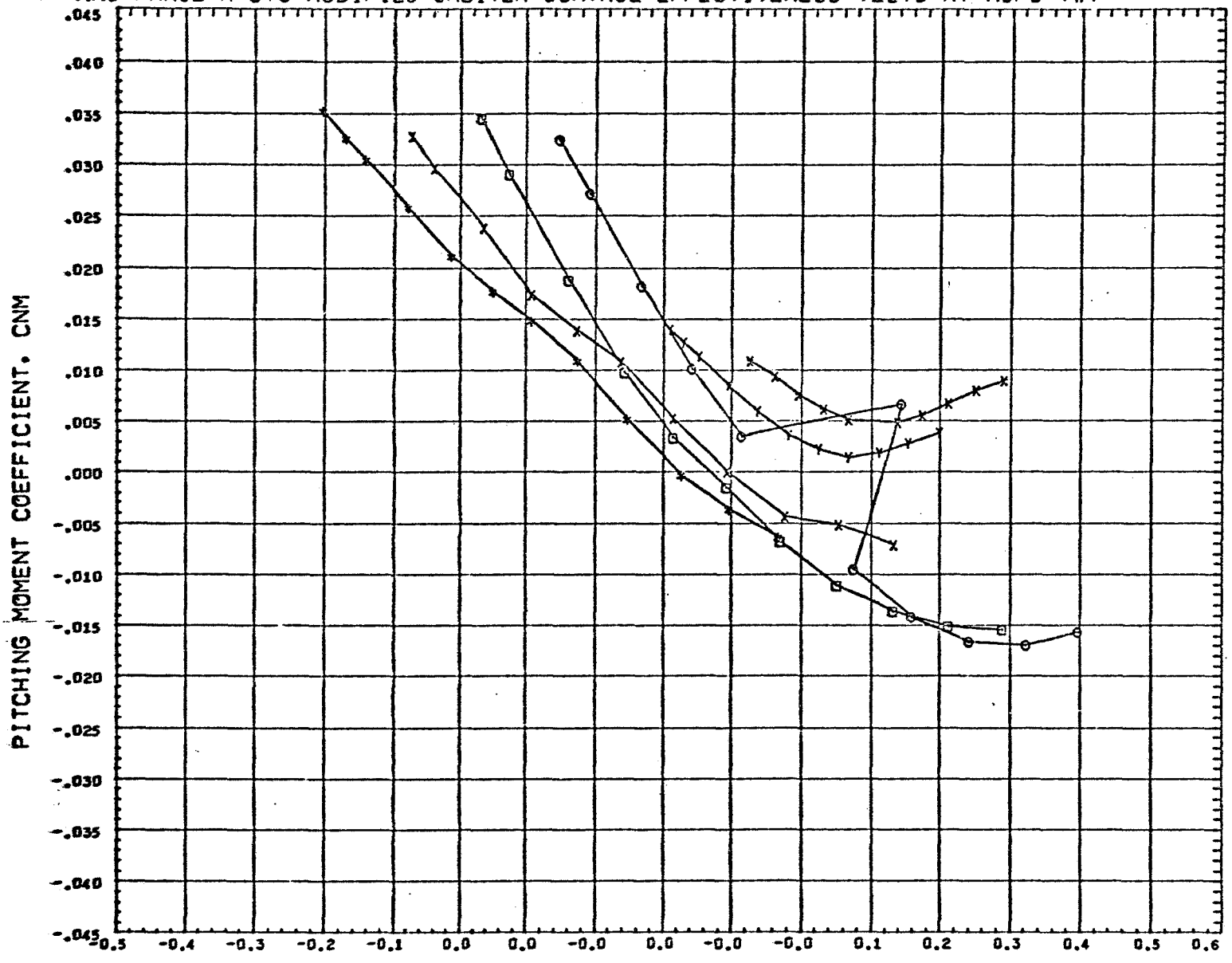


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	0.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

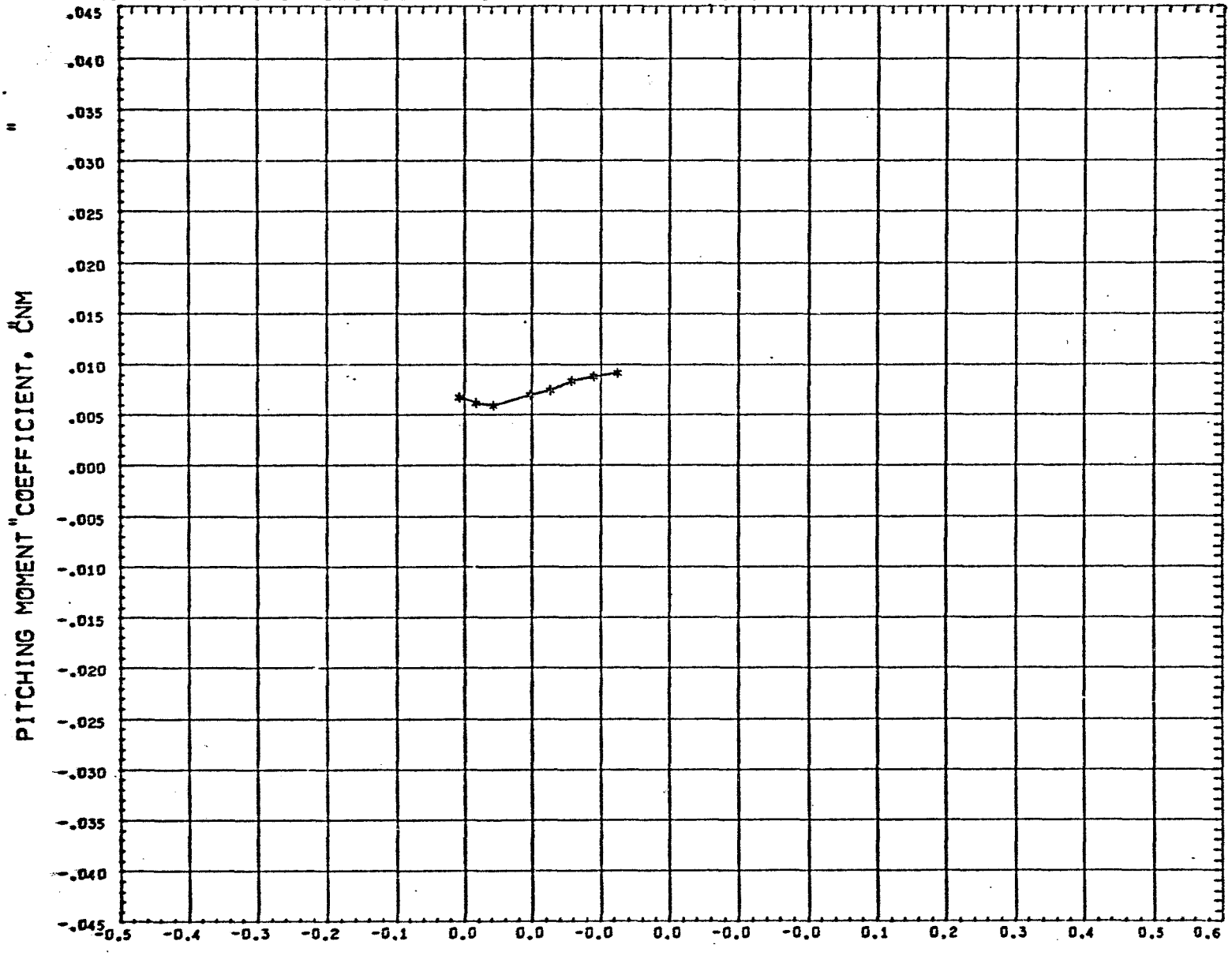
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
X	0.797	RUDDER	0.000		
B	0.997				
⊕	1.211				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

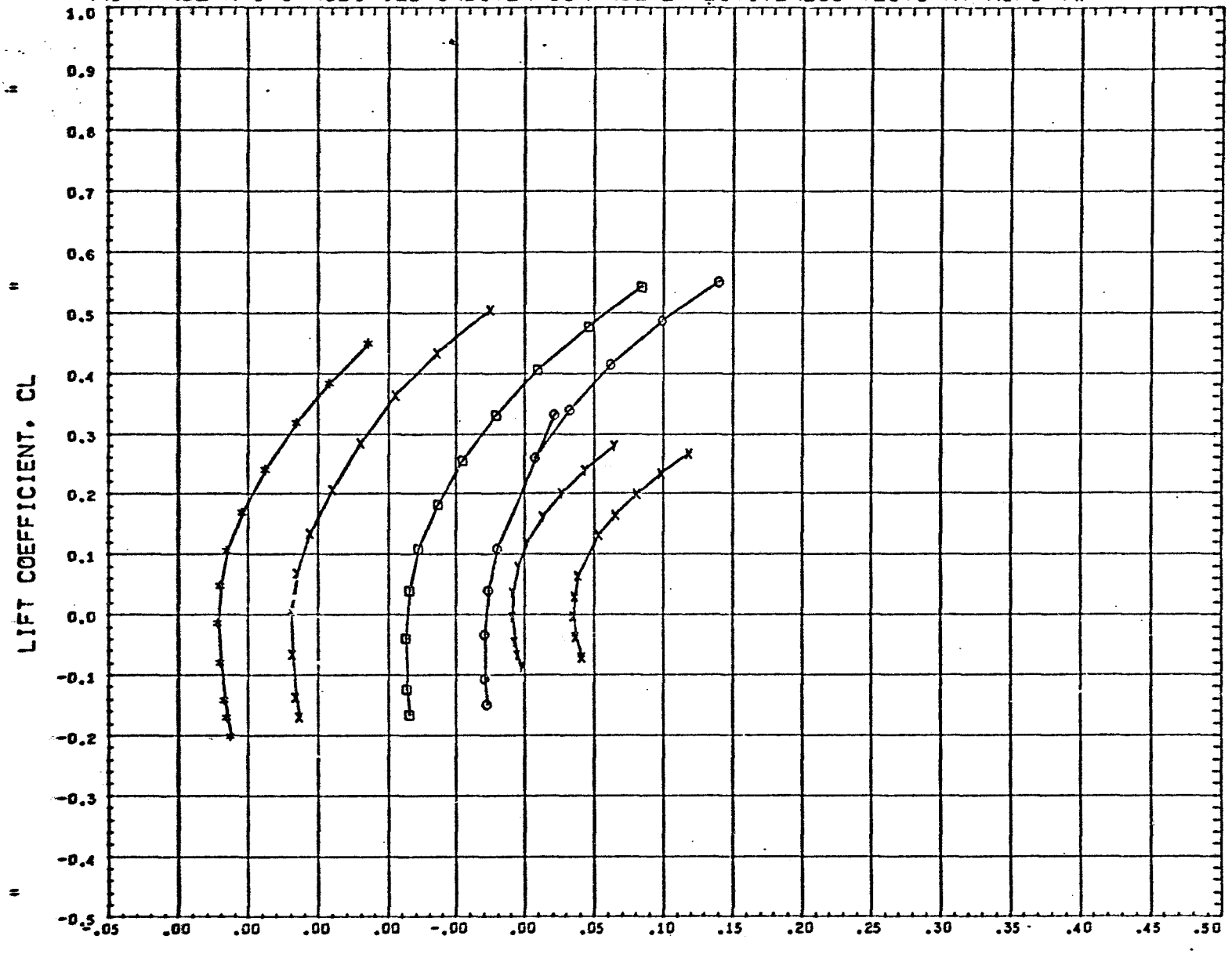


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

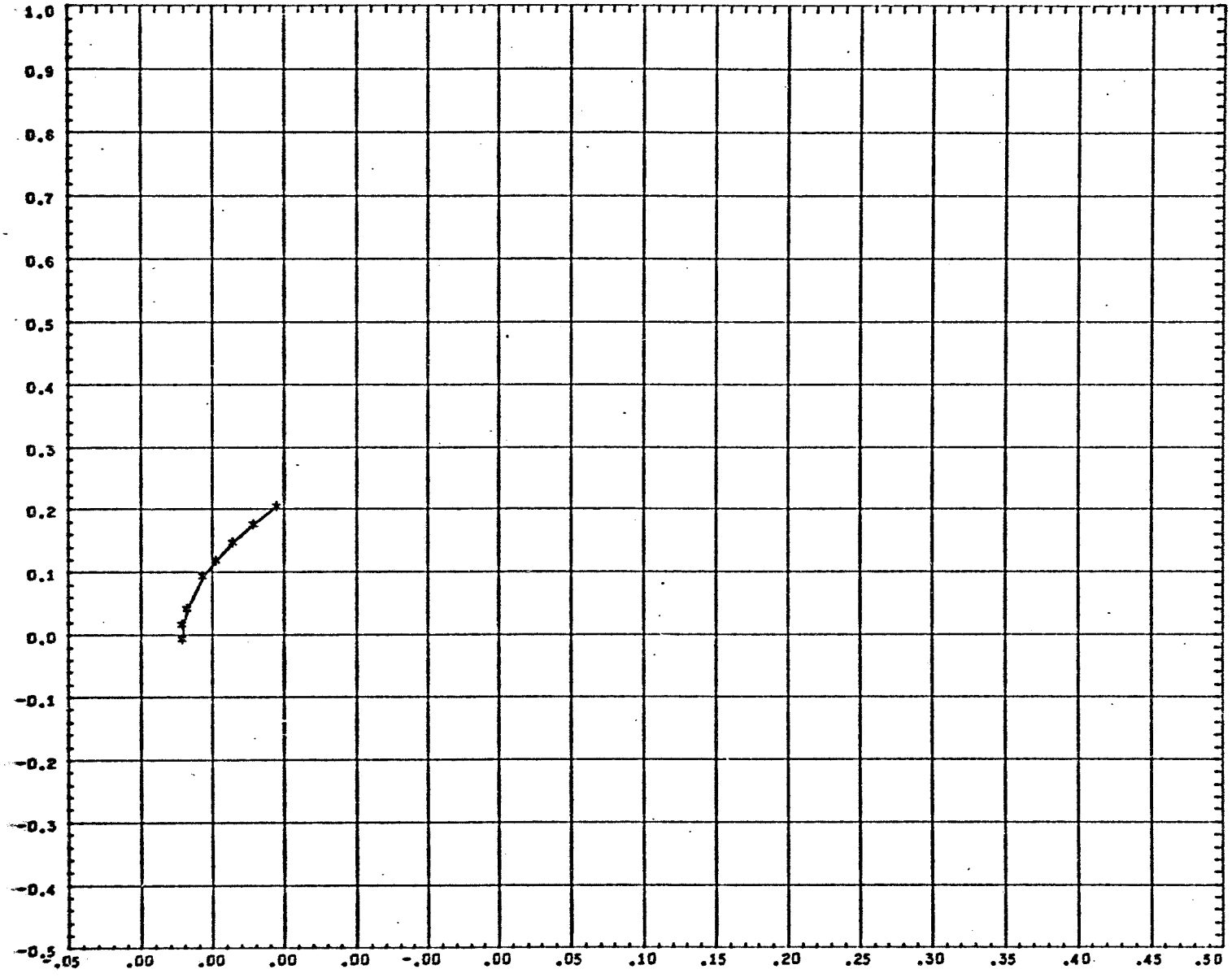
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
●	0.398	BETA	0.000	ELEVON	- 15.000
x	0.797	RUDDER	0.000		
⊡	0.997				
⊙	1.211				
▽	2.740				
✱	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

