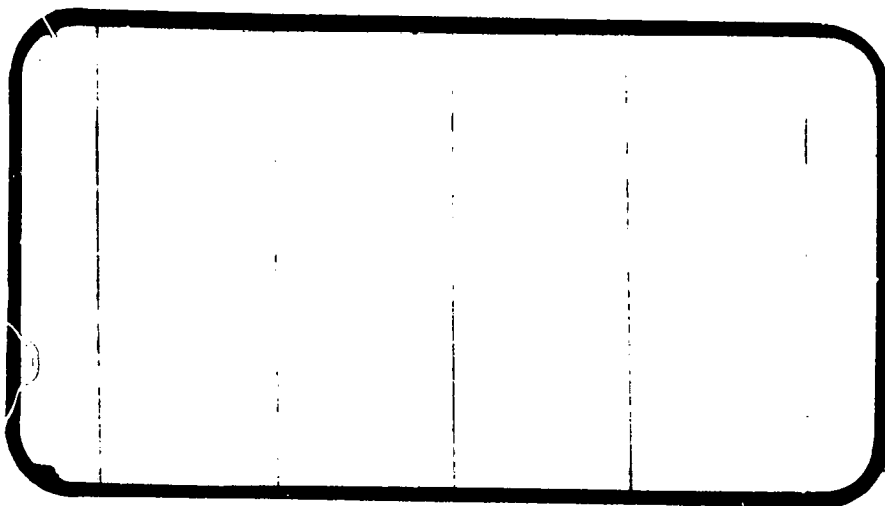




# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA CR-134110

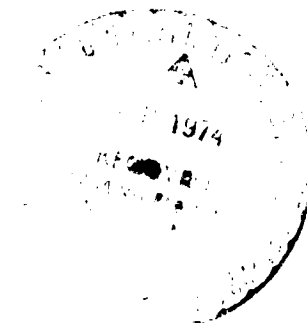


(NASA-CR-134110) RESULTS OF TESTS IN  
THE NASA/LARC 31 INCH CFHT ON AN  
C.010-SCALE MODEL (32-OT) OF THE SPACE  
SHUTTLE CONFIGURATION 3 TO (Chrysler  
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SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT

JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA MANAGEMENT services



July, 1974

DMS-DR-2133  
NASA CR-134,110

RESULTS OF TESTS IN THE NASA/LARC  
31-INCH CFHT ON AN 0.010-SCALE MODEL  
(32-0T) OF THE SPACE SHUTTLE CONFIGURATION 3  
TO OBTAIN HYPERSONIC AERODYNAMIC CHARACTERISTICS  
FOR SECOND STAGE OPERATION DURING  
NOMINAL BOOST AND THE ABORT RTLS MODE (IA58)

By

D. E. Thornton  
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Rockwell International Space Division

Prepared under NASA Contract Number NAS9-13247

By

Data Management Services  
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New Orleans, La. 70189

for

Engineering Analysis Division  
Johnson Space Center  
National Aeronautics and Space Administration  
Houston, Texas

WIND TUNNEL TEST SPECIFICS:

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

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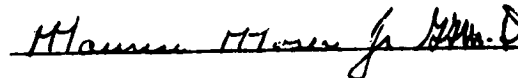
DATA MANAGEMENT SERVICES

This document has been prepared by:

*for* V. W. Sparks/D. A. Sarver  
Liaison Operations

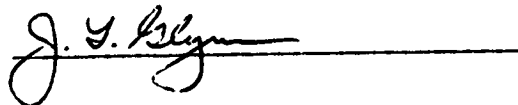
Maurice Moser, Jr.  
Data Operations





This document has been reviewed and is approved for release.

*for* N. D. Kemp  
Data Management Services



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

RESULTS OF TESTS IN THE NASA/LaRC  
31-INCH CFHT ON AN 0.010-SCALE MODEL  
(32-0T) OF THE SPACE SHUTTLE CONFIGURATION 3  
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NOMINAL BOOST AND THE ABORT RTLS MODE (IA58)

By D. E. Thornton, Rockwell International Space Division

ABSTRACT

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

## TABLE OF CONTENTS

|  | Page |
|--|------|
| ABSTRACT                                 | iii  |
| INDEX OF MODEL FIGURES                   | 2    |
| INDEX OF DATA FIGURES                    | 3    |
| NOMENCLATURE                             | 4    |
| CONFIGURATIONS INVESTIGATED              | 7    |
| INSTRUMENTATION                          | 9    |
| TEST FACILITY DESCRIPTION                | 9    |
| DATA REDUCTION                           | 10   |
| TABLES                                   |      |
| I. TEST CONDITIONS                       | 11   |
| II. DATASET/RUN NUMBER COLLATION SUMMARY | 12   |
| III. MODEL DIMENSIONAL DATA              | 14   |
| FIGURES                                  |      |
| MODEL                                    | 35   |
| DATA                                     | 43   |
| APPENDIX                                 |      |
| TABULATED SOURCE DATA                    |      |

## INDEX OF MODEL FIGURES

| Figure | Title   | Page |
|--------|---|------|
| 1.     | Axis systems.   | 35   |
| 2.     | Model sketches.   |      |
| a.     | Integrated Vehicle Configuration 3  | 36   |
| b.     | Orbiter Umbilical Door Fairing Support (FR6)<br>and LO2 (FL7) and LH2 (FL8) Feedlines | 37   |
| c.     | Forward attachment of the External Tank to<br>the Orbiter (AT21)                      | 38   |
| d.     | Aft Attachment of External Tank to Orbiter<br>(AT22, AT23)                            | 39   |
| e.     | External Tank Protuberances (PT16, PT17, PT18)  | 40   |
| 3.     | Model installation photographs.   |      |
| a.     | Model 32-OT in the LaRC CFHT  | 41   |
| b.     | Model 32-OT with Orbiter Solid Plumes   | 42   |

INDEX OF DATA FIGURES

| FIGURE   | TITLE  | PLOTTED COEFFICIENTS SCHEDULE | CONDITIONS VARYING              | PAGES          |
|--|--|-------------------------------|---------------------------------|----------------|
| 4  | Configuration Buildup  | (A)                           | Configuration $\alpha$          | 1-3            |
| 5  | Effects of Attach Structure Cross Beam and Solid Plume - Alpha Sweep | (A)                           | Configuration $\alpha$          | 4-6            |
| 6  | Effects of Attach Structure Cross Beam and Solid Plume - Beta Sweep  | (B)                           | Configuration $\beta$           | 7-9            |
| 7  | Effects of Rudder Deflection - Plume Off, Beta = 0 Degrees           | (C)                           | Rudder, Configuration $\alpha$  | 10-12          |
| 8  | Effects of Rudder Deflection - Plume On, Beta = 0 Degrees            | (C)                           | Rudder, $\alpha$                | 13-15          |
| 9  | Effects of Rudder Deflection - Beta = 5 Degrees                      | (C)                           | Rudder, $\alpha$                | 16-18          |
| 10   | Effects of Rudder Deflection - Beta Sweep                            | (B)                           | Rudder, Configuration $\beta$   | 19-21          |
| 11   | Effects of Aileron Deflection  | (C)<br>(A)                    | Aileron, Configuration $\alpha$ | 22-24<br>25-27 |
| 12   | Effects of Elevon Deflection - Beam On                               | (A)                           | Elevon, $\alpha$                | 28-30          |
| 13   | Effects of Elevon Deflection - Beam Off                              | (A)                           | Elevon, $\alpha$                | 31-33          |
| 14   | Effects of Alpha   | (B)                           | $\alpha, \beta$                 | 34-36          |
| PLOTTED COEFFICIENTS SCHEDULE: (A) CN, CA versus ALPHA |  |                               |                                 |                |
| (B) CY, CBL versus BETA                                |  |                               |                                 |                |
| CY versus CYN  |  |                               |                                 |                |
| (C) CY, CBL, CYN versus ALPHA                          |  |                               |                                 |                |

NOMENCLATURE  
General

| <u>SYMBOL</u>                           | <u>SADSAC SYMBOL</u> | <u>DEFINITION</u>   |
|---|----------------------|---|
| a                                       |                      | speed of sound; m/sec, ft/sec                                 |
| Cp                                      | CP                   | pressure coefficient; $(P_1 - P_m)/q$                         |
| M                                       | MACH                 | Mach number; $V/a$  |
| P                                       |                      | pressure; $N/m^2$ , psf                                       |
| q                                       | Q(NSM)<br>Q(PSF)     | dynamic pressure; $1/2\rho V^2$ , $N/m^2$ , psf               |
| RN/L                                    | RN/L                 | unit Reynolds number; per m, per ft                           |
| V                                       |                      | velocity; m/sec, ft/sec                                       |
| $\alpha$                                | ALPHA                | angle of attack, degrees                                      |
| $\beta$                                 | BETA                 | angle of sideslip, degrees                                    |
| $\psi$                                  | PSI                  | angle of yaw, degrees   |
| $\phi$                                  | PHI                  | angle of roll, degrees  |
| $\rho$                                  |                      | mass density; $kg/m^3$ , slugs/ft <sup>3</sup>                |
| <u>Reference &amp; C.G. Definitions</u> |                      |   |
| Ab                                      |                      | base area; m <sup>2</sup> , ft <sup>2</sup>                   |
| b                                       | BREF                 | wing span or reference span; m, ft                            |
| c.g.                                    |                      | center of gravity   |
| $l_{REF}$                               | LREF                 | reference length or wing mean aerodynamic chord; m, ft        |
| c                                       |                      | wing area or reference area; m <sup>2</sup> , ft <sup>2</sup> |
| S                                       | SREF                 | moment reference point  |
|   | MRP                  | moment reference point on X axis                              |
|   | XMRP                 | moment reference point on X axis                              |
|   | YMRP                 | moment reference point on Y axis                              |
|   | ZMRP                 | moment reference point on Z axis                              |

SUBSCRIPTS

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l  
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o

base  
local  
static conditions  
total conditions  
free stream



NOMENCLATURE  
(Continued)

Body-Axis System

| <u>SYMBOL</u>              | <u>SADSAC SYMBOL</u> | <u>DEFINITION</u>   |
|----------------------------|----------------------|---|
| C <sub>N</sub>             | CN                   | normal-force coefficient; $\frac{\text{normal force}}{qS}$                          |
| C <sub>A</sub>             | CA                   | axial-force coefficient; $\frac{\text{axial force}}{qS}$                            |
| C <sub>Y</sub>             | CY                   | side-force coefficient; $\frac{\text{side force}}{qS}$                              |
| C <sub>A<sub>b</sub></sub> | CAB                  | base-force coefficient; $\frac{\text{base force}}{qS}$<br>$-A_b(p_b - p_\infty)/qS$ |
| C <sub>A<sub>f</sub></sub> | CAF                  | forebody axial force coefficient; C <sub>A</sub> - C <sub>A<sub>b</sub></sub>       |
| C <sub>m</sub>             | CLM                  | pitching-moment coefficient; $\frac{\text{pitching moment}}{qS l_{REF}}$            |
| C <sub>n</sub>             | CYN                  | yawing-moment coefficient; $\frac{\text{yawing moment}}{qS b}$                      |
| C <sub>l</sub>             | CRL                  | rolling-moment coefficient; $\frac{\text{rolling moment}}{qS b}$                    |

NOMENCLATURE (Concluded)  
Additional Nomenclature

| <u>Symbol</u> | <u>SADSAC<br/>Symbol</u> | <u>Definition</u>                    |
|---------------|--------------------------|--------------------------------------|
| RTLS          |                          | return to launch site                |
| $\delta_a$    | AILRON                   | aileron deflection angle, degrees    |
| $\delta_e$    | ELEVON                   | elevon deflection angle, degrees     |
| $\delta_R$    | RUDDER                   | rudder deflection angle, degrees     |
| $\delta_{SB}$ | SPDBRK                   | speedbrake deflection angle, degrees |

## CONFIGURATIONS INVESTIGATED

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

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

|  |  |
|--|--|
| $O_1 = B_{19} C_7 E_{23} F_5 M_4 N_8 N_{24}$<br>$R_5 V_7 W_{107}$      | Orbiter without solid plume  |
| $O_2 = B_{19} C_7 E_{23} F_5 M_4 N_8 N_{24}$<br>$PL_2 R_5 V_7 W_{107}$ | Orbiter with solid plume   |
| $T_1 = T_{10} + L + P + A + F$   | External Tank with cross member<br>between aft ET/Orbiter attach<br>structures         |
| $T_2 = T_{10} + L + P + A$   | External Tank without cross member<br>between aft ET/Orbiter attach<br>structures      |
| $L = FL_7 + FL_8$  | LOX and LH <sub>2</sub> feedlines between ET<br>and Orbiter                            |
| $P = PT_{16} + PT_{17} + PT_{18}$                                      | LOX vent line fairing, LOX feedline<br>fairing, and LH <sub>2</sub> vent line fairing. |
| $A = AT_{22} + AT_{23} + AT_{21}$                                      | Attachment Structures  |
| $F = FR_6$   | Cross member between aft ET/Orbiter<br>attachment structures                           |

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

## INSTRUMENTATION

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

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

## TEST FACILITY DESCRIPTION

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

## DATA REDUCTION

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

$$\text{Reference Area (S}_{\text{Ref}}) = 0.269 \text{ ft}^2 (38.736 \text{ in}^2)$$

$$\text{Reference Length (L}_{\text{Ref}}) = 12.90 \text{ in.} = \text{B}_{\text{REF}}$$

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

### External Tank only

ET Station 12.00 (9.51 in aft of ET nose) on ET centerline

### Orbiter Only

Orbiter station 10.767 (8.387 in aft of Orbiter nose) in the plane of symmetry ( $Y_0 = 0.00$ ) along the FRP ( $Z_0 = 4.00$ )

### Integrated Vehicle

ET station 9.890 on ET centerline ( $X_0 = 2.38$ , Orbiter nose).

$$\text{YMRP} = 0$$

$$\text{ZMRP} = 3.33 \text{ in. below FRP}$$

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









TABLE III. MODEL DIMENSIONAL DATA -

MODEL COMPONENT : BODY - B<sub>19</sub>  
 GENERAL DESCRIPTION : Fuselage, Configuration 3, per Rockwell  
Lines VL70-000139B  
 NOTE: Identical to B<sub>17</sub> except forebody.  
 MODEL SCALE: 0.010  
 DRAWING NUMBER VL70-000139B

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

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : CANOPY - C7

GENERAL DESCRIPTION : Configuration 3 per Rockwell Lines

VL70-000139

MODEL SCALE: 0.010

DRAWING NUMBER : VL70-000139

| DIMENSIONS :                              | FULL SCALE                  | MODEL SCALE                 |
|---|-----------------------------|-----------------------------|
| Length ( $X_0=433$ to $X_0=578$ ) In.F.S. | <u>145</u>                  | <u>1.45</u>                 |
| Max Width                                 | <u>                    </u> | <u>                    </u> |
| Max Depth                                 | <u>                    </u> | <u>                    </u> |
| Fineness Ratio                            | <u>                    </u> | <u>                    </u> |
| Area                                      | <u>                    </u> | <u>                    </u> |
| Max. Cross-Sectional                      | <u>                    </u> | <u>                    </u> |
| Planform                                  | <u>                    </u> | <u>                    </u> |
| Wetted                                    | <u>                    </u> | <u>                    </u> |
| Base                                      | <u>                    </u> | <u>                    </u> |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ELEVON - E<sub>23</sub>

GENERAL DESCRIPTION: Configuration 3 per W<sub>107</sub> Rockwell Lines Drawing  
VL70-000139B data for (1) of (2) sides.

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139B

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

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : BODY FLAP - F<sub>2</sub>

GENERAL DESCRIPTION : 3 Configuration per Rockwell Lines VI70-000139

MODEL SCALE: 0.010

DRAWING NUMBER VI70-000139

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

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT OMS POD - M<sub>4</sub>

GENERAL DESCRIPTION Configuration 3 per Rockwell Lines VL70-000139

NOTE: M<sub>4</sub> identical to M<sub>3</sub>, except intersection to fuselage.

MODEL SCALE: 0.010

DRAWING NUMBER VL70-000139

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



TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: MPS NOZZLES - N 24

GENERAL DESCRIPTION: Configuration 3A MPS Nozzles

MODEL SCALE: 0.010

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

DIMENSIONS:

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



TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: SOLID PLUME - PL<sub>2</sub>

GENERAL DESCRIPTION: SSME simulated plumes from N<sub>2</sub>H<sub>4</sub> nozzles to represent all 3 engines at M = 5.5 during exit trajectory. Used with N<sub>2</sub>H<sub>4</sub> SSME nozzles with a 0.035 metric gap at the nozzle exit plane.

MODEL SCALE: 0.010

DRAWING NUMBER: \_\_\_\_\_

COORDINATES:

Ratio of local plume radius  
to nozzle exit plane internal  
radius

Ratio of local axial distance  
from nozzle exit plane to nozzle  
exit plane internal radius

|              |               |
|--------------|---------------|
| <u>1.053</u> | <u>0.057</u>  |
| <u>1.943</u> | <u>1.122</u>  |
| <u>2.772</u> | <u>2.250</u>  |
| <u>3.497</u> | <u>3.341</u>  |
| <u>4.450</u> | <u>4.912</u>  |
| <u>5.421</u> | <u>6.642</u>  |
| <u>5.905</u> | <u>7.566</u>  |
| <u>6.389</u> | <u>8.529</u>  |
| <u>7.321</u> | <u>10.496</u> |
| <u>7.861</u> | <u>11.699</u> |
| <u>8.136</u> | <u>12.330</u> |
| <u>8.672</u> | <u>13.602</u> |
| <u>8.937</u> | <u>14.307</u> |
| <u>9.204</u> | <u>14.912</u> |
| <u>9.464</u> | <u>15.569</u> |

DIMENSIONS:

Nozzle Exit Radius, In.

| <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|-------------------|--------------------|
| <u>45.2</u>       | <u>0.452</u>       |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: RUDDER - R<sub>5</sub>

GENERAL DESCRIPTION: Configuration 140A/B Orbiter Rudder

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000146A MODEL DRAWING: SS-AC0148, RELEASE 6

| <u>DIMENSIONS:</u>                                   | <u>FULL-SCALE</u> | <u>MODEL SCALE</u> |
|--|-------------------|--------------------|
| Area - Ft <sup>2</sup>                               | <u>106.38</u>     | <u>0.0106</u>      |
| Span (equivalent) - In.                              | <u>201.0</u>      | <u>2.010</u>       |
| Inb'd equivalent chord - In.                         | <u>91.585</u>     | <u>0.916</u>       |
| Outb'd equivalent chord - In.                        | <u>50.833</u>     | <u>0.508</u>       |
| Ratio movable surface chord/<br>total surface chord  |                   |                    |
| At Inb'd equiv. chord                                | <u>0.400</u>      | <u>0.400</u>       |
| At Outb'd equiv. chord                               | <u>0.400</u>      | <u>0.400</u>       |
| Sweep Back Angles, degrees                           |                   |                    |
| Leading Edge   | <u>34.83</u>      | <u>34.83</u>       |
| Trailing Edge  | <u>26.25</u>      | <u>26.25</u>       |
| Hingeline  | <u>34.83</u>      | <u>34.83</u>       |
| Area Moment (Normal to hinge line) - Ft <sup>3</sup> | <u>526.13</u>     | <u>0.00053</u>     |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: VERTICAL - V<sub>7</sub>

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

NOTE: Same as V<sub>5</sub>, but with manipulator housing removed.

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139

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

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: WING-W 107

GENERAL DESCRIPTION: Configuration 3 per Rockwell Lines VI70-000139B

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

MODEL SCALE: 0.010

TEST NO. \_\_\_\_\_ DWG. NO. VI70-000139B

DIMENSIONS: \_\_\_\_\_ FULL-SCALE \_\_\_\_\_ MODEL SCALE \_\_\_\_\_

TOTAL DATA

|                              | FULL-SCALE     | MODEL SCALE   |
|------------------------------|----------------|---------------|
| Area (Theo.) Ft <sup>2</sup> |                |               |
| Planform                     | <u>2690.00</u> | <u>0.2690</u> |
| Span (Theo) In.              | <u>936.68</u>  | <u>9.367</u>  |
| Aspect Ratio                 | <u>2.265</u>   | <u>2.265</u>  |
| Rate of Taper                | <u>1.177</u>   | <u>1.177</u>  |
| Taper Ratio                  | <u>0.200</u>   | <u>0.200</u>  |
| Dihedral Angle, degrees      | <u>3.500</u>   | <u>3.500</u>  |
| Incidence Angle, degrees     | <u>0.500</u>   | <u>0.500</u>  |
| Aerodynamic Twist, degrees   | <u>+3.000</u>  | <u>+3.000</u> |
| Sweep Back Angles, degrees   |                |               |
| Leading Edge                 | <u>45.000</u>  | <u>45.000</u> |
| Trailing Edge                | <u>-10.24</u>  | <u>-10.24</u> |
| 0.25 Element Line            | <u>35.209</u>  | <u>35.209</u> |
| Chords:                      |                |               |
| Root (Theo) B.P.0.0.         | <u>689.24</u>  | <u>6.892</u>  |
| Tip, (Theo) B.P.             | <u>137.85</u>  | <u>1.379</u>  |
| MAC                          | <u>474.81</u>  | <u>4.748</u>  |
| Fus. Sta. of .25 MAC         | <u>1136.89</u> | <u>11.369</u> |
| W.P. of .25 MAC              | <u>299.20</u>  | <u>2.992</u>  |
| B.L. of .25 MAC              | <u>182.13</u>  | <u>1.821</u>  |

EXPOSED DATA

|  |                |               |
|--|----------------|---------------|
| Area (Theo) - Ft <sup>2</sup>                  | <u>1752.29</u> | <u>0.1752</u> |
| Span, (Theo) - In. BP108                       | <u>720.68</u>  | <u>7.207</u>  |
| Aspect Ratio                                   | <u>2.058</u>   | <u>2.058</u>  |
| Taper Ratio                                    | <u>0.2451</u>  | <u>0.2451</u> |
| Chords   |                |               |
| Root BP108                                     | <u>562.40</u>  | <u>5.624</u>  |
| Tip 1.00 $\frac{b}{2}$                         | <u>137.85</u>  | <u>1.379</u>  |
| MAC  | <u>393.03</u>  | <u>3.930</u>  |
| Fus. Sta. of .25 MAC                           | <u>1185.31</u> | <u>11.853</u> |
| W.P. of .25 MAC                                | <u>300.20</u>  | <u>3.002</u>  |
| B.L. of .25 MAC                                | <u>251.76</u>  | <u>2.518</u>  |
| Airfoil Section (Rockwell Mod NASA)<br>XXXX-64 |                |               |
| Root $\frac{b}{2}$ =                           | <u>0.10</u>    | <u>0.10</u>   |
| Tip $\frac{b}{2}$ =                            | <u>0.12</u>    | <u>0.12</u>   |

Data for (1) of (2) Sides

|   |                |               |
|---|----------------|---------------|
| Leading Edge Cuff                       |                |               |
| Planform Area Ft <sup>2</sup>           | <u>118.333</u> | <u>0.0118</u> |
| Leading Edge Intersects Fus M. L. @ Sta | <u>500.</u>    | <u>5.00</u>   |
| Leading Edge Intersects Wing @ Sta      | <u>1083.4</u>  | <u>10.834</u> |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT : EXTERNAL TANK - T<sub>10</sub>  
 GENERAL DESCRIPTION : External Oxygen-Hydrogen Tank, 3 Configuration,  
per Rockwell Lines VL78-000041 and VL72-000088  
 MODEL SCALE: 0.010  
 DRAWING NUMBER : VL72-000088, VL78-000041

| DIMENSIONS :                          | FULL SCALE        | MODEL SCALE       |
|---------------------------------------|-------------------|-------------------|
| Length - In. (Nose @ $X_0 = 309$ )    | <u>1865</u>       | <u>18.650</u>     |
| Max Width (Dia. - In.)                | <u>324</u>        | <u>3.240</u>      |
| Max Depth                             | <u>          </u> | <u>          </u> |
| Fineness Ratio                        | <u>5.75617</u>    | <u>5.75617</u>    |
| Area - Ft <sup>2</sup>                | <u>          </u> | <u>          </u> |
| Max. Cross-Sectional                  | <u>572.555</u>    | <u>0.0573</u>     |
| Planform                              | <u>          </u> | <u>          </u> |
| Wetted                                | <u>          </u> | <u>          </u> |
| Base                                  | <u>          </u> | <u>          </u> |
| W.P. of Tank Centerline ( $X_T$ ) In. | <u>400.00</u>     | <u>4.00</u>       |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: FEEDLINE - FL-7

GENERAL DESCRIPTION: LOX feedline between ET and Orbiter

MODEL SCALE: 0.010

DRAWING NO.: VL78-000050

DIMENSIONS:

|                |                | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|----------------|----------------|-------------------|--------------------|
| Centerline at: | X <sub>T</sub> | <u>2081.0</u>     | <u>20.810</u>      |
|                | Y <sub>T</sub> | <u>70.0</u>       | <u>0.70</u>        |
|                | X <sub>O</sub> | <u>1330.0</u>     | <u>13.300</u>      |
|                | Y <sub>O</sub> | <u>70.0</u>       | <u>0.700</u>       |
| Diameter       |                | <u>18.5</u>       | <u>0.185</u>       |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: FEEDLINE - FL<sub>8</sub>

GENERAL DESCRIPTION: LH<sub>2</sub> feedline between ET and Orbiter

MODEL SCALE: 0.010

DRAWING NUMBER: VL78-000050

| DIMENSIONS:    |                | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|----------------|----------------|-------------------|--------------------|
| Centerline at: | X <sub>T</sub> | <u>2081.0</u>     | <u>20.810</u>      |
|                | Y <sub>T</sub> | <u>- 70.0</u>     | <u>- 0.700</u>     |
|                | X <sub>O</sub> | <u>1330.0</u>     | <u>13.300</u>      |
|                | Y <sub>O</sub> | <u>- 70.0</u>     | <u>- 0.700</u>     |
| Diameter       |                | <u>18.5</u>       | <u>0.185</u>       |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE - FT<sub>16</sub>

GENERAL DESCRIPTION: LOX vent line fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

| DIMENSIONS:            | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|------------------------|-------------------|--------------------|
| Leading edge at $X_T$  | <u>322.0</u>      | <u>3.210</u>       |
| $Y_T$                  | <u>0.0</u>        | <u>0.0</u>         |
| Trailing edge at $X_T$ | <u>955.0</u>      | <u>9.55</u>        |
| $Y_T$                  | <u>70.0</u>       | <u>0.70</u>        |



TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE- PT<sub>17</sub>

GENERAL DESCRIPTION: LOX feedline fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

| DIMENSIONS:       |                | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|-------------------|----------------|-------------------|--------------------|
| Leading edge at:  | X <sub>T</sub> | <u>955.0</u>      | <u>9.55</u>        |
|                   | Y <sub>T</sub> | <u>70.0</u>       | <u>0.70</u>        |
| Trailing edge at: | X <sub>T</sub> | <u>2058.0</u>     | <u>20.58</u>       |
|                   | Y <sub>T</sub> | <u>70.0</u>       | <u>0.70</u>        |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ET PROTUBERANCE - PT<sub>18</sub>

GENERAL DESCRIPTION: LH<sub>2</sub> vent line fairing

MODEL SCALE: 0.010

DRAWING NO.: VL78-000031A

DIMENSIONS:

|                   |                | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|-------------------|----------------|-------------------|--------------------|
| Leading edge at:  | X <sub>T</sub> | <u>947.0</u>      | <u>9.47</u>        |
|                   | Y <sub>T</sub> | <u>- 70.0</u>     | <u>- 0.70</u>      |
| Trailing edge at: | X <sub>T</sub> | <u>2058.0</u>     | <u>20.58</u>       |
|                   | Y <sub>T</sub> | <u>- 70.0</u>     | <u>- 0.700</u>     |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT<sub>22</sub>

GENERAL DESCRIPTION: Right rear, Orbiter to External Tank

MODEL SCALE: 0.010

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

| DIMENSIONS:   | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|---|-------------------|--------------------|
| First strut   |                   |                    |
| Diameter - In. (Approx.)                                    | <u>8.0</u>        | <u>0.08</u>        |
| Aft Location, In. (Attach to Orbiter)                       |                   |                    |
| $X_O$   | <u>1307.0</u>     | <u>13.070</u>      |
| $X_T$   | <u>2058.0</u>     | <u>20.580</u>      |
| Fwd Location - In. (Approx.)<br>(Attach to Orbiter)         |                   |                    |
| $X_O$   | <u>1108.0</u>     | <u>11.080</u>      |
| $X_T$   | <u>1859</u>       | <u>18.59</u>       |
| NOTE: This strut is the mirror image strut AT <sub>23</sub> |                   |                    |
| Second Strut  |                   |                    |
| Diameter, In. (Approx.)                                     | <u>8.0</u>        | <u>0.08</u>        |
| Location - In.  |                   |                    |
| $X_O$   | <u>1307.0</u>     | <u>13.070</u>      |
| $X_T$   | <u>2058</u>       | <u>20.580</u>      |
| NOTE: This is a cross brace strut.                          |                   |                    |

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT<sub>23</sub>

GENERAL DESCRIPTION: Left rear, Orbiter to External Tank

MODEL SCALE: 0.010

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

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

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

TABLE III. - MODEL DIMENSIONAL DATA - Continued.

MODEL COMPONENT: ATTACH STRUCTURE - AT<sub>21</sub>

GENERAL DESCRIPTION: Attach structure, same as AT<sub>11</sub> except only the  
forward attach structure.

MODEL SCALE: 0.010

DRAWING NO.: VL72-000089

| DIMENSIONS:     | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|-----------------|-------------------|--------------------|
| Orbiter to Tank |                   |                    |
| Location- In.   |                   |                    |
| X <sub>T</sub>  | <u>382.000</u>    | <u>3.820</u>       |
| X <sub>T</sub>  | <u>1133.000</u>   | <u>11.330</u>      |

TABLE III. - MODEL DIMENSIONAL DATA - Concluded.

MODEL COMPONENT: FAIRING - FR<sub>6</sub>

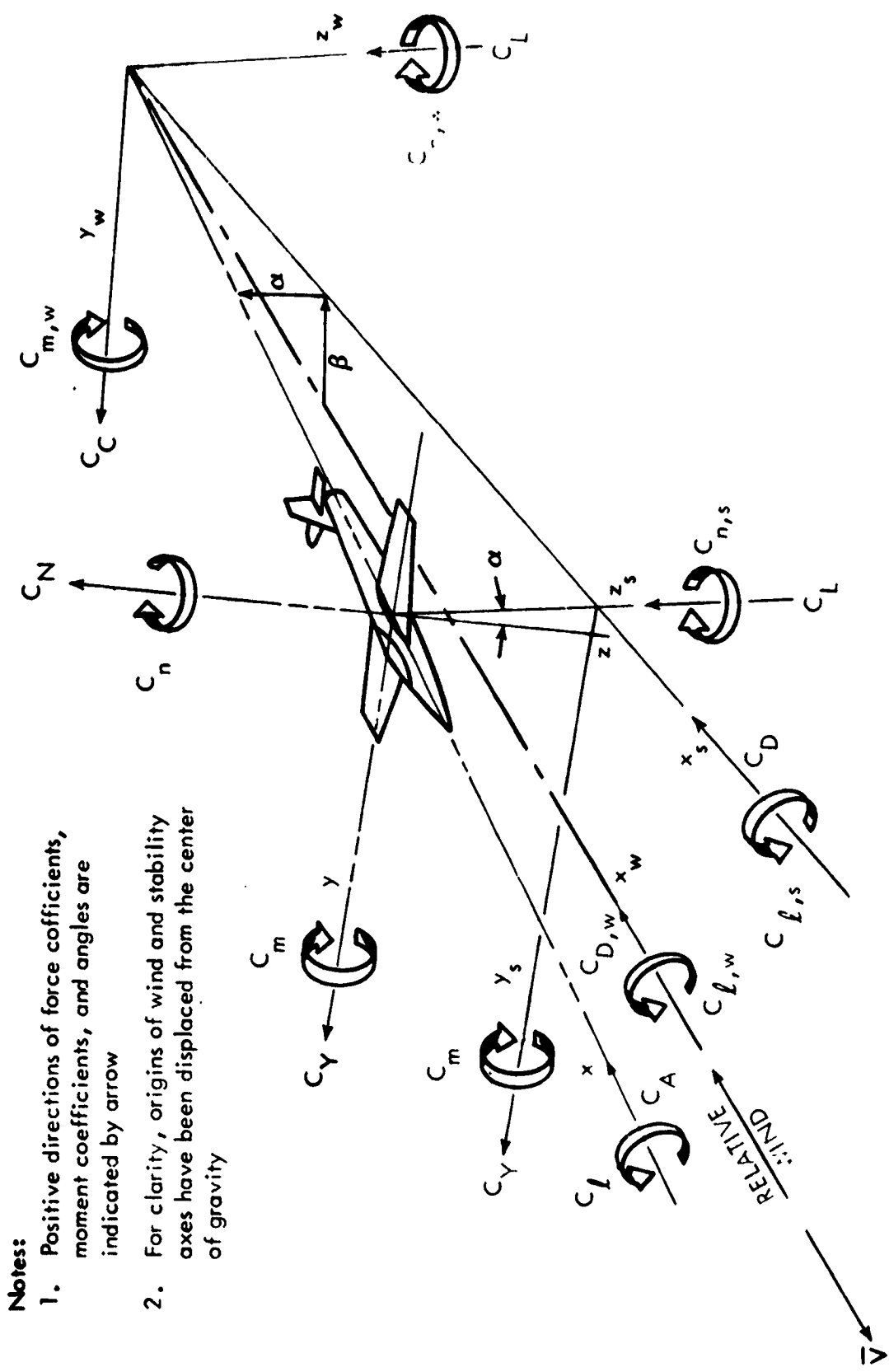
GENERAL DESCRIPTION: Cross member between aft ET/Orbiter attach structures.

MODEL SCALE: 0.010

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

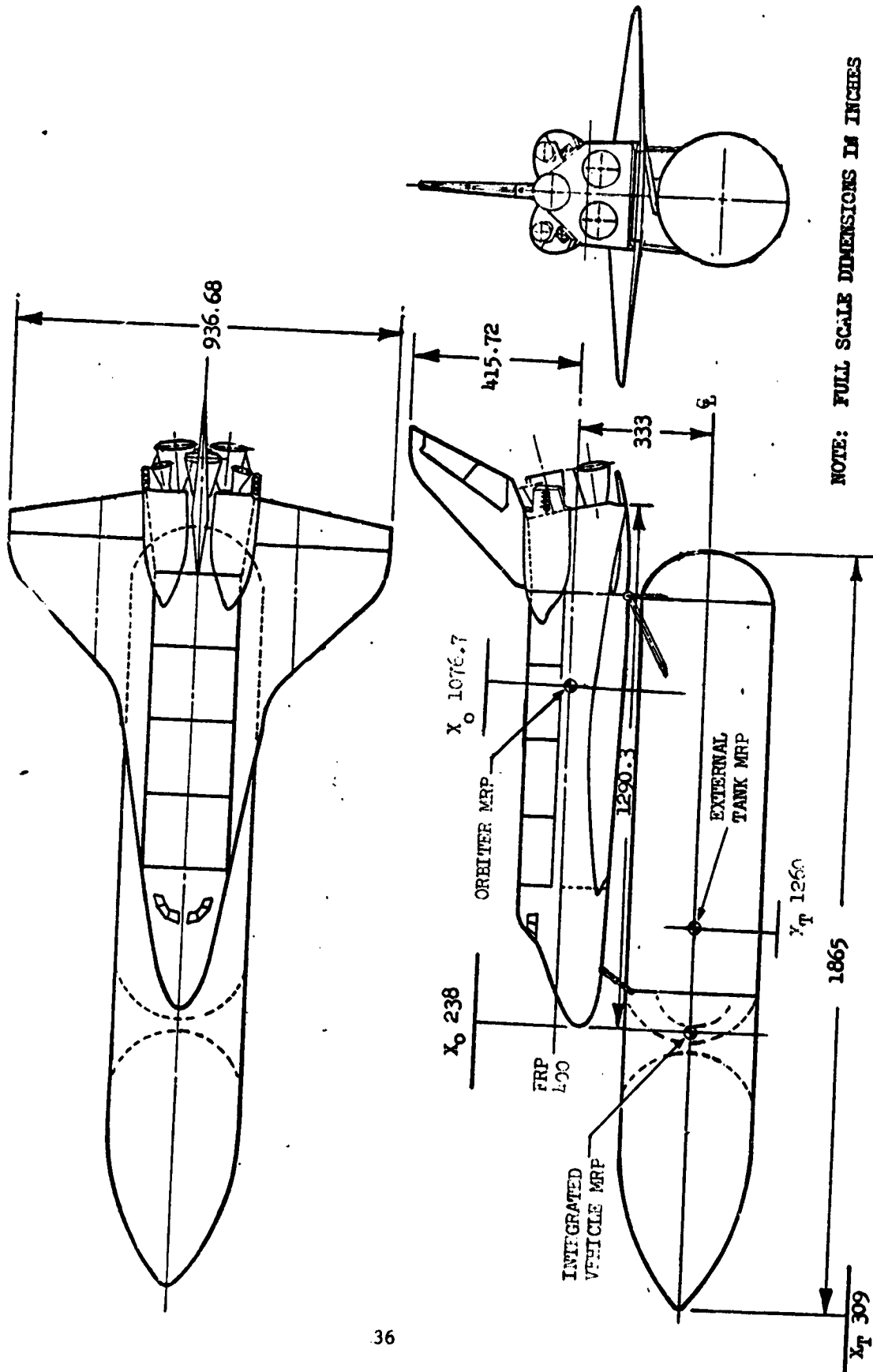
DIMENSIONS:

|                                | <u>FULL SCALE</u> | <u>MODEL SCALE</u> |
|--------------------------------|-------------------|--------------------|
| Leading edge at X <sub>T</sub> | <u>2035.50</u>    | <u>20.355</u>      |
| Length                         | <u>15.00</u>      | <u>0.150</u>       |
| Width                          | <u>193.00</u>     | <u>1.930</u>       |



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

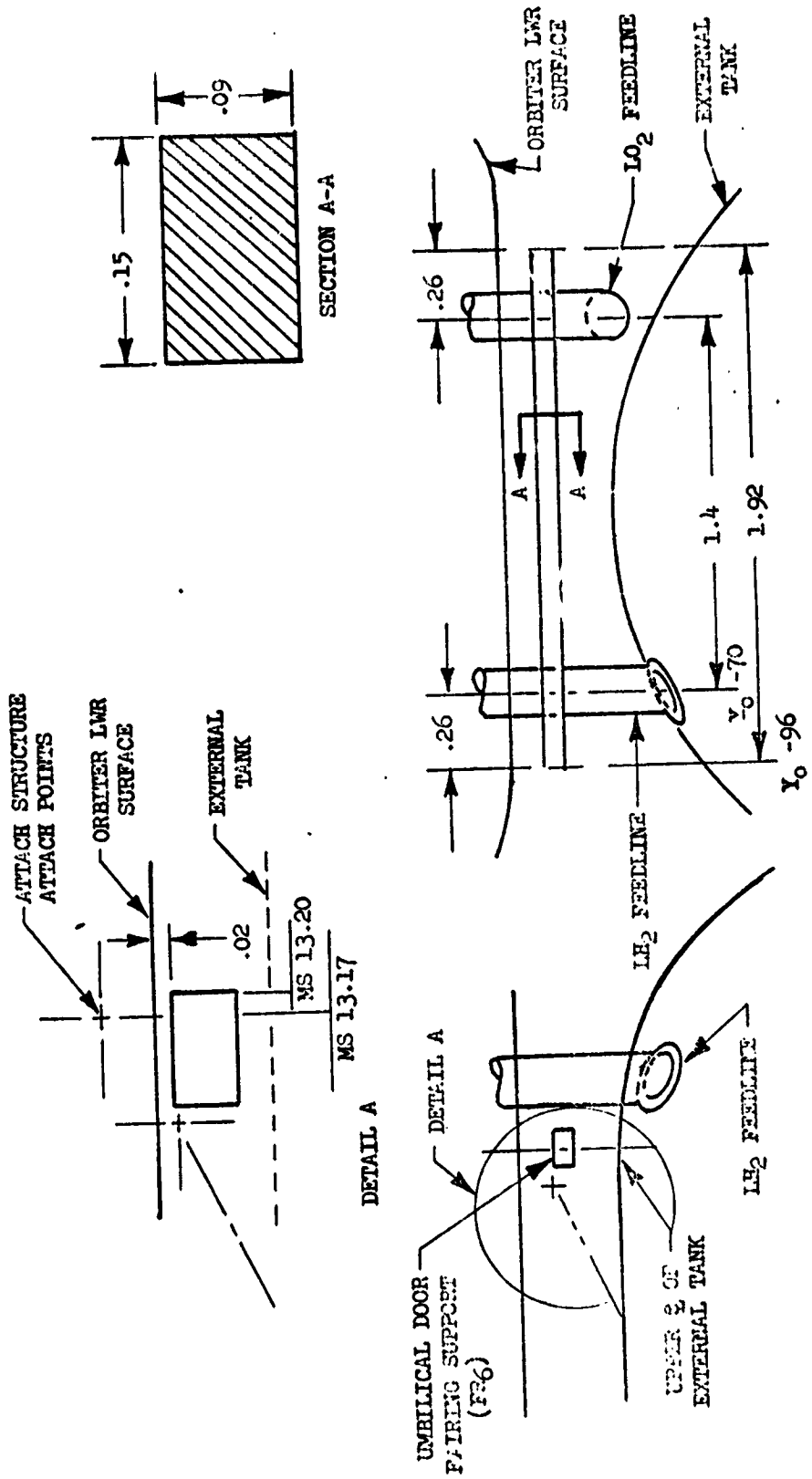
Figure 1. - Axis systems.



NOTE: FULL SCALE DIMENSIONS IN INCHES

Figure 2.a. Integrated Vehicle Configuration 3





NOTE: ALL DIMENSIONS ARE APPROXIMATE AND IN INCHES

Figure 2.b. Orbiter Umbilical Door Fairing Support (FR6) and LO<sub>2</sub>(FL7) and LH<sub>2</sub>(FL8) Feedlines

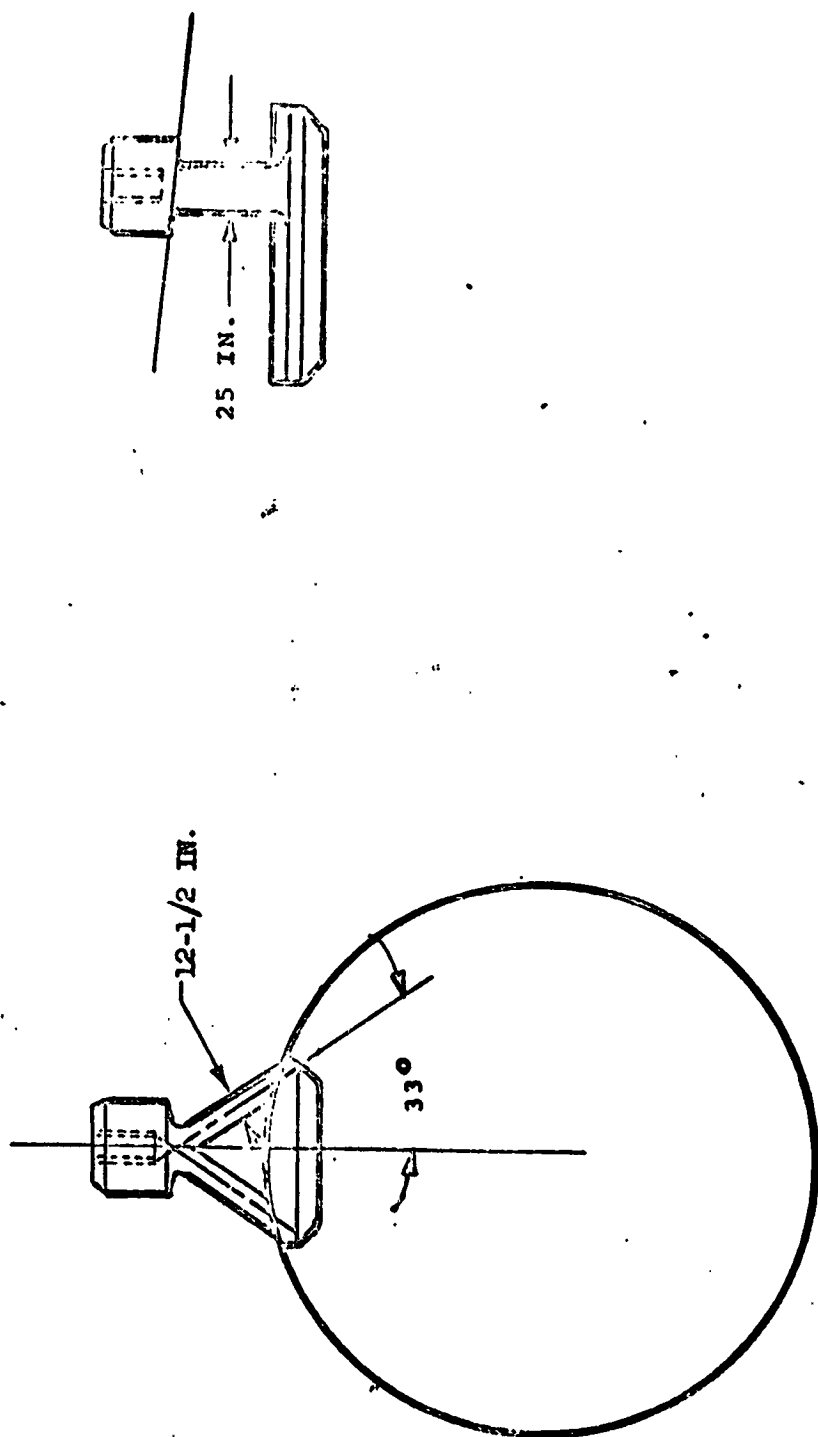


Figure 2.c. Forward Attachment of the External Tank to the Orbiter (AT 21)

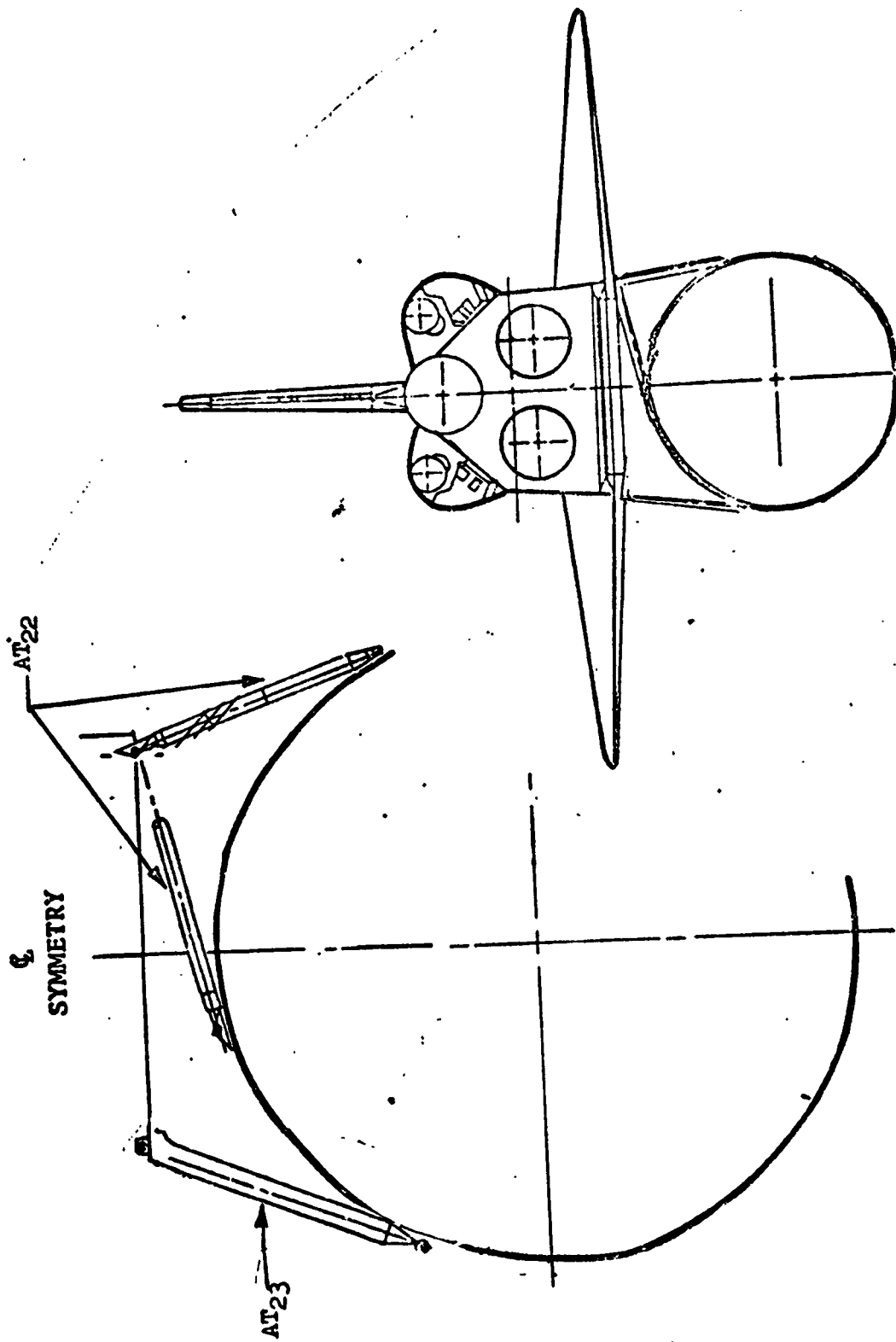


Figure 2.d. Aft Attachment of External Tank to Orbiter (AT<sub>22</sub>, AT<sub>23</sub>)

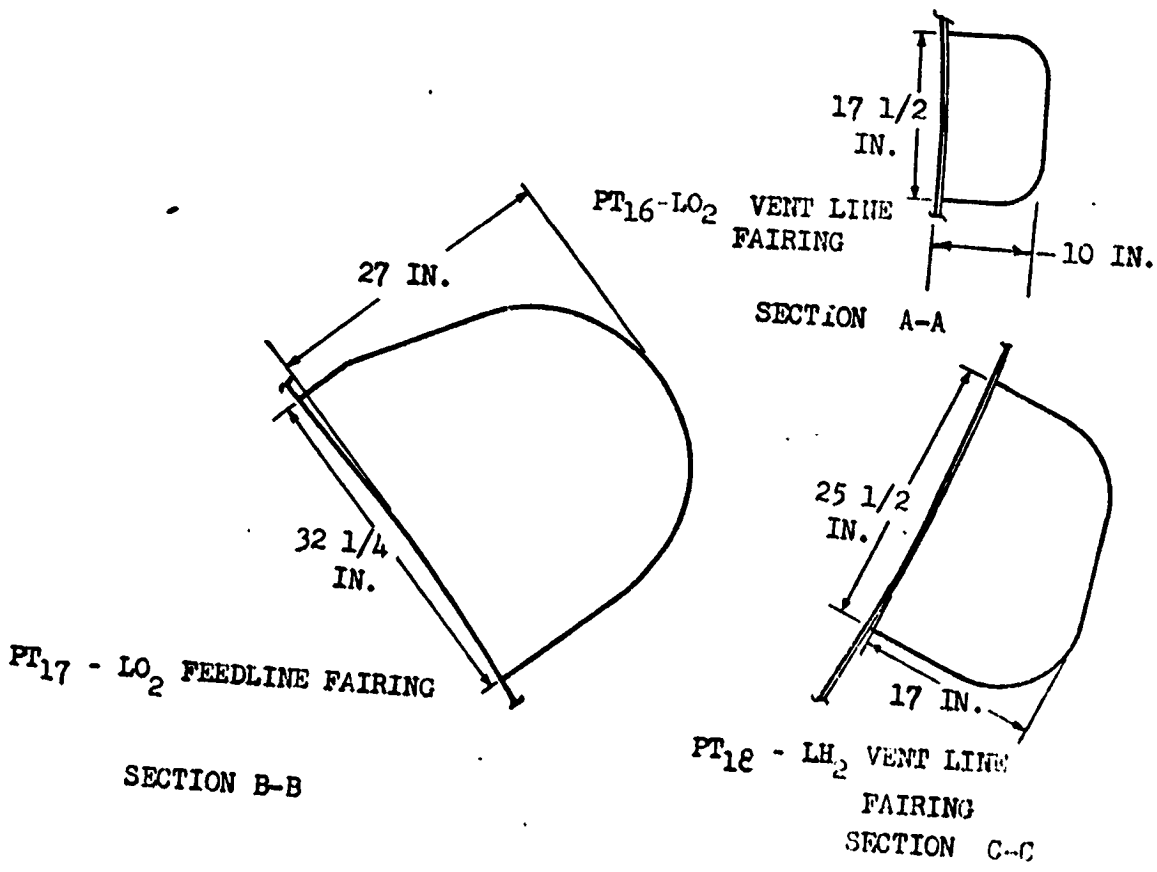
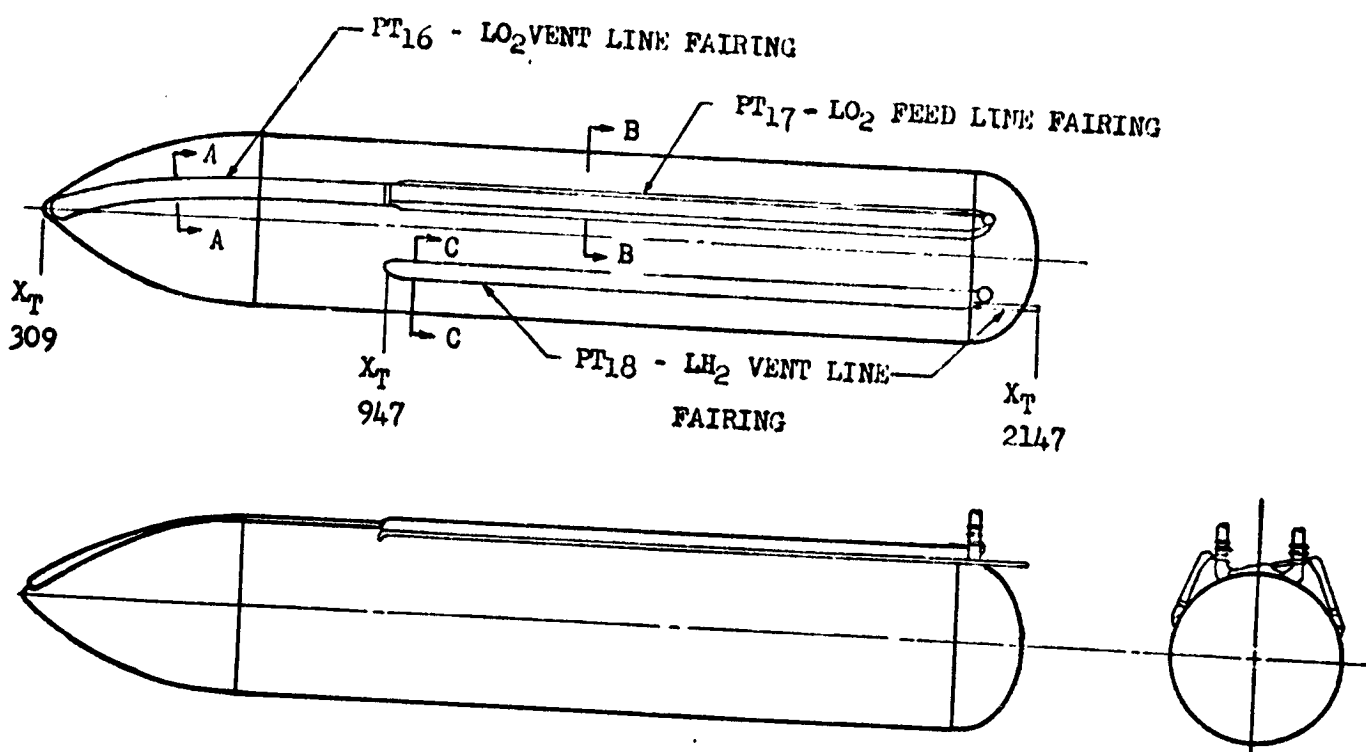
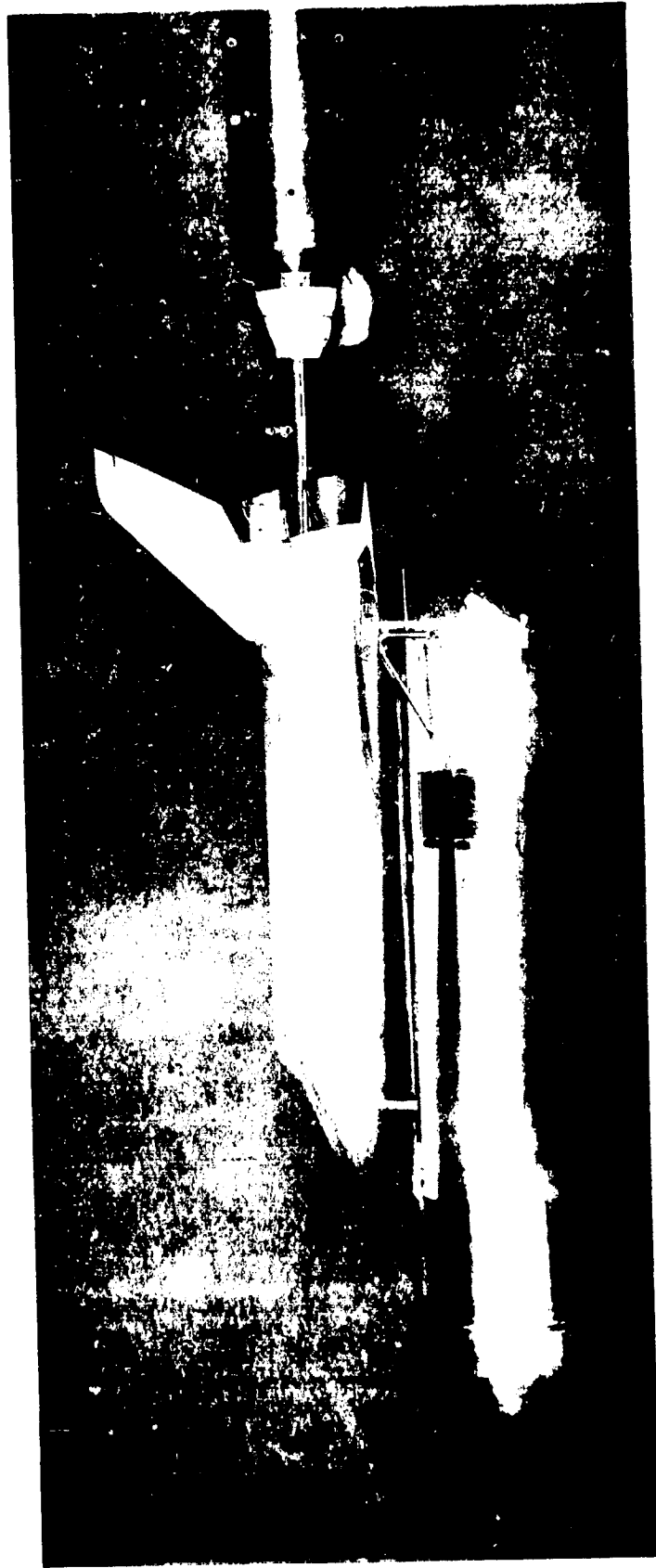


Figure 2.e. External Tank Protuberance. (PT<sub>16</sub>, PT<sub>17</sub>, PT<sub>18</sub>)



a: Model 32-0T in the LaRC CFHT  
Figure 3: - Model Installation photographs.



b. Model 32-0T with Orbiter solid plumes  
Figure 3. - Concluded

**DATA FIGURES**

DATA SET SYMBOL

CONFIGURATION DESCRIPTION

AILERON ELEVTR RUDDER SPOBRK

DATA SET SYMBOL  
 (RD001)  
 (RD002)  
 (AD009)

IA-58 CFMT-107 RI-1398 MODEL 32-0T (T1)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (O1)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (O1 + T2)

AILERON ELEVTR RUDDER SPOBRK  
 .000 .000 .000 .000  
 .000 .000 .000 .000

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

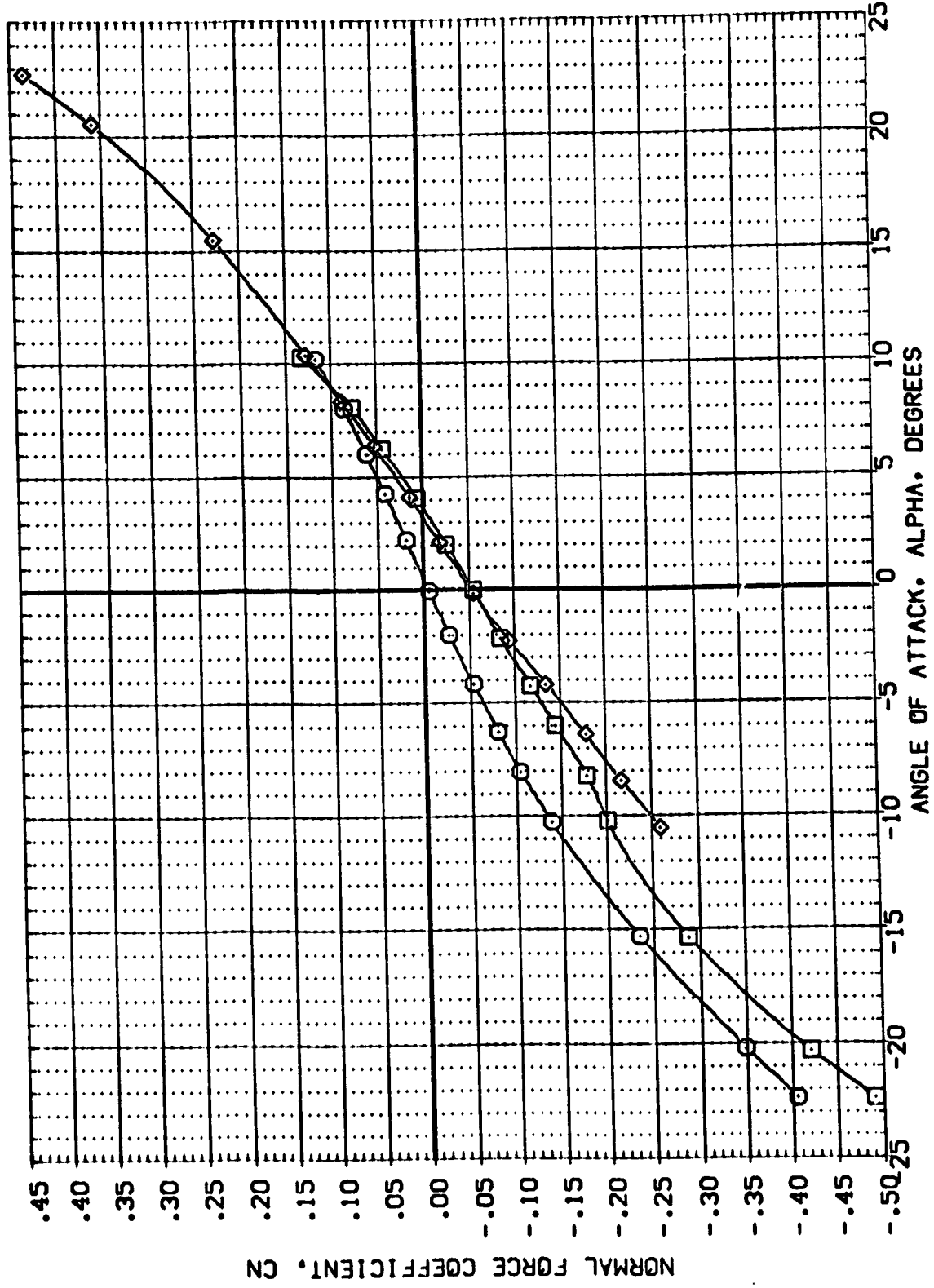


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33



DATA SET SYMBOL  
 (R01001)  
 (R01002)  
 (A01009)

CONFIGURATION DESCRIPTION  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (T1)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (01)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (01) + (T2)