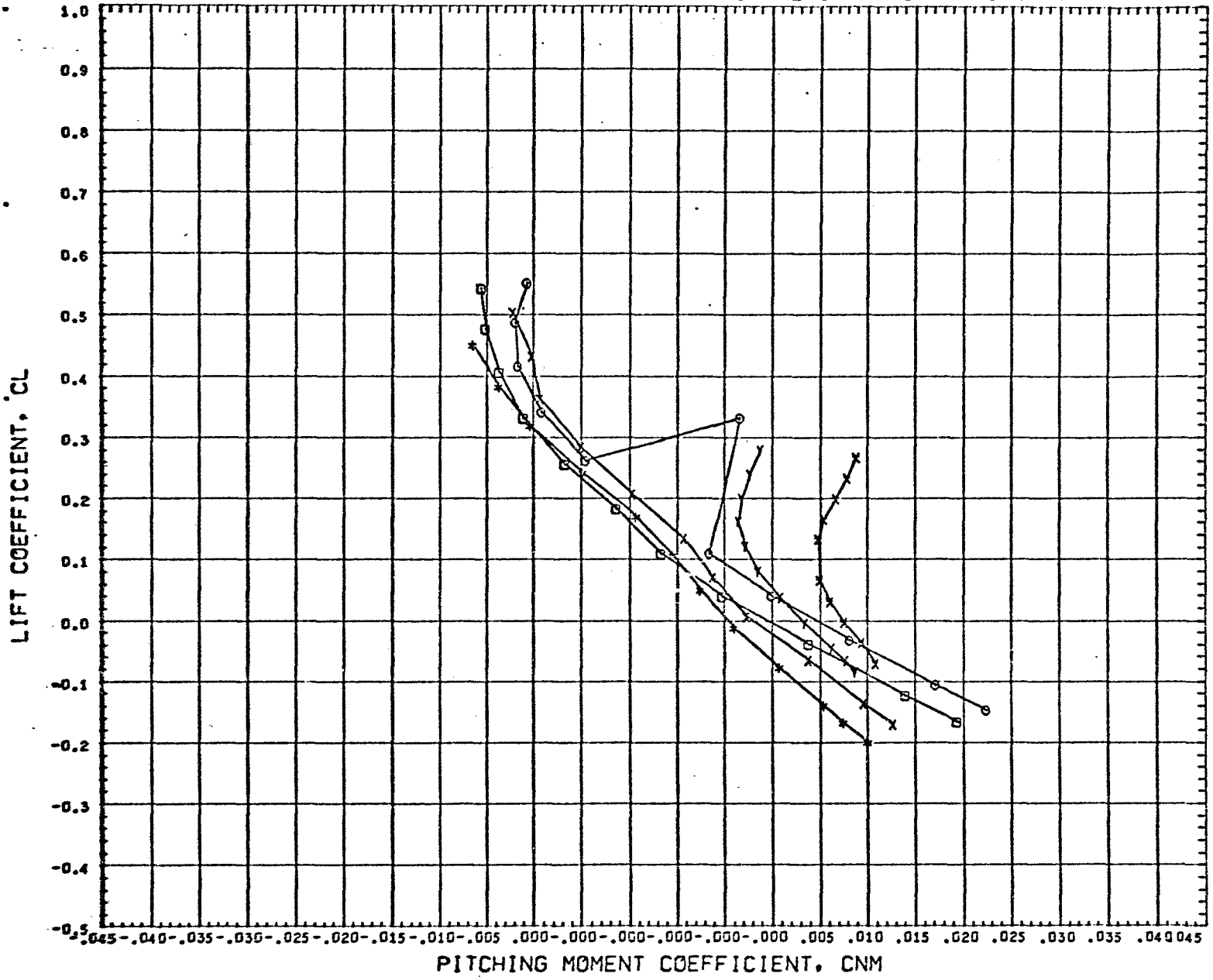


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

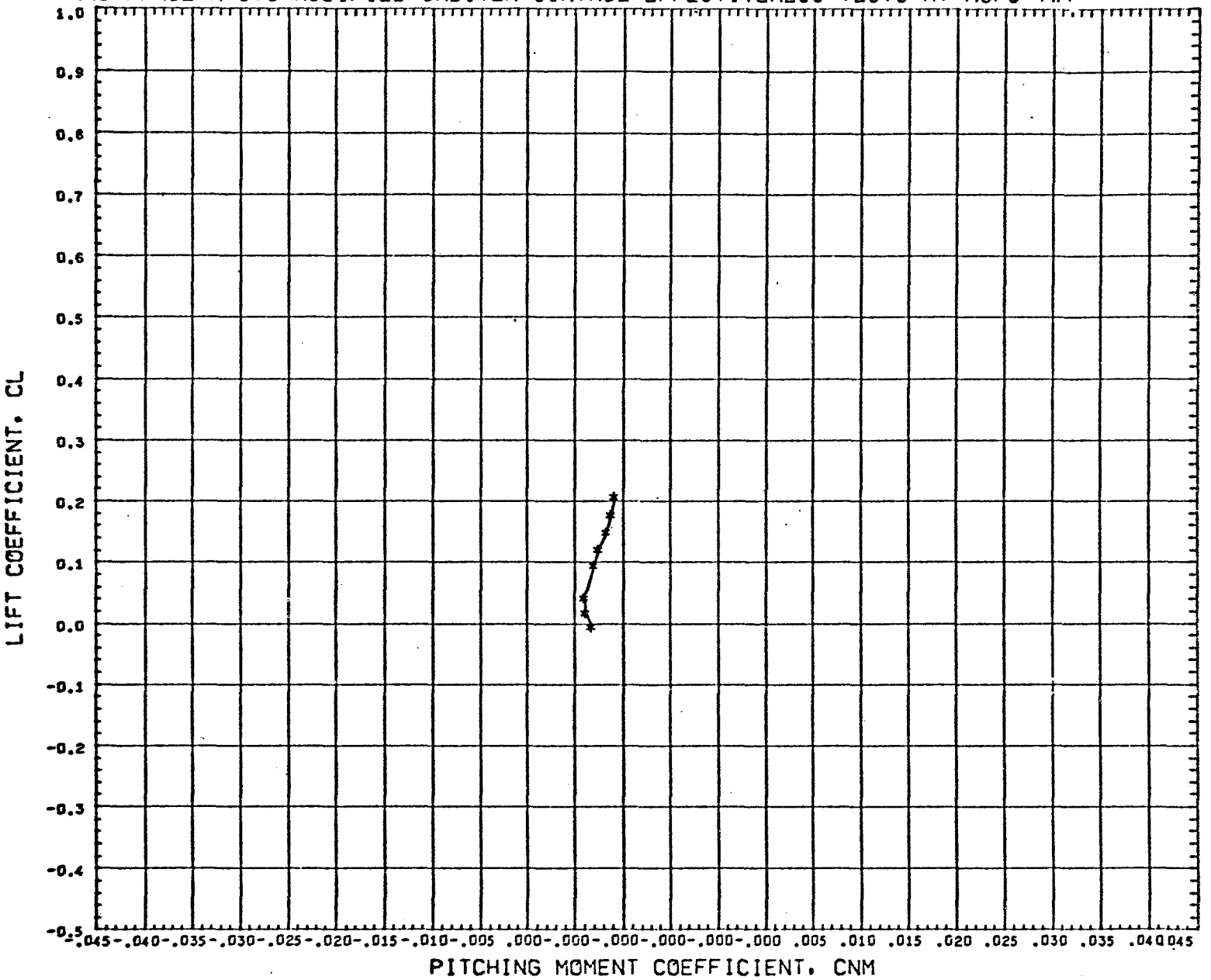
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
●	0.398	BETA	0.000	ELEVON	- 15.000
x	0.797	RUDDER	0.000		
⊞	0.997				
⊕	1.211				
▼	2.740				
✱	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

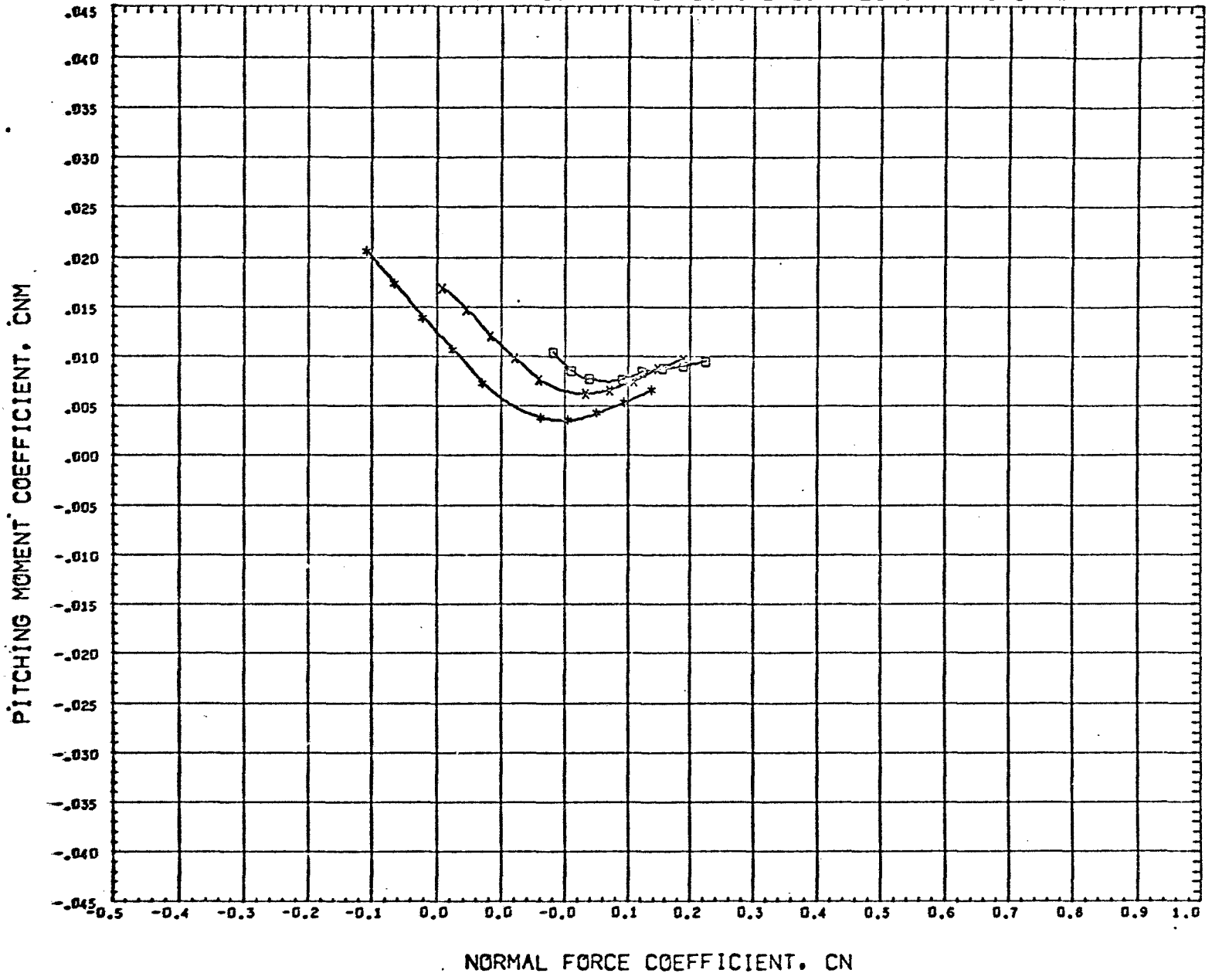


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 15.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

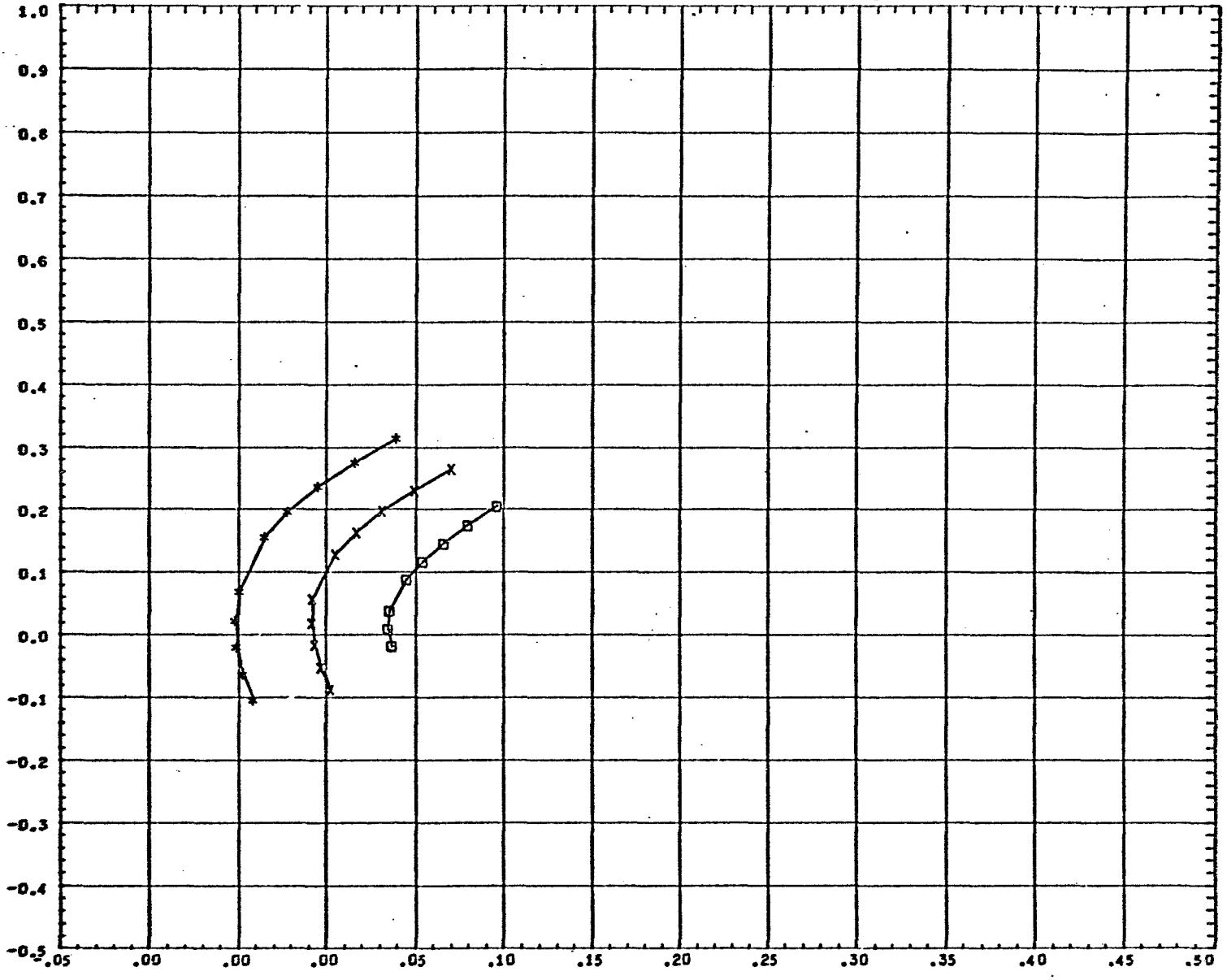


SYMBOL	MACH	PARAMETRIC VALUES			
*	2.749	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.965				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

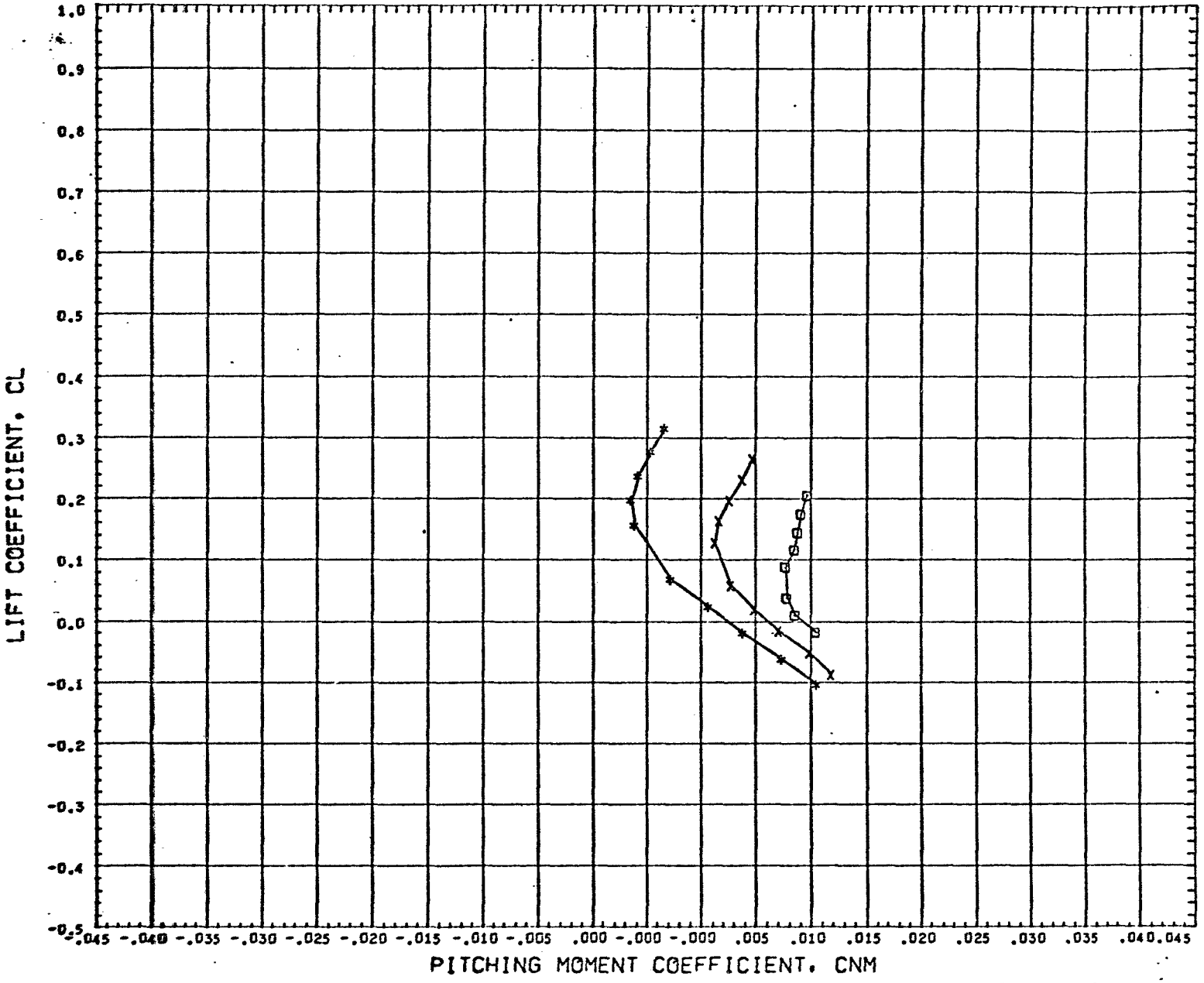


SYMBOL	MACH	PARAMETRIC VALUES			
*	2.740	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊡	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