AILRON ELEVTR RUDDER SPDRBK  
 .000 .000 .000 .000  
 .000 .000 .000 .000

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

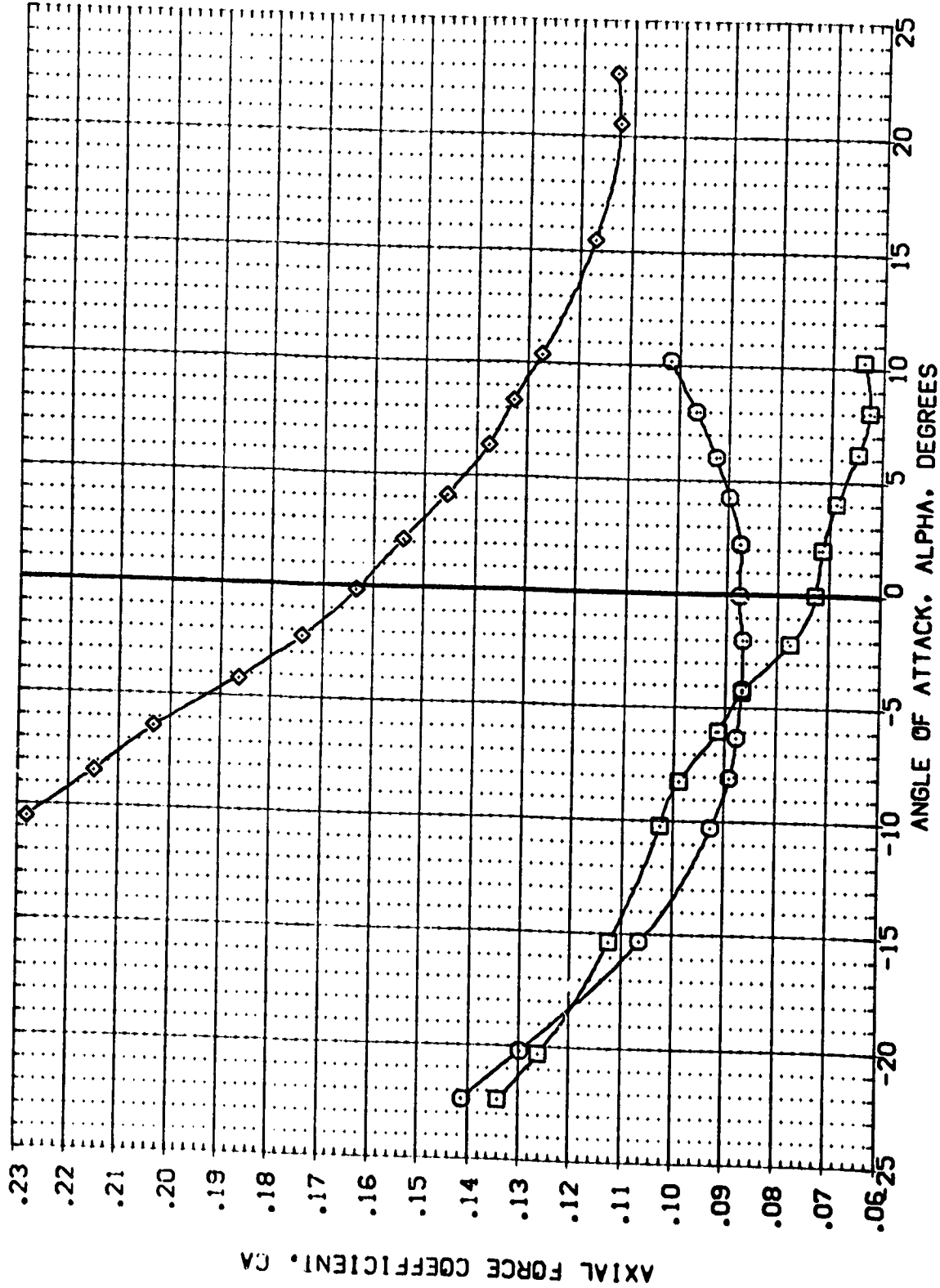


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33

DATA SET SYMBOL

(R01001)  
 (R01002)  
 (ADR009)

IA-58 CFHT-107 R1-1398  
 IA-58 CFHT-107 R1-1398  
 IA-58 CFHT-107 R1-1398

MODEL 32-01 (T1)  
 MODEL 32-01 (01)  
 MODEL 32-01 (01 + T2)

AIRLON .000 .000  
 ELEVT R .000 .000  
 RUDDER .000 .000  
 SPOBRK .000 .000

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

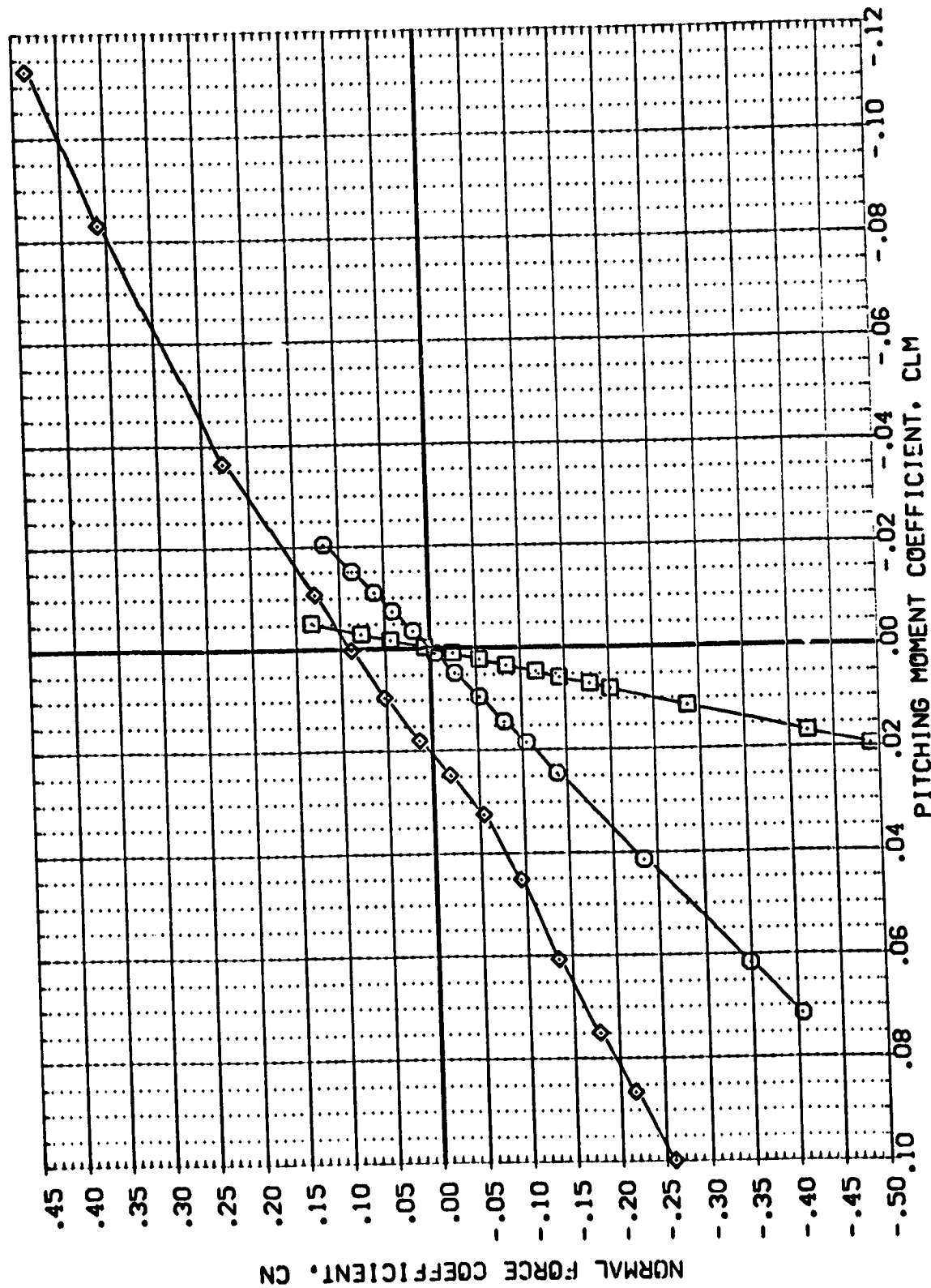


FIG 04 CONFIGURATION BUILDUP

(A)MACH = 10.33



|                 |  |        |        |        |        |                       |
|-----------------|--|--------|--------|--------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILRON | ELEVTR | RUDDER | SPOBRK | REFERENCE INFORMATION |
| (RQ003)         | 1A-58 CFMT-107 R1-1398 MODEL 32-0T (02 + T1) | .000   | .000   | .000   | .000   | SREF 38.7360 50. IN.  |
| (RQ007)         | 1A-58 CFMT-107 R1-1398 MODEL 32-0T (02 + T2) | .000   | .000   | .000   | .000   | LREF 12.9000 IN.      |
| (AD009)         | 1A-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T2) | .000   | .000   | .000   | .000   | BREF 12.9000 IN.      |
|                 |  |        |        |        |        | XMRP 1.0000 IN.       |
|                 |  |        |        |        |        | YMRP 1.0000 IN.       |
|                 |  |        |        |        |        | ZMRP -3.3300 IN.      |
|                 |  |        |        |        |        | SCALE .0100 SCALE     |

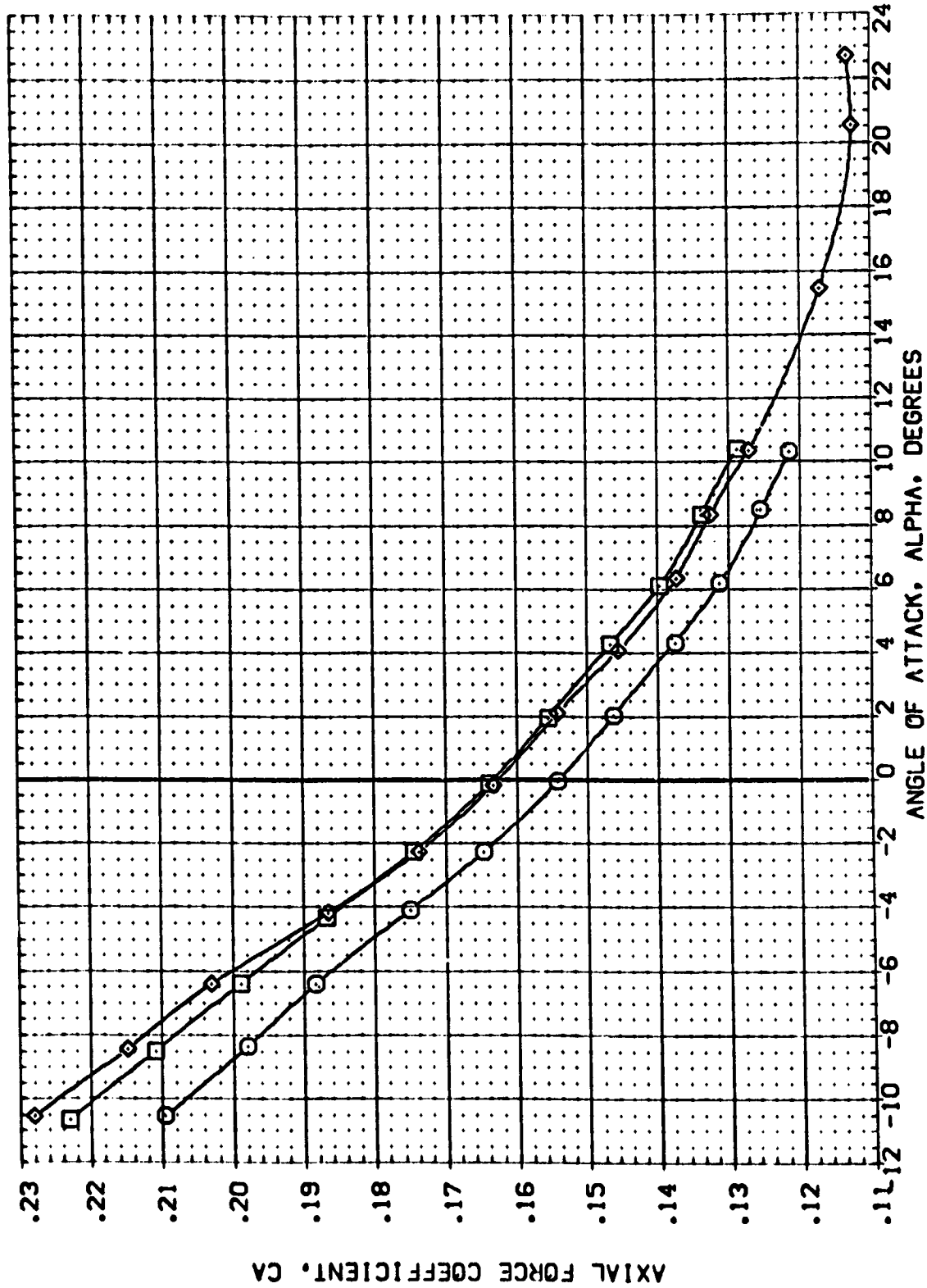


FIG 05 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - ALPHA SWEEP  
 (A)MACH = 10.33  
 PAGE 5

DATA SET SYMBOL    CONFIGURATION DESCRIPTION    MODEL    32-0T (02 + T1)    32-0T (02 + T2)    32-0T (01 + T2)

(R01003)    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398

(P01007)    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398

(A01009)    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398    IA-58 CFHT-107 RI-1398

REFERENCE INFORMATION

SREF    38.7360    SC.IN.

LREF    12.9000    IN.

BREF    12.9000    IN.

XMRP    .0000    IN.

YMRP    .0000    IN.

ZMRP    -3.3300    IN.

SCALE    .0100    SCALE

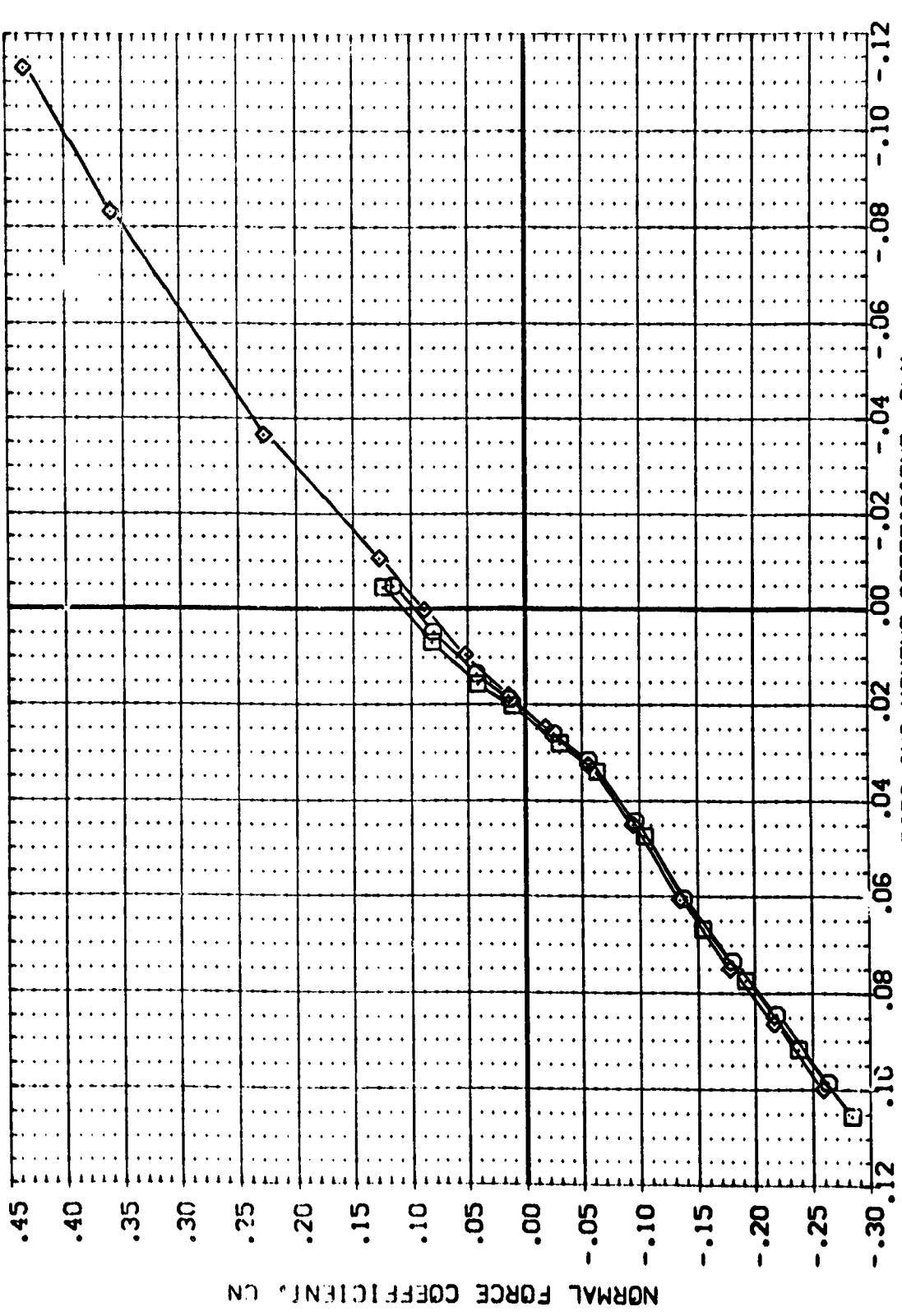


FIG 05 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - ALPHA SWEEP

(^)MACH = 10.33

PITCHING MOMENT COEFFICIENT, CLM

PAGE 6

|                 |                              |       |                 |        |        |        |        |                       |
|-----------------|------------------------------|-------|-----------------|--------|--------|--------|--------|-----------------------|
| DATA SET SYMBOL | C-2 F IGURATI LA DESCRIPTION | MODEL | 32-01 (02 + T2) | AILRON | ELEVTR | RUDDER | SPOBRK | REFERENCE INFORMATION |
| (R0K008)        | IA-58 CFMT-107 RI-1398       | MODEL | 32-01 (02 + T1) | .000   | .000   | .000   | .000   | SREF 38.7360 SO.IN.   |
| (R0K004)        | IA-58 CFMT-107 RI-1398       | MODEL | 32-01 (01 + T1) | .000   | .000   | .000   | .000   | LREF 12.9000 IN.      |
| (R0K010)        | IA-58 CFMT-107 RI-1398       | MODEL | 32-01 (01 + T2) | .000   | .000   | .000   | .000   | BREF 12.9000 IN.      |
|                 |                              |       |                 |        |        |        |        | XPRP .0000 IN.        |
|                 |                              |       |                 |        |        |        |        | YMRP .0000 IN.        |
|                 |                              |       |                 |        |        |        |        | ZMRP -3.3300 IN.      |
|                 |                              |       |                 |        |        |        |        | SCALE .0100           |

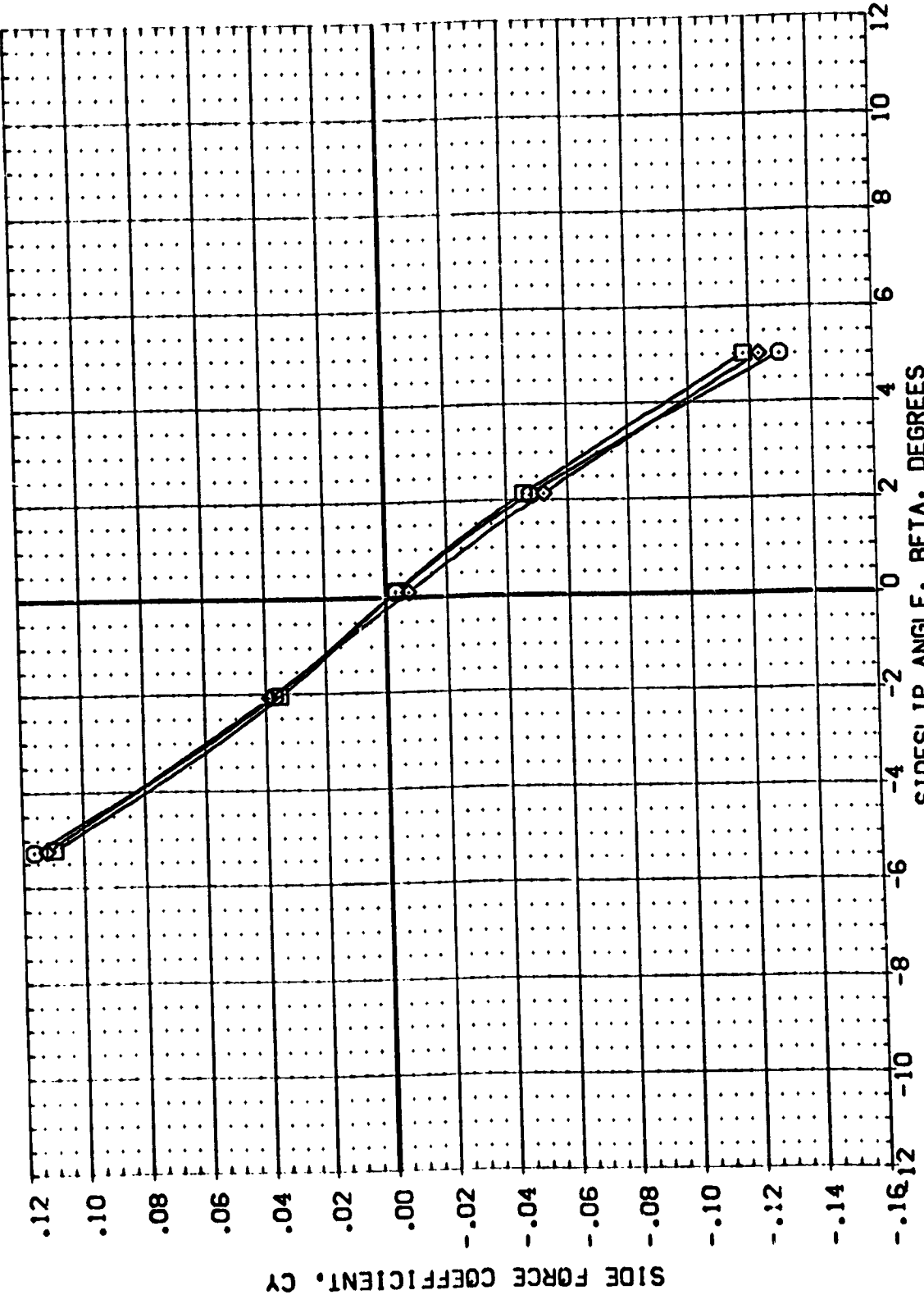


FIG 06 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - BETA SWEEP  
 (A)MACH = 10.33  
 PAGE 7

DATA SET SYMBOL: (R0K008) (R0K004) (R0K010)

CONFIGURATION DESCRIPTION: IA-58 CFMT-107 RI-1398 MODEL 32-0T (02 + T2) IA-58 CFMT-107 RI-1398 MODEL 32-0T (02 + T1) IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)

AILERON: .000 .000 .000  
 ELEVTR: .000 .000 .000  
 RUDDER: .000 .000 .000  
 SPOBRK: .000 .000 .000

REFERENCE INFORMATION: SREF 38.7360 SG.IN. IN. LREF 12.5000 IN. BREF 12.5000 IN. XWRP .0000 IN. YWRP .0000 IN. ZWRP -3.3300 IN. SCALE .0100

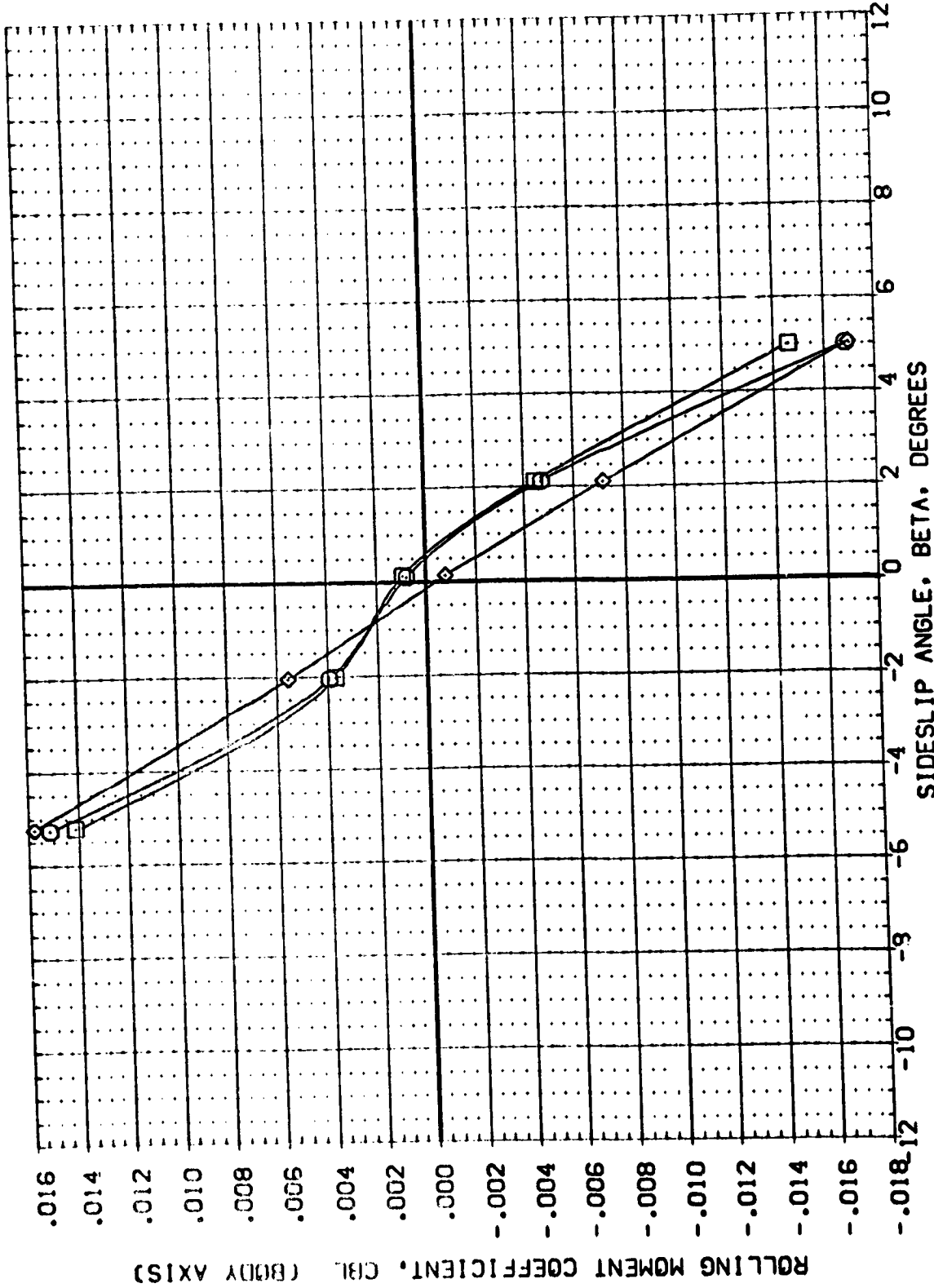
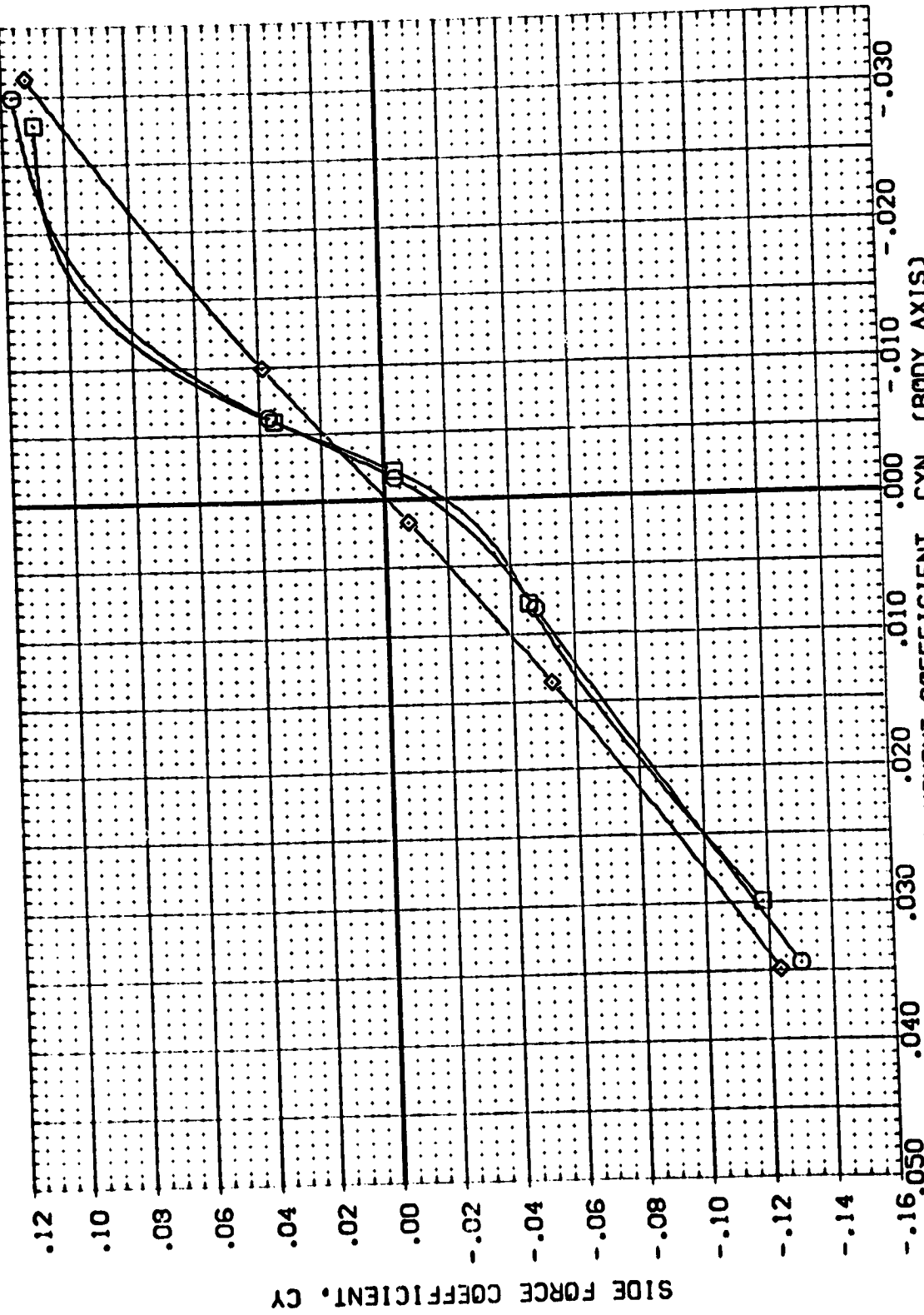


FIG 06 EFFECTS OF ATTACH STRUCTURE CROSS BEAM AND SOLID PLUME - BETA SWEEP (A)MACH = 10.33

|                 |  |        |        |        |        |                       |
|-----------------|--|--------|--------|--------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILRON | ELEVTR | RUDDER | SPOBRK | REFERENCE INFORMATION |
| (R0K009)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T2) | .000   | .000   | .000   | .000   | SREF 36.7360 SQ. IN.  |
| (R2PJC4)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (02 + T1) | .000   | .000   | .000   | .000   | LREF 12.9000 IN.      |
| (R0K010)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2) | .000   | .000   | .700   | .000   | BREF 12.9000 IN.      |
|                 |  |        |        |        |        | XMRP .0000 IN.        |
|                 |  |        |        |        |        | YMRP .0000 IN.        |
|                 |  |        |        |        |        | ZMRP -3.3300 IN.      |
|                 |  |        |        |        |        | SCALE .0100           |





**DATA SET SYMBOL**  
 (RD021)  
 (RD024)  
 (RD013)

**CONFIGURATION DESCRIPTION**  
 IA-58 CFMT-107 RI-1398 MODEL 32-07 (01 + T2)  
 IA-58 CFMT-107 RI-1398 MODEL 32-07 (01 + T2)  
 IA-58 CFMT-107 RI-1398 MODEL 32-07 (01 + T1)

**AILERON** .000  
**ELEVTR** .000  
**RUDDER** -20.000  
**SPOBRK** .000  
**SREF** 38.7360  
**LREF** 12.9000  
**BREF** 12.5000  
**XMRP** .0000  
**YMRP** .0000  
**ZMRP** -3.3300  
**SCALE** .0100

**REFERENCE INFORMATION**  
 SO. IN.  
 IN.  
 IN.  
 IN.  
 IN.  
 IN.

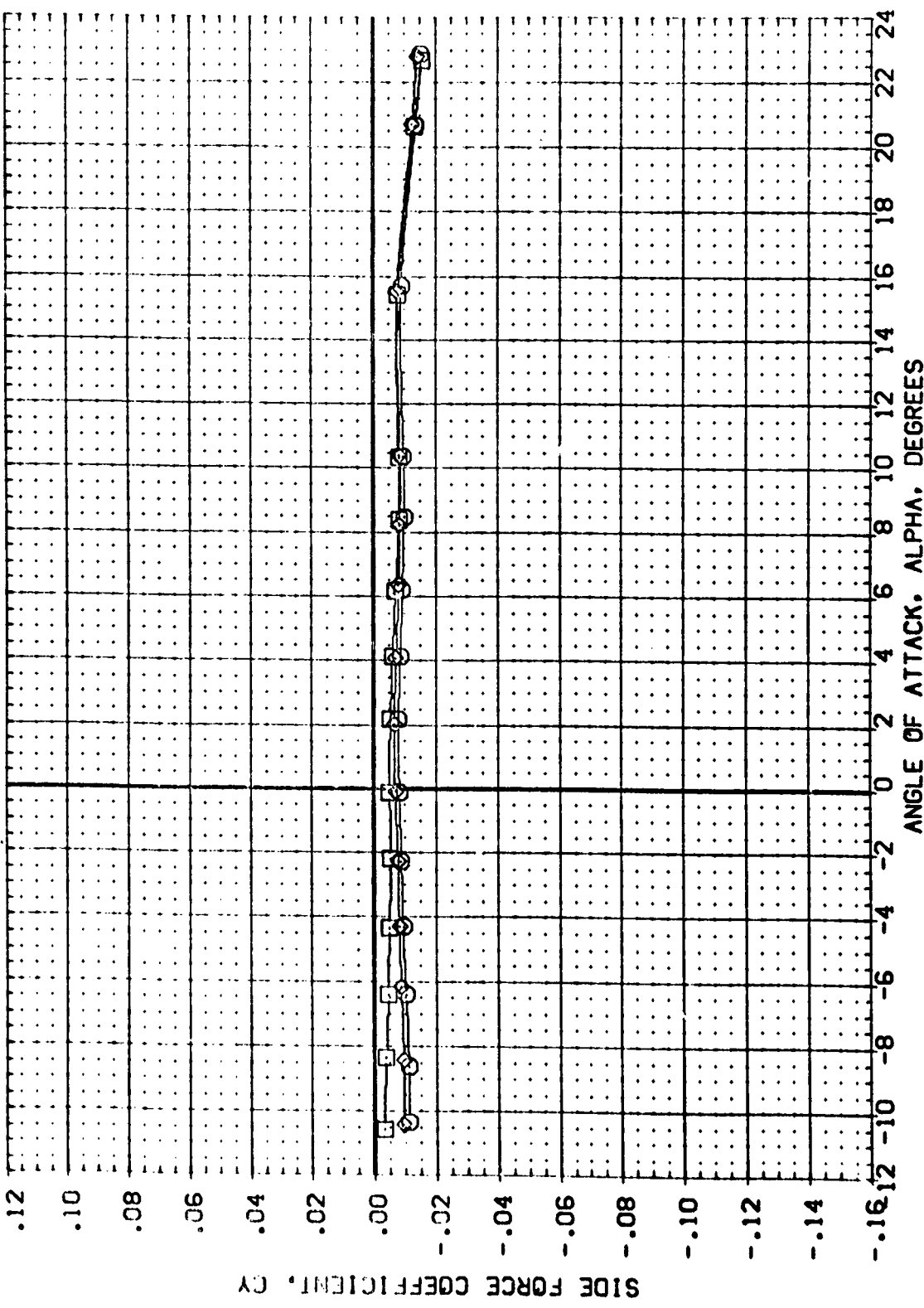


FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL: (R04021), (R04024), (R04013)  
 CONFIGURATION DESCRIPTION: IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2), IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2), IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T1)  
 AIRLON: .000, .000, .000  
 ELEVTR: .000, .000, .000  
 RUDDER: -20.000, .000, -20.000  
 SPOBRK: .000, .000, .000  
 REFERENCE INFORMATION: SREF 38.7350 SQ. IN., LREF 12.5000 IN., BREF 12.5000 IN., YMRP .0000 IN., ZMRP .0000 IN., ZMRP -3.3300 IN., SCALE .0100

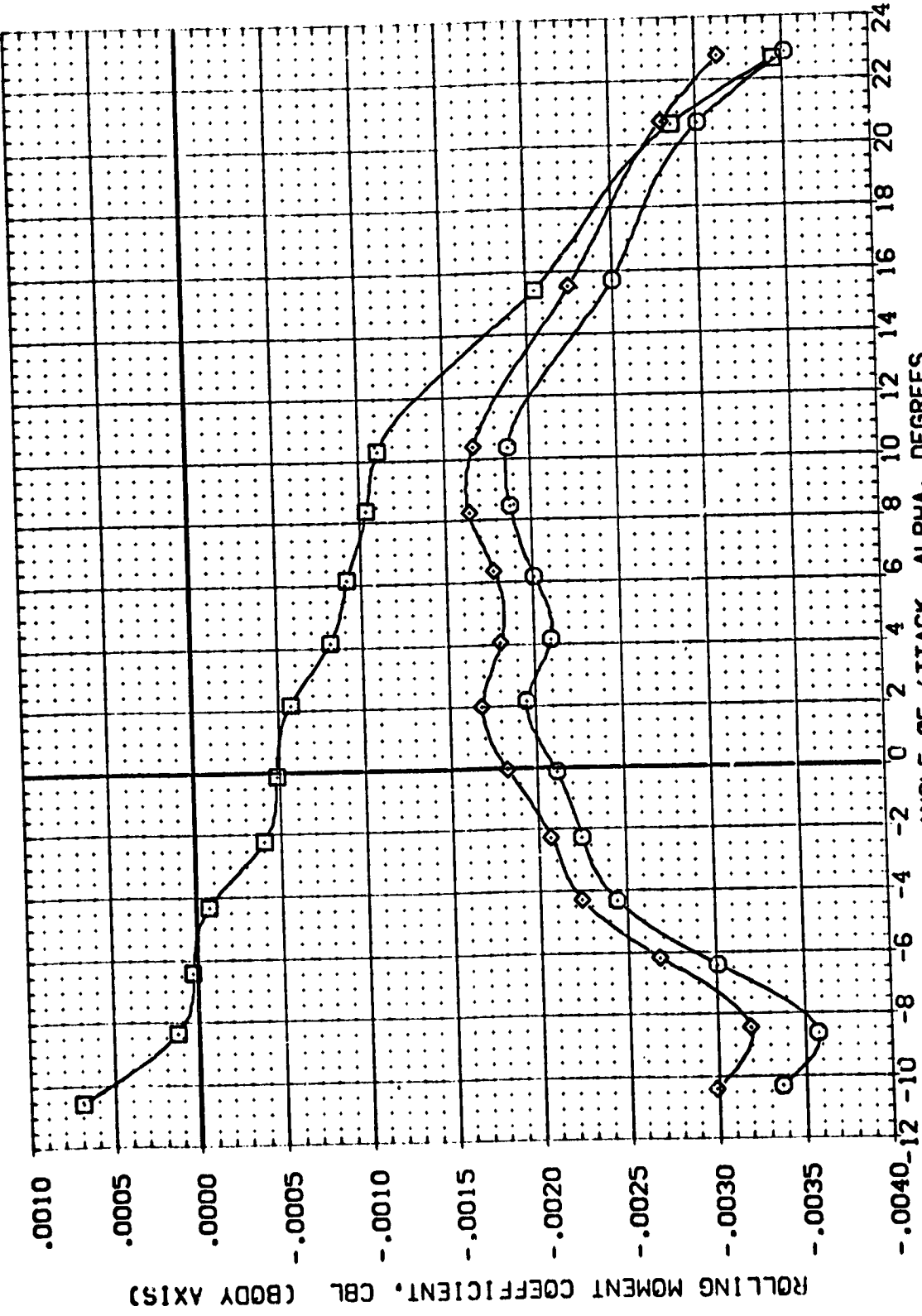


FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

REFERENCE INFORMATION  
 SREF 38.7260 SQ. IN.  
 LREF 12.5000 IN.  
 BREF 12.5000 IN.  
 XMRP .0000 IN.  
 YMRP .0000 IN.  
 ZMRP -3.3300 IN.  
 SCALE .0100

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

CONFIGURATION DESCRIPTION  
 1A-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)  
 1A-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)  
 1A-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T1)

DATA SET SYMBOL  
 (R0K021)  
 (R0K024)  
 (R0K013)

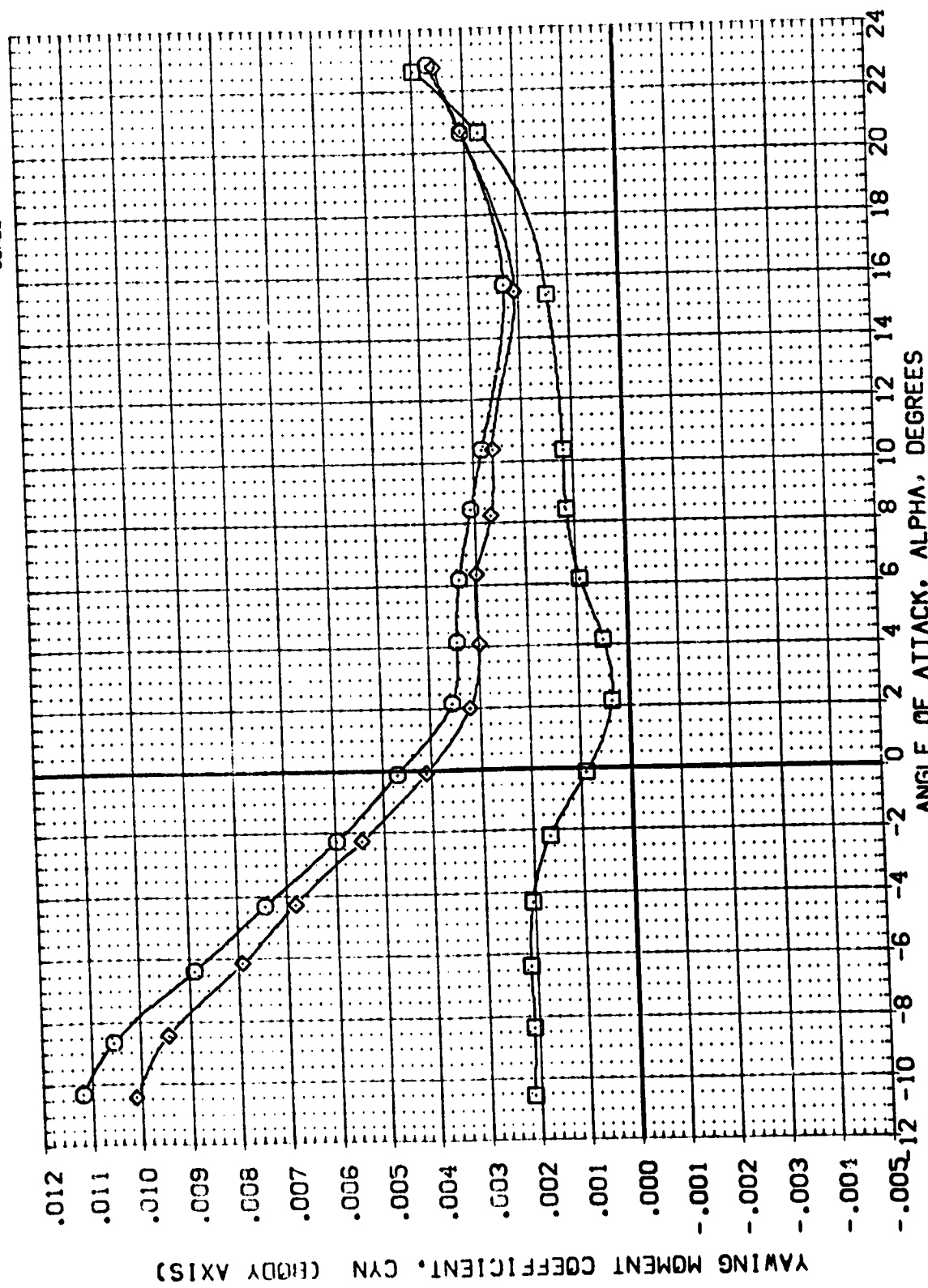


FIG 07 EFFECTS OF RUDDER DEFLECTION - PLUME OFF, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL: (R04005) (R04003)  
 CONFIGURATION DESCRIPTION: IA-58 CFMT-107 RI-1398 MODEL 32-0T (02 + T1) IA-58 CFMT-107 RI-1398 MODEL 32-0T (02 + T1)  
 REFERENCE INFORMATION: SQ. IN. 38.7360 IN. 12.5000 IN. 12.5000 IN. XMRP .0000 IN. YMRP .0000 IN. ZMRP -3.3300 IN. SCALE .0100



FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES  
 (A)MACH = 10.33

DATA SET SYMBOL (R04005) (R04003)

CONFIGURATION DESCRIPTION  
 1A-58 CFMT-107 RI-1358 MODEL 32-0T (02 + T1)  
 1A-58 CFMT-107 RI-1358 MODEL 32-0T (02 + T1)

AILTRON .000  
 ELEVTR .000  
 RUDDER -20.000  
 SPOBRK .000

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

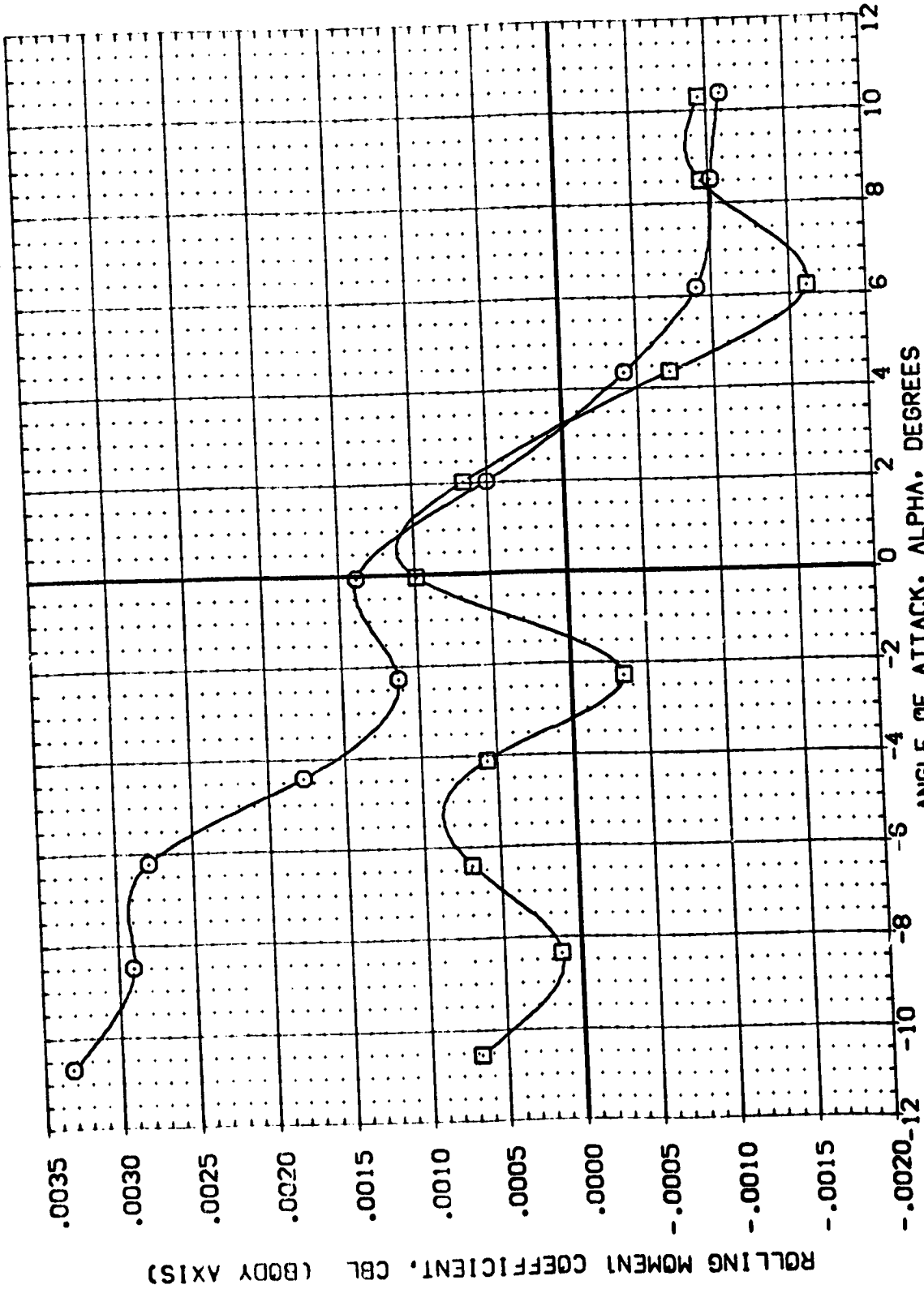


FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES  
 (A)MACH = 10.33

DATA SET SYMBOL (R04005)  
 (R04003)

CONFIGURATION DESCRIPTION  
 1A-58 CHT-107 RI-1358 MODEL 32-0T (02 + T1)  
 1A-58 CHT-107 RI-1358 MODEL 32-0T (02 + T1)

AILERON ELEVTR RUDDER SPOBRK  
 .000 .000 .000 .000  
 .000 -20.000 .000 .000

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

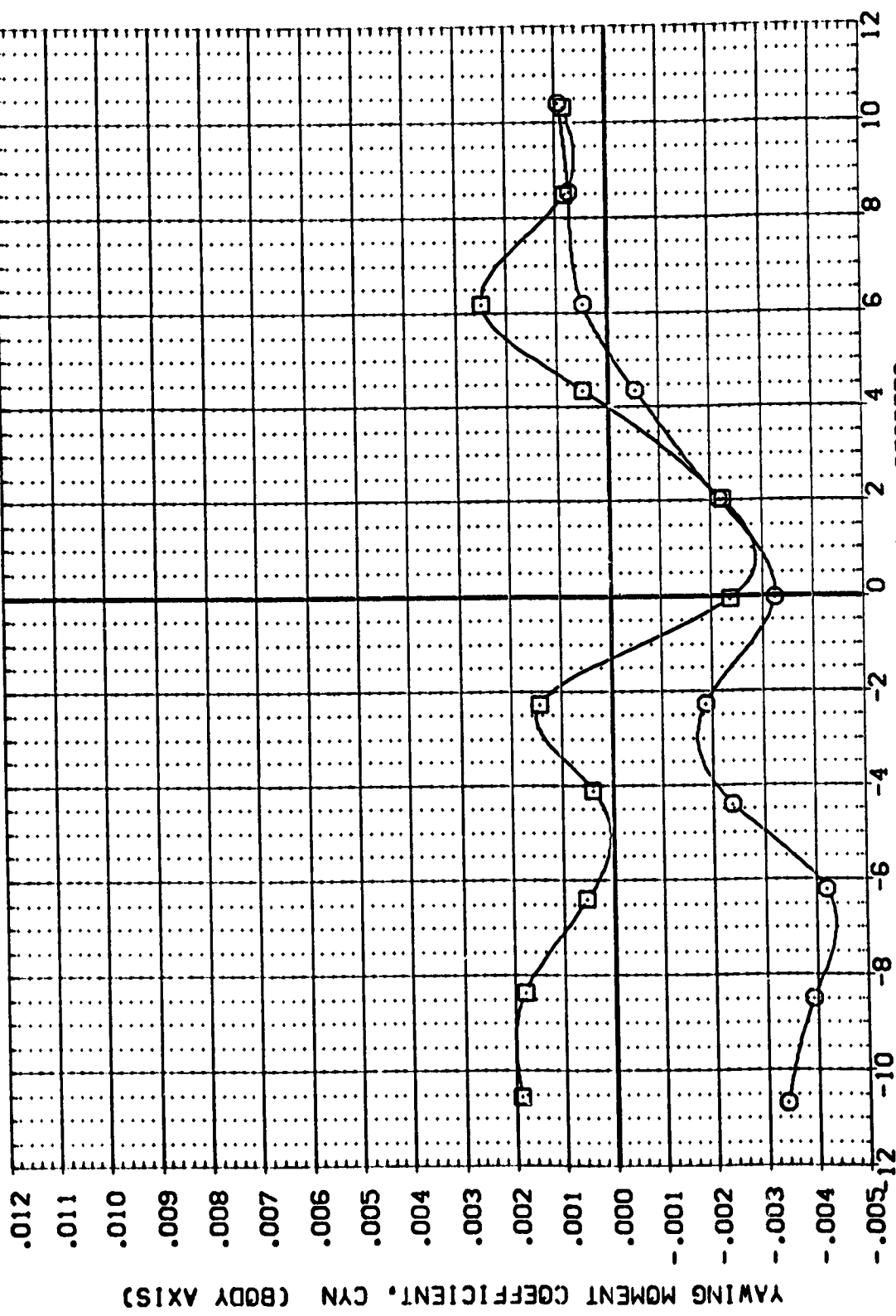


FIG 08 EFFECTS OF RUDDER DEFLECTION - PLUME ON, BETA = 0 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL: (R01021) (R01023)

CONFIGURATION DESCRIPTION: IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2) IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)

AILRON: .000  
ELEVTR: .000  
RUDDER: -20.000  
SPDRBK: .000

REFERENCE INFORMATION: SREF: 38.7360 SO, IN. LREF: 12.9000 IN. BREF: 12.9000 IN. XPRP: .0000 IN. YPRP: .0000 IN. ZPRP: -3.3300 IN. SCALE: .0100

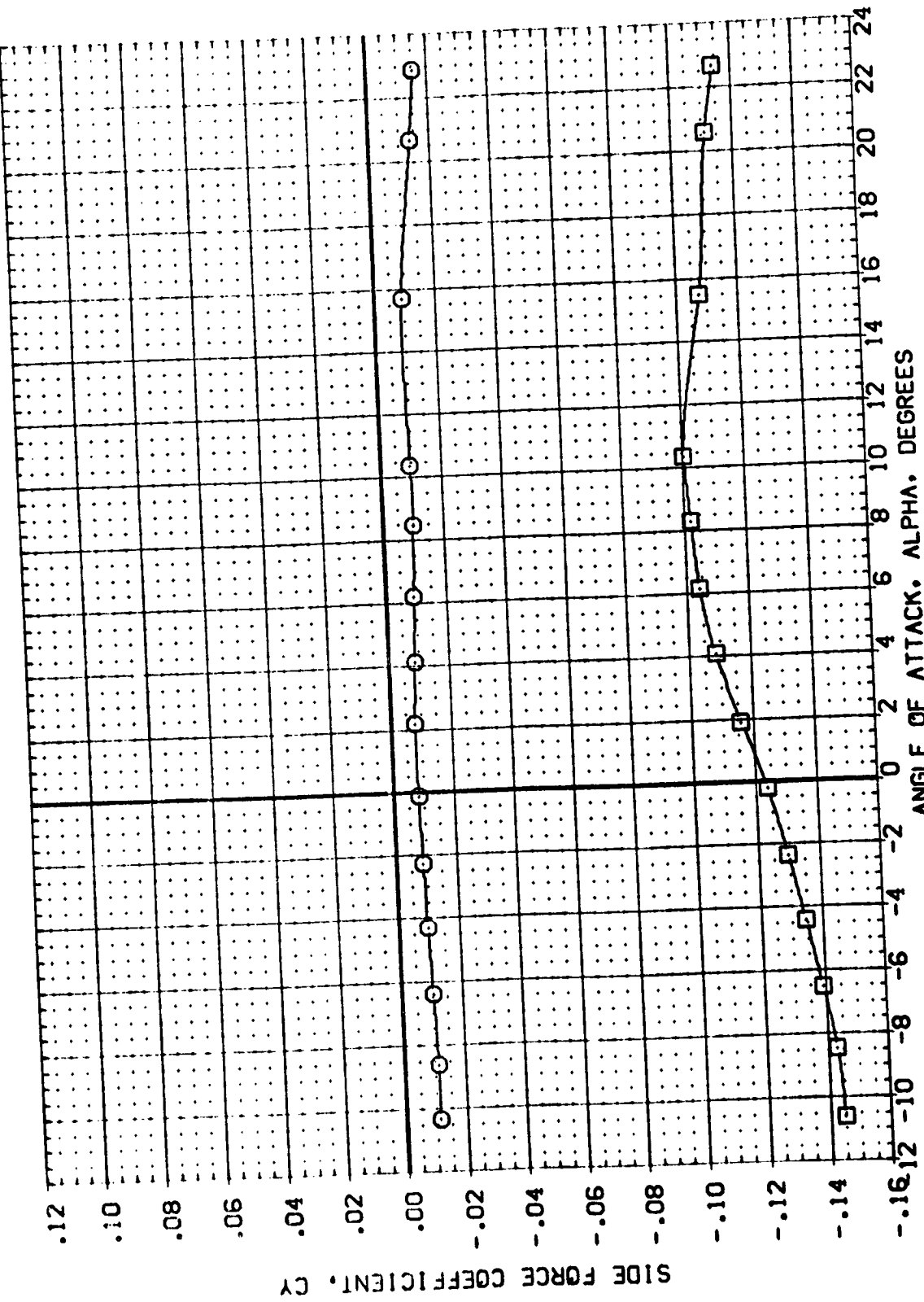


FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

DATA SET SYMBOL: (R01021) (R01023)

CONFIGURATION DESCRIPTION: 1A-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)  
 1A-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2)

AILRON: .000  
 ELEVTR: .000  
 RUDDER: -20.000  
 SPOBRK: .000

REFERENCE INFORMATION: SREF: 38.7360 SD, IN.  
 LREF: 12.9000 IN.  
 EREF: 12.9000 IN.  
 YPRP: .0000 IN.  
 ZPRP: -3.3300 IN.  
 SCALE: .0100

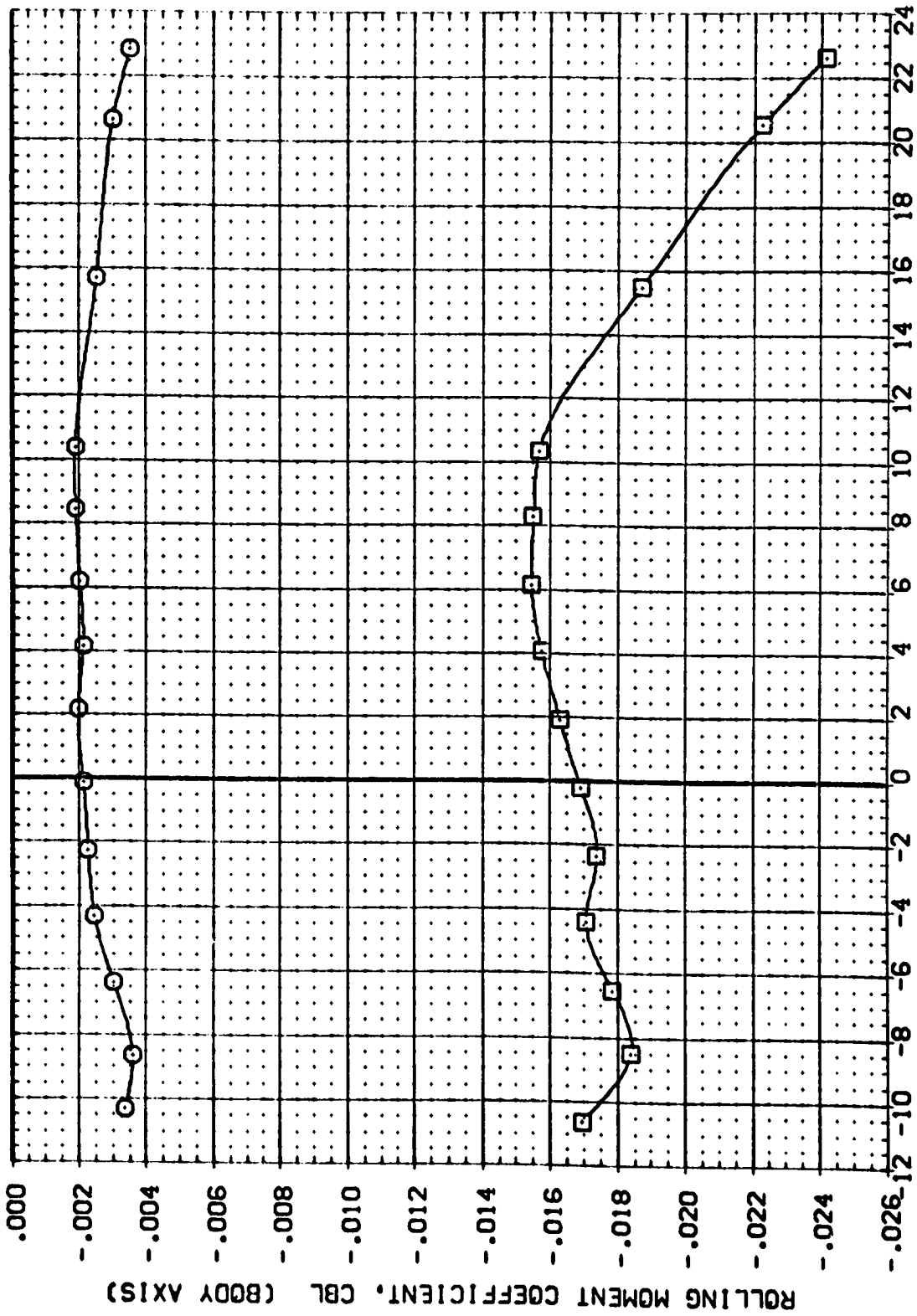


FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

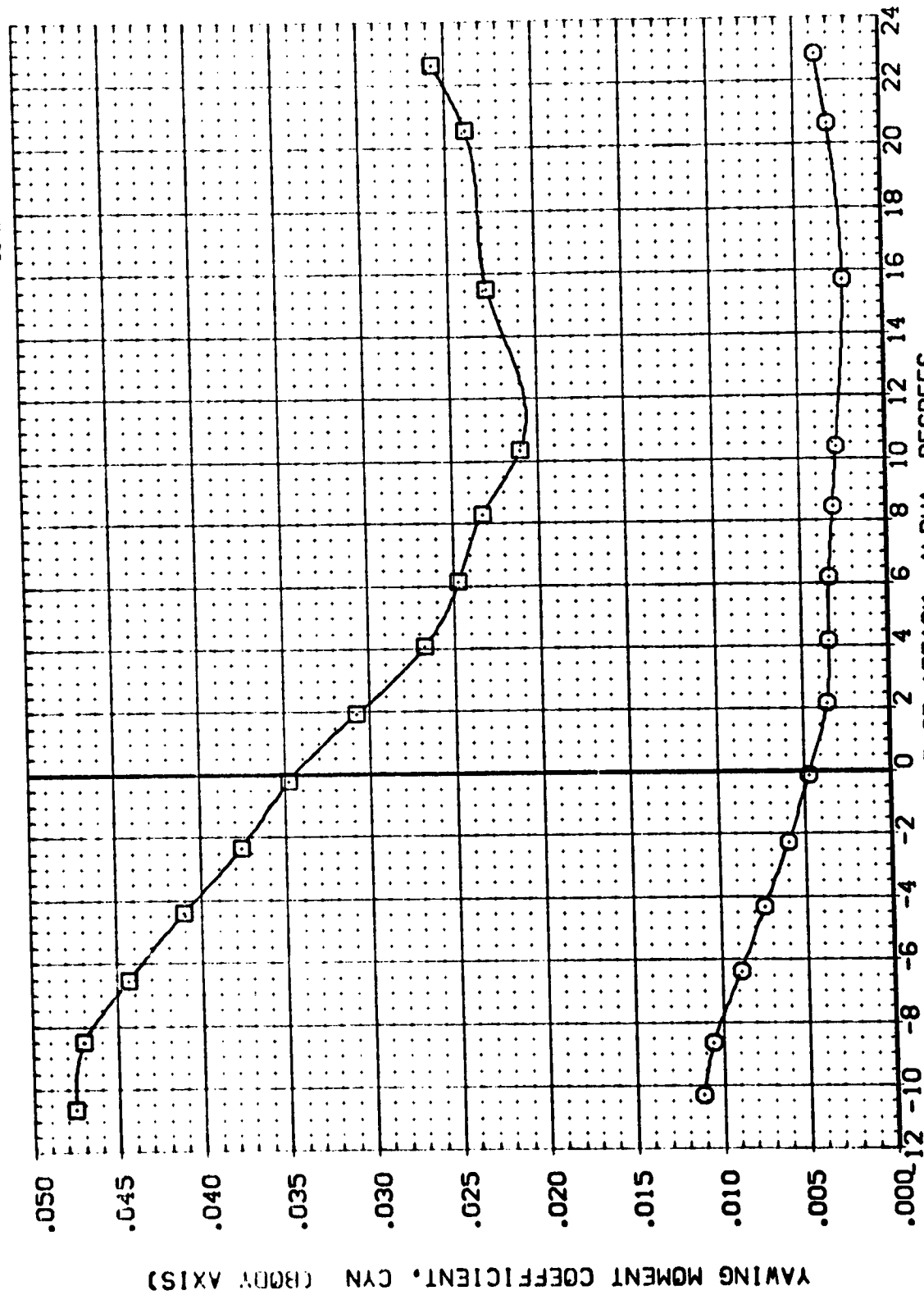


DATA SET SYMBOL (R04021) (R04023)

CONFIGURATION DESCRIPTION  
 1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)  
 1A-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T2)