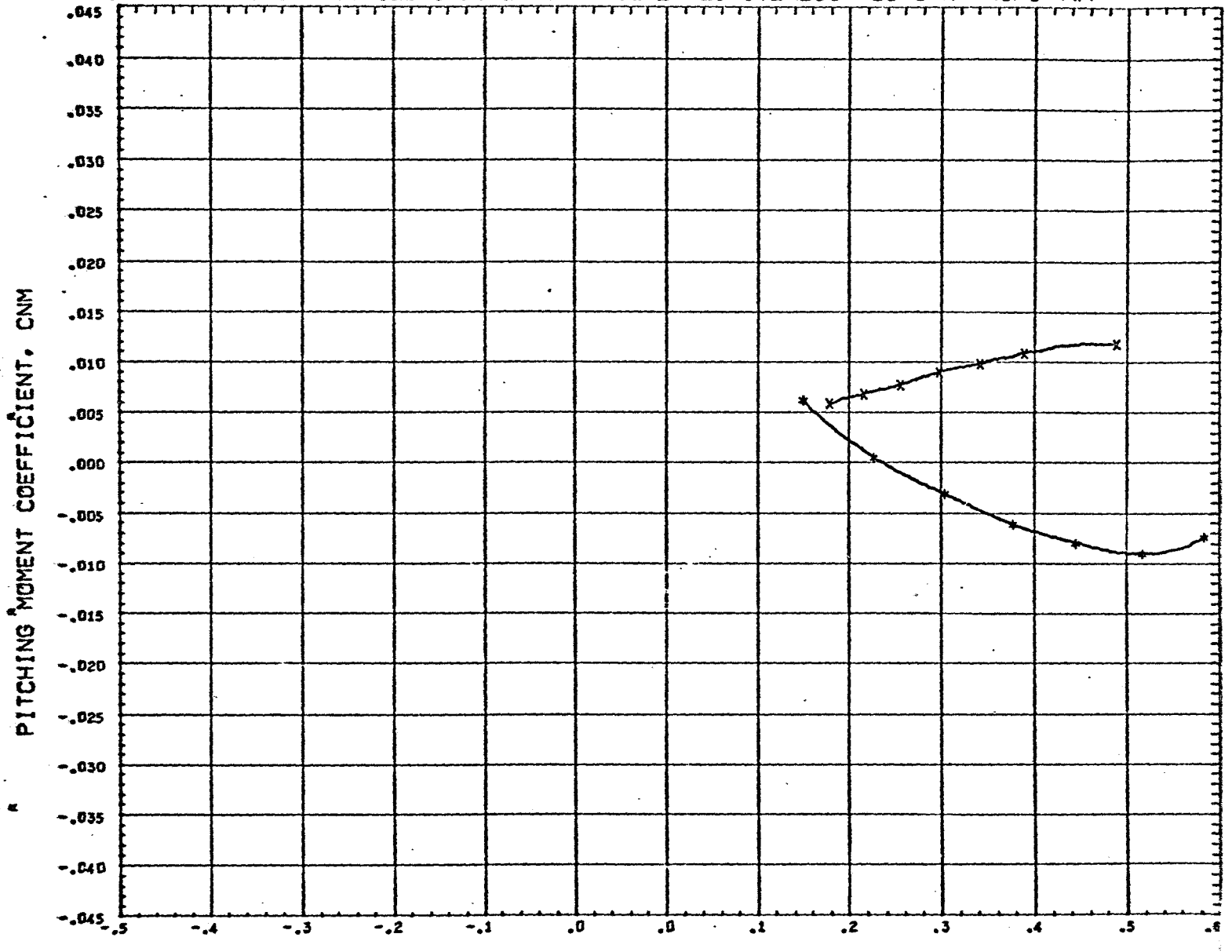


SYMBOL	MACH	PARAMETRIC VALUES			
*	2.740	BETA	0.000	ELEVON	- 30.000
x	3.479	RUDDER	0.000		
⊕	4.960				

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

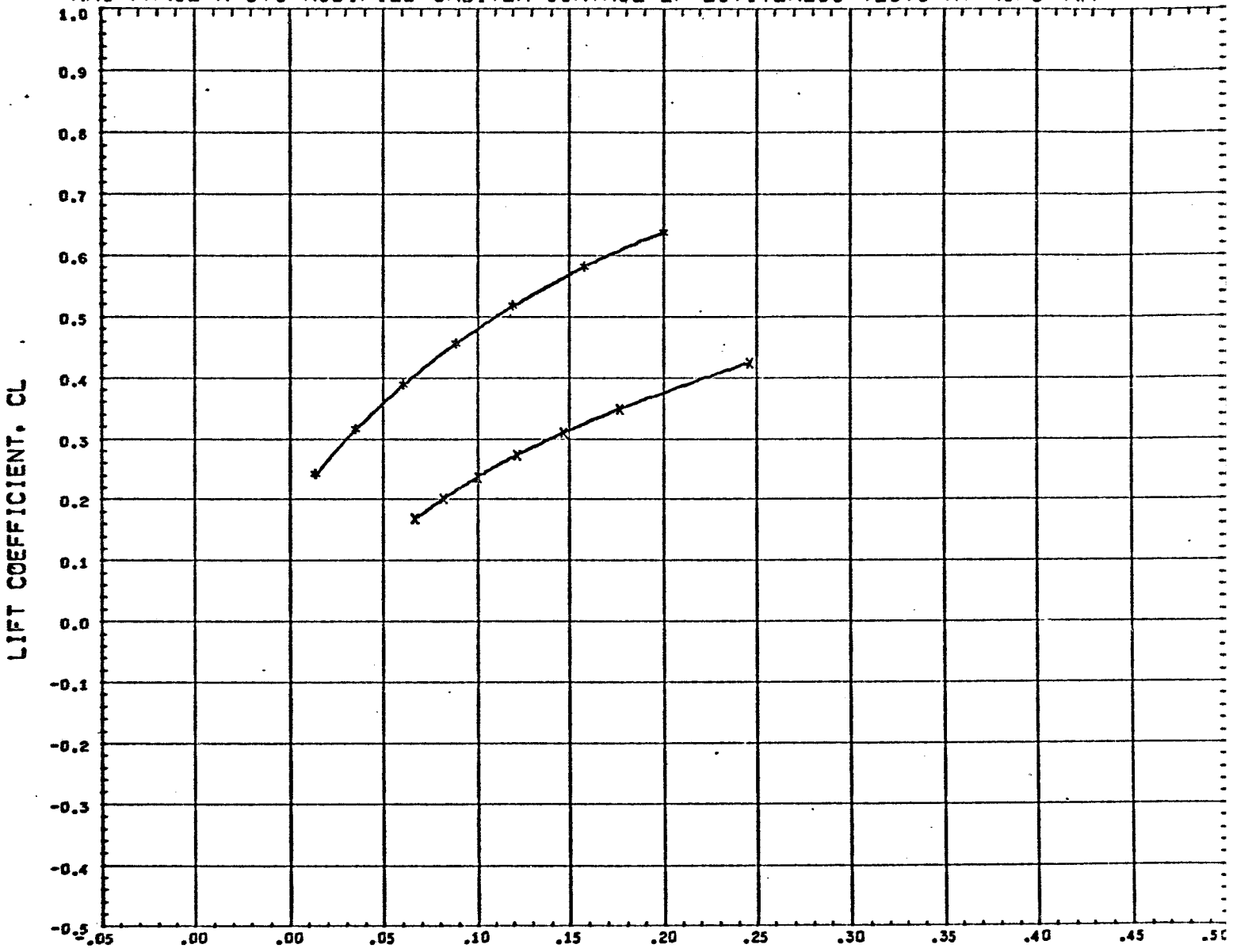


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

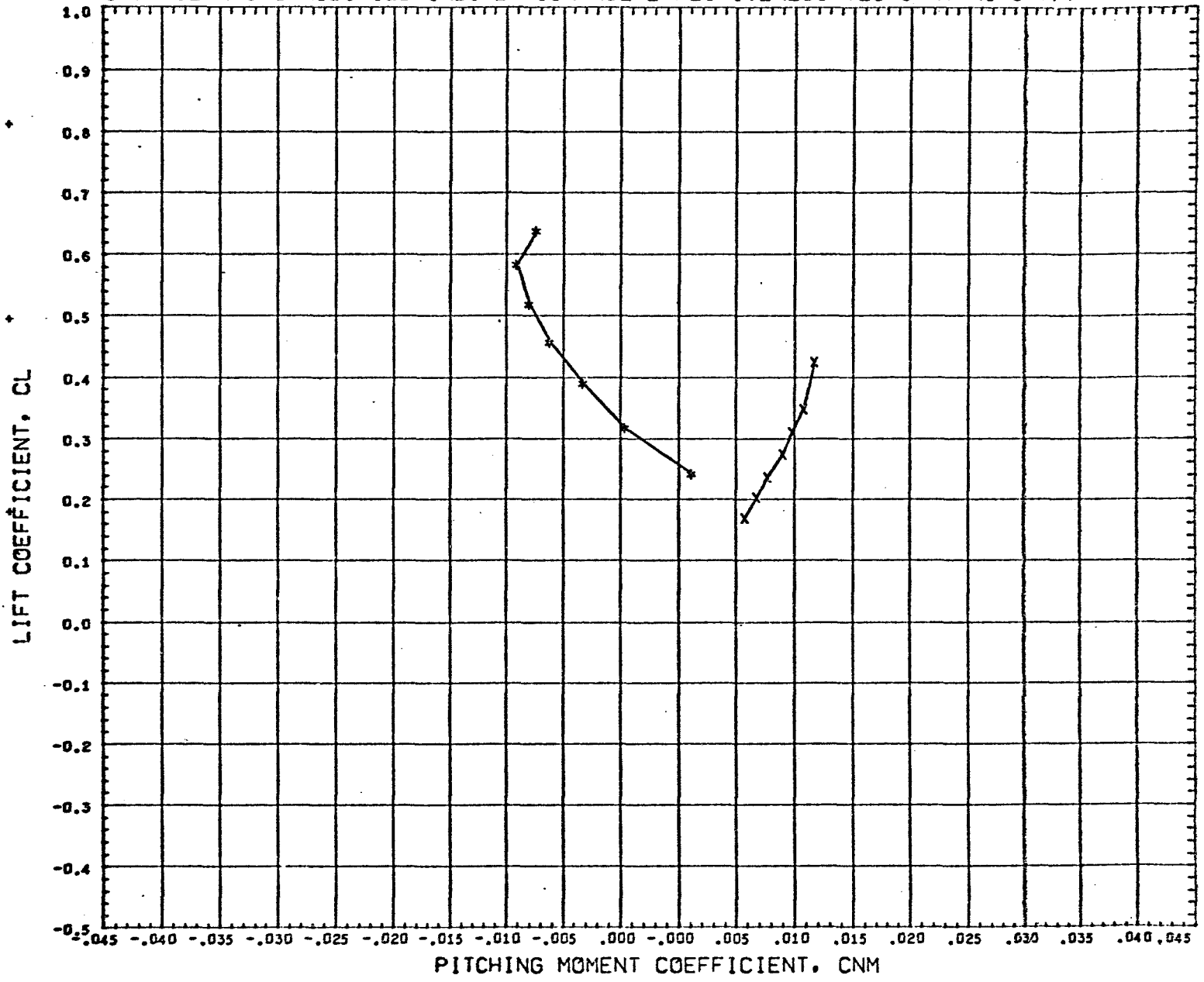


SYMBOL	MACH		PARAMETRIC VALUES		
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

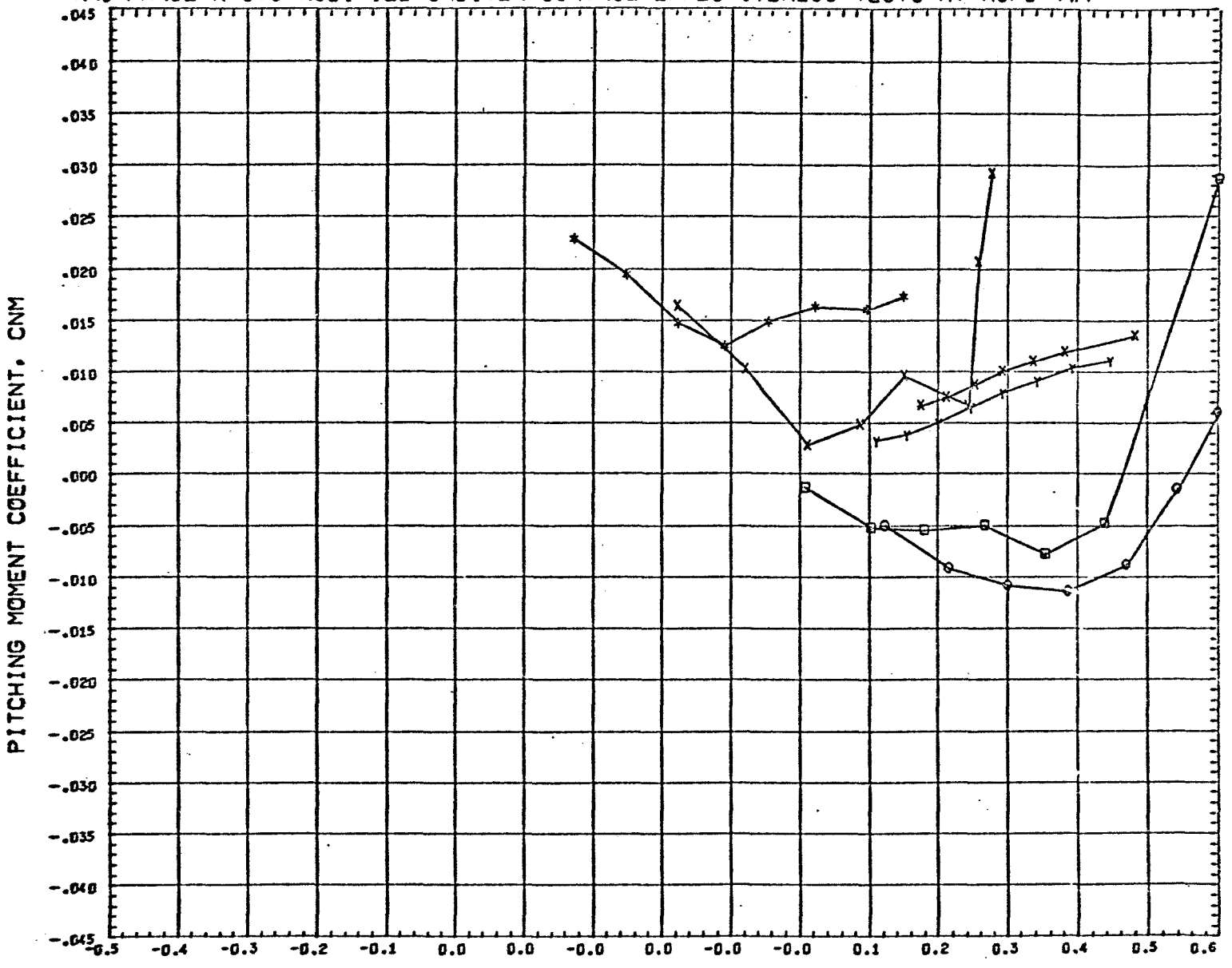


SYMBOL	MACH	PARAMETRIC VALUES			
*	0.398	BETA	0.000	ELEVON	- 15.000
x	3.479	RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

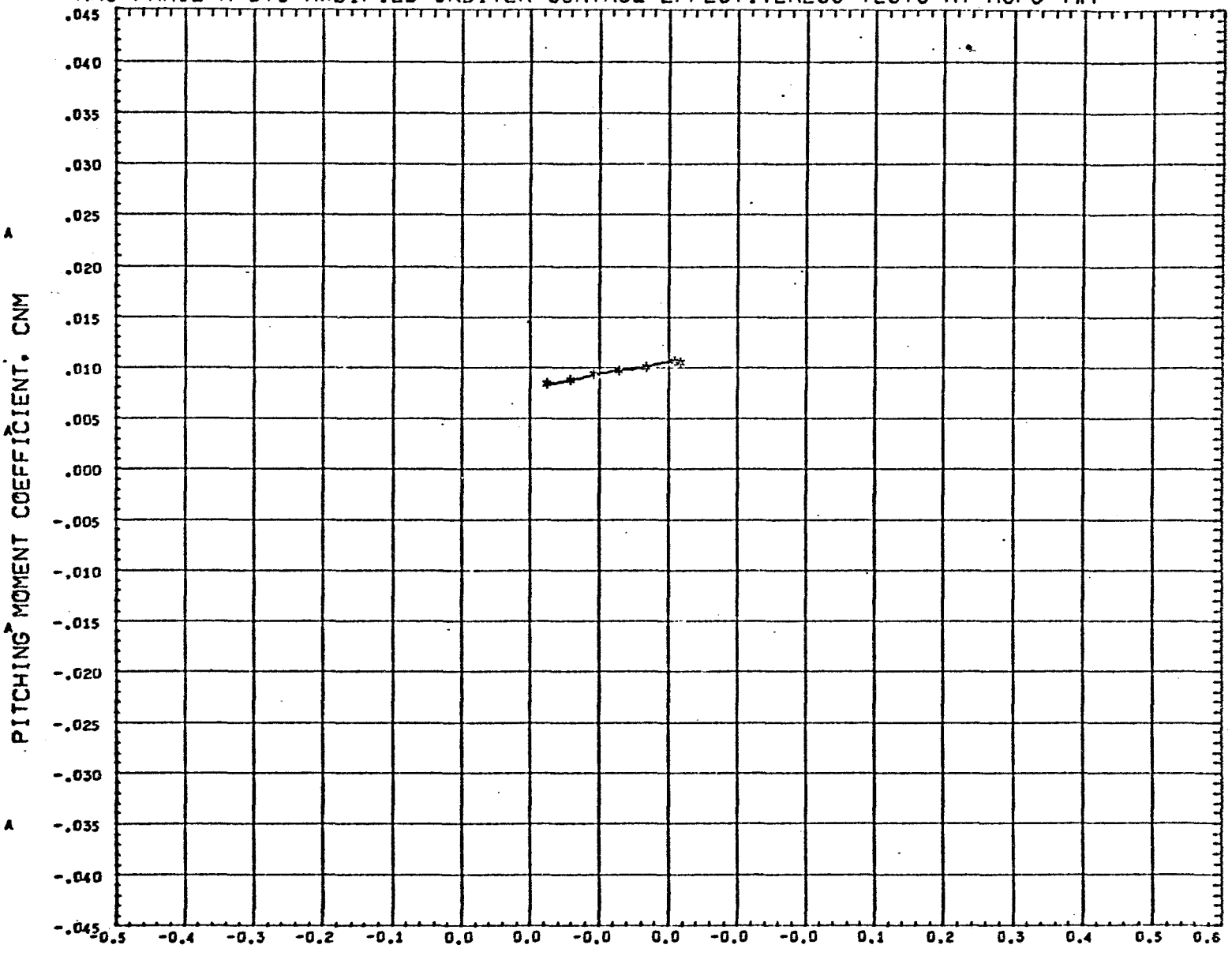
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
⊡	0.995				
⊙	1.198				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

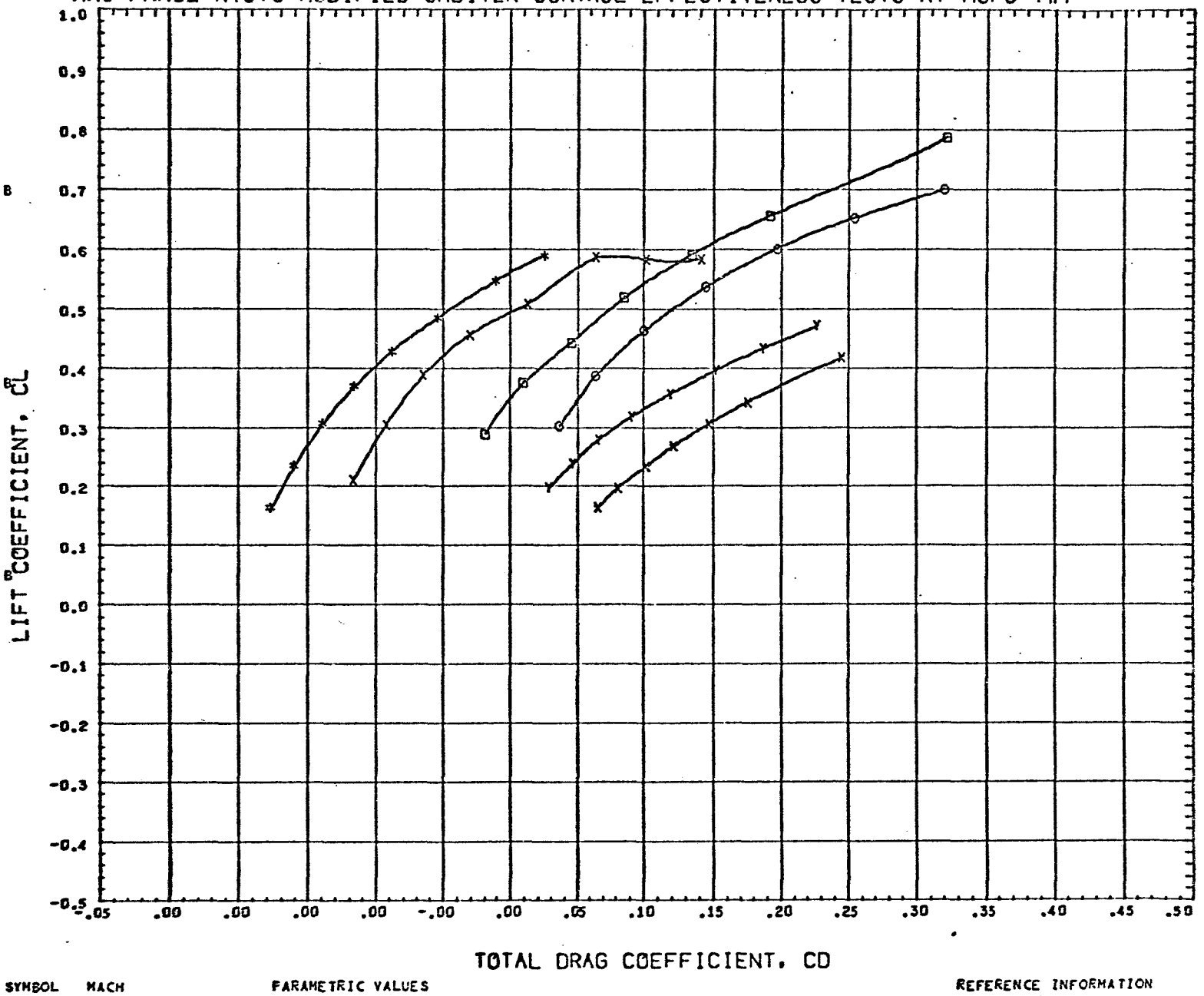


SYMBOL	MACH	PARAMETRIC VALUES			
●	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

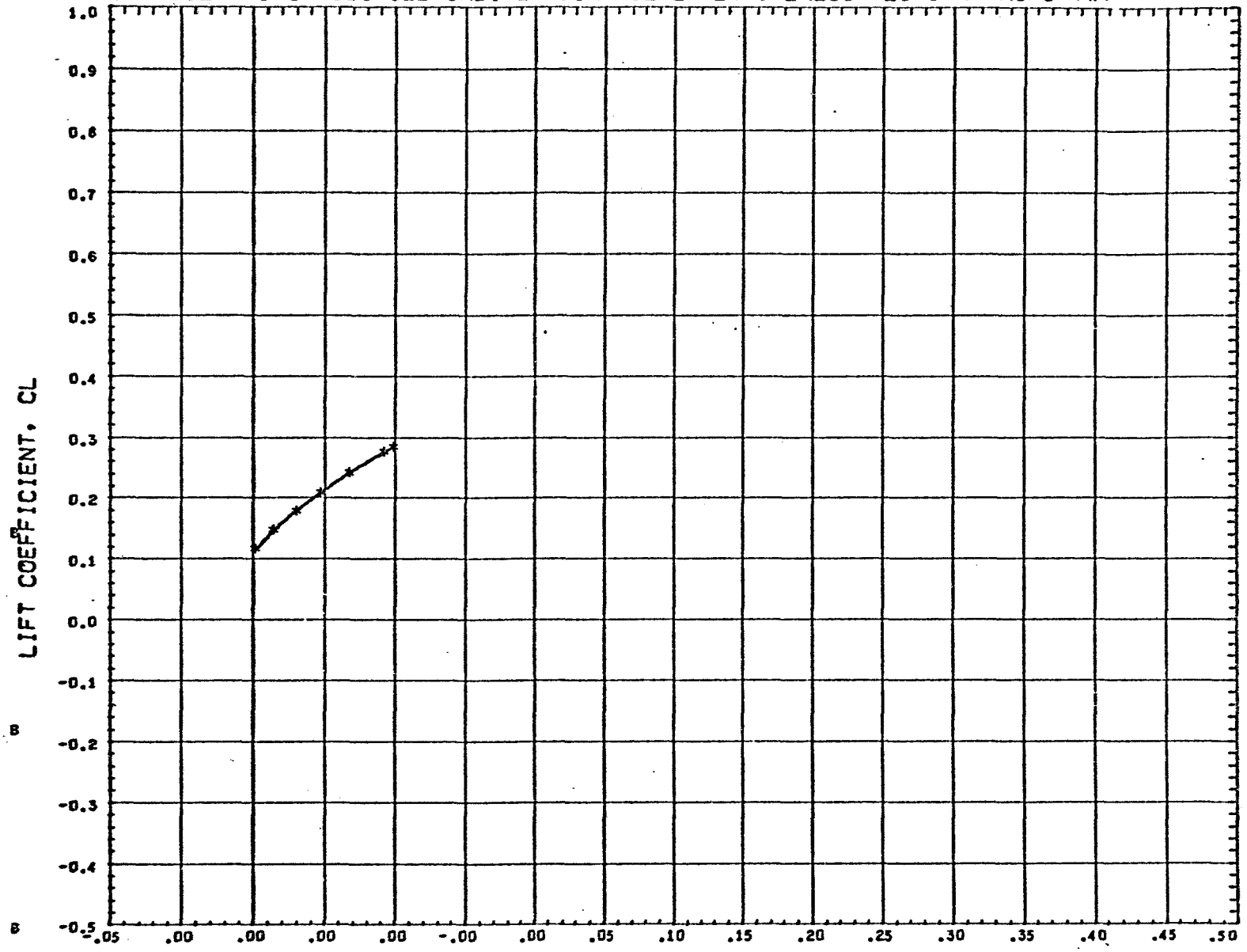
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	MACH		PARAMETRIC VALUES		
*	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
⊡	0.995				
⊕	1.198				
▽	2.740				
⊠	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.405	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



TOTAL DRAG COEFFICIENT, CD

SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

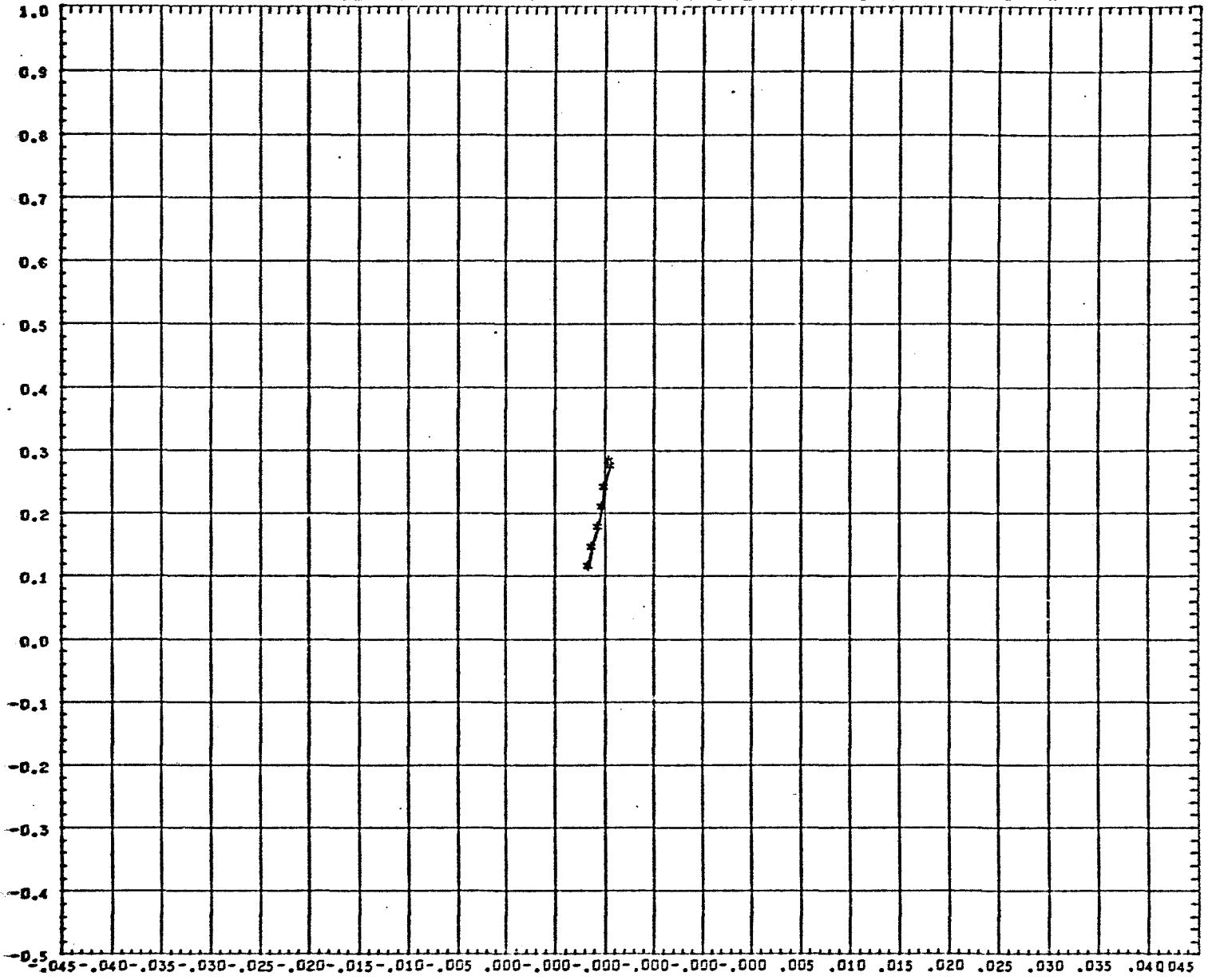
B REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

SYMBOL	MACH	PARAMETRIC VALUES			
*	0.395	BETA	0.000	ELEVON	- 30.000
X	0.794	RUDDER	0.000		
B	0.995				
C O	1.198				
Y	2.740				
X	3.479	REFERENCE FILE.			

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

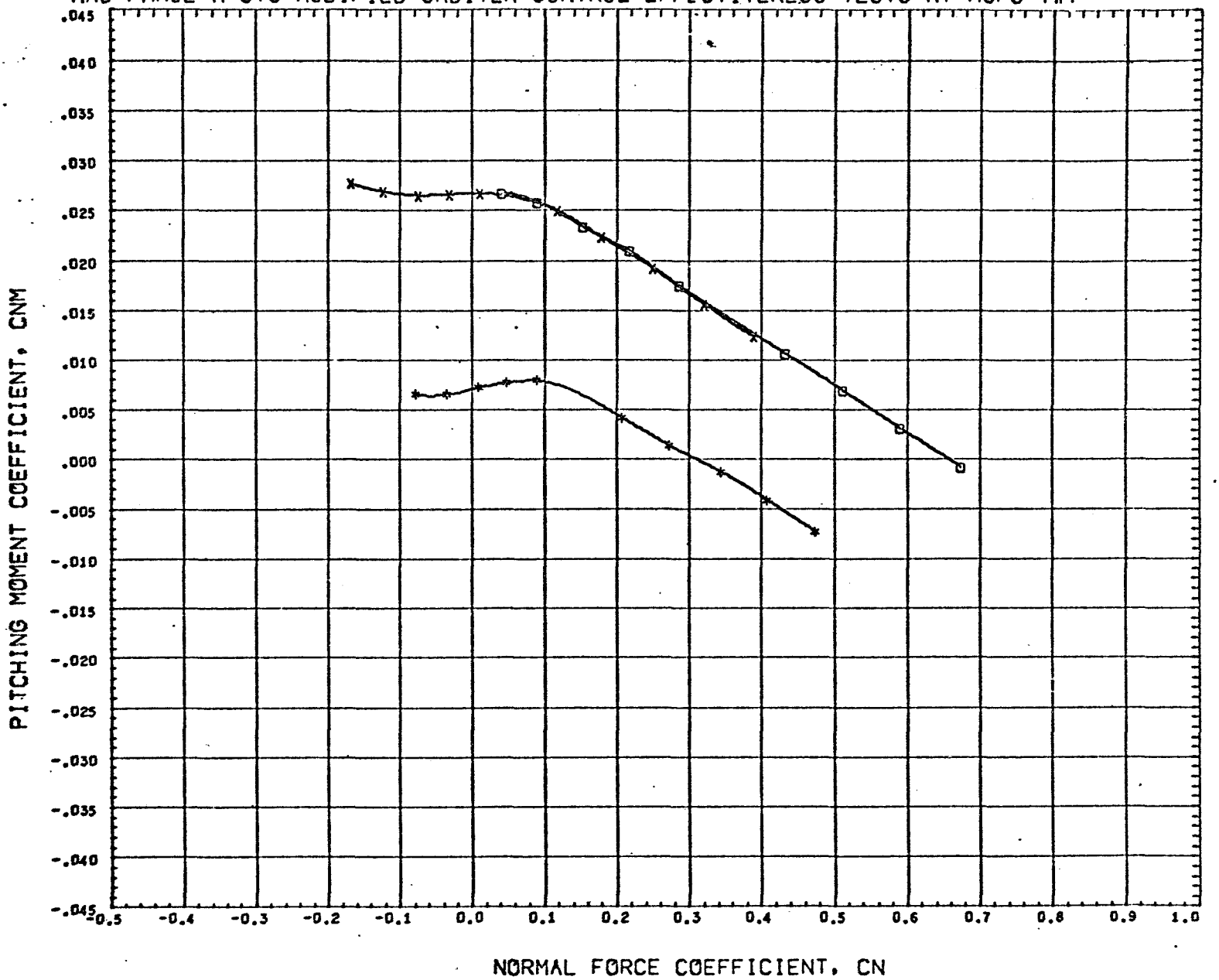


SYMBOL	MACH	PARAMETRIC VALUES			
*	4.960	BETA	0.000	ELEVON	- 30.000
		RUDDER	0.000		

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

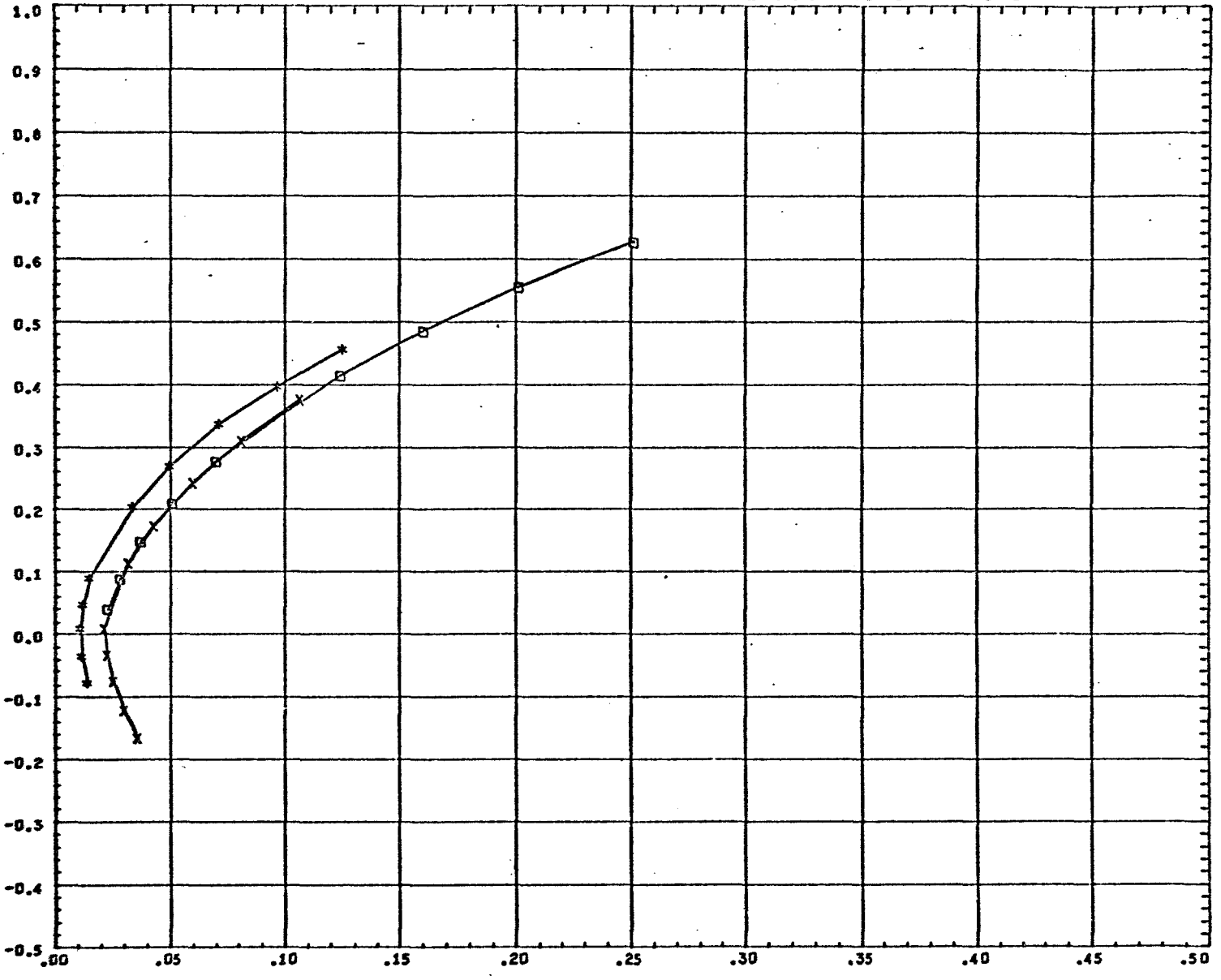


SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL ED		(R17021)	02 JUL 70	0.396
X	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(B17022)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2E1	E=-15	(B17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

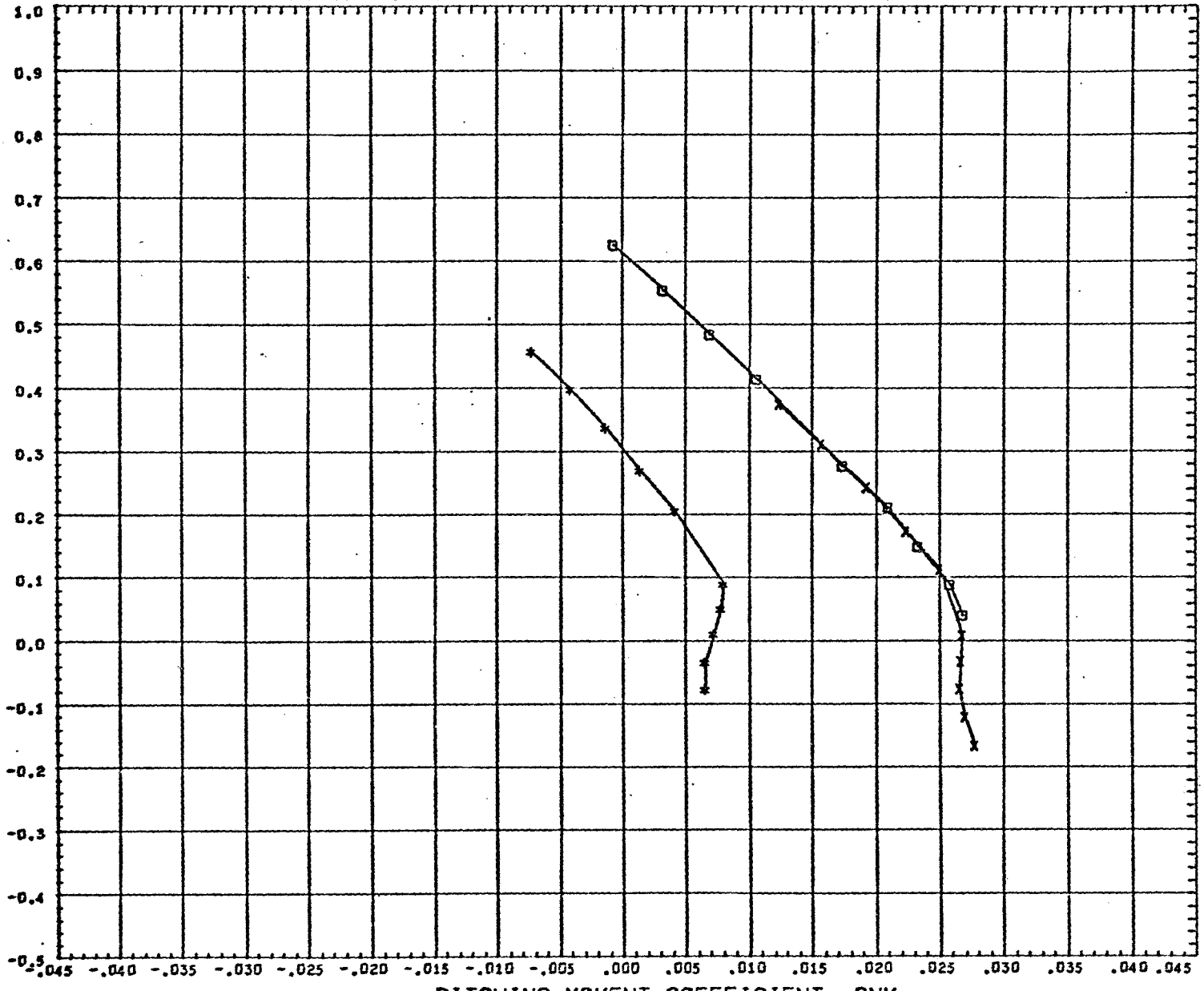


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL E0	(S17021)	02 JUL 70	0.396
X	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(T17022)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(T17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