AILRON ELEVTR RUDDER SPDWRK  
 .000 .000 .000 .000  
 .000 .000 .000 .000

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



ANGLE OF ATTACK, ALPHA, DEGREES

FIG 09 EFFECTS OF RUDDER DEFLECTION - BETA = 5 DEGREES

(A)MACH = 10.33

|                 |  |        |        |         |        |                       |
|-----------------|--|--------|--------|---------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILRON | ELEVTR | RUDDER  | SPODRK | REFERENCE INFORMATION |
| (RD006)         | IA-58 CFMT-107 RI-1398 MODEL 32-01 (02 + T1) | .000   | .000   | -20.000 | .000   | SREF 38.7360 SQ.IN.   |
| (RD004)         | IA-58 CFMT-107 RI-1398 MODEL 32-01 (02 + T1) | .000   | .000   | -20.000 | .000   | LREF 12.9000 IN.      |
| (RD014)         | IA-58 CFMT-107 RI-1398 MODEL 32-01 (01 + T1) | .000   | .000   | -20.000 | .000   | BREF 12.9000 IN.      |
|                 |  |        |        |         |        | XMRP .0000 IN.        |
|                 |  |        |        |         |        | YMRP .0000 IN.        |
|                 |  |        |        |         |        | ZMRP -3.3300 IN.      |
|                 |  |        |        |         |        | SCALE .0100           |

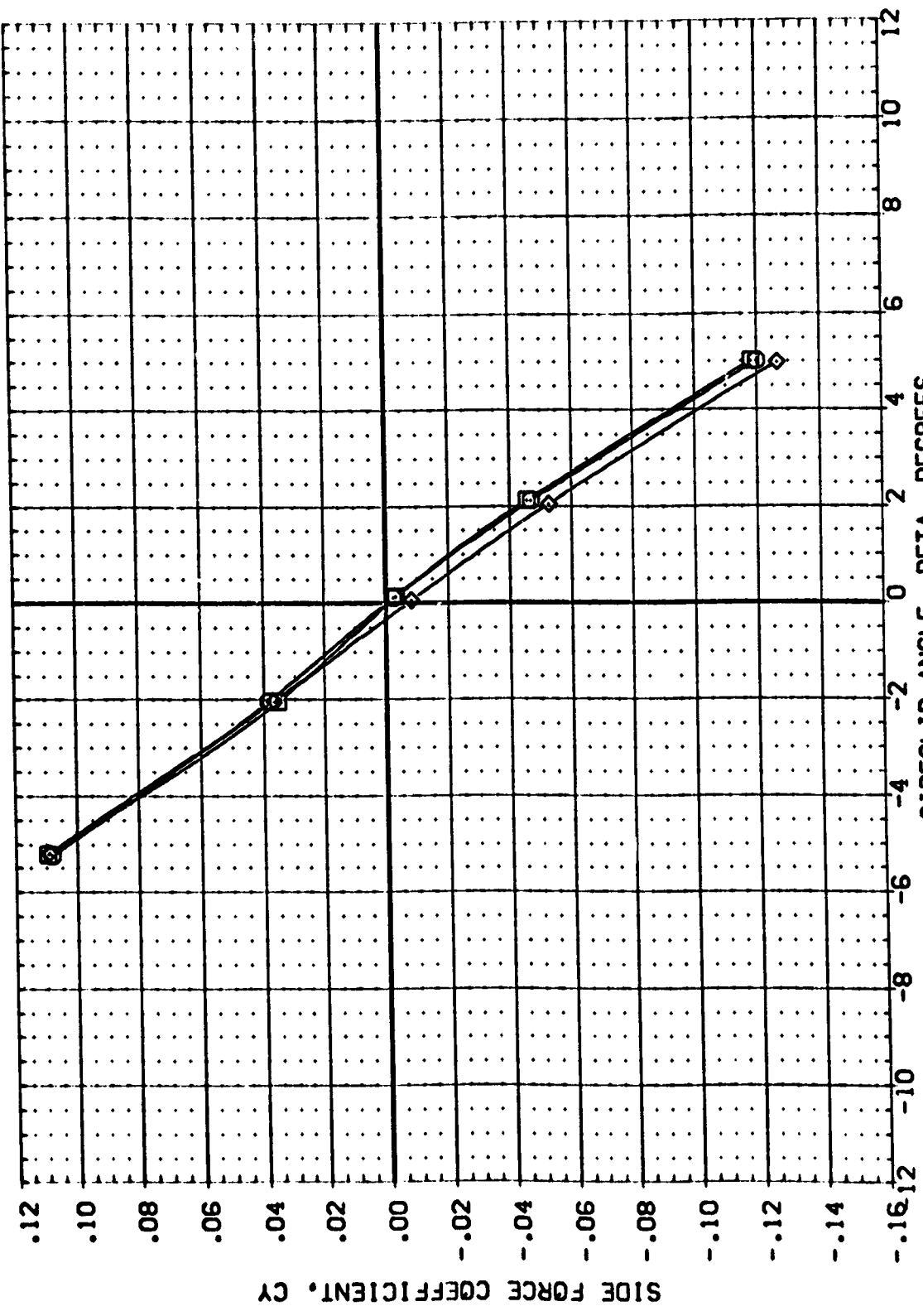


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A) MACH = 10.33

|                 |                           |                       |         |        |         |        |                       |
|-----------------|---------------------------|-----------------------|---------|--------|---------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION | MODEL 32-0T (02 + 11) | AILERON | ELEVTR | RUDDER  | SPODRK | REFERENCE INFORMATION |
| (R0K006)        | IA-58 CFMT-107 R1-1398    | MODEL 32-0T (02 + 11) | .000    | .000   | -20.000 | .000   | SREF 38.7360 50.1IN.  |
| (R0K004)        | IA-58 CFMT-107 R1-1398    | MODEL 32-0T (02 + 11) | .000    | .000   | .000    | .000   | LREF 12.5000 IN.      |
| (R0K014)        | IA-58 CFMT-107 R1-1398    | MODEL 32-0T (01 + 11) | .000    | .000   | -20.000 | .000   | BREF 12.5000 IN.      |
|                 |                           |                       |         |        |         |        | XMRP .0000 IN.        |
|                 |                           |                       |         |        |         |        | YMRP .0000 IN.        |
|                 |                           |                       |         |        |         |        | ZMRP -3.3300 IN.      |
|                 |                           |                       |         |        |         |        | SCALE .0100           |

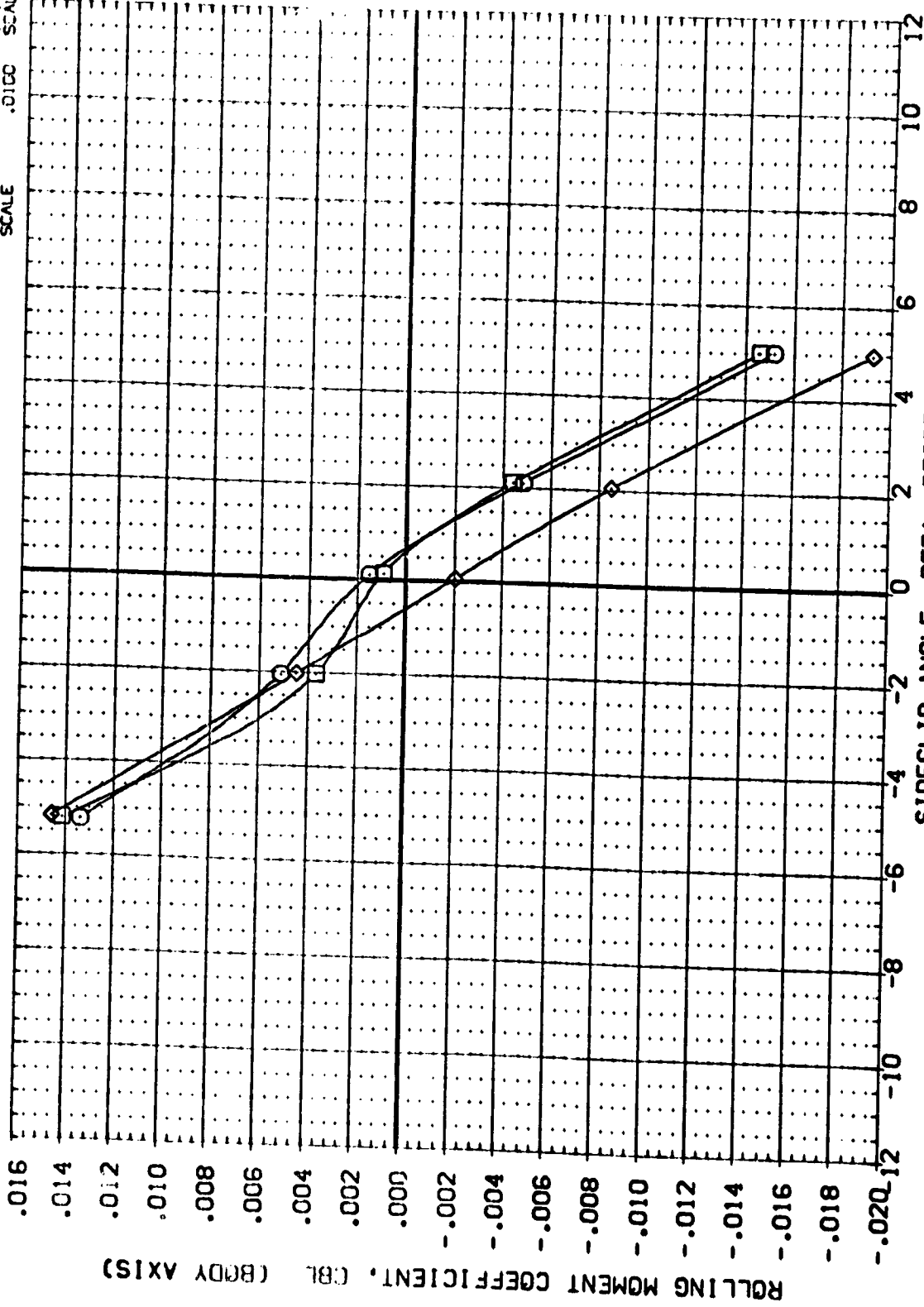


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A)MACH = 10.33

|                 |  |         |        |         |        |                       |
|-----------------|--|---------|--------|---------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILTRON | ELEVTR | RUDDER  | SPOBRK | REFERENCE INFORMATION |
| (R0K006)        | IA-S8 CFMT-107 RI-1398 MODEL 32-0T (02 + T1) | .000    | .000   | -20.000 | .000   | SREF 38.7360 SD,IN.   |
| (R0K004)        | IA-S8 CFMT-107 RI-1398 MODEL 32-0T (02 + T1) | .000    | .000   | .000    | .000   | LREF 12.9000 IN.      |
| (R0K014)        | IA-S8 CFMT-107 RI-1398 MODEL 32-0T (01 + T1) | .000    | .000   | -20.000 | .000   | BREF 12.9000 IN.      |
|                 |  |         |        |         |        | YPRP .0000 IN.        |
|                 |  |         |        |         |        | ZPRP -3.3300 IN.      |
|                 |  |         |        |         |        | SCALE .0100 SCALE     |

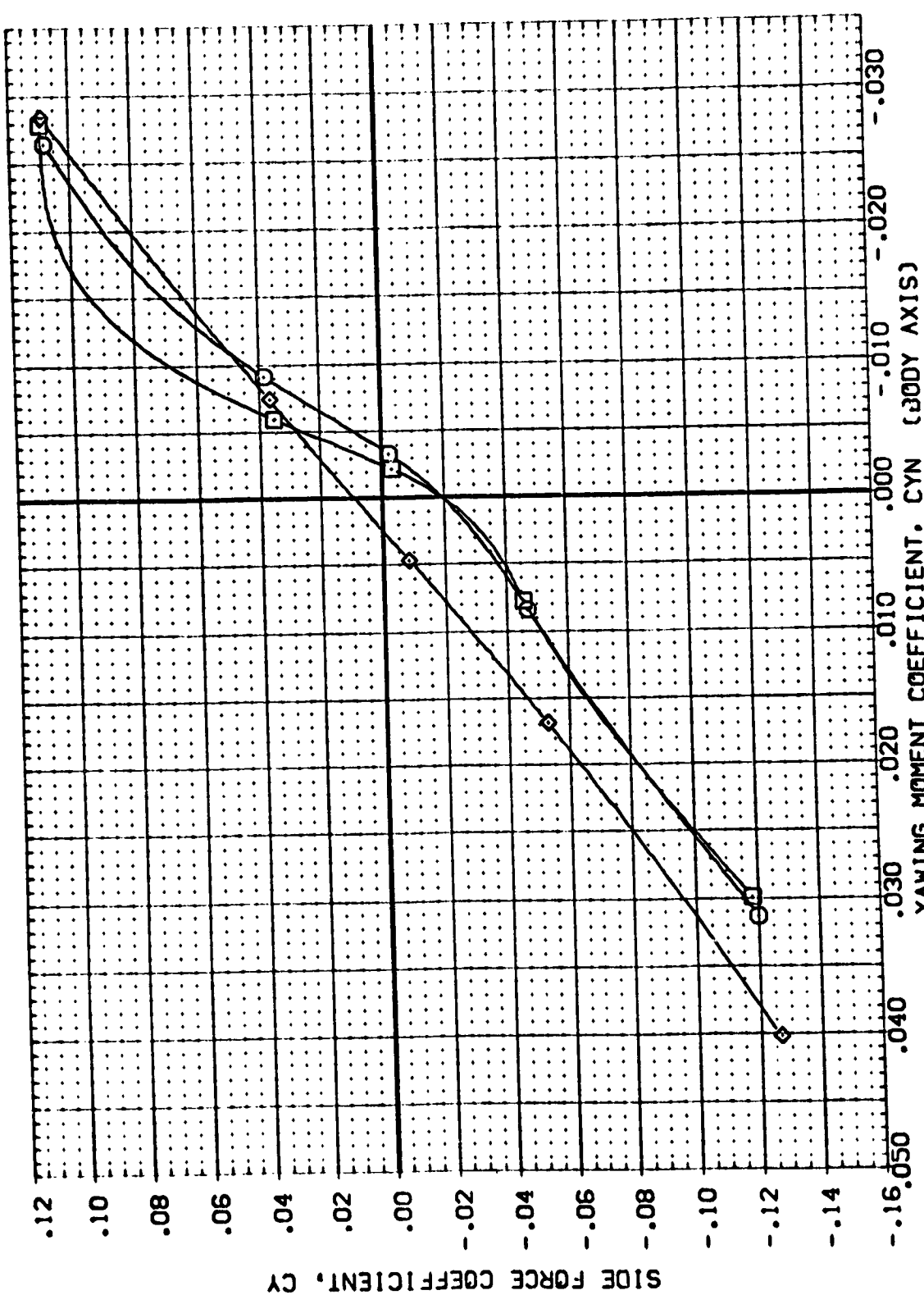


FIG 10 EFFECTS OF RUDDER DEFLECTION - BETA SWEEP

(A) MACH = 10.33

DATA SET SYMBOL:  $\square$  CONFIGURATION DESCRIPTION: IA-58 CFMT-107 RI-1388 MODEL 32-0T (01 + 12)  
 (ADVIS) IA-58 CFMT-107 RI-1388 MODEL 32-0T (01 + 11)  
 (RWD:5)

AIRLON: 10.000  
 ELEVTR: .000  
 RUDDER: .000  
 SPOBRK: .000

REFERENCE INFORMATION:  
 SREF: 28.7360 SQ. IN.  
 LREF: 12.9000 IN.  
 BREF: 12.9000 IN.  
 XMRP: .0000 IN.  
 YMRP: .0000 IN.  
 ZMRP: -3.3300 IN.  
 SCALE: .0100

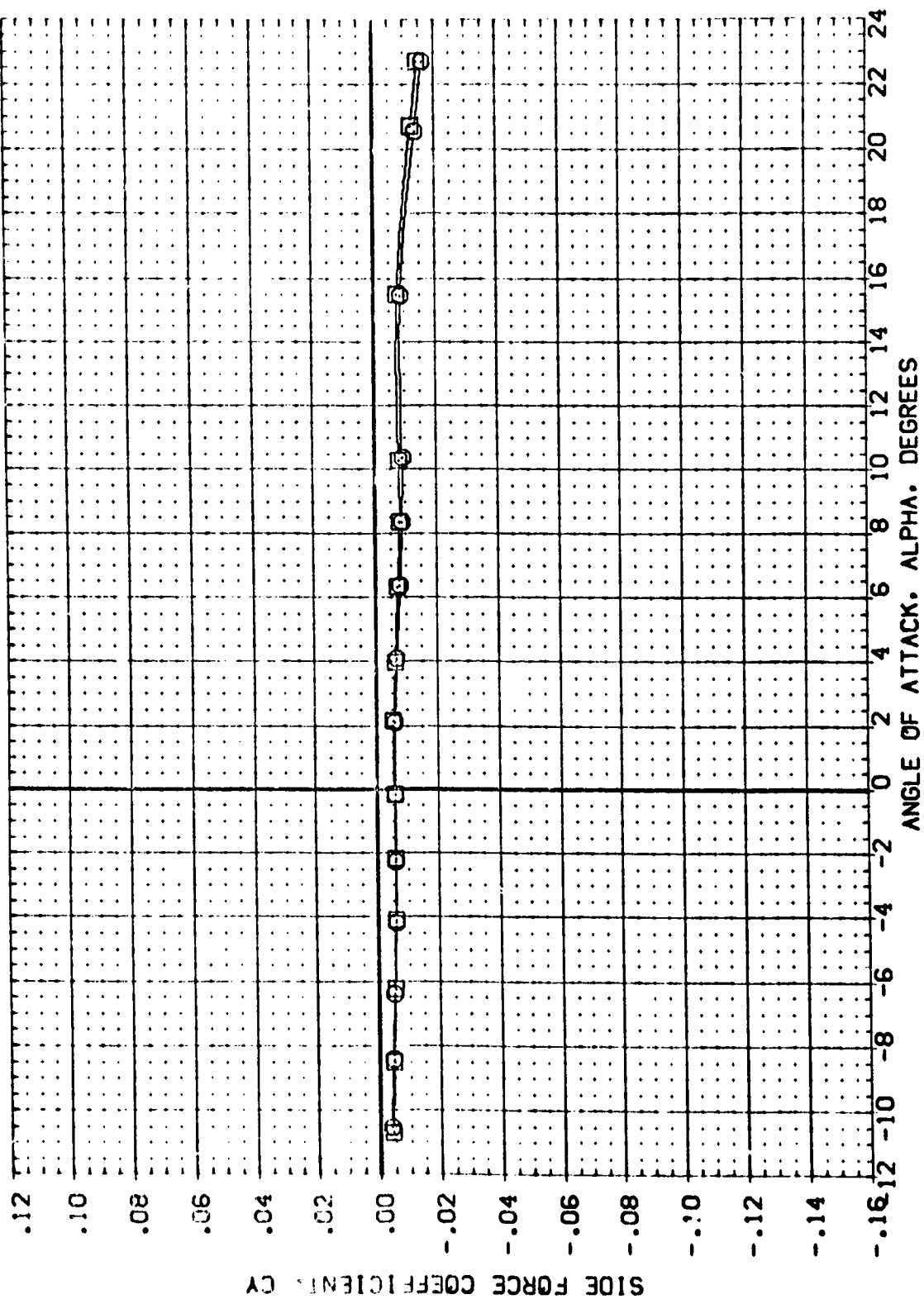


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

|                  |  |                       |
|------------------|--|-----------------------|
| DATA SET SYM BOL | CONFIGURATION DESCRIPTION                    | REFERENCE INFORMATION |
| (AD009)          | IA-58 CFMT-107 RI-1388 MODEL 32-0T (01 + T2) | SREF 38.7360 50. IN.  |
| (R00015)         | IA-58 CFMT-107 RI-1388 MODEL 32-0T (01 + T1) | LREF 12.9000 IN.      |
|                  |  | BREF 12.9000 IN.      |
|                  |  | XMPP .0000 IN.        |
|                  |  | YMPP .0000 IN.        |
|                  |  | ZMPP -3.3300 IN.      |
|                  |  | SCALE .0100           |

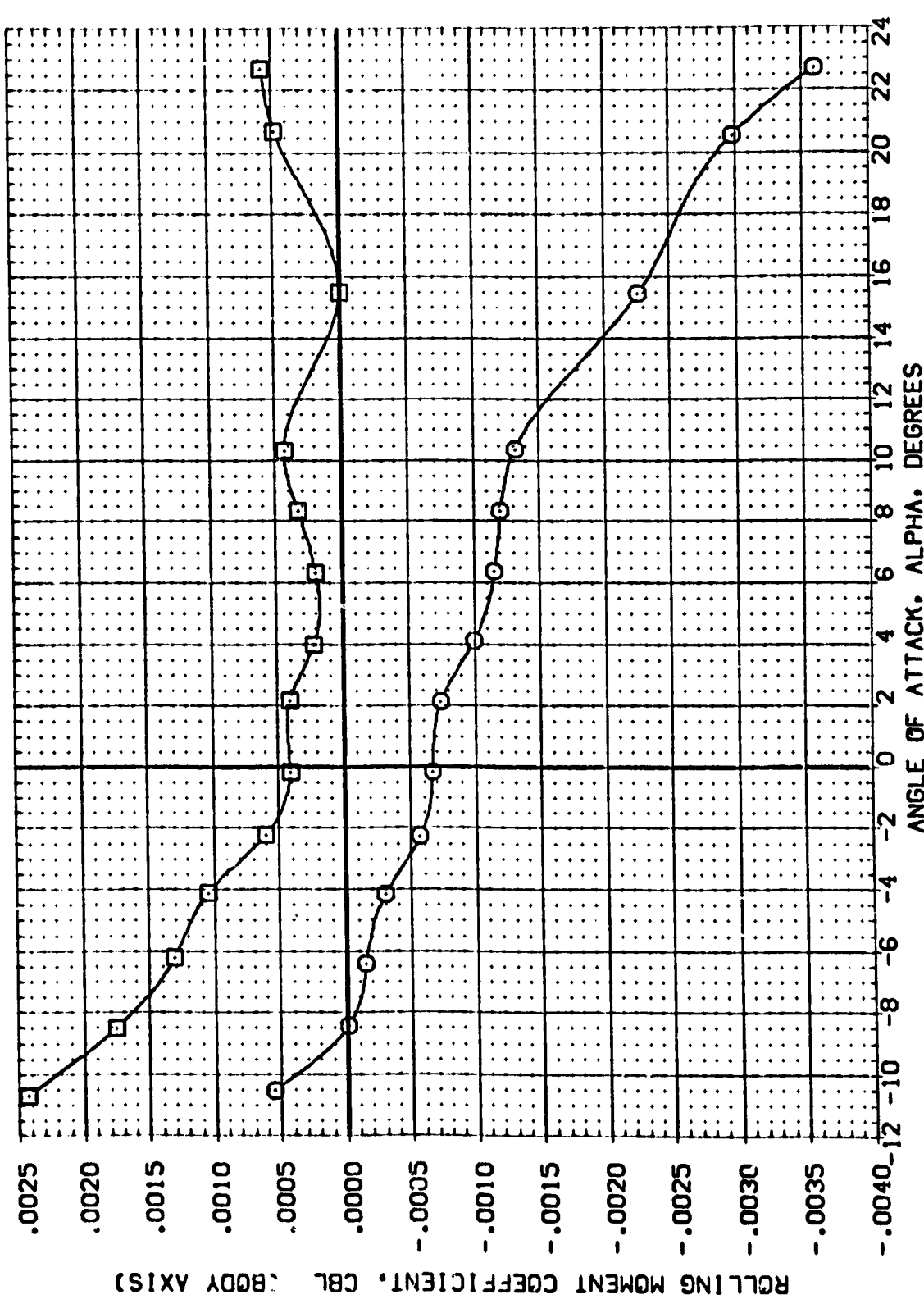


FIG-11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

**DATA SET SYMBOL** (ADK009) (R0K015) **CONFIGURATION DESCRIPTION** IA-58 CFHT-107 RI-1358 MODEL 32-0T (01 + T2) IA-58 CFHT-107 RI-1358 MODEL 32-0T (01 + T1)  
**AILERON** .000 10.000 **ELEVTR** .000 .000 **RUDDER** .000 .000 **SPODBRK** .000 .000  
**REFERENCE INFORMATION** SREF 38.7360 SO.IN. 12.9000 IN. BREF 12.9000 IN. XMRP .0000 IN. YMRP .0000 IN. ZMRP -3.3300 IN. SCALE .0100

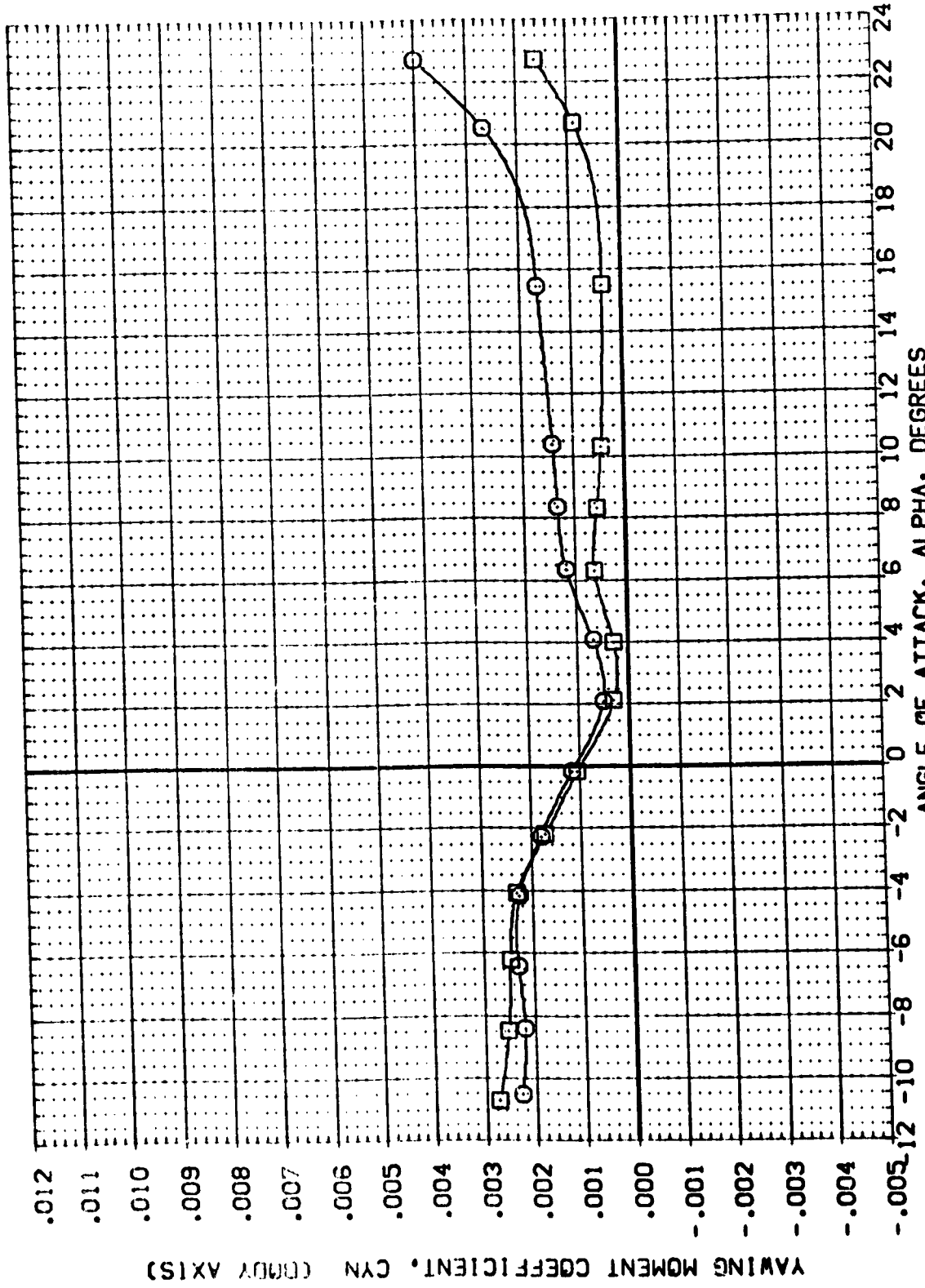


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

DATA SET SYMBOL: □  
 (ADP009)  
 (RD4015)

CONFIGURATION DESCRIPTION  
 IA-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2)  
 IA-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T1)

AIRLON: .000  
 10.000

ELEVTR: .000  
 .000

RUDDER: .000  
 .000

SPODBK: .000  
 .000

REFERENCE INFORMATION  
 SREF: 38.7360 50. IN.  
 LREF: 12.9000 IN.  
 BREF: 12.9000 IN.  
 XMRP: .0000 IN.  
 YMRP: .0000 IN.  
 ZMRP: -3.3300 IN.  
 SCALE: .0100 SCALE

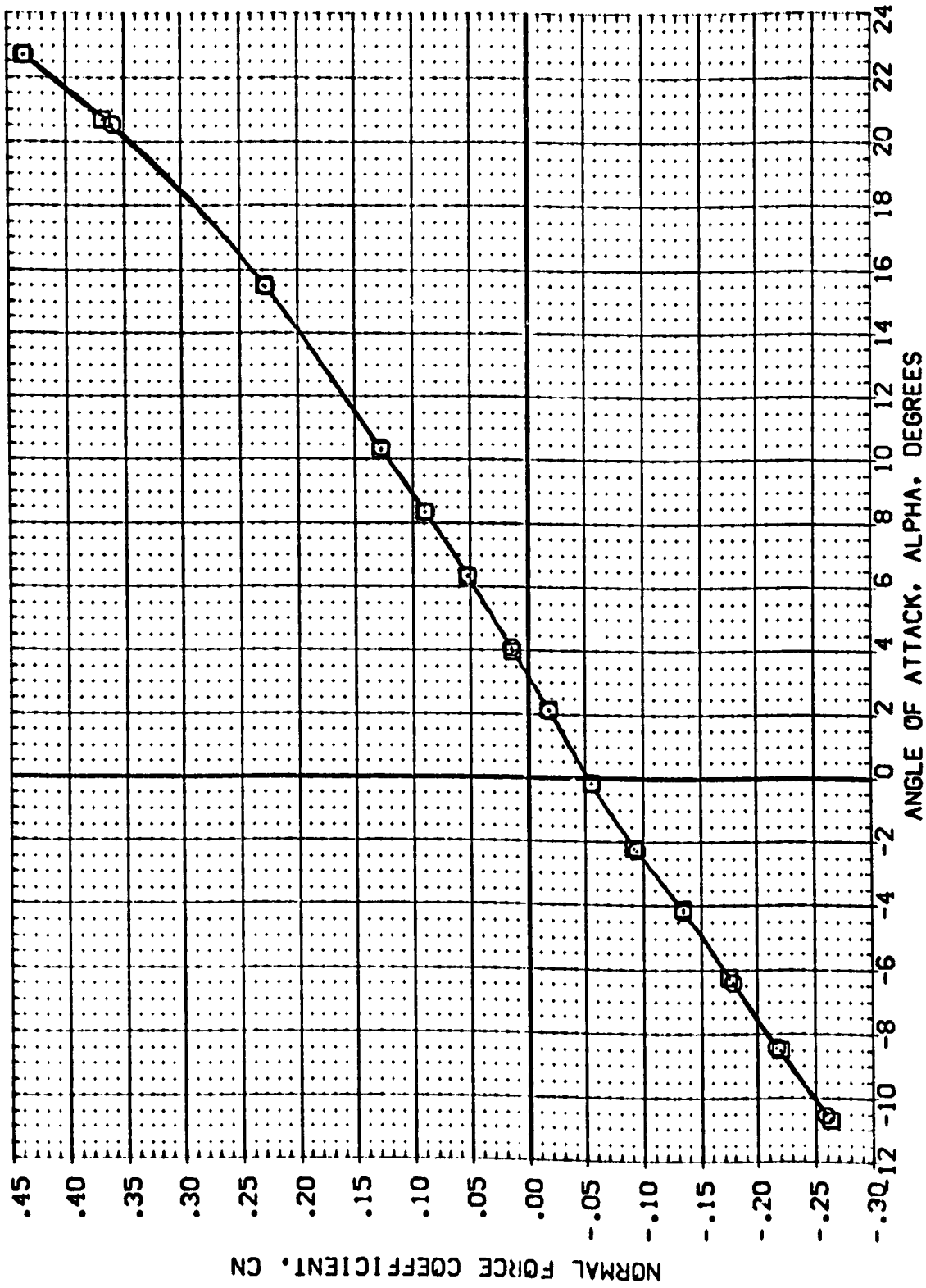


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33



DATA SET SYMBOL: (ADK009) (R0K015)   
 CONFIGURATION DESCRIPTION: 1A-58 CFMT-107 R1-1358 MODEL 32-0T (01 + T2)   
 1A-58 CFMT-107 R1-1358 MODEL 32-0T (01 + T1)   
 REFERENCE INFORMATION: SREF 38.7360 SQ. IN.   
 LREF 12.5000 IN.   
 BREF 12.5000 IN.   
 YMRP .0000 IN.   
 ZMRP -3.3300 IN.   
 SCALE .0100