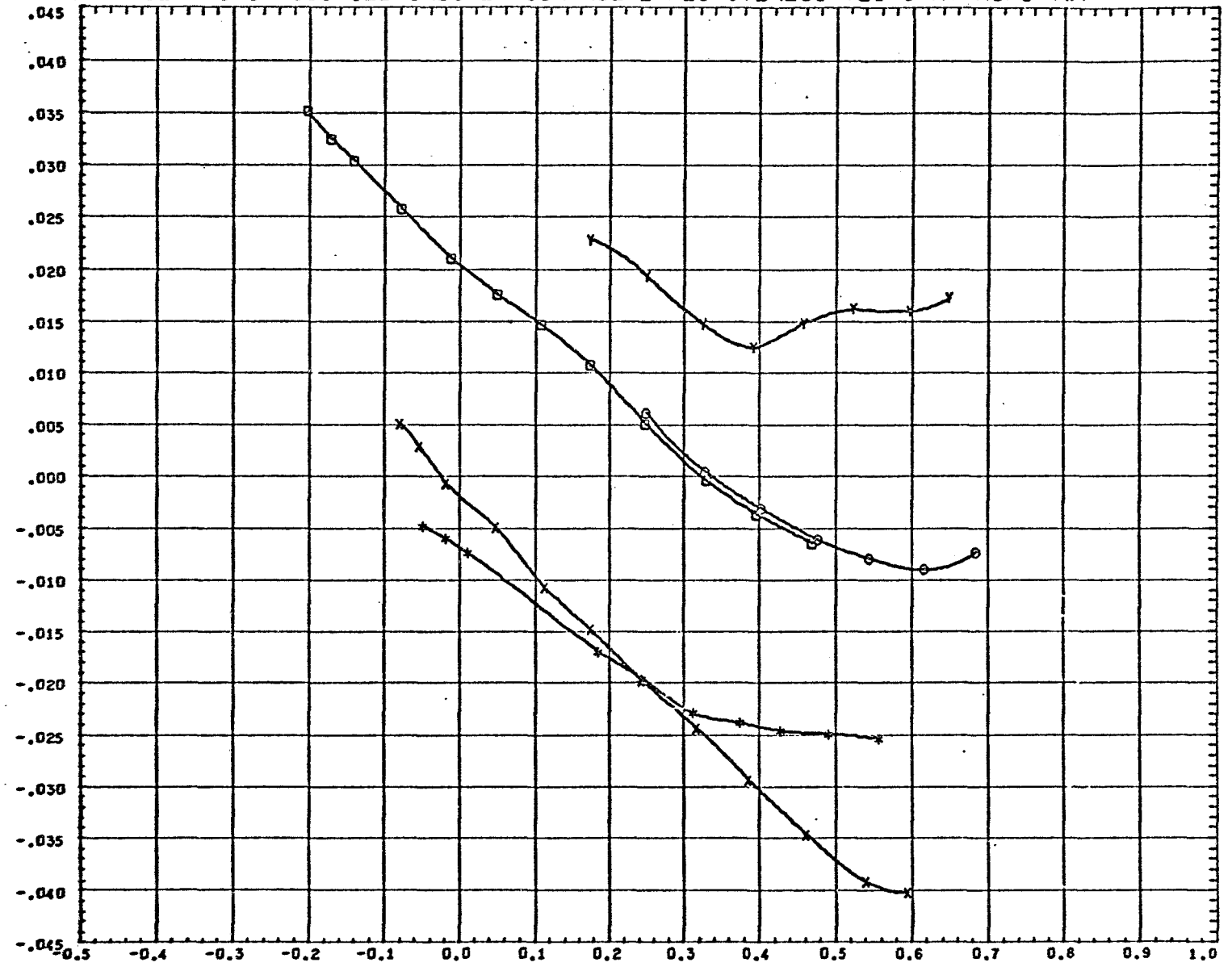


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2E1 DEL ED	(S17021)	02 JUL 70	0.396
X	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(T17022)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2E1 E=-15	(T17023)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



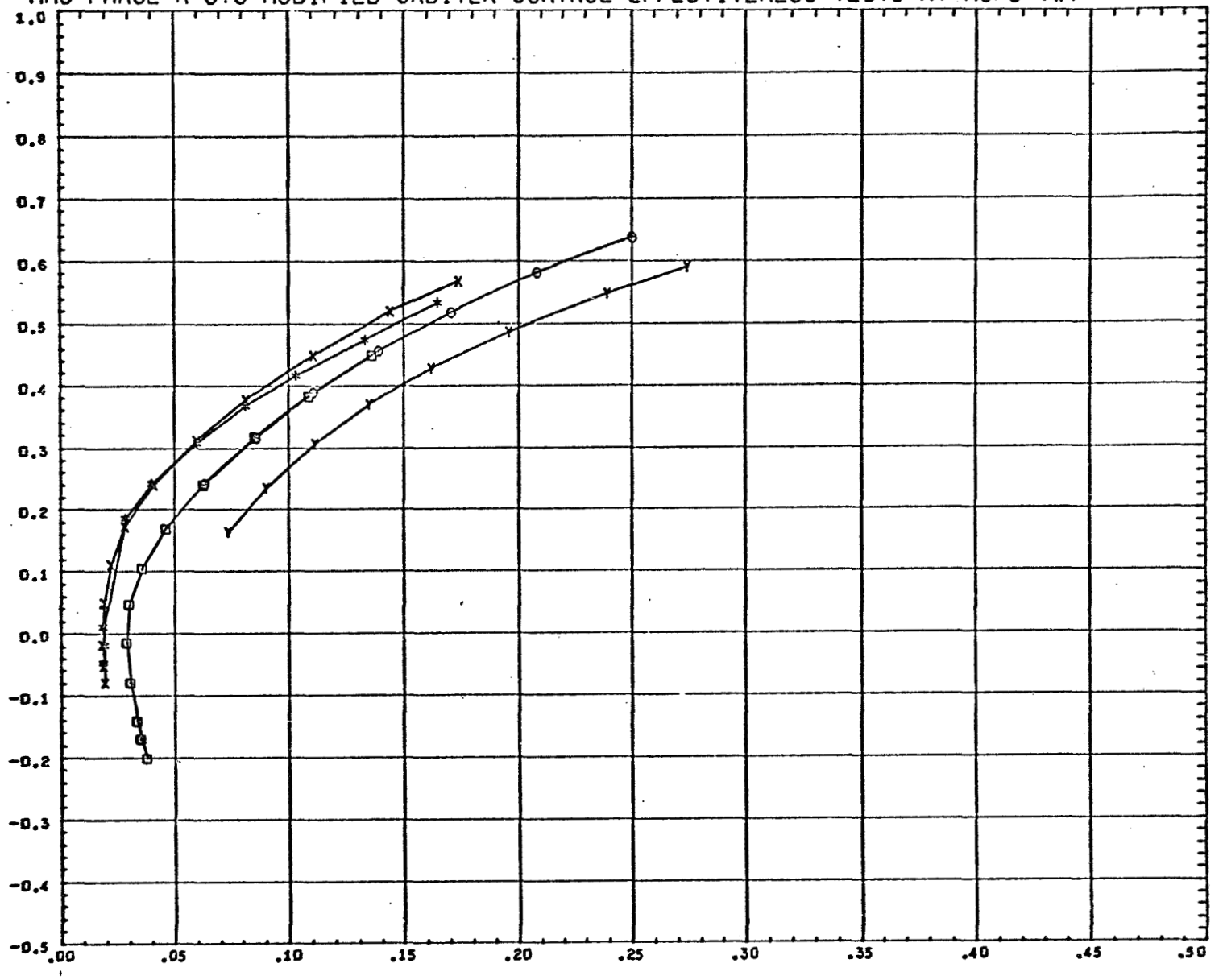
SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(B17024)	02 JUL 70	0.398
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(B17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(B17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(B17029)	02 JUL 70	

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION		DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1	E=OFF	(T17024)	02 JUL 70	0.398
X	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=0	(T17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-15	(T17026)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-15	(T17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1	E=-30	(T17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

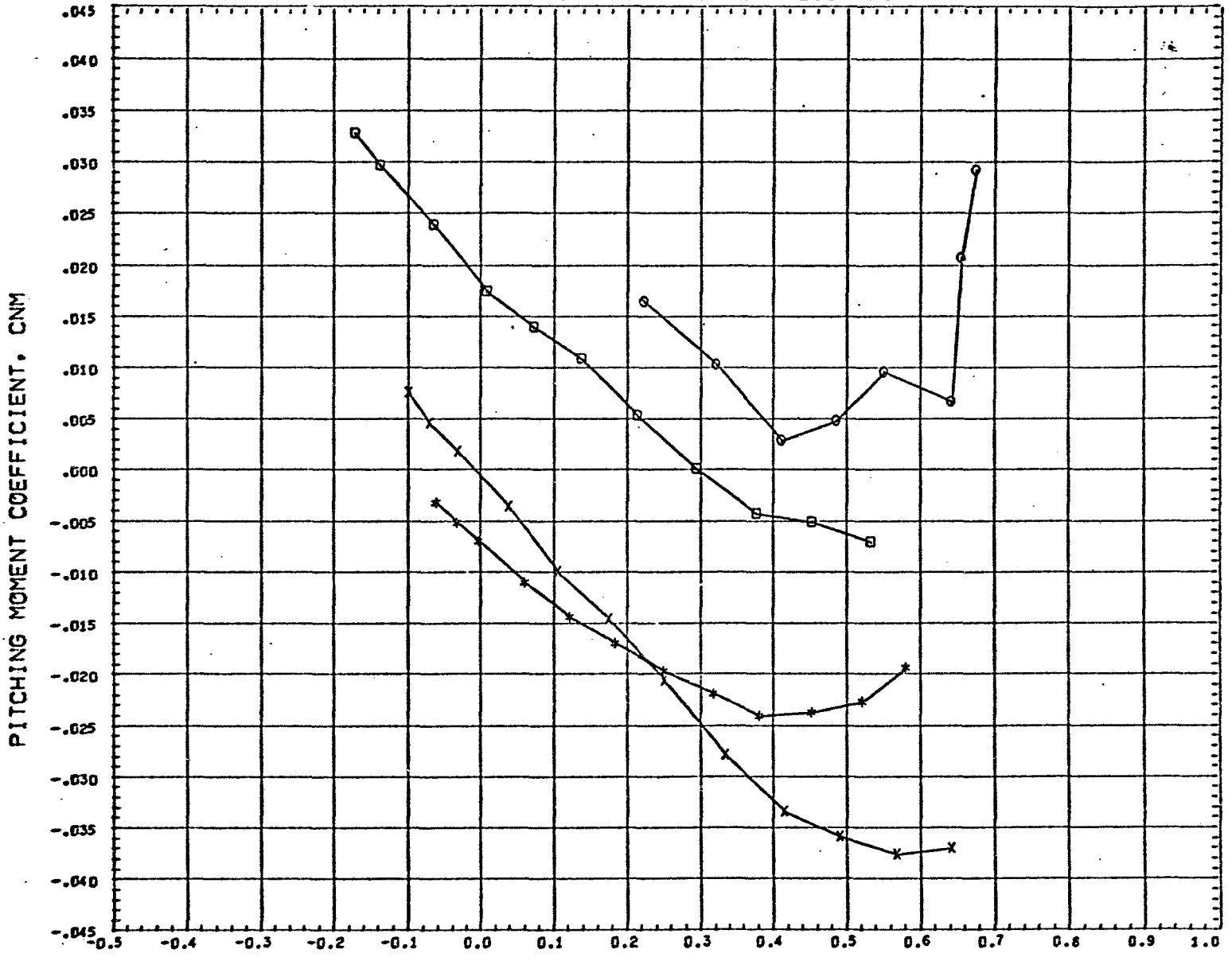
MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(T17024)	02 JUL 70	0.398
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(T17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17026)	02 JUL 70	
⊕	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(T17028)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(T17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

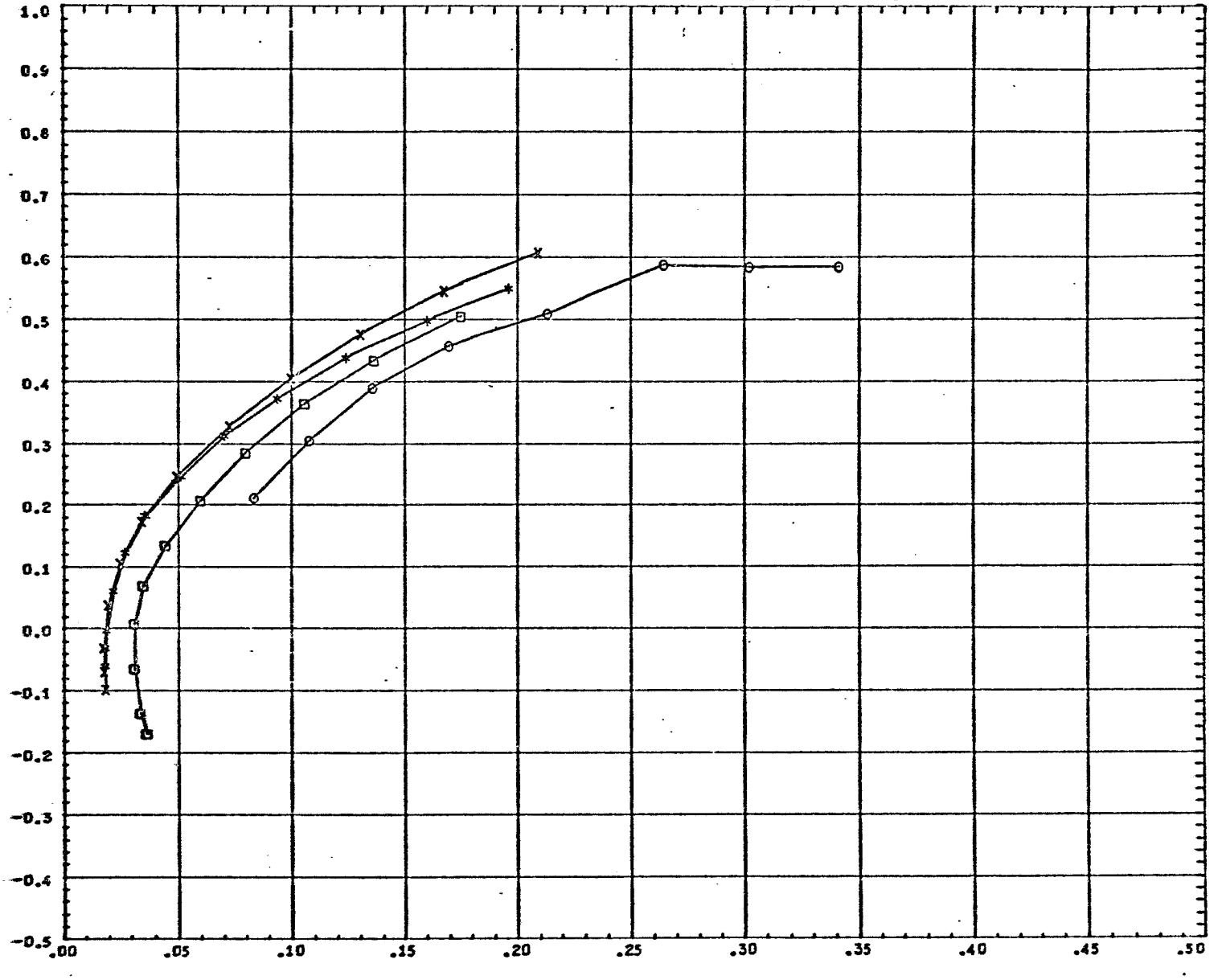


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(C17024)	06 JUL 70	0.797
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(C17025)	06 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(C17026)	06 JUL 70	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(C17029)	06 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

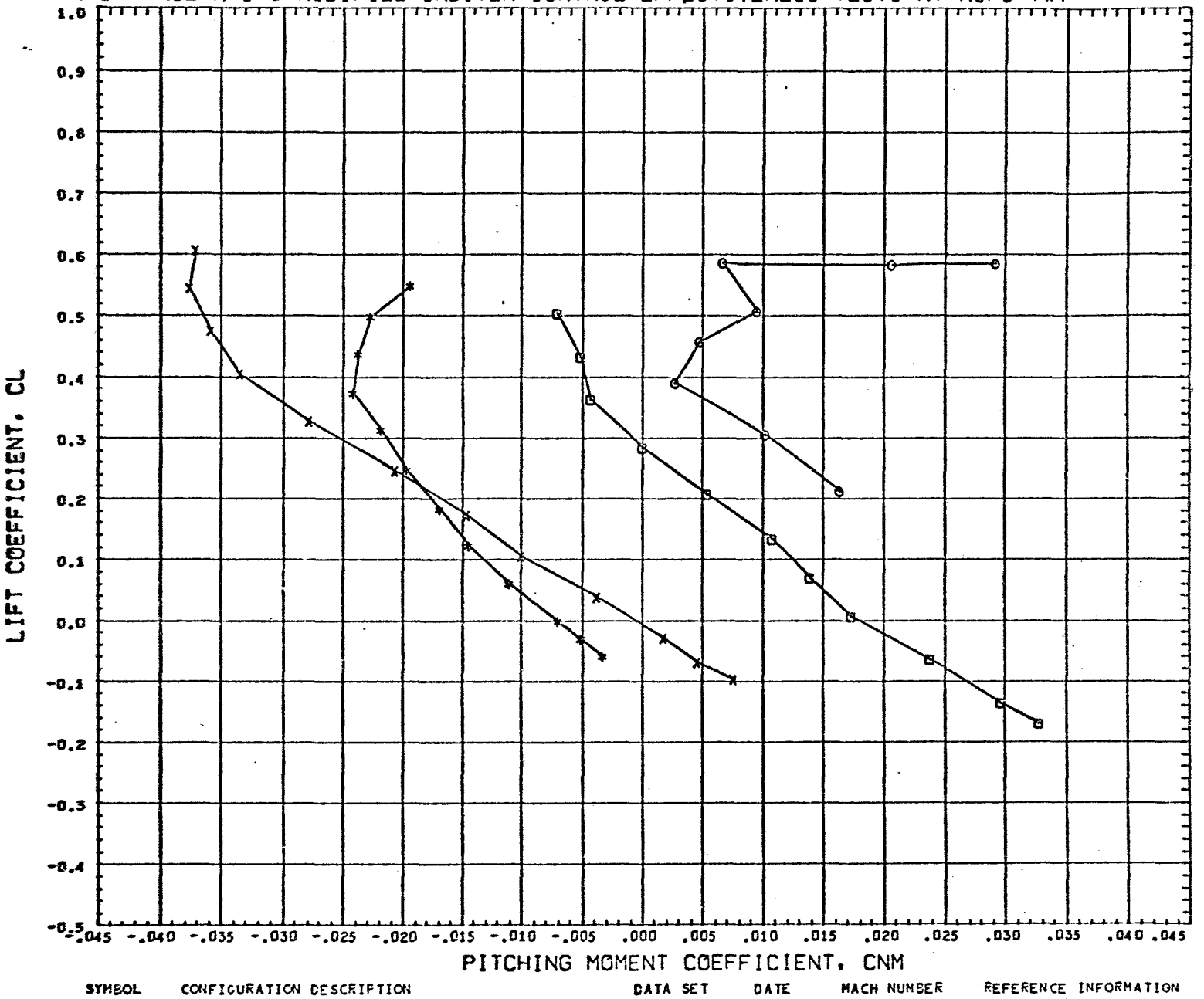


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(U17024)	02 JUL 70	0.797
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(U17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(U17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(U17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

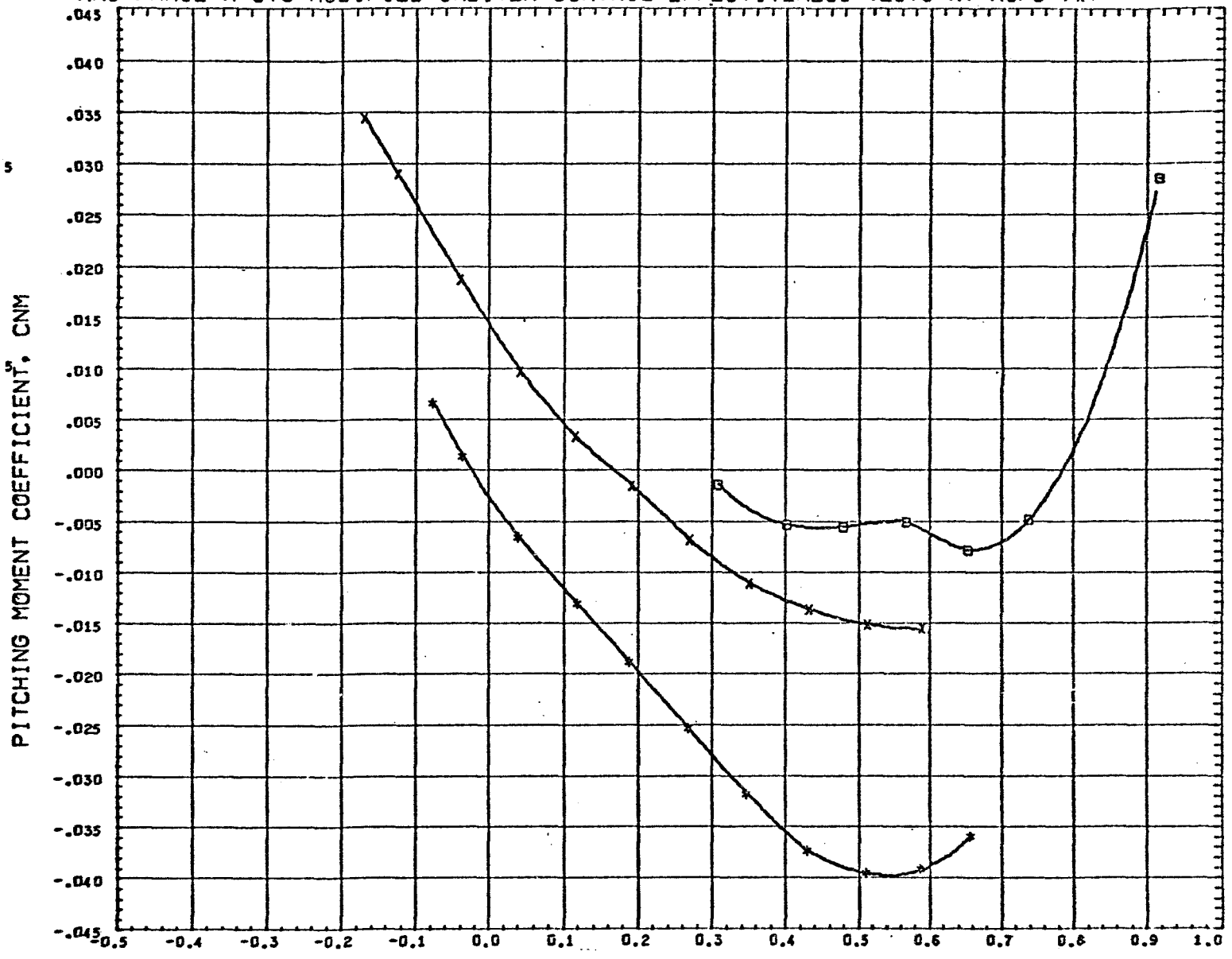


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(U17024)	02 JUL 79	0.797
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(U17025)	02 JUL 79	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(U17026)	02 JUL 79	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(U17029)	02 JUL 79	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

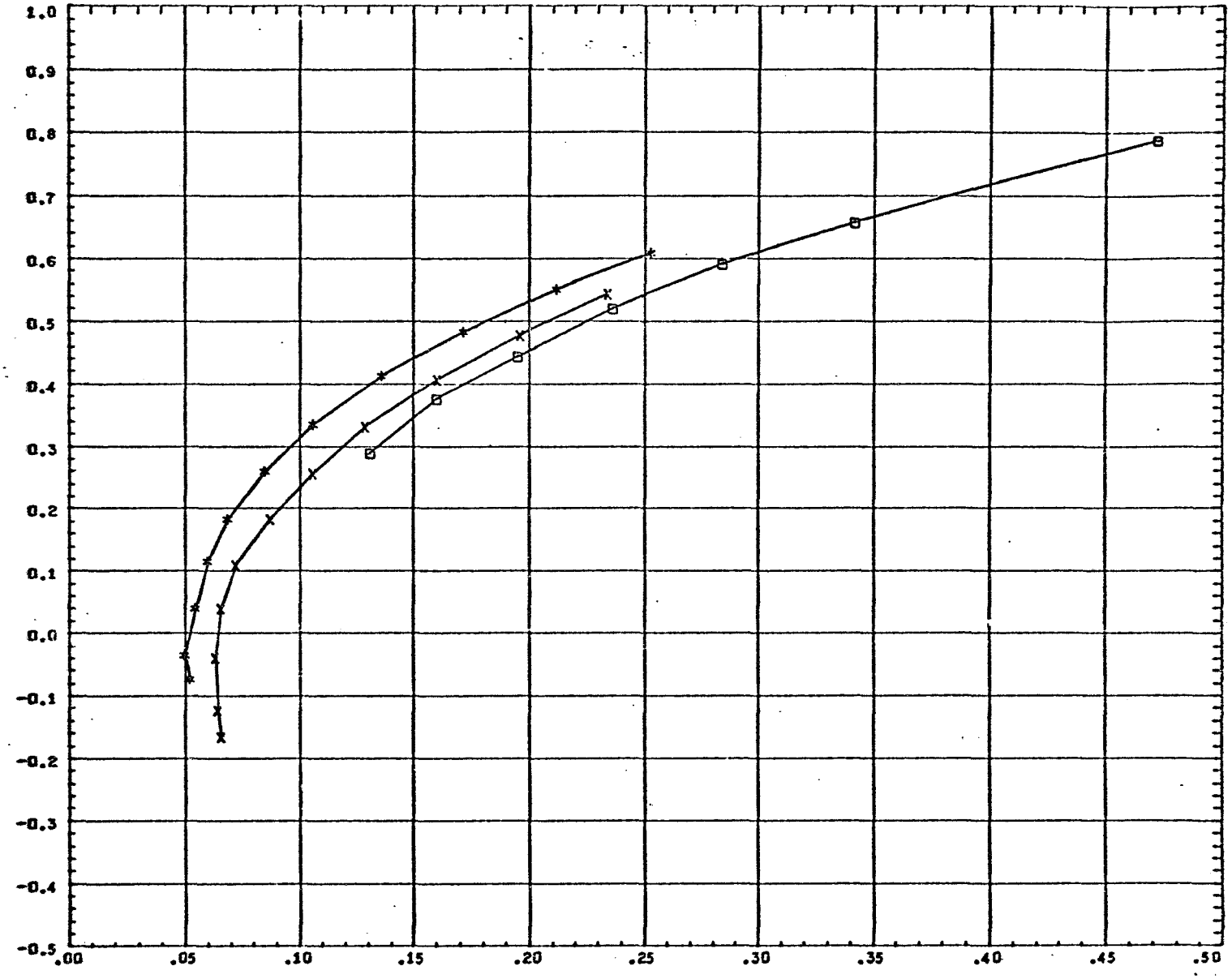


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(D17025)	02 JUL 70	0.996
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(D17026)	02 JUL 70	
B	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(D17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

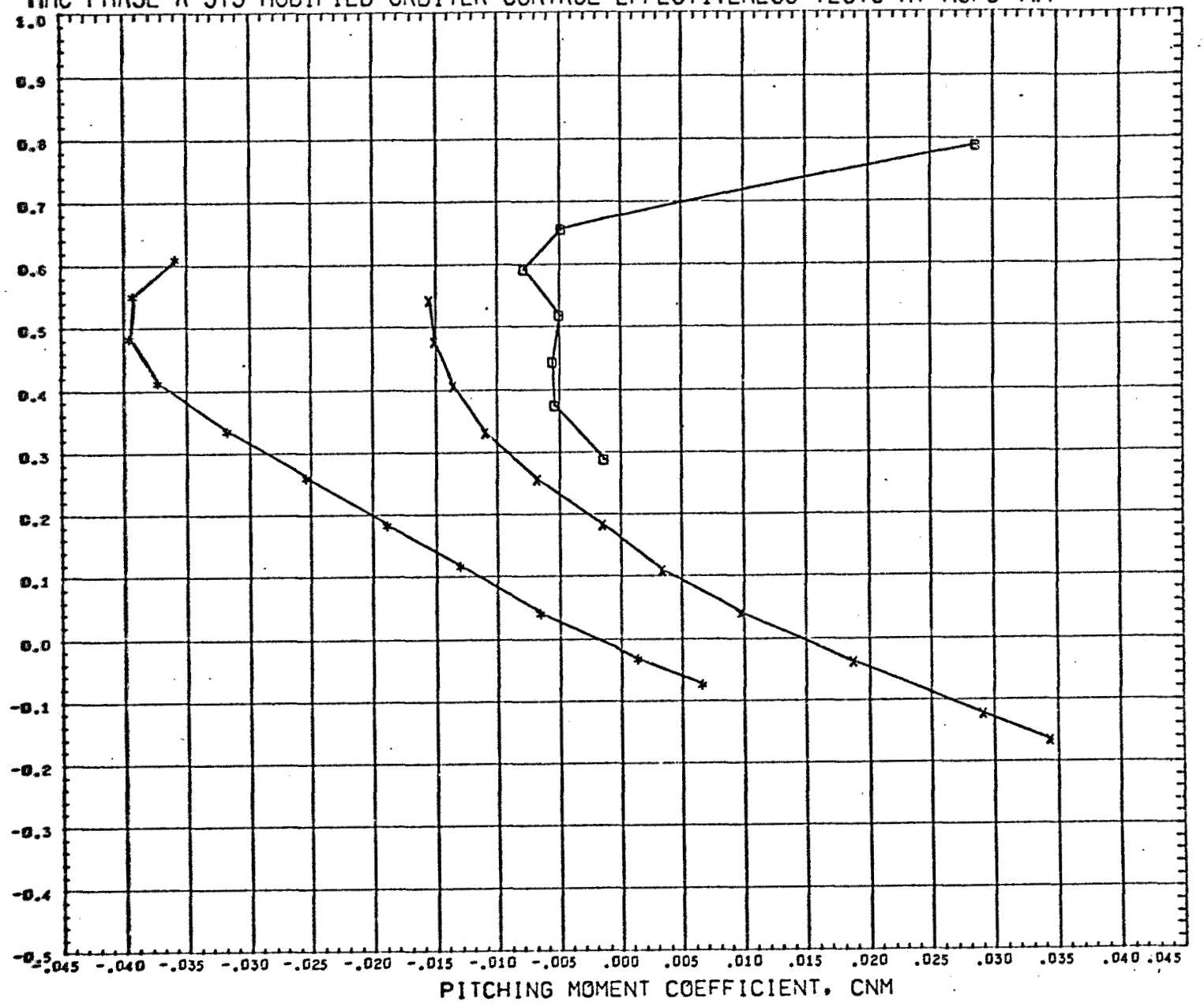


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(V17025)	02 JUL 70	0.996
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(V17026)	02 JUL 70	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(V17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



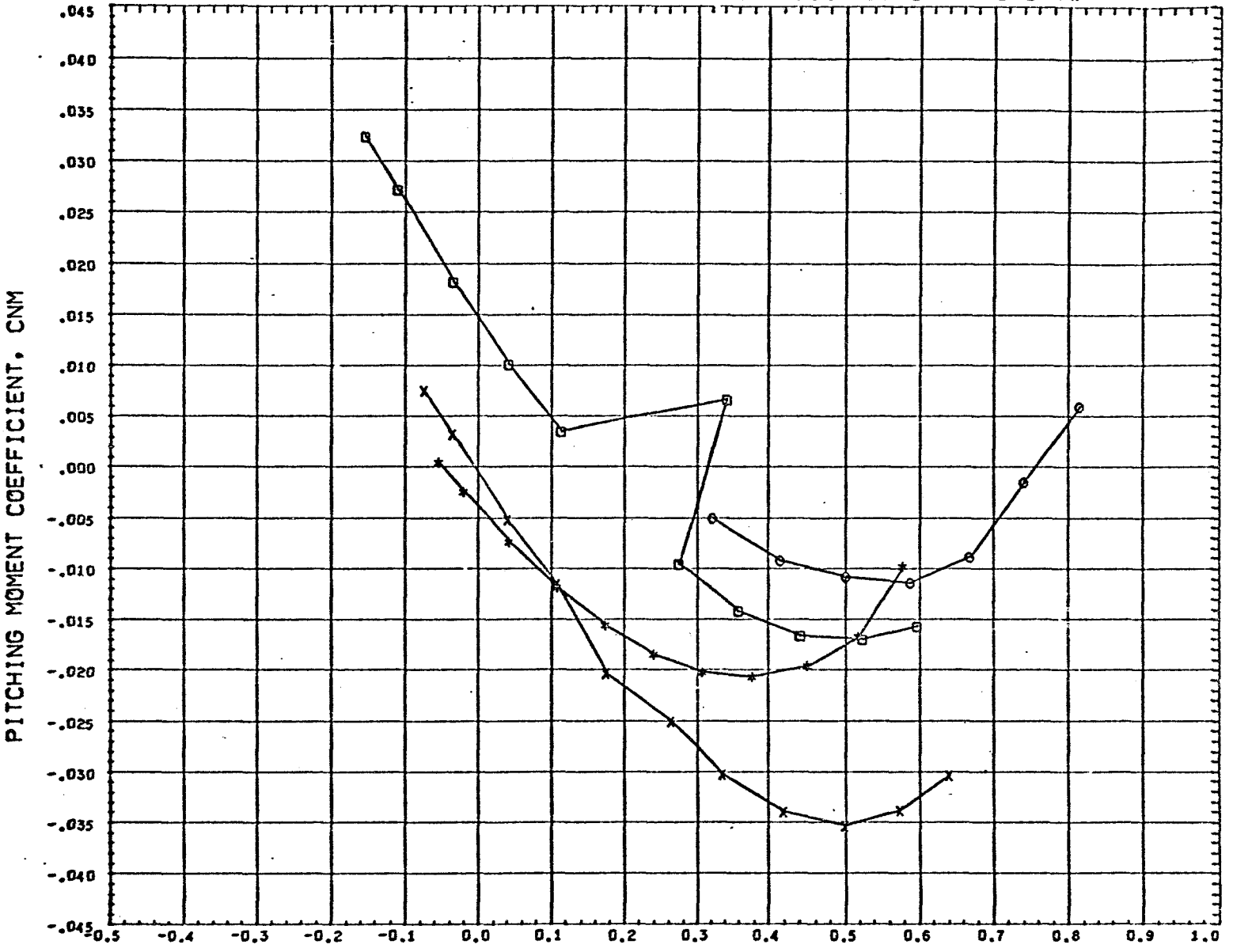
SYMBOL	CONFIGURATION DESCRIPTION
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30

DATA SET	DATE	MACH NUMBER
(V17025)	02 JUL 70	0.996
(V17026)	02 JUL 70	
(V17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

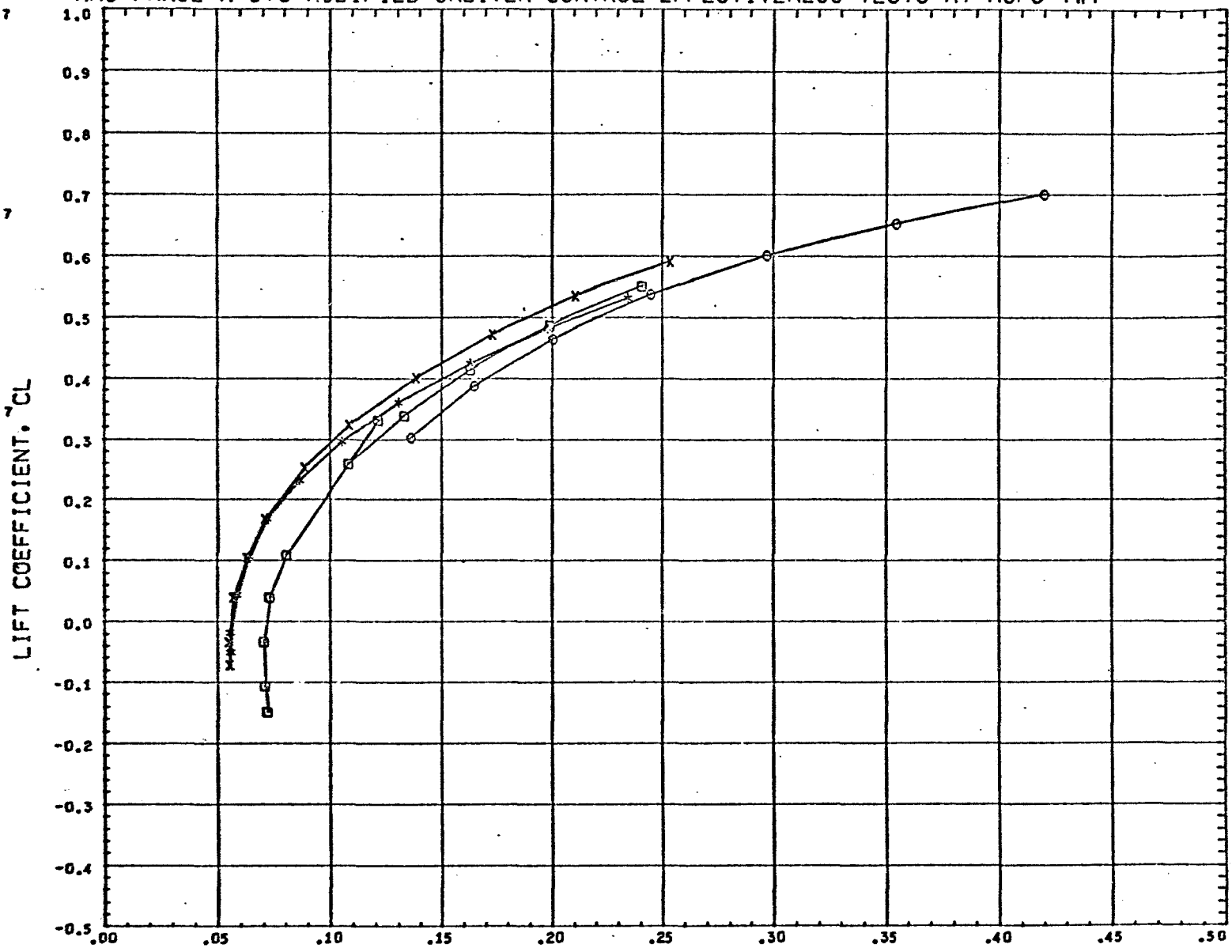


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(E17024)	02 JUL 70	1.199
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(E17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(E17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(E17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