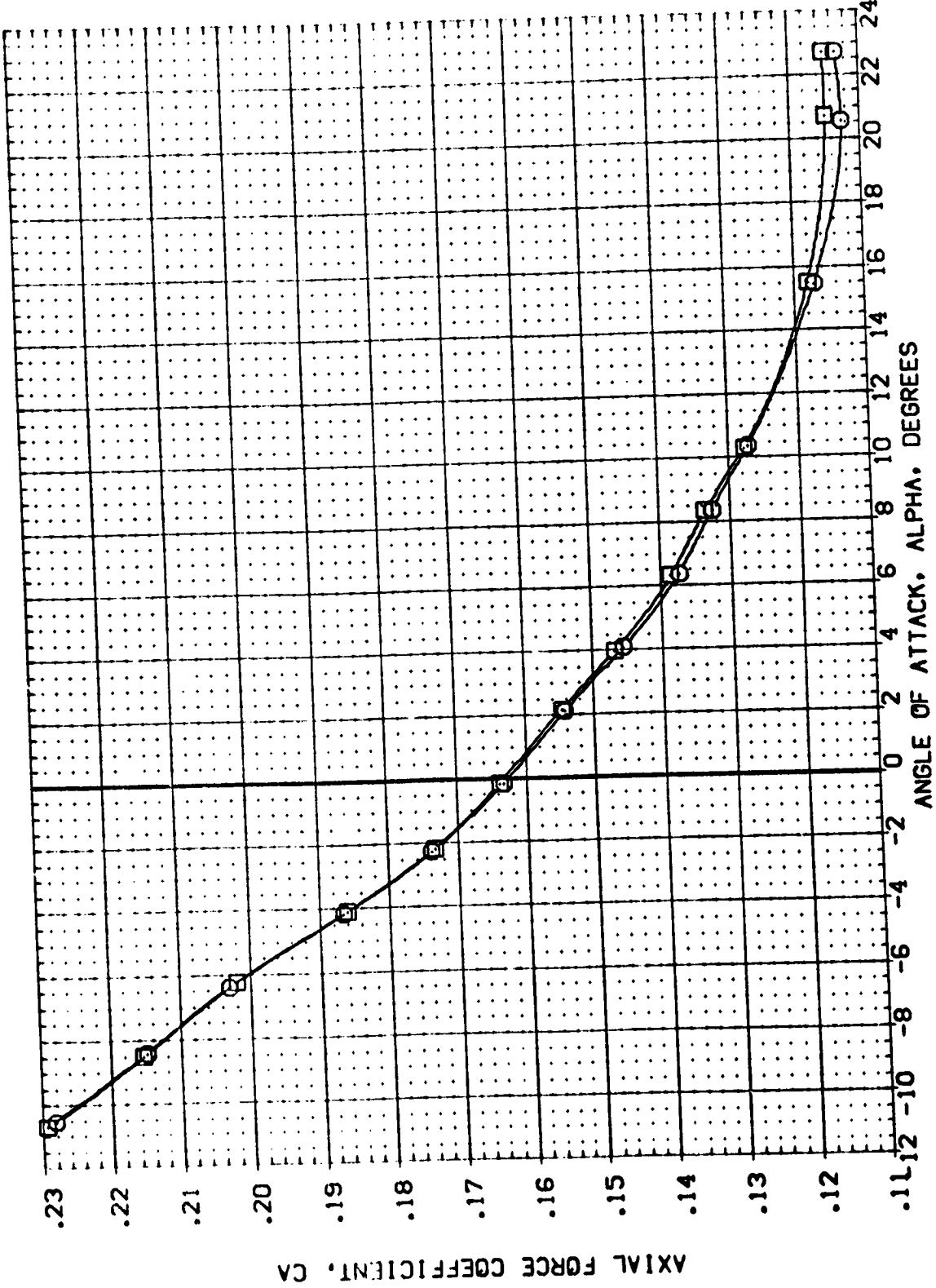


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

REFERENCE INFORMATION

|       |         |         |
|-------|---------|---------|
| SREF  | 38.7360 | SO, IN. |
| LREF  | 12.5000 | IN.     |
| BREF  | 12.5000 | IN.     |
| XPRP  | .0000   | IN.     |
| YPRP  | .0000   | IN.     |
| ZPRP  | -3.3300 | IN.     |
| SCALE | .0100   | SCALE   |

|        |        |       |        |
|--------|--------|-------|--------|
| AILRON | ELEVTR | RUDDR | SPDRBK |
| .000   | .000   | .000  | .000   |
| 10.000 | .000   | .000  | .000   |

DATA SET SYMBOL. CONFIGURATION DESCRIPTION

|          |                        |                       |
|----------|------------------------|-----------------------|
| (ADK009) | 1A-58 CFMT-107 R1-1398 | MODEL 32-0T (0) + T2) |
| (R0K015) | 1A-58 CFMT-107 R1-1398 | MODEL 32-0T (0) + T1) |

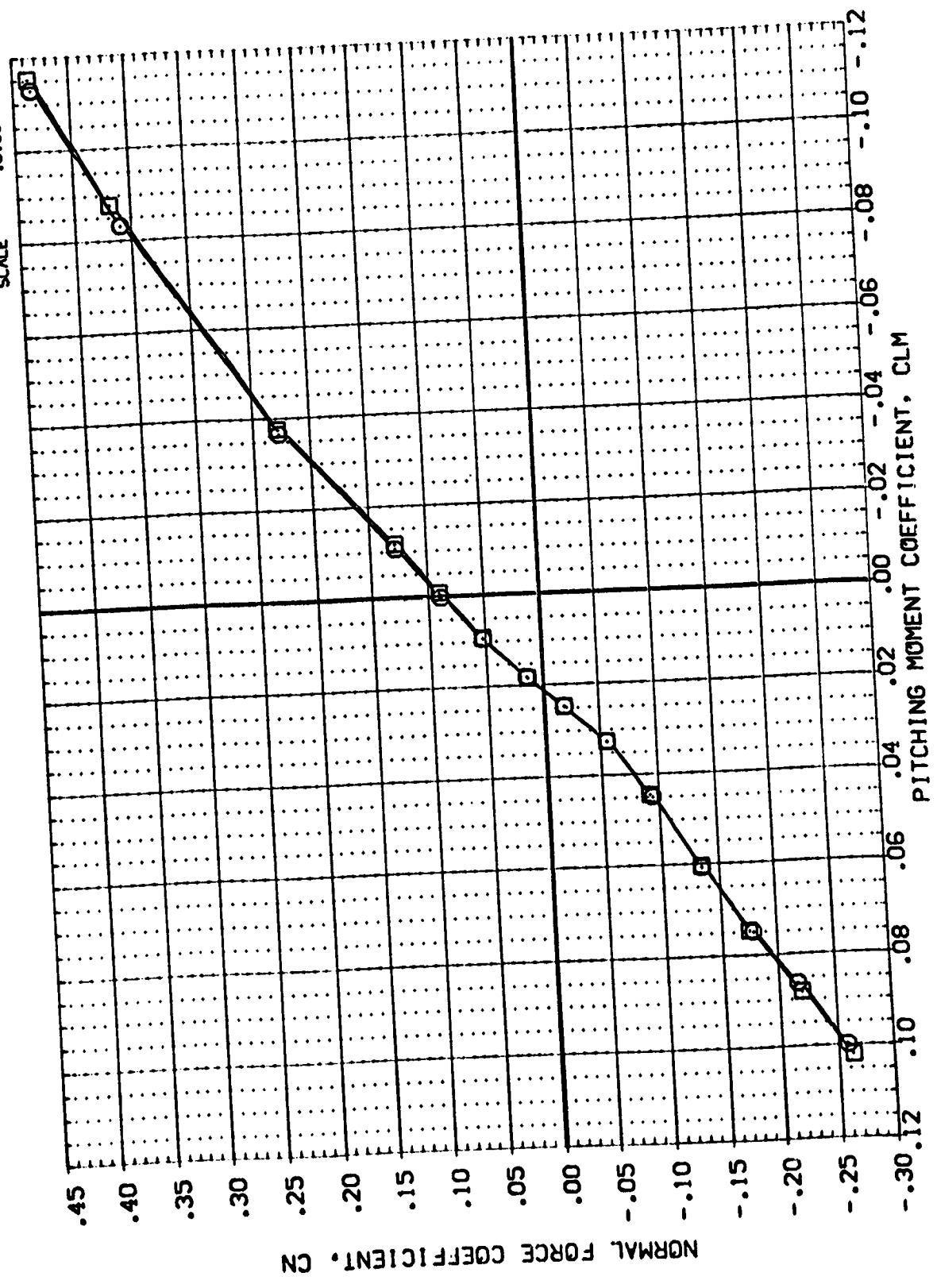


FIG 11 EFFECTS OF AILERON DEFLECTION

(A)MACH = 10.33

|                 |                           |                       |                 |         |        |        |        |                       |
|-----------------|---------------------------|-----------------------|-----------------|---------|--------|--------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION | MODEL                 | 32-0T (01 + T1) | AILERON | ELEVTR | RUDDER | SPDRBK | REFERENCE INFORMATION |
| (ADP016)        | 1A-58 CFMT-107 R1-1398    | MODEL 32-0T (01 + T1) | .000            | -40.000 | .000   | .000   | .000   | SREF 38.7360 50.1N.   |
| (ADP017)        | 1A-58 CFMT-107 R1-1398    | MODEL 32-0T (01 + T1) | .000            | -29.000 | .000   | .000   | .000   | LREF 12.9000 IN.      |
| (ADP018)        | 1A-58 CFMT-107 R1-1398    | MODEL 32-0T (01 + T1) | .000            | 15.000  | .000   | .000   | .000   | BREF 12.9000 IN.      |
|                 |                           |                       |                 |         |        |        |        | YPRP .0000 IN.        |
|                 |                           |                       |                 |         |        |        |        | ZPRP -3.3300 IN.      |
|                 |                           |                       |                 |         |        |        |        | SCALE .0100 SCALE     |

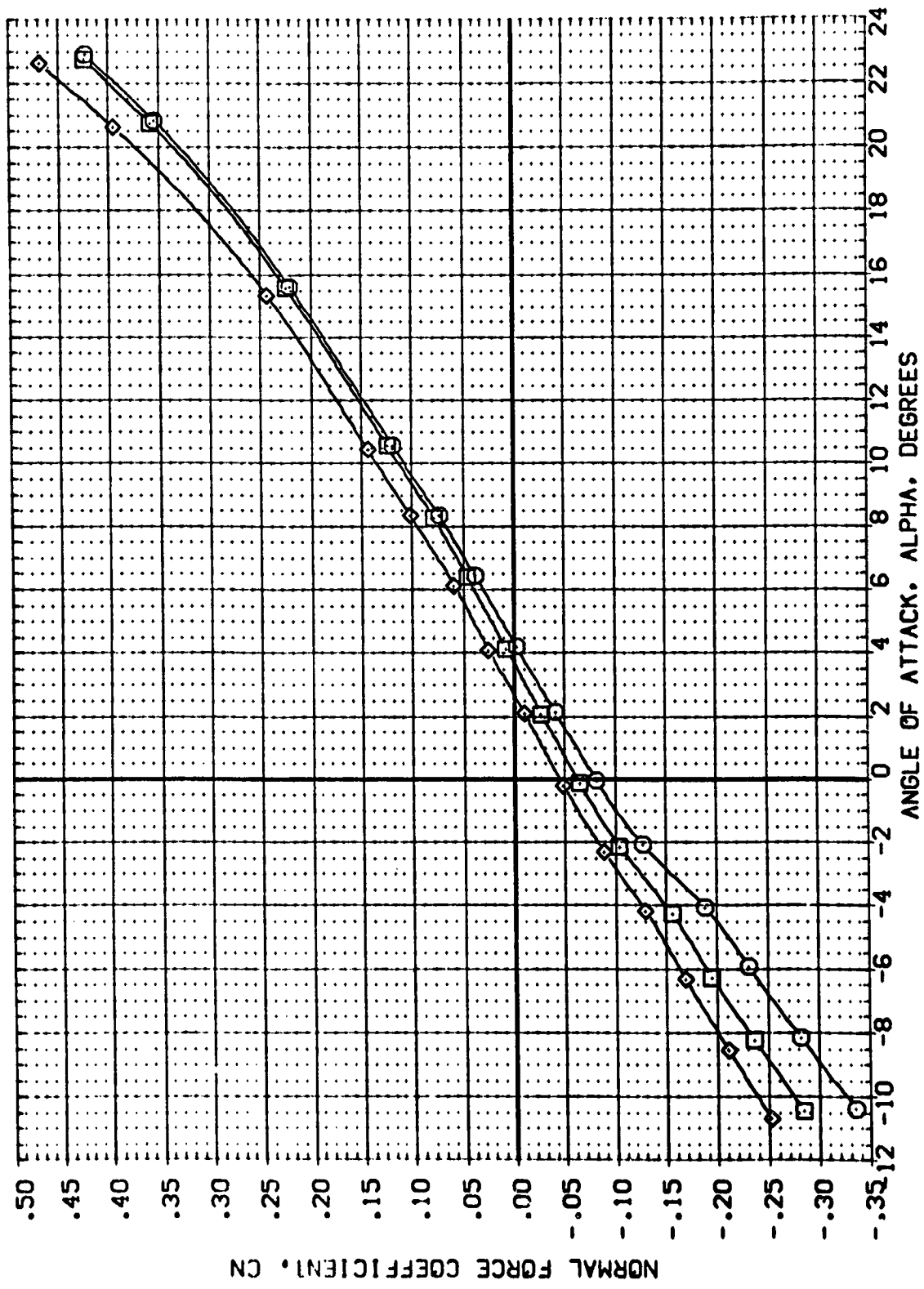


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

REFERENCE INFORMATION  
 SREF 38.7360 SQ. IN.  
 LREF 12.9000 IN.  
 BREF 12.9000 IN.  
 XPRP .0000 IN.  
 YPRP .0000 IN.  
 ZPRP -3.3300 IN.  
 SCALE .0100

AILRON ELEVTR RUDDER SPOBRK  
 .000 -40.000 .000 .000  
 .000 -20.000 .000 .000  
 .000 15.000 .000 .000

DATA SET SYMBOL CONFIGURATION DESCRIPTION  
 (A0016) IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T1)  
 (A0017) IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T1)  
 (A0018) IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T1)

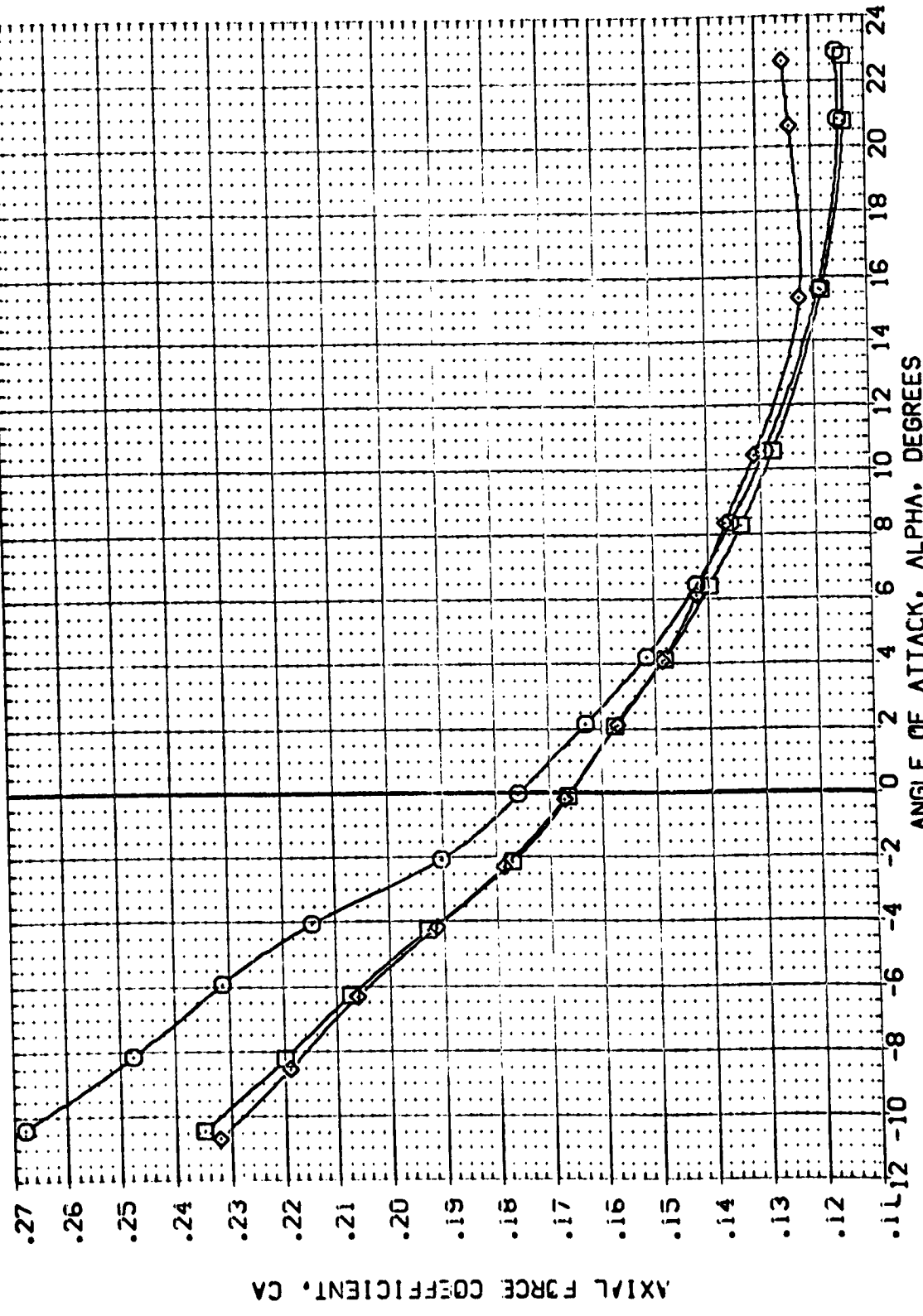


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

|                 |  |         |         |        |        |                       |
|-----------------|--|---------|---------|--------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILTRON | ELEVTR  | RUDDER | SPDBRK | REFERENCE INFORMATION |
| (ADK016)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1) | .000    | -40.000 | .000   | .000   | SREF 38.7360 SQ.IN.   |
| (ADK017)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1) | .000    | -20.000 | .000   | .000   | LREF 12.9000 IN.      |
| (ADK018)        | IA-58 CFHT-107 RI-1398 MODEL 32-0T (01 + T1) | .000    | 15.000  | .000   | .000   | BREF 12.9000 IN.      |
|                 |  |         |         |        |        | YMRP .0000 IN.        |
|                 |  |         |         |        |        | ZMRP .0000 IN.        |
|                 |  |         |         |        |        | SCALE -3.33CC IN.     |
|                 |  |         |         |        |        | SCALE .01CC           |

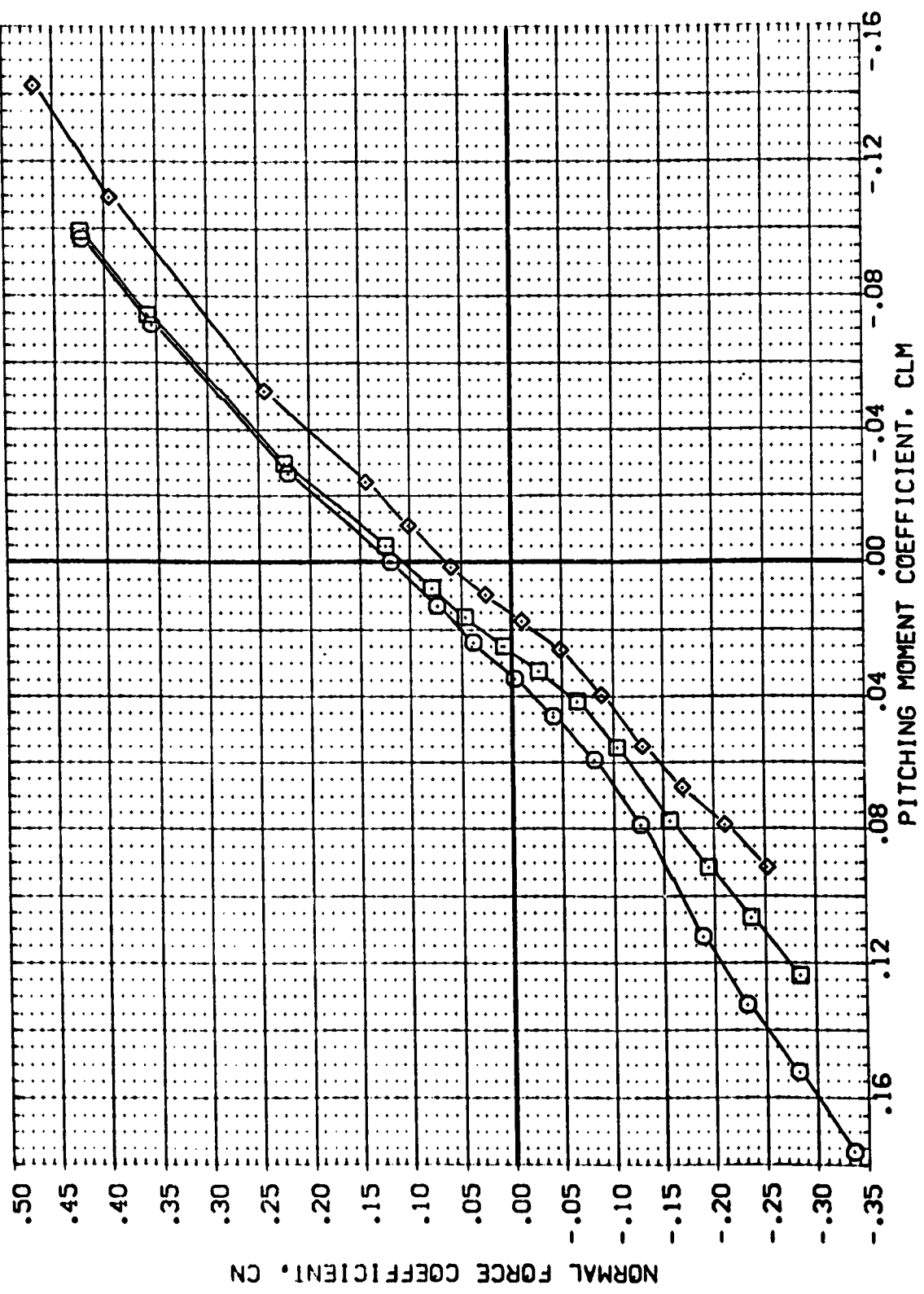


FIG 12 EFFECTS OF ELEVON DEFLECTION - BEAM ON

(A)MACH = 10.33

DATA SET SYMBOL  
 (ADP:020)  
 (ADP:009)  
 (ADP:019)

CONFIGURATION DESCRIPTION  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12)  
 IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12)

AILRON  
 .000  
 .000  
 .000

ELEVTR  
 -40.000  
 .000  
 15.000

RUDDER  
 .000  
 .000  
 .000

SPODBRK  
 .000  
 .000  
 .000

REFERENCE INFORMATION  
 SREF 38.7360 SQ. IN.  
 LREF 12.5000 IN.  
 BREF 12.5000 IN.  
 YMRP .0000 IN.  
 ZMRP .0000 IN.  
 ZMRP -3.3300 IN.  
 SCALE .0100

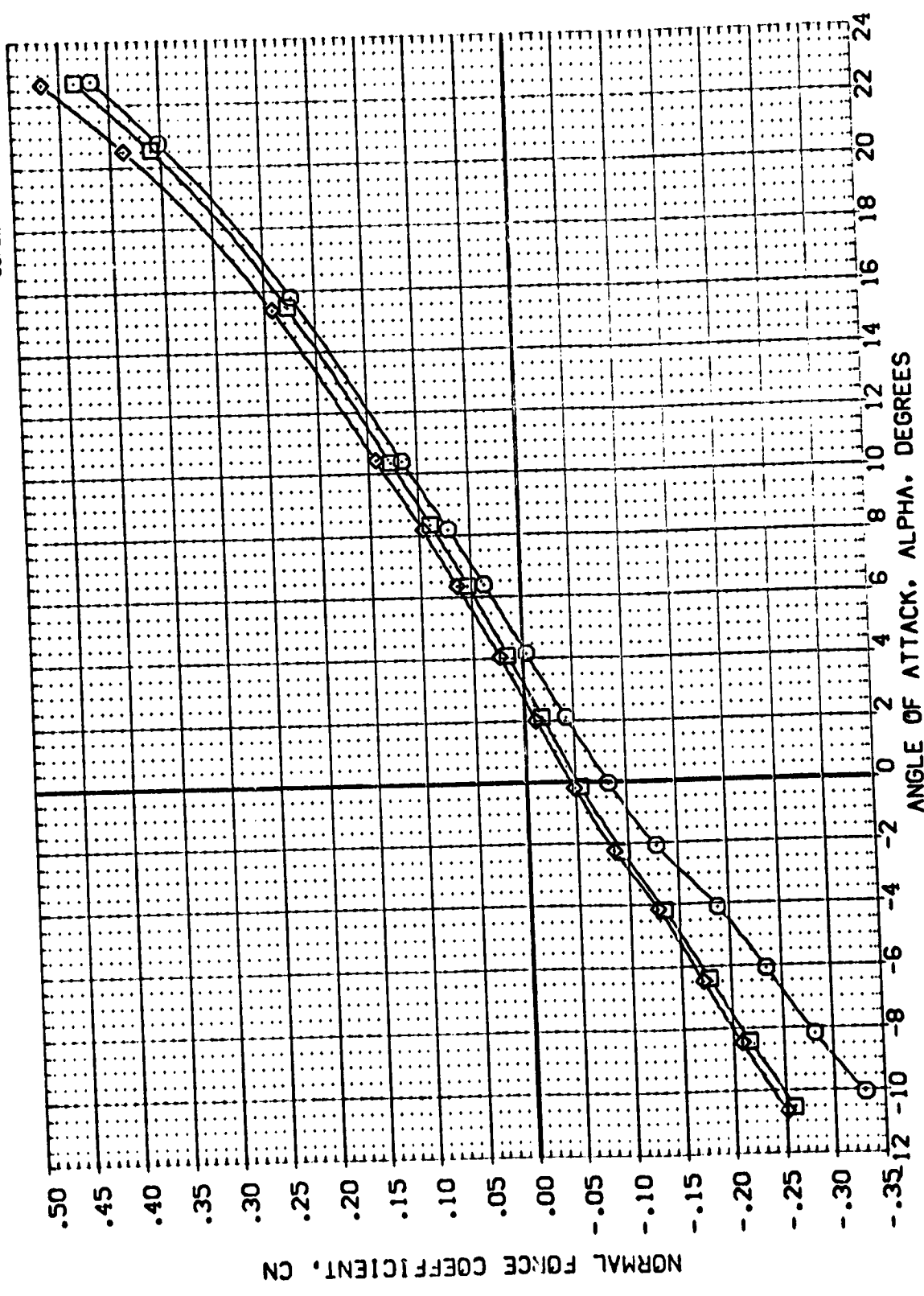


FIG 13 EFFECTS OF ELEVON DEFLECTION - BEAM OFF

(A)MACH = 10.33



|                 |  |        |         |        |        |                       |
|-----------------|--|--------|---------|--------|--------|-----------------------|
| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | AILRON | ELEVTR  | RUDDER | SPOBRK | REFERENCE INFORMATION |
| (ADK020)        | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12) | .000   | -40.000 | .000   | .000   | SREF 38.7360 50. IN.  |
| (ADK009)        | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12) | .000   | .000    | .000   | .000   | LREF 12.9000 IN.      |
| (ADK019)        | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + 12) | .000   | 15.000  | .000   | .000   | BREF 12.9000 IN.      |
|                 |  |        |         |        |        | XPRP .0000 IN.        |
|                 |  |        |         |        |        | YPRP .0000 IN.        |
|                 |  |        |         |        |        | ZPRP -3.3300 IN.      |
|                 |  |        |         |        |        | SCALE .0100 SCALE     |

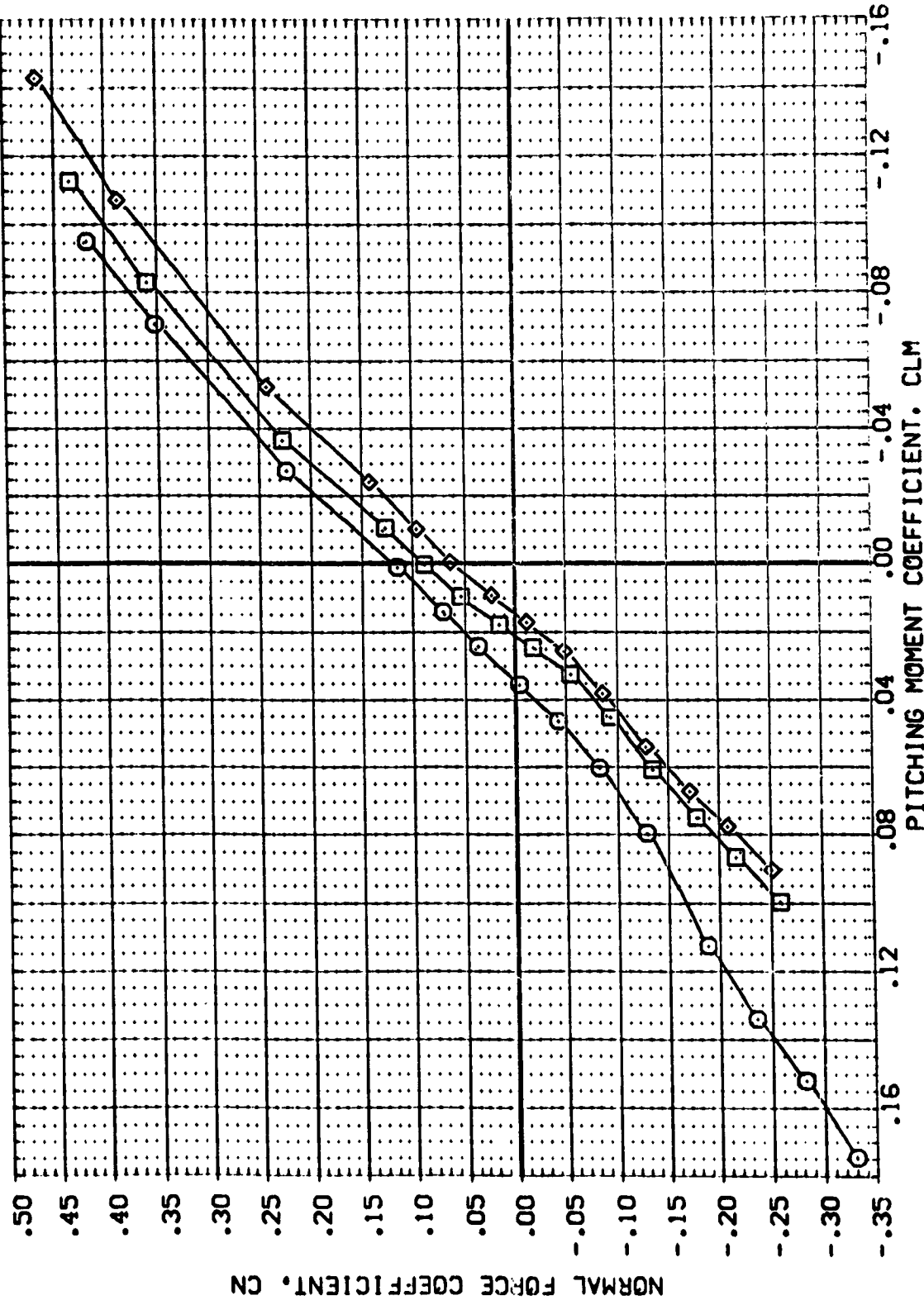


FIG 13 EFFECTS OF ELEVON DEFLECTION - BEAM OFF

(A)MACH = 10.33



DATA SET SYMBOL: (R01025) (R01010) (R01026) (R01027)

CONFIGURATION DESCRIPTION: 1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2) 1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2) 1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2) 1A-58 CFHT-107 R1-1398 MODEL 32-0T (01 + T2)

ALPHA: -10.000, .000, 10.000, 20.000  
 AIRLON: .000, .000, .000, .000  
 ELEVTR: .000, .000, .000, .000  
 RUDDER: .000, .000, .000, .000