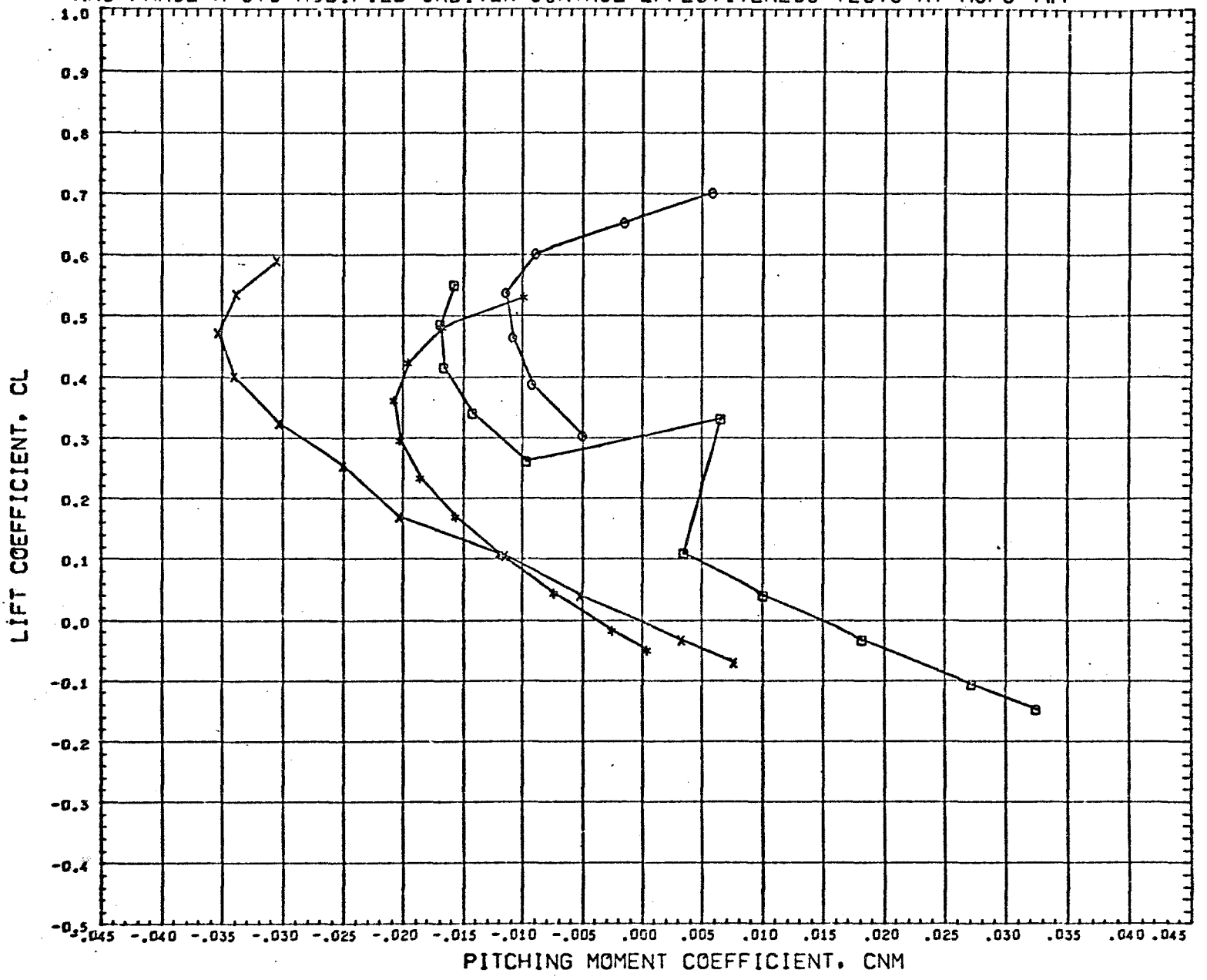


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(W17024)	02 JUL 70	1.199
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(W17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(W17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(W17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

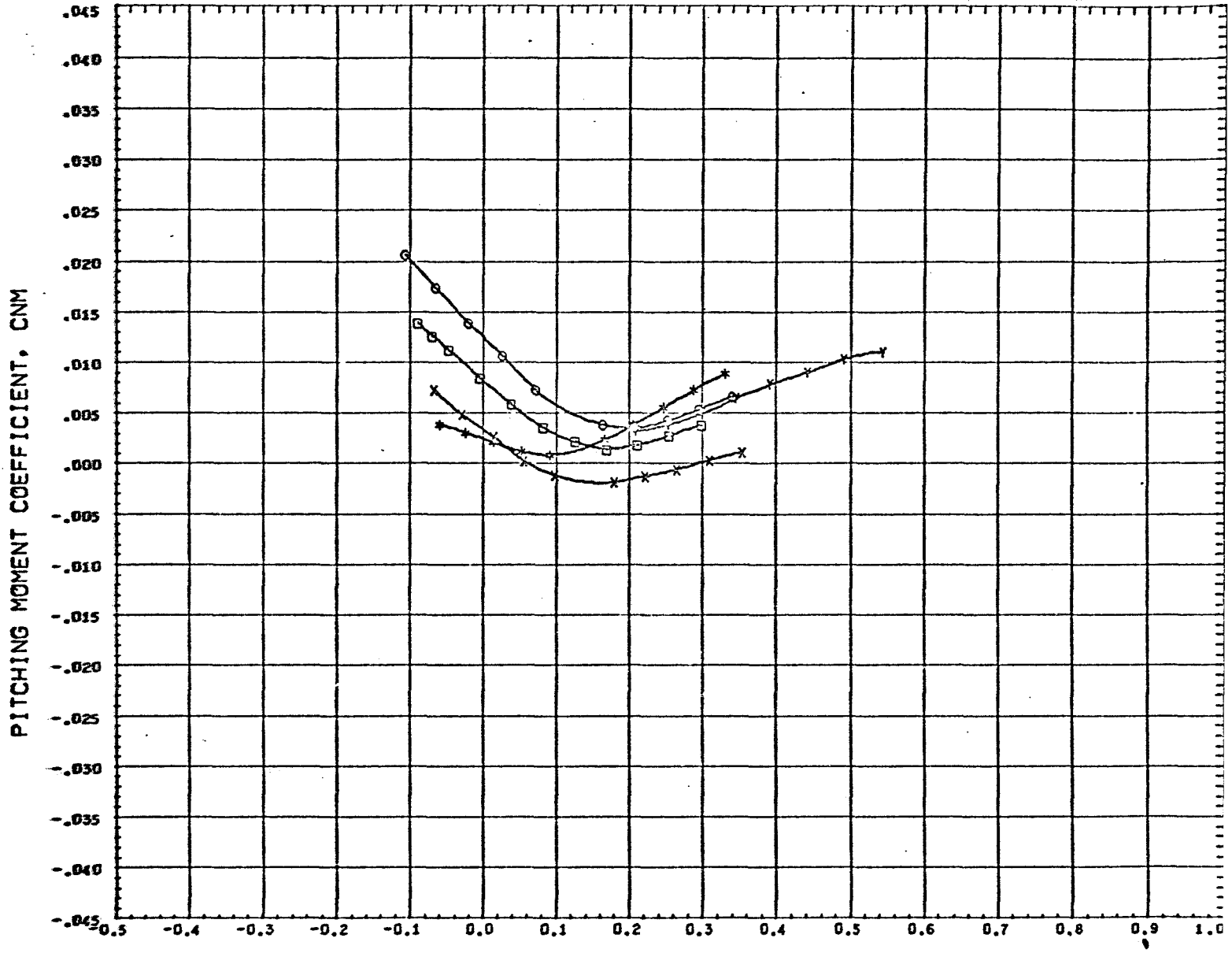


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(W17024)	02 JUL 70	1.199
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(W17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(W17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(W17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



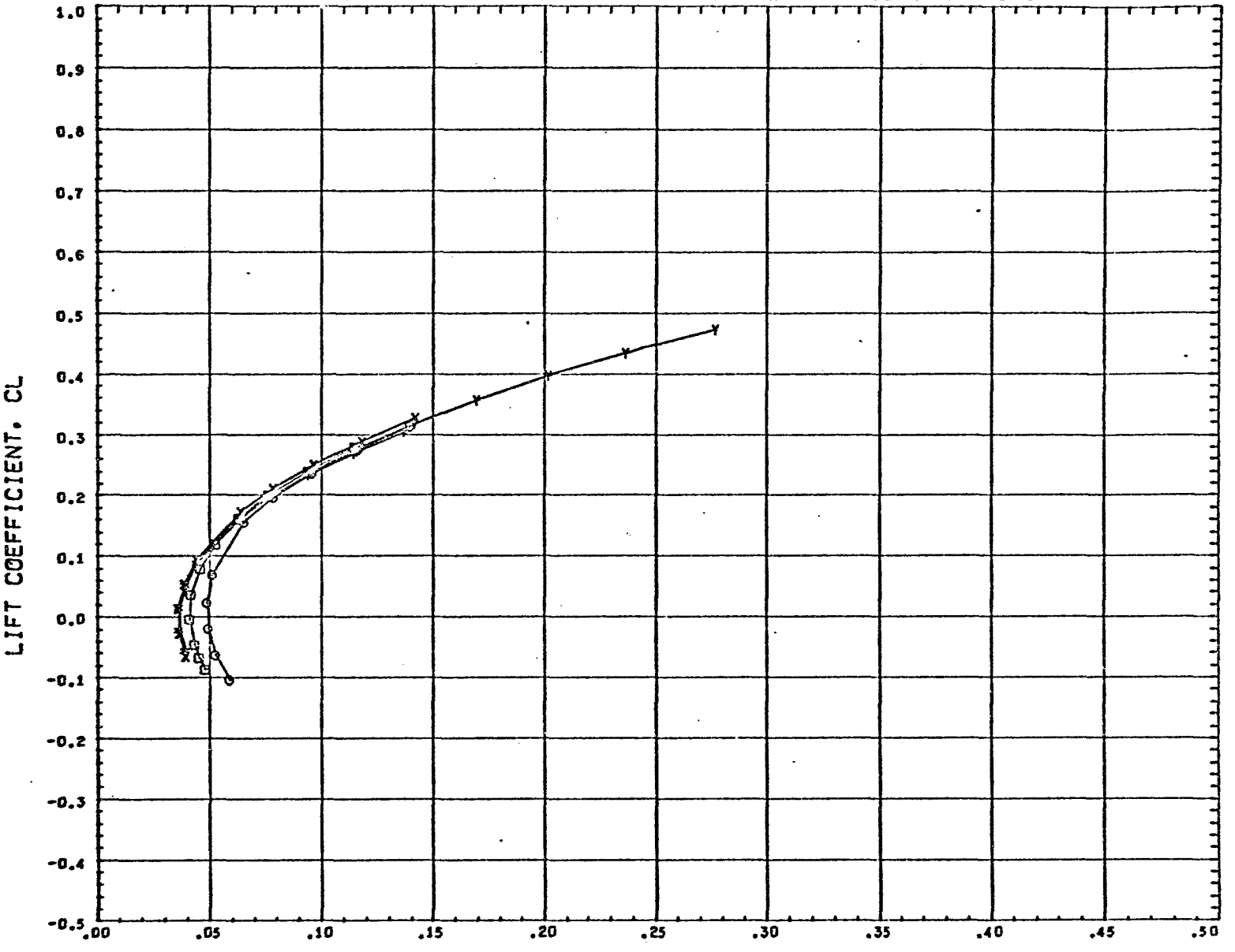
SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(F17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(F17025)	02 JUL 70	
B	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(F17026)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(F17029)	02 JUL 70	

REFERENCE INFORMATION

REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

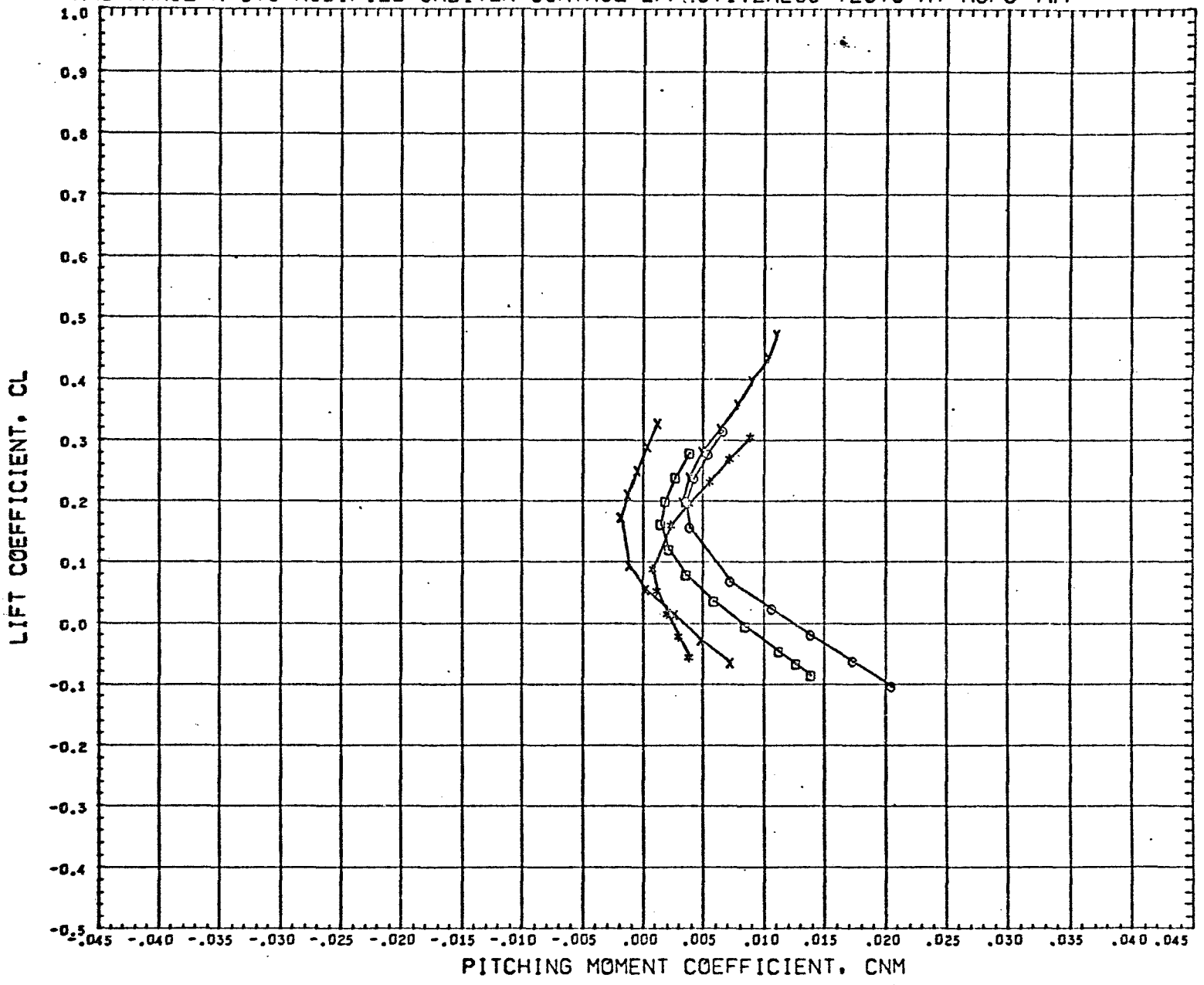


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(X17024)	02 JUL 70	2.740
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(X17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(X17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.043	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

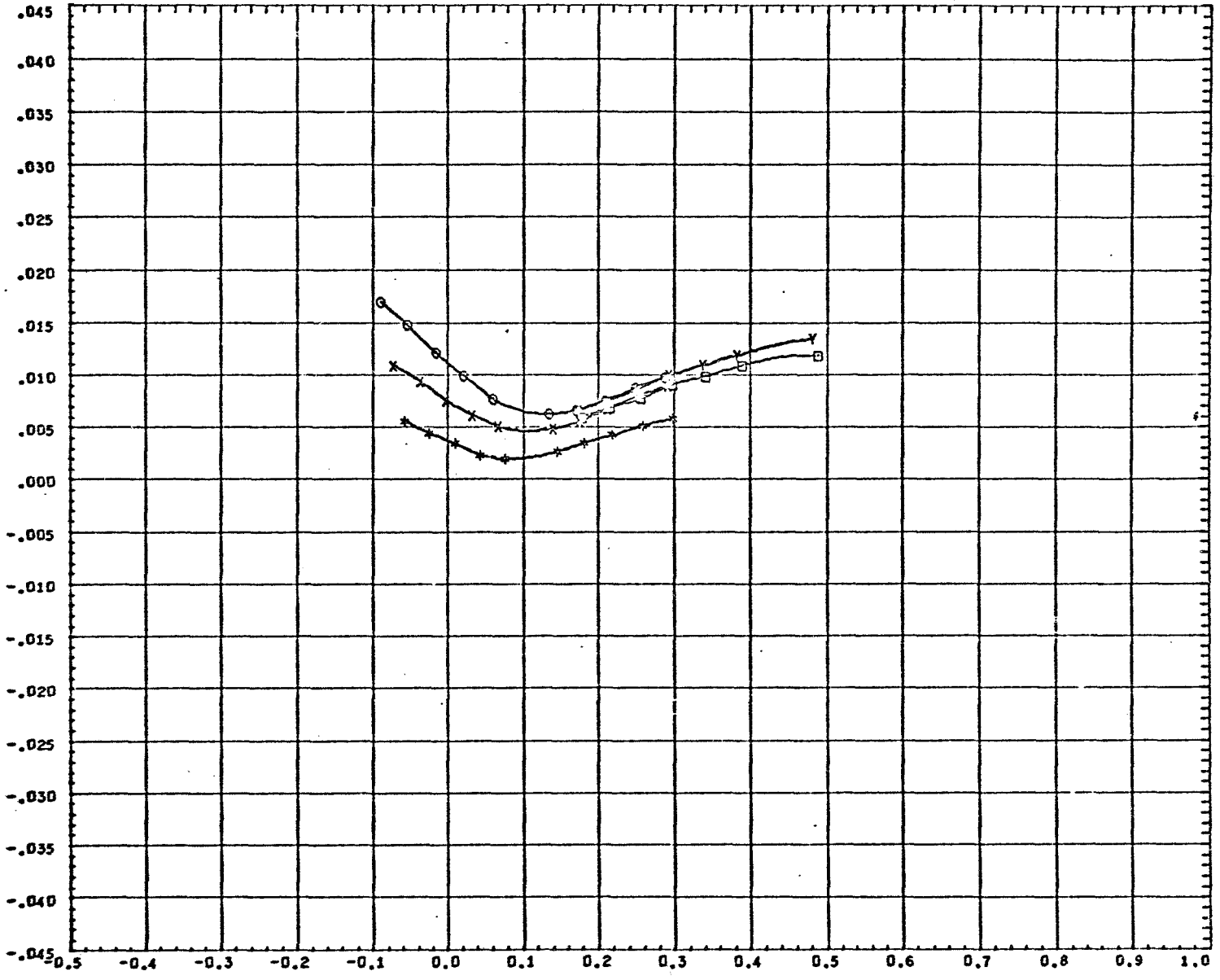


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(X17024)	02 JUL 70	2.749
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(X17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(X17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17027)	02 JUL 70	
▽	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(X17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

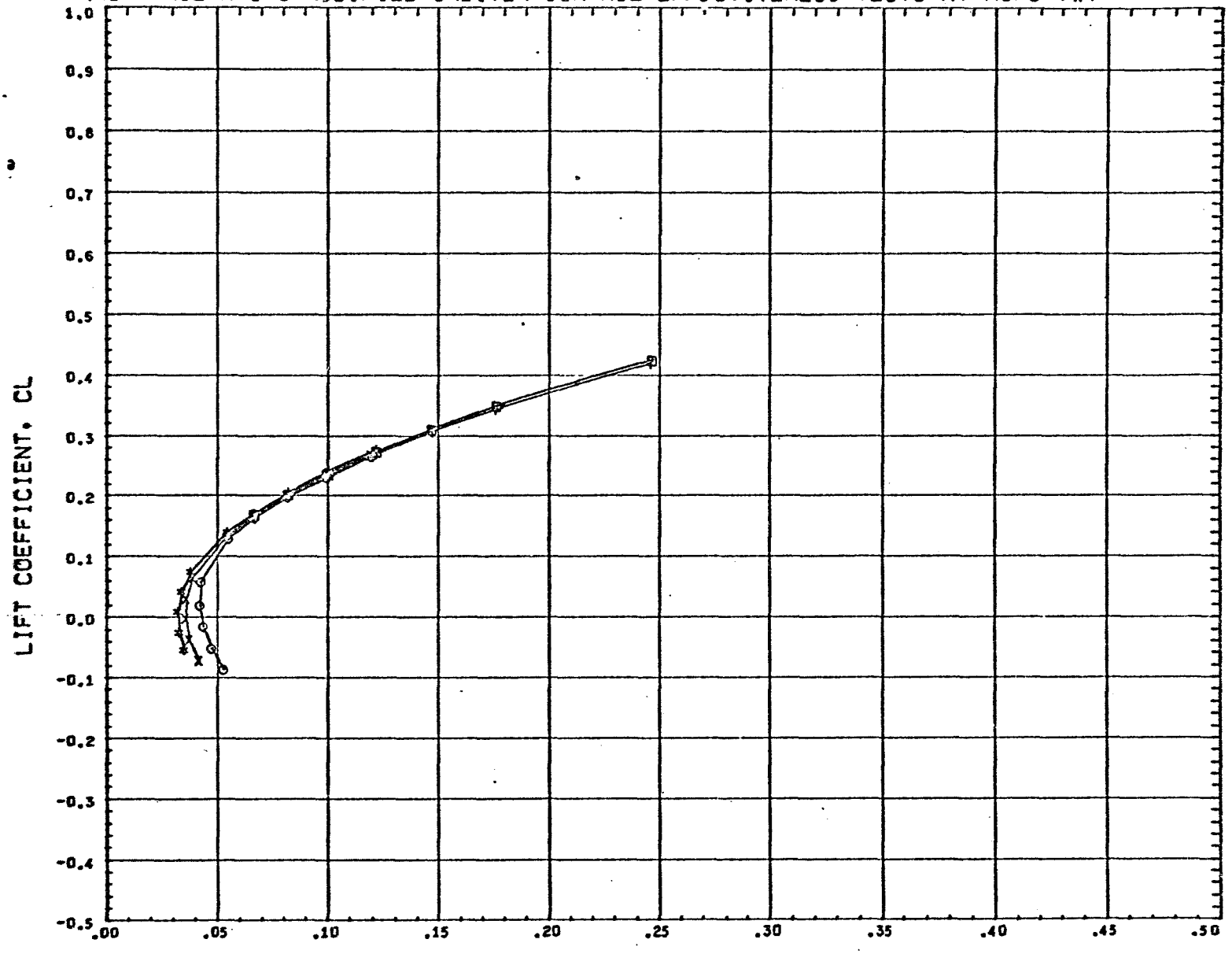


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(G17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17026)	02 JUL 70	
B	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(G17028)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(G17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

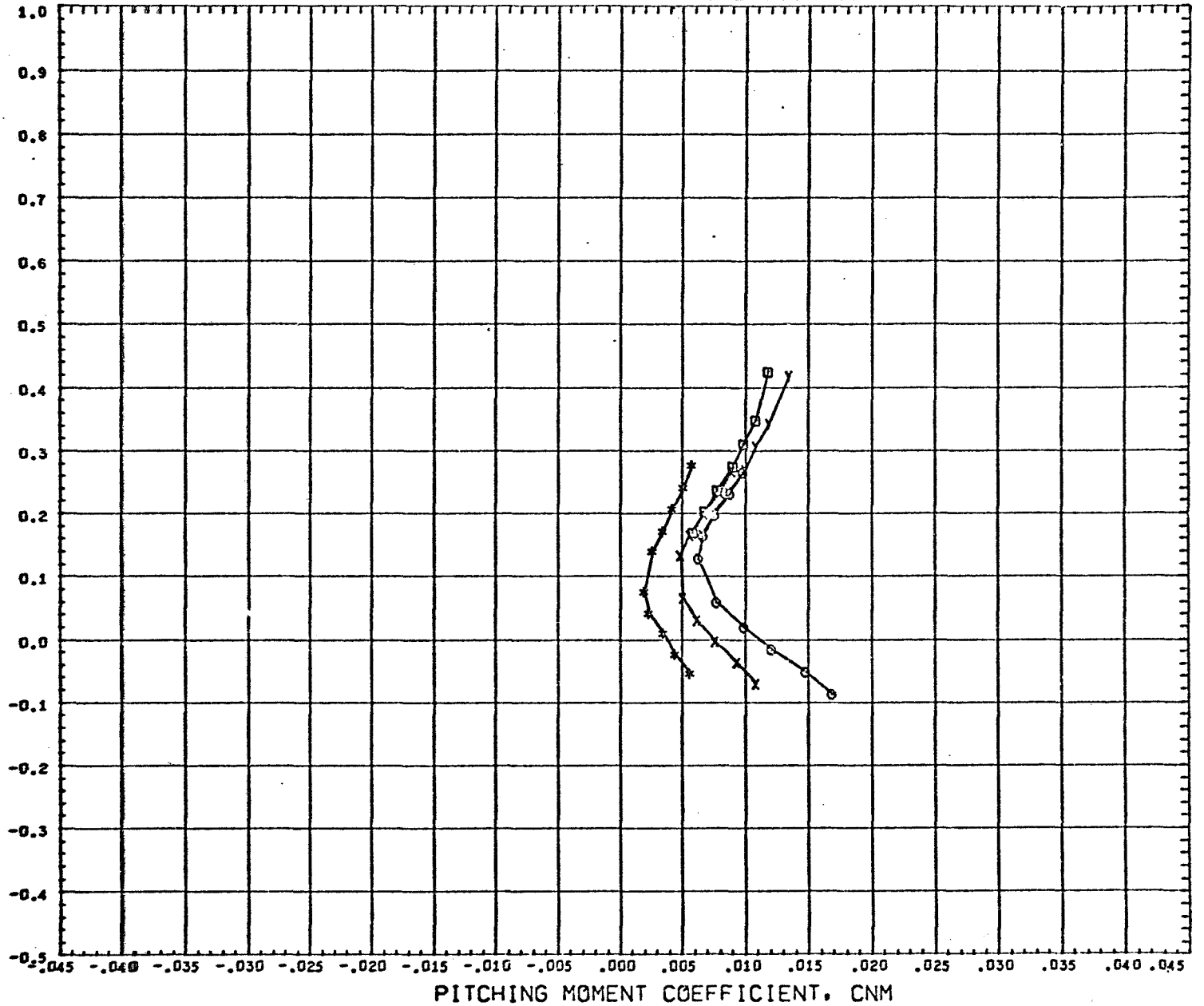


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Y17025)	02 JUL 70	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17026)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17028)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17027)	02 JUL 70	
V	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

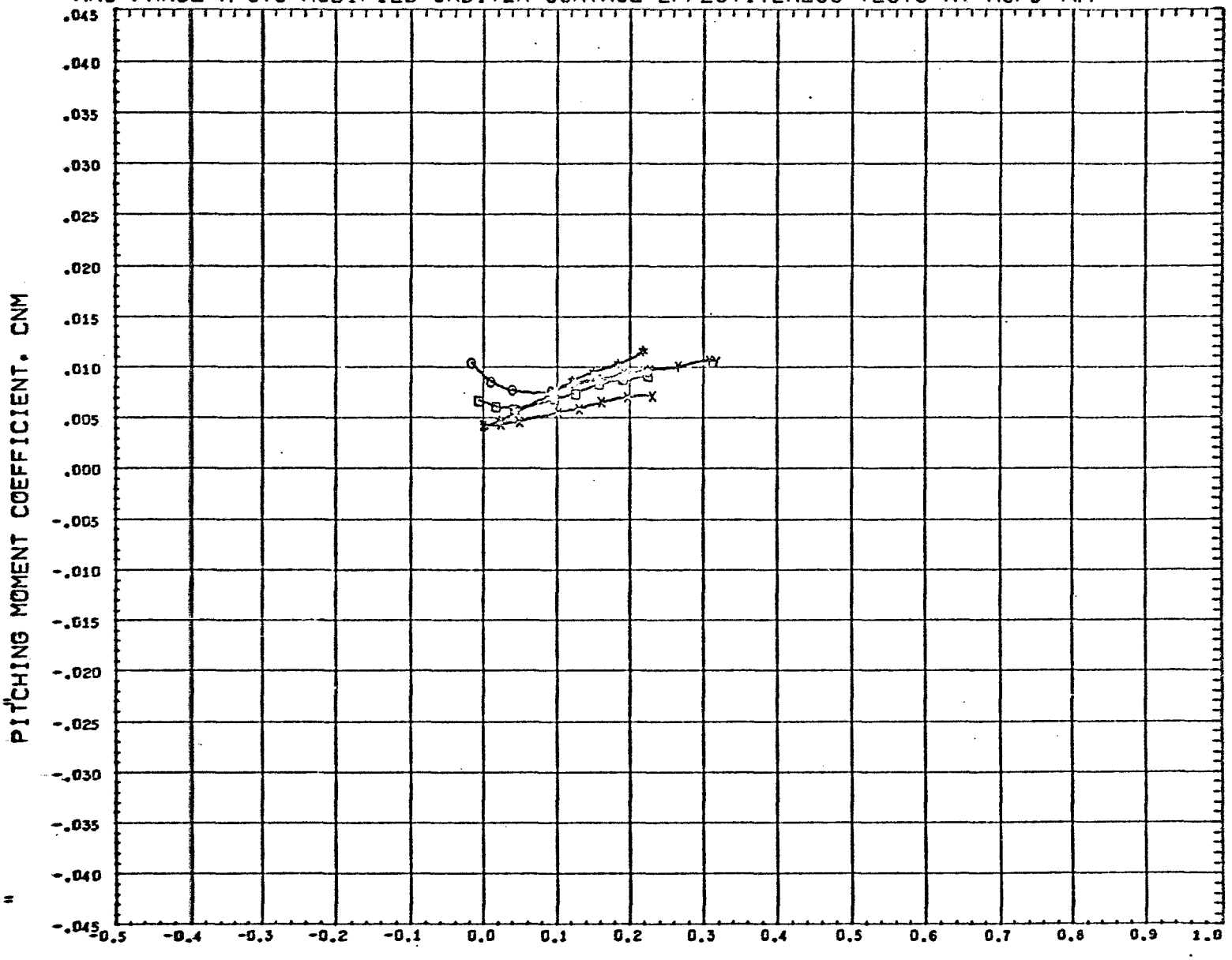


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Y17025)	02 JUL 79	3.479
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17026)	02 JUL 79	
□	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Y17028)	02 JUL 79	
○	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17027)	02 JUL 79	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Y17029)	02 JUL 79	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

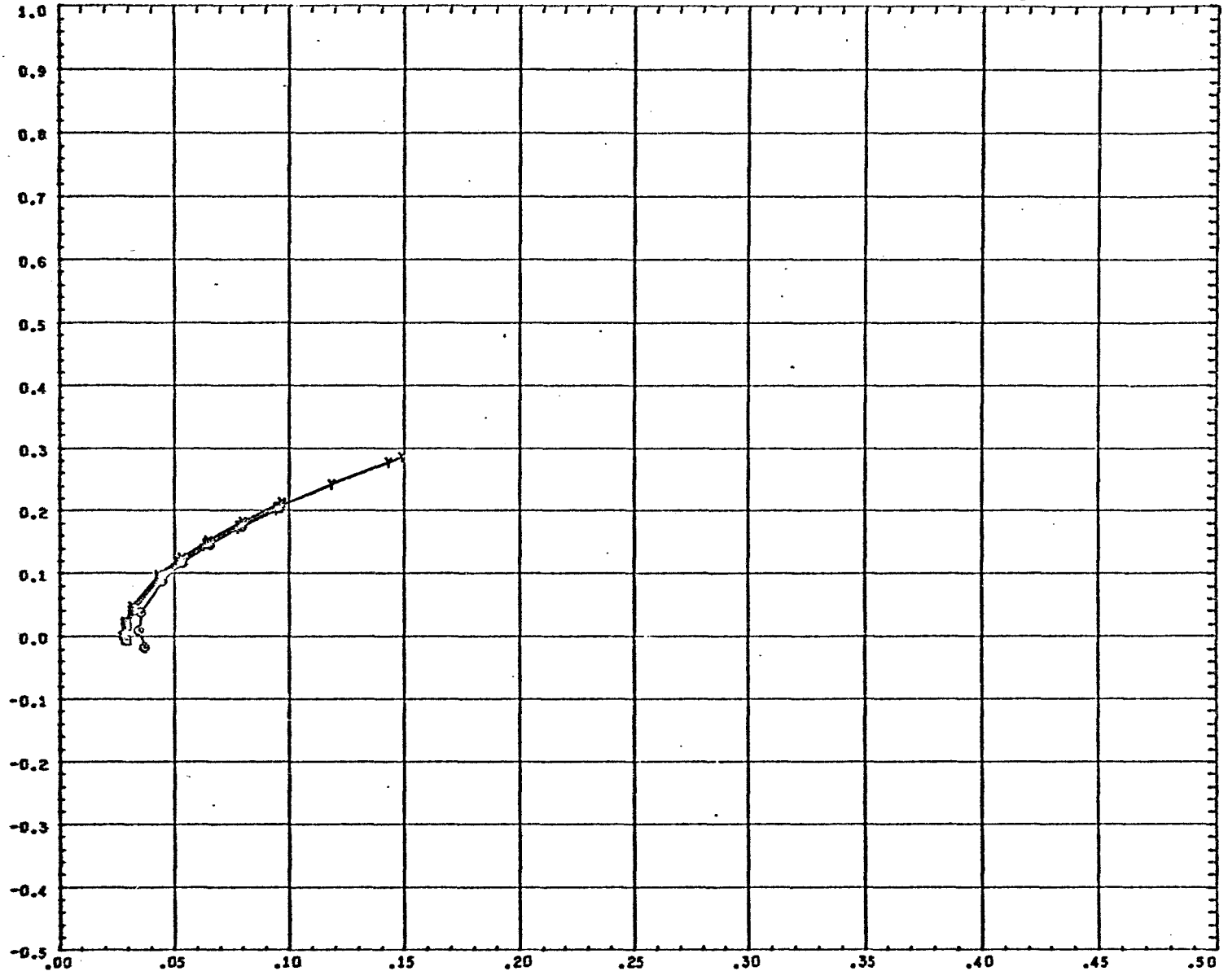


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(H17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(H17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(H17026)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(H17029)	02 JUL 70	

REFERENCE FILE.

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.496	
YMRP	0.000	
ZMRP	0.045	

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT

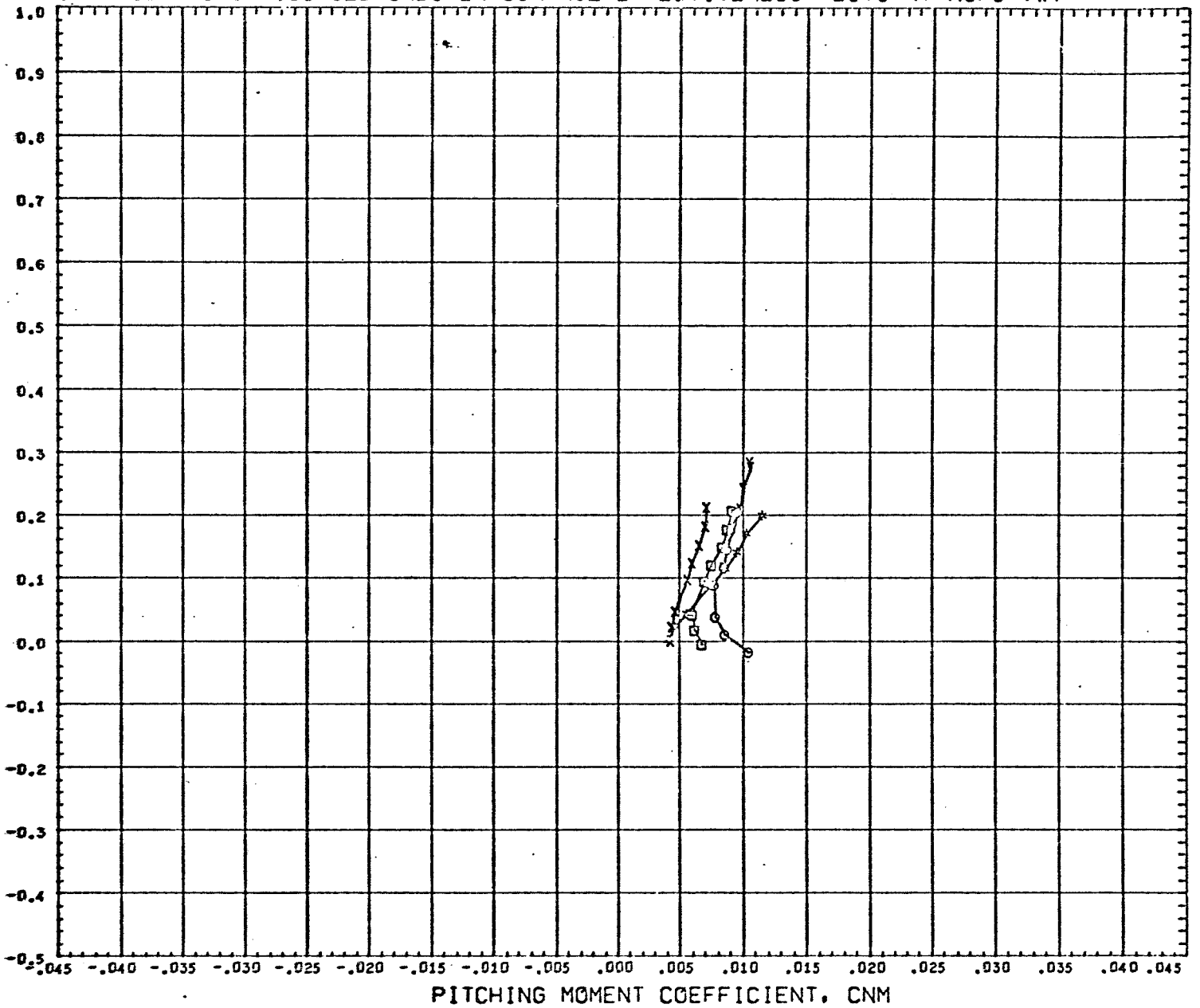


SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
●	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(Z17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Z17025)	02 JUL 70	
⊡	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Z17026)	02 JUL 70	
⊙	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRP	0.406	
YMRP	0.000	
ZMRP	0.045	

REFERENCE FILE.

MMC PHASE A STS MODIFIED ORBITER CONTROL EFFECTIVENESS TESTS AT MSFC TWT



SYMBOL	CONFIGURATION DESCRIPTION	DATA SET	DATE	MACH NUMBER
*	MSFC 453 MMC MOD ORB B2W2T1R1 E=OFF	(Z17024)	02 JUL 70	4.960
X	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=0	(Z17025)	02 JUL 70	
G	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-15	(Z17026)	02 JUL 70	
O	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17027)	02 JUL 70	
Y	MSFC 453 MMC MOD ORB B2W2T1E1R1 E=-30	(Z17029)	02 JUL 70	

REFERENCE INFORMATION		
REFS	0.116	SQ.FT.
REFL	0.646	FT.
REFB	0.405	FT.
XMRF	0.406	
YMRF	0.000	
ZMRF	0.045	

REFERENCE FILE.