REFERENCE INFORMATION: SREF 38.7360 SO.1N. LREF 12.9000 IN. BREF 12.9000 IN. XPRP .0000 IN. YPRP .0000 IN. ZPRP -3.3330 IN. SCALE .0100

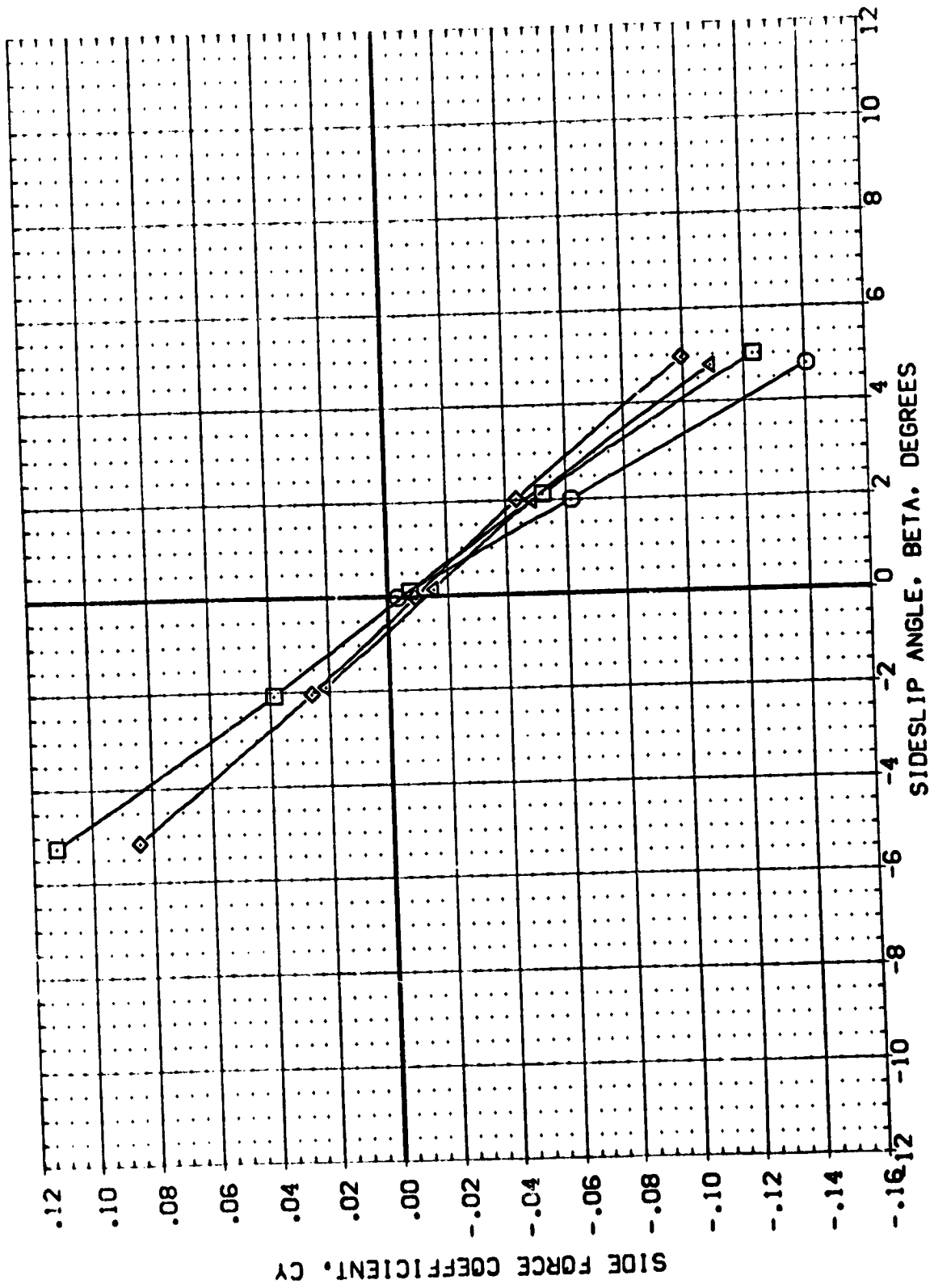


FIG 14 EFFECTS OF ALPHA  
 (A)MACH = 10.33

|                        |  |                              |
|------------------------|--|------------------------------|
| <b>DATA SET SYMBOL</b> | <b>CONFIGURATION DESCRIPTION</b>             | <b>REFERENCE INFORMATION</b> |
| (R01025)               | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2) | SREF 38.7360 50. IN.         |
| (R01010)               | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2) | LREF 12.5000 IN.             |
| (R01026)               | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2) | BREF 12.5000 IN.             |
| (R01027)               | IA-58 CFMT-107 RI-1398 MODEL 32-0T (01 + T2) | XMRP .0000 IN.               |
|                        |  | YMRP .0000 IN.               |
|                        |  | ZMRP -3.3300 IN.             |
|                        |  | SCALE .0100                  |

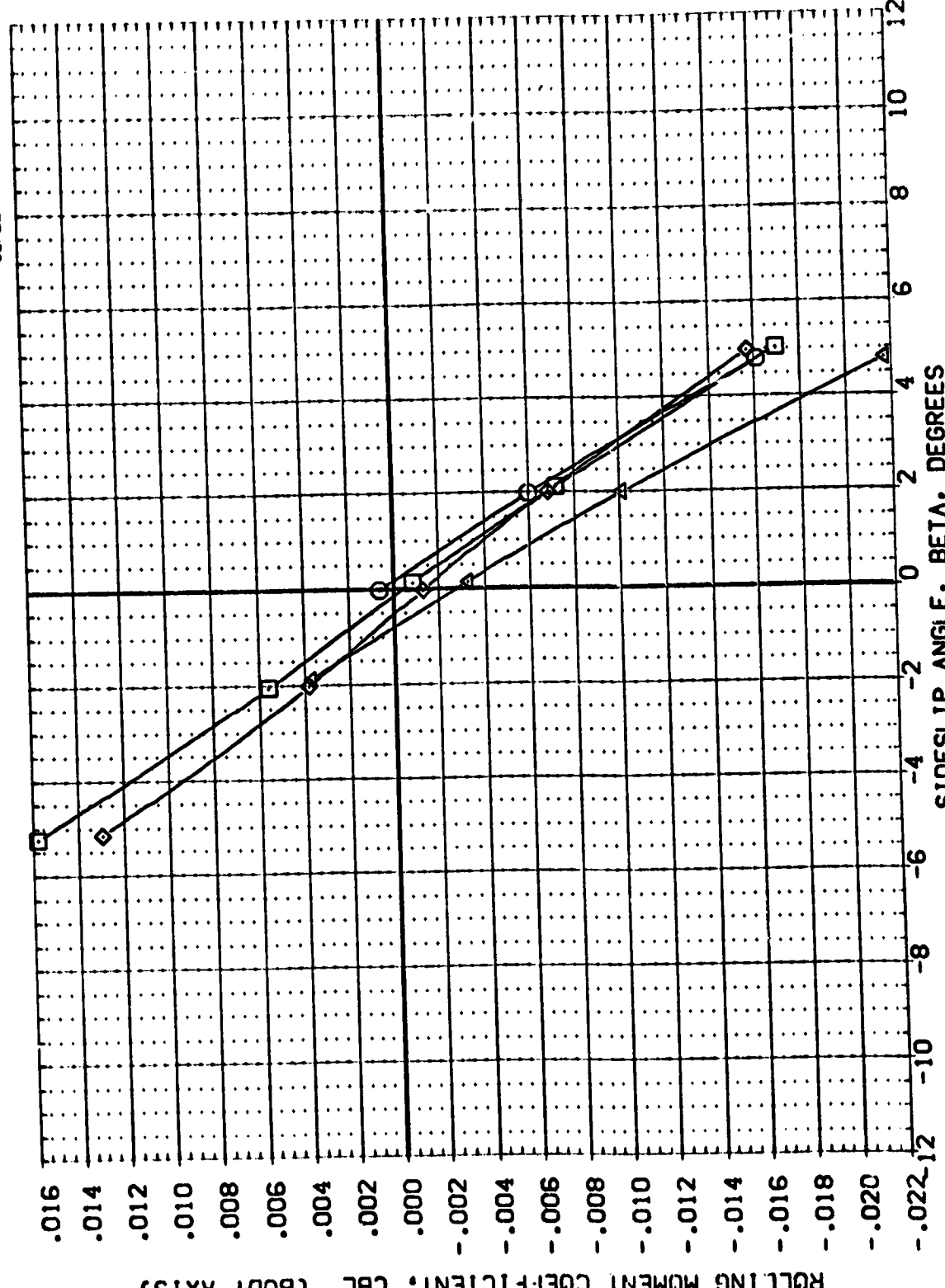


FIG 14 EFFECTS OF ALPHA  
 (A)MACH = 10.33  
 PAGE 35

| DATA SET SYMBOL | CONFIGURATION DESCRIPTION                    | ALPHA   | AILRON | ELEVTR | RUDDER | REFERENCE INFORMATION |
|-----------------|--|---------|--------|--------|--------|-----------------------|
| (R04025)        | IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T2) | -10.000 | .000   | .000   | .000   | SREF 38.7360 SQ. IN.  |
| (R04010)        | IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T2) | 10.000  | .000   | .000   | .000   | LREF 12.5000 IN.      |
| (R04026)        | IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T2) | 20.000  | .000   | .000   | .000   | BREF 12.5000 IN.      |
| (R04027)        | IA-58 CFMT-107 R1-1398 MODEL 32-0T (01 + T2) |         | .000   | .000   | .000   | XMRP .0000 IN.        |
|                 |  |         | .000   | .000   | .000   | YMRP .0000 IN.        |
|                 |  |         | .000   | .000   | .000   | ZMRP -3.3300 IN.      |
|                 |  |         |        |        |        | SCALE .0100           |

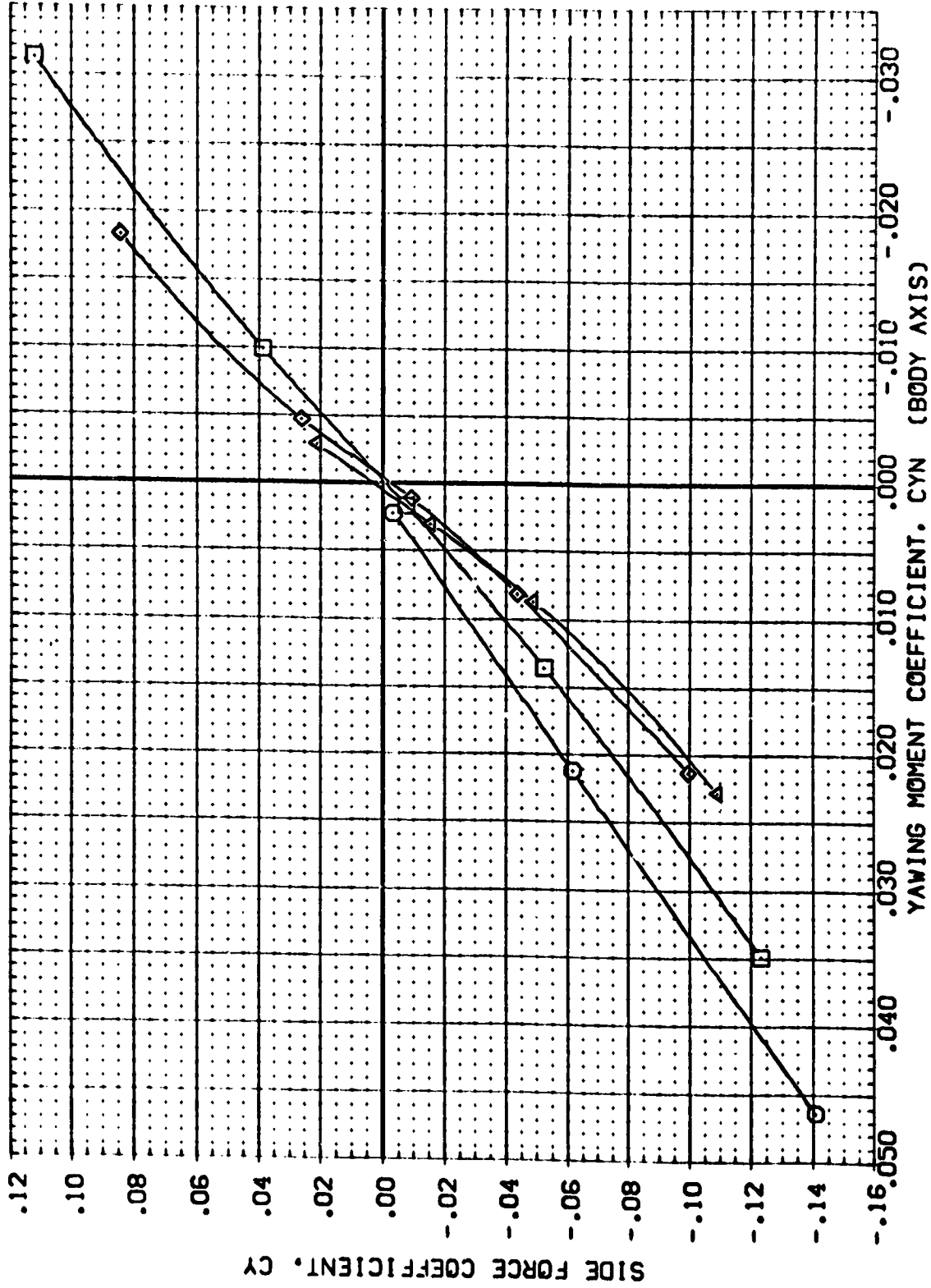


FIG 14 EFFECTS OF ALPHA

(A)MACH = 10.33

APPENDIX  
TABULATED SOURCE DATA

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

TABULATED SOURCE DATA, LARC CPMT 107

DATE 11 JUN 74

(080901) ( 15 MAR 74 )

1A-36 CPMT-107 81-1398 MODEL 32-07 (11)

PARAMETRIC DATA

REFERENCE DATA

BREF = 38.7360 98.1M. XMRP = 9.5100 1M.  
 LREF = 12.9000 1M. YMRP = .0000 1M  
 BREF = 12.9000 1M. ZMRP = .0000 1M  
 SCALE = .0100 SCALE

BETA = .000

RUN NO. 3/0 RM/L = 1.07 GRADIENT INTERVAL = -3.00/ 3.00

| MACH   | ALPHA    | BETA    | CM      | CA     | CLM     | CBL    | CYN     | CT      | CL      | CO     | L/D      |
|--------|----------|---------|---------|--------|---------|--------|---------|---------|---------|--------|----------|
| 10.330 | -22.377  | -.02449 | -.40566 | .14119 | .07173  | .00046 | .00180  | .00177  | -.32137 | .28499 | -1.12783 |
| 10.330 | -20.210  | -.01943 | -.34916 | .12967 | .06174  | .00032 | .00174  | .00016  | -.29287 | .24230 | -1.16743 |
| 10.330 | -15.326  | -.01282 | -.23437 | .10634 | .04144  | .00018 | .00165  | -.00203 | -.19793 | .16430 | -1.20323 |
| 10.330 | -10.261  | -.00448 | -.13820 | .09237 | .02444  | .00003 | .00104  | -.00270 | -.11950 | .11371 | -1.03279 |
| 10.330 | -8.045   | .00089  | -.10474 | .08902 | .01854  | .00004 | .00042  | -.00229 | -.09125 | .10281 | -.88760  |
| 10.330 | -6.304   | .00367  | -.08060 | .08771 | .01427  | .00005 | .00019  | -.00245 | -.07048 | .09803 | -.73390  |
| 10.330 | -4.195   | .00629  | -.05305 | .08689 | .00941  | .00001 | -.00013 | -.00294 | -.04862 | .09051 | -.51904  |
| 10.330 | -1.987   | .01439  | -.02689 | .08685 | .00478  | .00000 | -.00069 | -.00305 | -.02382 | .08773 | -.27148  |
| 10.330 | -.059    | .01976  | -.00359 | .08783 | .00103  | .00004 | -.00118 | -.00317 | -.00350 | .08784 | -.08274  |
| 10.330 | 2.213    | .02588  | .01931  | .08757 | -.00340 | .00001 | -.00173 | -.00331 | -.01612 | .01820 | .18280   |
| 10.330 | 4.274    | .03119  | .04227  | .08997 | -.00741 | .00001 | -.00212 | -.00369 | .03543  | .07287 | .38167   |
| 10.330 | 6.001    | .03860  | .06211  | .09260 | -.01091 | .00003 | -.00266 | -.00380 | .05209  | .38659 | .52836   |
| 10.330 | 8.016    | .04359  | .08619  | .09679 | -.01517 | .00004 | -.00297 | -.00464 | .07185  | .10787 | .66612   |
| 10.330 | 10.221   | .04759  | .11638  | .10172 | -.02050 | .00005 | -.00349 | -.00498 | .09648  | .12075 | .79859   |
| 10.330 | GRADIENT | .00272  | .01125  | .00033 | -.00199 | .00000 | -.00024 | -.00010 | .00969  | .00025 | .10673   |

1A-98 CFMT-107 RI-1398 MODEL 32-OT (01)

IR8002 ( 13 MAR 74 )

## REFERENCE DATA

BREF = 36.7300 98.1M. YMRP = 0.3070 IM.  
 LREF = 12.9000 IM. YMRP = .0000 IM.  
 BREF = 12.9000 IM. ZMRP = .0000 IM.  
 SCALE = .0100 SCALE

## PARAMETRIC DATA

BETA = .000 ELEVTR = .000  
 AILRON = .000 RUDDER = .000  
 SP00PK = .000

RUN NO. 67 0 RM/L = .98 GRADIENT INTERVAL = -.5.00/ 5.00

| MACH     | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CTM     | CY      | CL      | CD      | L/D      |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| 10.330   | -22.393 | -.00079 | -.49090 | .13409  | .01932  | .00069  | .00038  | -.00409 | -.40282 | .31099  | -1.29342 |
| 10.330   | -20.328 | -.00633 | -.42127 | .12609  | .01679  | .00061  | .00067  | -.00465 | -.33123 | .26499  | -1.32743 |
| 10.330   | -19.349 | -.00942 | -.28916 | .11236  | .01149  | .00064  | .00069  | -.00509 | -.24919 | .18461  | -1.34621 |
| 10.330   | -10.242 | -.00329 | -.20066 | .10260  | .00797  | .00049  | .00055  | -.00427 | -.17922 | .13685  | -1.31158 |
| 10.330   | -6.299  | -.00150 | -.17859 | .09910  | .00710  | .00040  | .00039  | -.00397 | -.16251 | .12372  | -1.31350 |
| 10.330   | -6.038  | .00047  | -.14446 | .09138  | .00379  | .00026  | .00023  | -.00380 | -.13409 | .10607  | -1.26379 |
| 10.330   | -4.297  | -.00134 | -.11790 | .08677  | .00469  | .00023  | .00014  | -.00329 | -.11114 | .09529  | -1.16633 |
| 10.330   | -2.174  | -.00186 | -.08491 | .07743  | .00336  | .00015  | .00013  | -.00352 | -.08191 | .08080  | -1.01631 |
| 10.330   | .006    | -.00236 | -.05459 | .07259  | .00218  | .00011  | .00007  | -.00298 | -.05460 | .07259  | -.79219  |
| 10.330   | 1.990   | .00340  | -.02963 | .07139  | .00103  | .00006  | -.00006 | -.00236 | -.02908 | .07040  | -.39889  |
| 10.330   | 4.011   | .00421  | -.00981 | .06670  | -.00022 | .00007  | -.00012 | -.00312 | -.00099 | .06994  | .01433   |
| 10.330   | 6.290   | .00569  | .04465  | .06474  | -.00177 | .00003  | -.00026 | -.00312 | .03734  | .08921  | -33949   |
| 10.330   | 8.047   | .00748  | .07748  | .06265  | -.00307 | -.00001 | -.00041 | -.00351 | .08794  | .07208  | .93232   |
| 10.330   | 10.297  | .00938  | .13236  | .06387  | -.00525 | -.00003 | -.00057 | -.00393 | -.11081 | .08650  | 1.37359  |
| GRADIENT |         | .00039  | -.01482 | -.00205 | -.00059 | -.00002 | -.00003 | -.00004 | .01344  | -.00308 | .14362   |

## REFERENCE DATA

BREF = 36.7300 98.1M. YMRP = .0000 IM.  
 LREF = 12.9000 IM. YMRP = .0000 IM.  
 BREF = 12.9000 IM. ZMRP = -.5.3900 IM.  
 SCALE = .0100 SCALE

## PARAMETRIC DATA

BETA = .000 ELEVTR = .000  
 AILRON = .000 RUDDER = .000  
 SP00PK = .000

RUN NO. 68 0 RM/L = .98 GRADIENT INTERVAL = -.5.00/ 5.00

IR8003 ( 13 MAR 74 )

RUN NO. 317 0 RM/L = .95 GRADIENT INTERVAL = -.5.00/ 5.00

| MACH     | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CTM     | CY      | CL      | CD      | L/D     |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -10.980 | -.02963 | -.20372 | .20967  | .09463  | .00069  | .00190  | -.00351 | -.22083 | .25449  | -.86784 |
| 10.330   | -8.370  | -.02390 | -.21076 | .19009  | .08459  | .00013  | .00181  | -.07107 | -.18762 | .22778  | -.82368 |
| 10.330   | -6.417  | -.01432 | -.10100 | .18031  | .07338  | .00069  | .00054  | -.03300 | -.19082 | .20738  | -.76992 |
| 10.330   | -4.109  | -.01271 | -.13012 | .17507  | .06031  | .00057  | .00039  | -.03331 | -.12923 | .18431  | -.67670 |
| 10.330   | -2.273  | -.01961 | -.09649 | .16497  | .04428  | -.00034 | .00143  | -.00493 | -.09989 | .16827  | -.53428 |
| 10.330   | -.097   | .00310  | -.09499 | .15827  | .03165  | .00099  | -.00237 | -.00197 | -.05478 | .15432  | -.39497 |
| 10.330   | 2.023   | .01418  | -.02438 | .14838  | .02593  | .00066  | -.00224 | -.00273 | -.02993 | .14943  | -.29389 |
| 10.330   | 4.349   | .00824  | .01356  | .13761  | .01878  | -.00971 | .00030  | -.00561 | .00356  | .13824  | .02216  |
| 10.330   | 6.192   | -.00932 | .04229  | .13129  | .01399  | -.00182 | .00248  | -.00793 | .02789  | .13503  | .20694  |
| 10.330   | 8.494   | .00542  | .00032  | .12946  | .00479  | -.00095 | -.00095 | -.00708 | .06091  | .13399  | .44802  |
| 10.330   | 10.318  | .00589  | .11482  | .12139  | -.00479 | -.00099 | -.00084 | -.00707 | .09123  | .13099  | .65106  |
| GRADIENT |         | .00268  | -.01768 | -.00438 | -.00076 | -.00007 | -.00018 | -.00019 | .01491  | -.00340 | .08182  |

TABULATED SOURCE DATA, LARC CFMT 107

(R0K004) ( 13 MAR 74 )

1A-50 CFMT-107 RI-1300 MODEL 32-OT (02 + T1)

REFERENCE DATA

MACH = 30.7360 90.1M. YMRP = .0000 IM.  
 LREF = 12.0000 IM. YMRP = .0000 IM.  
 BREF = 12.0000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

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

| MACH   | BETA     | ALPHA   | CM     | CA      | CLM     | CBL     | CYM     | CY      | CL      | CD      | L/D     |
|--------|----------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -3.231   | -22475  | -05978 | .18213  | .03446  | .01412  | -02793  | .10965  | -.05914 | .18238  | -.10424 |
| 10.330 | -2.044   | -19338  | -06036 | .15804  | .03402  | .00387  | -00390  | .03504  | -.05984 | .15825  | -.36301 |
| 10.330 | -.122    | -20294  | -05891 | .15550  | .03265  | .00093  | -00215  | -.00341 | -.05836 | .15971  | -.37480 |
| 10.330 | 2.112    | -20125  | -05964 | .15585  | .03371  | -.00444 | .00774  | -.04599 | -.05906 | .15806  | -.37864 |
| 10.330 | 5.004    | -24367  | -06183 | .16259  | .03478  | -.01461 | .02993  | -.11828 | -.06113 | .16285  | -.37940 |
| 10.330 | GRADIENT | -.00144 | .00019 | -.00005 | -.00008 | -.00194 | -.00326 | -.01947 | .00019  | -.00005 | .00109  |

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

PARAMETRIC DATA

(R0K005) ( 13 MAR 74 )

1A-50 CFMT-107 RI-1300 MODEL 32-OT (02 + T1)

REFERENCE DATA

MACH = 30.7360 90.1M. YMRP = .0000 IM.  
 LREF = 12.0000 IM. YMRP = .0000 IM.  
 BREF = 12.0000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

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

| MACH   | BETA     | ALPHA  | CM      | CA      | CLM     | CBL     | CYM     | CY      | CL      | CD      | L/D     |
|--------|----------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.886  | .00173 | -.28703 | .21174  | .09931  | .00332  | -.00338 | .00020  | -.22314 | .25758  | -.06629 |
| 10.330 | -8.306   | .01353 | -.22319 | .19947  | .06569  | .00291  | -.00392 | .00007  | -.19123 | .23029  | -.03036 |
| 10.330 | -6.219   | .01798 | -.17881 | .18797  | .07272  | .00279  | -.00419 | .00015  | -.15739 | .20624  | -.76316 |
| 10.330 | -4.404   | .00796 | -.14506 | .17711  | .06308  | .00177  | -.00237 | -.00160 | -.13103 | .18773  | -.09799 |
| 10.330 | -2.271   | .01176 | -.09572 | .16508  | .04411  | .00113  | -.00186 | -.00286 | -.08910 | .16874  | -.52874 |
| 10.330 | -.053    | .02482 | -.03423 | .15441  | .03132  | .00138  | -.00325 | -.00209 | -.05409 | .15446  | -.35010 |
| 10.330 | 2.039    | .02277 | -.02369 | .14673  | .02597  | .00050  | -.00217 | -.00336 | -.02890 | .14379  | -.19823 |
| 10.330 | 4.366    | .01365 | .01444  | .13787  | .01863  | -.00042 | -.00053 | -.00580 | .00390  | .13857  | .02616  |
| 10.330 | 6.190    | .00870 | .04254  | .13116  | .01363  | -.00090 | .00048  | -.00686 | .02615  | .13498  | .28856  |
| 10.330 | 8.328    | .01049 | .08091  | .12360  | .00477  | -.00102 | .00074  | -.00768 | .06139  | .13621  | .45087  |
| 10.330 | 10.387   | .01030 | .11744  | .12145  | -.00362 | -.00109 | .00093  | -.00775 | .09362  | .14064  | .68568  |
| 10.330 | GRADIENT | .00101 | .01789  | -.00443 | -.00469 | -.00023 | .00016  | -.00042 | .01310  | -.00534 | .08162  |

PARAMETRIC DATA

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

TABULATED SOURCE DATA, LARC CPMT 107

(IR0000) ( 13 MAR 74 )

1A-50 CPMT-107 RI-1398 MODEL 32-OT (02 + 11)

DATE 11 JUN 74

PARAMETRIC DATA

REFERENCE DATA

ALPHA = .000 ELEVTR = .000  
AILROM = .000 RUDDER = -.20.000  
SPDRK = .000

REF = 30.7360 90.IN. YMRP = .0000 IN.  
LREF = 12.9000 IN. YMRP = .0000 IN.  
BREF = 12.9000 IN. ZMRP = -3.3300 IN.  
SCALE = .0100 SCALE

RUN NO. 34/ 0 RM/L = .90 GRADIENT INTERVAL = -5.00/ 5.00

| WACH     | BETA    | ALPHA   | CM      | CA     | CLM     | CBL     | CTM     | CV      | CL      | CB      | L/O     |
|----------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -3.236  | -3.0042 | -0.0012 | .10293 | .03493  | .01341  | -.02690 | .10034  | -.03927 | -.10204 | -.30304 |
| 10.330   | -2.093  | -2.7360 | -0.0020 | .15616 | .03374  | .00513  | -.00914 | .03826  | -.03945 | .15644  | -.30002 |
| 10.330   | .101    | -2.7456 | -0.0935 | .15605 | .03290  | .00149  | -.00326 | -.00247 | -.05060 | .15633  | -.37483 |
| 10.330   | 2.111   | -2.7775 | -0.0012 | .15229 | .03399  | -.00464 | .00046  | -.04732 | -.05937 | .15634  | -.37925 |
| 10.330   | 5.007   | -3.0798 | -0.0254 | .18408 | .03587  | -.01920 | .03136  | -.12004 | -.06165 | .16461  | -.37590 |
| GRADIENT | -.00099 | .00002  | .00002  | .00005 | -.00239 | .00421  | -.02033 | .00002  | .00002  | .00002  | .00021  |

(IRK007) ( 13 MAR 74 )

1A-50 CPMT-107 RI-1398 MODEL 32-OT (02 + 12)

PARAMETRIC DATA

REFERENCE DATA

BETA = .000 ELEVTR = .000  
AILROM = .000 RUDDER = .000  
SPDRK = .000

REF = 30.7360 90.IN. YMRP = .0000 IN.  
LREF = 12.9000 IN. YMRP = .0000 IN.  
BREF = 12.9000 IN. ZMRP = -3.3300 IN.  
SCALE = .0100 SCALE

RUN NO. 29/ 0 RM/L = .90 GRADIENT INTERVAL = -5.00/ 5.00

| WACH     | ALPHA   | BETA     | CM      | CA      | CLM     | CBL     | CTM     | CV      | CL      | CB      | L/O     |
|----------|---------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -10.073 | -0.1749  | -2.0357 | .22316  | .10567  | .00139  | .00109  | -.00323 | -.23734 | -.27102 | -.07315 |
| 10.330   | -6.507  | -0.1308  | -2.3736 | .21098  | .09183  | .00066  | .00129  | -.00400 | -.20354 | -.24377 | -.03496 |
| 10.330   | -6.404  | -0.1090  | -1.9174 | .19691  | .07739  | .00064  | .00088  | -.00349 | -.16036 | .21905  | -.70000 |
| 10.330   | -4.336  | -0.0597  | -1.9508 | .18866  | .06692  | .00061  | .00058  | -.00331 | -.14052 | .19785  | -.71025 |
| 10.330   | -2.287  | -0.0042  | -1.0490 | .17455  | .04734  | -.00025 | .00139  | -.00450 | -.09785 | .17680  | -.54787 |
| 10.330   | -.116   | -0.1364  | -0.0248 | .16374  | .03397  | .00049  | -.00110 | -.00206 | -.06214 | .16387  | -.37920 |
| 10.330   | 1.956   | .01217   | -0.0297 | .15533  | .02806  | .00002  | -.00070 | -.00326 | -.03326 | .15441  | -.22337 |
| 10.330   | 4.300   | .00612   | .01134  | .14862  | .02023  | -.00076 | .00062  | -.00569 | .00032  | .14705  | .00215  |
| 10.330   | 6.111   | -0.00708 | .04133  | .13971  | .01555  | -.00177 | .00284  | -.00790 | -.02622 | .14332  | .10294  |
| 10.330   | 8.358   | .01092   | .00148  | .13385  | .00689  | -.00107 | .00106  | -.00718 | .00116  | .14427  | .42391  |
| 10.330   | 10.434  | .01136   | .12414  | .12074  | -.00439 | -.00103 | .00000  | -.00690 | .00077  | .14910  | .66247  |
| GRADIENT | .00206  | .01093   | -.00468 | -.00521 | -.00013 | -.00009 | -.00019 | .01598  | -.00502 | .00117  | .00117  |

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR



1A-50 CPNT-107 RI-1398 MODEL 32-0T (02 + T2)

(IR0000) ( 13 MAR 74 )

REFERENCE DATA

BREF = 30.7360 90.1M. XMRP = .0000 IN.  
 LREF = 12.9000 1M. YMRP = .0000 IN.  
 RBREF = 12.9000 1M. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

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

| MACH     | BETA    | ALPHA  | CM      | CA      | CLN     | CBL     | CYN     | CY      | CL      | CD      | L/D     |
|----------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -5.282  | -13126 | -0.8315 | -17103  | .03986  | .01517  | -.02900 | .11651  | -.06270 | .17110  | -.36683 |
| 10.330   | -2.050  | -10030 | -0.6413 | -16414  | .03540  | .00392  | -.06622 | .03709  | -.06304 | .16429  | -.36871 |
| 10.330   | .098    | -10902 | -0.8314 | -16400  | .03418  | .00077  | -.00161 | -.00323 | -.06283 | .16412  | -.36283 |
| 10.330   | 2.107   | -10221 | -0.6390 | -16412  | .03527  | -.00470 | .00820  | -.04800 | -.06361 | .16423  | -.36731 |
| 10.330   | 5.004   | -14367 | -0.6531 | -17144  | .03639  | -.01488 | .07490  | -.13005 | -.06488 | .17161  | -.37809 |
| GRADIENT | -.00045 | .00006 | -.00001 | -.00004 | -.00004 | -.00207 | .00345  | -.02045 | .00006  | -.00001 | .00036  |

PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000  
 AIRLON = .000 RUDDER = .000  
 SPDRK = .000

1A-50 CPNT-107 RI-1398 MODEL 32-0T (01 + T2)

(IR0000) ( 13 MAR 74 )

REFERENCE DATA

BREF = 30.7360 90.1M. XMRP = .0000 IN.  
 LREF = 12.9000 1M. YMRP = .0000 IN.  
 RBREF = 12.9000 1M. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

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

| MACH     | BETA    | ALPHA  | CM      | CA      | CLN     | CBL     | CYN     | CY      | CL      | CD      | L/D     |
|----------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -10.531 | -03289 | -25946  | -22807  | .09985  | .00055  | .00227  | -.00361 | -.21340 | .27169  | -.70550 |
| 10.330   | -8.434  | -02724 | -21606  | -21491  | .08651  | -.00001 | .00220  | -.00432 | -.10220 | .24427  | -.74509 |
| 10.330   | -6.429  | -02851 | -17805  | -20308  | .07459  | -.00015 | .00230  | -.00902 | -.15419 | .22174  | -.69336 |
| 10.330   | -4.175  | -02101 | -13479  | -18649  | .06082  | -.00030 | .00225  | -.00559 | -.12085 | .19391  | -.61720 |
| 10.330   | -2.270  | -01544 | -09432  | -17385  | .04516  | -.00057 | .00181  | -.00991 | -.08736 | .17745  | -.49229 |
| 10.330   | -.165   | -00802 | -05467  | -16323  | .03284  | -.00067 | .00116  | -.00582 | -.05420 | .16336  | -.33173 |
| 10.330   | 1.115   | -02123 | 00059   | 00018   | -.00021 | -.00002 | .00081  | -.00017 | .00059  | .00018  | 3.32837 |
| 10.330   | 4.095   | 00223  | 01486   | 14561   | .02467  | -.00074 | .00050  | -.00587 | -.02343 | .13340  | -.15273 |
| 10.330   | 8.363   | 00363  | 03299   | 13744   | .00948  | -.00116 | .00120  | -.00797 | .03743  | .14246  | .26272  |
| 10.330   | 6.348   | 00677  | 08856   | 13260   | .00031  | -.00121 | .00133  | -.00077 | .06637  | .14403  | .47463  |
| 10.330   | 10.379  | 00877  | 12767   | 12719   | -.01064 | -.00132 | .00141  | -.00891 | .10266  | .14011  | .69316  |
| 10.330   | 15.481  | 00095  | 22802   | 11715   | -.03657 | -.00227 | .00166  | -.00874 | .10040  | .13376  | 1.08470 |
| 10.330   | 20.595  | 01458  | 36018   | 11259   | -.09318 | -.00298 | .00266  | -.01357 | .29772  | .23188  | 1.28393 |
| 10.330   | 22.719  | 01302  | 43481   | 11331   | -.11295 | -.00360 | .00402  | -.01818 | .35751  | .27245  | 1.31147 |
| GRADIENT | .00289  | .01819 | -.00560 | -.00520 | -.00007 | -.00007 | -.00022 | -.00008 | .01526  | -.00663 | .09550  |

PARAMETRIC DATA

BETA = .000 ELEVTR = .000  
 AIRLON = .000 RUDDER = .000  
 SPDRK = .000

1A-30 CPMT-107 01-1300 MODEL 32-07 (01 + 12)

(R00010) ( 13 MAR 74 )

REFERENCE DATA

XREF = 30.7300 50. IN. XMRP = .0000 IN.  
 LREF = 12.9000 IN. YMRP = .0000 IN.  
 DREF = 12.9000 IN. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000  
 AIRLON = .000 NUMBER = .000  
 SPDRK = .000

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

| MACH   | BETA     | ALPHA   | CM      | CA      | CLM    | CBL     | CYN     | CY      | CL      | CD      | L/D     |
|--------|----------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|
| 10.330 | -3.244   | -.20842 | -.04992 | .17059  | .03033 | .01576  | -.03127 | .11831  | -.04030 | .17077  | -.26070 |
| 10.330 | -2.058   | -.17160 | -.03341 | .16312  | .03213 | .00337  | -.00992 | .03037  | -.05291 | .16328  | -.32013 |
| 10.330 | .109     | -.16446 | -.03489 | .16449  | .03307 | -.00082 | .00185  | -.00750 | -.05442 | .16465  | -.33951 |
| 10.330 | 2.125    | -.17009 | -.03373 | .16479  | .03242 | -.00722 | .01362  | -.03253 | -.05323 | .16495  | -.32272 |
| 10.330 | 5.019    | -.21355 | -.03585 | .17500  | .03373 | -.01696 | .03489  | -.12349 | -.05319 | .17321  | -.31501 |
|        | GRADIENT | .00026  | -.00008 | -.00008 | .00007 | -.00306 | .00562  | -.02177 | -.00008 | -.00000 | -.00067 |

IA-58 CPNT-107 RI-1398 MODEL 32-OT (01 + T1)

(IRK013) ( 13 MAR 74 )

REFERENCE DATA

SREF = 39.7360 SQ. IN. XMRP = .0000 IN.  
 LREF = 12.9000 IN. YMRP = .0000 IN.  
 BREF = 12.9000 IN. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

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

PARAMETRIC DATA

RUN NO. 127 0 RM/L = .98 GRADIENT INTERVAL = -9.00/ 5.00

| MACH   | ALPHA    | BETA    | CM      | CA      | CLM     | CBL     | CYN     | CY      | CL      | CD      | L/D     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.433  | -.08059 | -.23766 | .22837  | .10071  | -.00299 | .01012  | -.00940 | -.21209 | .27126  | -.78172 |
| 10.330 | -6.458   | -.07447 | -.21809 | .21558  | .08820  | -.00319 | .00945  | -.00943 | -.18401 | .24531  | -.75031 |
| 10.330 | -6.189   | -.06348 | -.17428 | .20238  | .07494  | -.00268 | .00792  | -.00870 | -.15152 | .21994  | -.68893 |
| 10.330 | -4.298   | -.05301 | -.13905 | .18847  | .06296  | -.00224 | .00684  | -.00814 | -.12454 | .19836  | -.62768 |
| 10.330 | -2.256   | -.04111 | -.09374 | .17446  | .04551  | -.00207 | .00545  | -.00766 | -.08680 | .17601  | -.48781 |
| 10.330 | -.068    | -.03135 | -.03284 | .16355  | .03262  | -.00183 | .00410  | -.00684 | -.05265 | .16361  | -.32178 |
| 10.330 | 2.024    | -.02332 | -.02037 | .15481  | .02551  | -.00169 | .00319  | -.00662 | -.02582 | .15399  | -.16769 |
| 10.330 | 4.075    | -.01871 | .01322  | .14603  | .01874  | -.00181 | .00297  | -.00717 | .00281  | .14660  | .01814  |
| 10.330 | 6.337    | -.01632 | .03145  | .13806  | .01039  | -.00178 | .00299  | -.00804 | .03579  | .14290  | .23048  |
| 10.330 | 8.246    | -.00831 | .08336  | .13283  | .00159  | -.00164 | .00265  | -.00841 | .06543  | .14370  | .45535  |
| 10.330 | 10.402   | -.00703 | .12751  | .12725  | -.01028 | -.00167 | .00259  | -.00849 | .1024   | .14818  | .69132  |
| 10.330 | 15.531   | -.01123 | .22693  | .11642  | -.03623 | -.00225 | .00207  | -.00757 | -.0747  | .17293  | 1.56409 |
| 10.330 | 20.736   | .00521  | .36558  | .11335  | -.08130 | -.00280 | .00308  | -.01257 | .30177  | .23544  | 1.28171 |
| 10.330 | 22.767   | .00648  | .43372  | -.11374 | -.11276 | -.00313 | .00358  | -.01996 | .35614  | .27217  | 1.35893 |
|        | GRADIENT | .00429  | .01798  | -.00497 | -.00516 | .00006  | -.00048 | .00014  | .01302  | -.05667 | .57676  |

## TABULATED SOURCE DATA, LARC CFMT 107

DATE 11 JUN 74

1A-58 CFMT-107 RI-1398 MODEL 32-OT (01 + T1)

(R0R014) ( 13 MAR 74 )

## PARAMETRIC DATA

ALPHA = .000 ELEVTR = .000  
 AILSON = .000 RUMBER = -20.000  
 SPDBRK = .000

## REFERENCE DATA

MACH = 30.7360 50.1M. YMRP = .0000 IM.  
 10.330 12.9000 IM. YMRP = .0000 IM.  
 10.330 12.9000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

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

| MACH   | BETA     | ALPHA   | CM      | CA     | CLM    | CBL     | CYN     | CY      | CL      | CD     | L/D     |
|--------|----------|---------|---------|--------|--------|---------|---------|---------|---------|--------|---------|
| 10.330 | -9.189   | -.20583 | -.04955 | .17078 | .03061 | -.01458 | -.02045 | .10925  | -.04893 | .17096 | -.20823 |
| 10.330 | -2.043   | -.16337 | -.02287 | .16321 | .03239 | .00446  | -.00740 | .03670  | -.05230 | .16336 | -.31684 |
| 10.330 | .045     | -.16102 | -.03453 | .16434 | .03335 | -.00203 | .00464  | -.00921 | -.05407 | .16469 | -.32832 |
| 10.330 | 2.055    | -.16337 | -.03334 | .16541 | .03316 | -.00852 | .01686  | -.05296 | -.05287 | .16556 | -.31934 |
| 10.330 | 4.974    | -.20080 | -.05344 | .17624 | .03499 | -.01925 | .04019  | -.12652 | -.05482 | .17643 | -.31072 |
| 10.330 | GRADIENT | -.00530 | -.00030 | .00137 | .00034 | -.00338 | .00677  | -.02326 | -.00028 | .00157 | -.00129 |

(R0R015) ( 13 MAR 74 )

1A-58 CFMT-107 RI-1398 MODEL 32-OT (01 + T1)

## PARAMETRIC DATA

BETA = .000 ELEVTR = .000  
 AILSON = 10.000 RUMBER = .000  
 SPDBRK = .000

## REFERENCE DATA

MACH = 30.7360 50.1M. YMRP = .0000 IM.  
 10.330 12.9000 IM. YMRP = .0000 IM.  
 10.330 12.9000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

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

| MACH   | BETA     | ALPHA   | CM      | CA      | CLM     | CUL     | CYN     | CY      | CL      | CD      | L/D     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.706  | -.04626 | -.26587 | .22945  | .10215  | .00243  | .00273  | -.00417 | -.21685 | .27445  | -.78940 |
| 10.330 | -8.515   | -.03782 | -.21958 | .21543  | .08638  | .06176  | .00253  | -.00457 | -.18326 | .24537  | -.75440 |
| 10.330 | -6.234   | -.03165 | -.17535 | .20189  | .07479  | .00131  | .00247  | -.00518 | -.19230 | .21974  | -.69391 |
| 10.330 | -4.112   | -.02603 | -.13441 | .18801  | .06054  | .00105  | .00231  | -.00567 | -.12073 | .19517  | -.61859 |
| 10.330 | -2.211   | -.01700 | -.09247 | .17329  | .04451  | .00060  | .00172  | -.00378 | -.08372 | .17673  | -.46352 |
| 10.330 | -.167    | -.01028 | -.03492 | .16378  | .03261  | .00041  | .00106  | -.00560 | -.05445 | .16394  | -.33212 |
| 10.330 | 2.154    | -.00066 | -.01806 | .15461  | .02459  | .00041  | .00029  | -.00352 | -.02386 | .15303  | -.15511 |
| 10.330 | 3.983    | .00401  | -.01294 | .14684  | .01830  | .00022  | .00028  | -.06617 | .00271  | .14738  | -.61841 |
| 10.330 | 6.311    | .00530  | .05252  | .13853  | .00926  | .00020  | .00063  | -.00717 | .03697  | .14346  | .25772  |
| 10.330 | 8.328    | .01271  | .08939  | .13331  | -.00070 | .00033  | .00056  | -.00806 | .06811  | .14505  | .47642  |
| 10.330 | 10.316   | .01494  | .12822  | .12775  | -.01180 | .00043  | .00045  | -.00760 | .10327  | .14864  | .69474  |
| 10.330 | 13.511   | .01922  | .22843  | .11804  | -.03776 | .00000  | .00038  | -.00763 | .10654  | .17403  | 1.07841 |
| 10.330 | 20.701   | .04303  | .36659  | .11491  | -.08776 | .00048  | .00068  | -.01233 | .10418  | .23778  | 1.27924 |
| 10.330 | 22.716   | .05204  | .43759  | .11510  | -.11945 | .00098  | .00182  | -.01451 | .10319  | .27315  | 1.30544 |
| 10.330 | GRADIENT | -.00372 | -.01793 | -.00471 | -.00306 | -.00009 | -.00027 | -.00003 | .01550  | -.00575 | -.07789 |

TABULATED SOURCE DATA, LARC CPMT 107

DATE 11 JUN 74

1A-10 CPMT-107 RI-1398 MODEL 32-OT 101 + 111

(R08016) ( 13 MAR 74 )

PARAMETRIC DATA

REFERENCE DATA

SREF = 30.7300 50.1M. YMRP = .0000 1M.  
 LREF = 12.9500 1M. YMRP = .0000 1M.  
 BREF = 12.9500 1M. ZMRP = -3.3300 1M.  
 SCALE = .0100 SCALE

BETA = .050 ELESTR = -40.000  
 AIRLON = 10.000 RUBBER = .000  
 SPDRK = .000

RUN NO. 15/ 0 RM/L = .90 GRADIENT INTERVAL = -5.00/ 5.00

| MACH      | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CYM     | CY      | CL      | CO      | L/D     |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.335    | -19.380 | -.04991 | -.33597 | .26000  | .17597  | .00221  | .00207  | -.00197 | -.20213 | .32419  | -.07026 |
| 10.335    | -8.180  | -.04528 | -.20202 | .24771  | .19225  | .00170  | .00235  | -.00257 | -.24391 | .20532  | -.05407 |
| 10.335    | -5.910  | -.03502 | -.23136 | .23116  | .13232  | .00160  | .00219  | -.00337 | -.20629 | .23378  | -.01209 |
| 10.335    | -4.672  | -.03545 | -.18792 | .21435  | .11226  | .00116  | .00262  | -.00410 | -.17223 | .22716  | -.75010 |
| 10.335    | -2.560  | -.02561 | -.12693 | .19019  | .07862  | .00023  | .00147  | -.00453 | -.11999 | .19465  | -.61644 |
| 10.335    | -.051   | -.01340 | -.08161 | .17556  | .05923  | -.00004 | .00114  | -.00477 | -.08148 | .17563  | -.46301 |
| 10.335    | 2.133   | -.05277 | -.04064 | .16294  | .04592  | -.00926 | .00037  | -.00506 | -.04668 | .16132  | -.20937 |
| 10.335    | 4.254   | -.05109 | -.00222 | .15161  | .03492  | -.00953 | .00045  | -.00564 | -.01332 | .15104  | -.50021 |
| 10.335    | 6.456   | -.05130 | .03072  | .14217  | .02303  | -.00074 | .00099  | -.00697 | .02249  | .14563  | .15444  |
| 10.335    | 8.334   | .05175  | .07426  | .13568  | .01304  | -.00005 | .00119  | -.00789 | .05381  | .14501  | .37100  |
| 10.335    | 10.572  | .05419  | .11927  | .12916  | -.00031 | -.00097 | .00107  | -.00792 | .09355  | .14005  | .62047  |
| 10.335    | 15.645  | .00045  | .22166  | .11804  | -.02674 | -.00177 | .00129  | -.00795 | .10140  | .17421  | 1.54126 |
| 10.335    | 20.826  | .01203  | .35433  | .11406  | -.07149 | -.00253 | .00256  | -.01308 | .29034  | .23333  | 1.24434 |
| 10.335    | 22.902  | .01162  | .42329  | .11518  | -.09691 | -.00297 | .00330  | -.01493 | .34510  | .27003  | 1.27425 |
| 6GRADIENT | .00416  | .02202  | -.00734 | -.00950 | -.00026 | -.00017 | -.00017 | -.00017 | .01002  | -.05091 | .00537  |

1A-30 CPMT-107 81-1398 MODEL 32-OT (01 + 71)

(R08017) ( 13 MAR 74 )

REFERENCE DATA

SREP = 30.7300 30.1M. YMRP = .0000 1M.  
 LREP = 12.9000 1M. YMRP = .0000 1M.  
 BREP = 12.9000 1M. ZMRP = -3.3300 1M.  
 SCALE = .5100 SCALE

PARAMETRIC DATA

BETA = .090 ELEVTR = -29.000  
 AIRLON = 10.000 RUDDER = .000  
 SPDRK = .000

RUN NO. 10/ 0 RM/L = 1.00 GRADIENT INTERVAL = -9.00/ 3.00

| MACW     | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CYM     | CT      | CL      | CD      | L/D     |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 15.330   | -10.499 | -.03506 | -.28303 | -.27400 | -.12303 | -.00110 | .00177  | -.00227 | -.23763 | .20200  | -.84036 |
| 15.330   | -8.237  | -.02941 | -.23657 | -.21904 | -.10630 | -.00033 | -.00172 | -.00309 | -.20264 | .29146  | -.80383 |
| 15.330   | -6.277  | -.02330 | -.19456 | -.20744 | -.09190 | -.00030 | .00166  | -.00360 | -.17072 | .22747  | -.79051 |
| 15.330   | -4.200  | -.02156 | -.15505 | -.19202 | -.07760 | -.00027 | .00160  | -.00410 | -.14102 | .20391  | -.69196 |
| 15.330   | -2.166  | -.01333 | -.10424 | -.17600 | -.05531 | -.00012 | -.00124 | -.00463 | -.09748 | .18061  | -.33972 |
| 15.330   | -.128   | -.00644 | -.06434 | -.16637 | -.04152 | -.00033 | .00075  | -.00473 | -.06397 | .16851  | -.30416 |
| 15.330   | 2.069   | .00296  | -.02705 | .15757  | .09267  | -.00040 | -.00011 | -.00402 | -.03272 | .15849  | -.25910 |
| 15.330   | 4.133   | .00279  | .00747  | .14825  | .02514  | -.00065 | .00023  | -.00531 | -.00323 | .14840  | -.22170 |
| 15.330   | 6.396   | .00363  | .04630  | .13976  | .01639  | -.00007 | .00077  | -.00680 | .03092  | .14406  | -.21105 |
| 15.330   | 8.265   | .00552  | .07919  | .13370  | .00737  | -.00092 | .00092  | -.00765 | .03913  | .14377  | -.41131 |
| 15.330   | 10.575  | .00635  | .12475  | .12764  | -.00500 | -.00100 | .00101  | -.00794 | .09921  | .14037  | -.66069 |
| 15.330   | 13.574  | .00115  | .22442  | -.02971 | -.00193 | -.00193 | .00122  | -.00799 | .10443  | .17415  | 1.09905 |
| 15.330   | 20.742  | .01606  | .35001  | -.07451 | -.00260 | -.00260 | .00230  | -.01302 | .29445  | .23337  | 1.26171 |
| 15.330   | 22.752  | .01135  | .42309  | .11306  | -.09929 | -.00316 | .00369  | -.01536 | .34607  | .26094  | 1.20905 |
| GRADIENT |         | .00309  | .01917  | -.00514 | -.00606 | -.00010 | -.00019 | -.00014 | .01616  | -.00041 | -.07931 |

TABULATED SOURCE DATA, LASC CPMT 107

DATE 11 JUN 74

(R00010) ( 13 MAR 74 )

1A-30 CPMT-107 RI-1398 MODEL 32-07 (01 + 71)

PARAMETRIC DATA

REFERENCE DATA

BREF = 30.7500 30. IN.    XMRP =    .0000 IN.  
 LREF = 12.9500 10. IN.    YMRP =    .0000 IN.  
 SREF = 12.9500 10. IN.    ZMRP = -3.3300 IN.  
 SCALE = .5100 SCALE

BETA = .000    ELEVR = 11.000  
 ALLROM = 10.000    NUMBER = .000  
 SPOBRK = .000

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

| MACH   | ALPHA    | BETA    | CM      | CA      | CLM     | CPB     | CTM     | CT      | CL      | CO      | L/D     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.750  | -.03304 | -.23273 | .23219  | .09140  | .00046  | .00219  | -.00326 | -.20320 | -.27311 | -.75395 |
| 10.330 | -8.370   | -.02402 | -.21040 | .21894  | .07892  | -.00057 | .00211  | -.00307 | -.17539 | -.24707 | -.75759 |
| 10.330 | -6.312   | -.02530 | -.18040 | .20822  | .06732  | -.00223 | .00209  | -.00455 | -.14471 | -.22348 | -.54732 |
| 10.330 | -4.189   | -.01940 | -.12989 | .19129  | .05494  | -.00530 | .00202  | -.00506 | -.11357 | -.20226 | -.37707 |
| 10.330 | -2.323   | -.00972 | -.08096 | .17853  | .03959  | -.00060 | .00137  | -.00523 | -.08164 | -.18159 | -.44060 |
| 10.330 | -.212    | -.00400 | -.04822 | .16710  | .02616  | -.00073 | .00106  | -.00542 | -.04769 | -.16720 | -.28450 |
| 10.330 | 2.599    | .00187  | -.00970 | .15711  | .01741  | -.00060 | .00047  | -.00550 | -.01344 | -.15665 | -.09089 |
| 10.330 | 4.099    | .00244  | .02489  | .14855  | .00957  | -.00109 | .00072  | -.00663 | -.01420 | -.14995 | -.58472 |
| 10.330 | 6.114    | .00329  | .05923  | .14216  | .00351  | -.00122 | .00122  | -.00747 | .04375  | -.14766 | -.29630 |
| 10.330 | 8.340    | .00916  | .10202  | .13662  | -.01121 | -.00175 | .00137  | -.00855 | .08112  | -.14997 | -.54594 |
| 10.330 | 10.447   | .00393  | .14400  | .13111  | -.02409 | -.00152 | .00153  | -.00067 | .11791  | -.15556 | -.76504 |
| 10.330 | 15.353   | -.00272 | .24377  | .12224  | -.03159 | -.00254 | .00183  | -.00050 | -.20270 | .10242  | 1.11110 |
| 10.330 | 20.822   | .00834  | .39312  | .12304  | -.10937 | -.00347 | .00332  | -.01387 | .32619  | .23307  | 1.27003 |
| 10.330 | 27.644   | .00531  | .46926  | .12488  | -.14251 | -.00393 | .00416  | -.01557 | .38501  | -.29593 | 1.30152 |
| 10.330 | GRADIENT | .00262  | .01849  | -.00500 | -.00535 | -.00050 | -.00010 | -.00017 | -.01549 | -.00597 | -.00571 |

1A-36 CPMT-107 RI-1390 MODEL 32-OT 101 + T2)

(888019) ( 13 MAR 74 )

REFERENCE DATA

ZREF = 30.9360 IN. XMRP = .0000 IN.  
 LREF = 12.9000 IN. YMRP = .0000 IN.  
 BREF = 12.9000 IN. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

PARAMETRIC DATA

BETA = .000 ELEVTR = 13.900  
 ALLROM = 10.000 RUDDER = .500  
 SPODRK = .500

40M NO. 10/ 0 RM/L = .93 GRADIENT INTERVAL = -9.00/ 9.00

| WACH   | ALPHA    | BETA    | CM      | CA      | CLM     | CBL     | CM      | CV      | CL      | CD      | L/D     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.673  | -.03003 | -.23097 | .22650  | .09041  | .00047  | .00233  | -.00343 | -.20467 | .20814  | -.76343 |
| 10.330 | -8.491   | -.02726 | -.20787 | .21312  | .07770  | -.00014 | .00235  | -.00432 | -.17412 | .24147  | -.72109 |
| 10.330 | -6.477   | -.02340 | -.17090 | .20210  | .06721  | -.00023 | .00235  | -.00400 | -.14700 | .22010  | -.68799 |
| 10.330 | -4.154   | -.02114 | -.12046 | .18635  | .05305  | -.00041 | .00229  | -.00346 | -.11462 | .19317  | -.58731 |
| 10.330 | -2.252   | -.01367 | -.08015 | .17291  | .03850  | -.00063 | .00182  | -.00361 | -.07920 | .17617  | -.45059 |
| 10.330 | -.202    | -.00750 | -.04030 | .16105  | .02466  | -.00073 | .00120  | -.00356 | -.04773 | .16202  | -.29453 |
| 10.330 | 1.506    | .00534  | -.01100 | .15271  | .01732  | -.00079 | .00061  | -.00373 | -.01717 | .15220  | -.11278 |
| 10.330 | 4.051    | .01109  | .02263  | .14367  | .00943  | -.00112 | .00005  | -.00679 | .01242  | .14491  | .58572  |
| 10.330 | 6.342    | .00171  | .06328  | .13670  | -.00043 | -.00127 | .00133  | -.00778 | .04779  | .14206  | .33453  |
| 10.330 | 8.174    | .00590  | .09712  | .13242  | -.01031 | -.00136 | .00143  | -.00805 | .07732  | .14400  | .53369  |
| 10.330 | 10.455   | .00400  | .14201  | .12631  | -.02437 | -.00150 | .00169  | -.00900 | .11732  | .13013  | .78276  |
| 10.330 | 13.300   | -.00310 | .24332  | .11776  | -.05253 | -.00250 | .00197  | -.00875 | .20337  | .17050  | 1.14253 |
| 10.330 | 20.300   | .00751  | .38727  | .11001  | -.10719 | -.00340 | .00307  | -.01343 | .32111  | .24695  | 1.30026 |
| 10.330 | 22.609   | .00599  | .46766  | .12057  | -.14292 | -.00402 | .00437  | -.01606 | .38523  | .29130  | 1.32127 |
|        | GRADIENT | .00203  | .01021  | -.00310 | -.00320 | -.00000 | -.00020 | -.00014 | .01329  | -.00600 | -.60160 |



TABULATED SOURCE DATA. LARC CFMT 107

DATE 11 JUN 74

1A-38 CFMT-107 RI-1398 MODEL 32-07 (01 + 12)

(R00020) ( 13 MAR 74 )

PARAMETRIC DATA

REFERENCE DATA

BETA = .500 ELEVTR = -49.000  
 AIRLON = 10.900 RUDDER = .000  
 SPDRBK = .000

BREF = 30.7300 38-IN. LMRP = .0000 IN.  
 LREF = 12.9550 IN. TMRP = .0000 IN.  
 BRF = 12.9050 IN. ZMRP = -3.3300 IN.  
 SCALE = .5155 SCALE

RUN NO. 19/ 0 RN/L = .98 GRADIENT INTERVAL = -3.00/ 3.00

| MACH     | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CYM     | CY      | CL      | CD      | L/D      |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| 10.330   | -10.086 | -.04783 | -.32998 | .26371  | -.17460 | .09209  | .00340  | -.00239 | -.27033 | .31940  | -.07167  |
| 10.330   | -8.207  | -.03737 | -.28199 | .24696  | .13199  | .06150  | .00238  | -.00286 | -.24303 | .20460  | -.05638  |
| 10.330   | -6.156  | -.03158 | -.23444 | .23223  | .13391  | .00165  | .00233  | -.00342 | -.25840 | .23587  | -.01449  |
| 10.330   | -4.120  | -.02943 | -.18809 | .21428  | .11230  | .00119  | .00285  | -.00446 | -.17221 | .22724  | -.17384  |
| 10.330   | -2.078  | -.01299 | -.12775 | .19050  | .07932  | .00038  | .00161  | -.00468 | -.12071 | .19300  | -.6.1902 |
| 10.330   | -.543   | -.00944 | -.08289 | .17323  | .06022  | -.00001 | .00128  | -.00333 | -.08275 | .17332  | -.47202  |
| 10.330   | 2.151   | .00127  | -.04133 | .16245  | .04645  | -.00019 | .00044  | -.00318 | -.04725 | .16083  | -.29332  |
| 10.330   | 4.134   | .00322  | -.03087 | .15126  | .03360  | -.00054 | .00059  | -.05397 | -.01482 | .15358  | -.03843  |
| 16.330   | 6.459   | .00349  | .03677  | .14165  | .02445  | -.00077 | .00103  | -.00721 | .02973  | .14487  | -.14311  |
| 10.330   | 8.161   | .00796  | .07120  | .13366  | .01421  | -.00093 | .00137  | -.00833 | .03117  | .14441  | .34632   |
| 10.330   | 10.459  | .00973  | .11373  | .12325  | .00592  | -.00102 | .00124  | -.00833 | .09647  | .14053  | .81120   |
| 10.330   | 13.794  | .00442  | .22375  | .11826  | -.02761 | -.00188 | .00156  | -.00800 | .18311  | .17470  | 1.04813  |
| 10.330   | 20.770  | .01893  | .33238  | .11432  | -.07066 | -.00263 | .00236  | -.01324 | .28893  | .23183  | 1.27363  |
| 10.330   | 22.737  | .01588  | .41758  | .11432  | -.09311 | -.00318 | .00375  | -.01509 | .34977  | .26714  | 1.27363  |
| GRADIENT |         | .00384  | .02193  | -.00743 | -.00900 | -.00019 | -.00027 | -.00017 | .01872  | -.00903 | .07333   |

1A-58 CFMT-107 81-1398 MODEL 32-01 (01 + 72)

(880021) ( 13 MAR 74 )

REFERENCE DATA


SREF = 30.7360 30.000 IN. ZMRP = .0000 IN.  
 LREF = 12.9500 12.000 IN. YMRP = .0000 IN.  
 BREF = 12.9500 12.000 IN. ZMRP = -3.3300 IN.  
 SCALE = .5100 SCALE

BETA = .000 ELEVTE = .000  
 AIRLON = .000 RUDDER = -20.000  
 SPDRK = .000

RUN NO. 20/ 0 RW/L = .96 GRADIENT INTERVAL = -.5.00/ 5.00

PARAMETRIC DATA

| MAC1   | ALPHA    | BETA    | CM      | CA      | CLM     | CBL     | CTM     | CT      | CL      | CD      | L/O     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.330  | -.08300 | -.29719 | .22061  | .10134  | -.09337 | .01120  | -.01104 | -.21195 | .27164  | -.70199 |
| 10.330 | -0.647   | -.07514 | -.22187 | .21762  | .09028  | -.09358 | .01056  | -.01110 | -.18661 | .24870  | -.75033 |
| 10.330 | -0.413   | -.08504 | -.17937 | .20466  | .07707  | -.09301 | .00889  | -.01026 | -.15336 | .22381  | -.69878 |
| 10.330 | -4.317   | -.05598 | -.14906 | .18940  | .06404  | -.09244 | .00744  | -.00939 | -.12540 | .19940  | -.62889 |
| 10.330 | -2.208   | -.04160 | -.09505 | .17525  | .04886  | -.09225 | .00397  | -.00880 | -.08797 | .17895  | -.45174 |
| 10.330 | -.135    | -.03125 | -.05411 | .16417  | .03365  | -.09211 | .00470  | -.00818 | -.05373 | .16429  | -.32706 |
| 10.330 | 2.189    | -.01972 | -.01732 | .15470  | .02363  | -.09195 | .00355  | -.00791 | -.02321 | .15392  | -.15082 |
| 10.330 | 4.144    | -.01931 | -.01333 | .14625  | .01872  | -.09215 | .00343  | -.00861 | .00474  | .14698  | .03223  |
| 10.330 | 6.195    | -.01188 | -.04878 | .13887  | .01130  | -.09201 | .00334  | -.00917 | .03333  | .14332  | .23397  |
| 10.330 | 8.449    | -.00465 | -.08901 | .13246  | .00561  | -.09188 | .00306  | -.00978 | .06659  | .14419  | .47397  |
| 10.330 | 10.371   | -.00348 | -.12742 | .12734  | -.01016 | -.09187 | .00281  | -.00986 | .10241  | .14828  | .69105  |
| 10.330 | 13.714   | -.00432 | -.23237 | .11663  | -.03780 | -.09250 | .00228  | -.00900 | .19210  | .17521  | 1.05642 |
| 10.330 | 20.877   | -.01163 | -.36395 | .11218  | -.08474 | -.09301 | .00306  | -.01339 | .30089  | .23347  | 1.20880 |
| 10.330 | 22.857   | -.01229 | -.43995 | .11320  | -.11500 | -.09332 | .00370  | -.01351 | .36144  | .27529  | 1.31334 |
|        | GRADIENT | .00483  | .01815  | -.00499 | -.00521 | .00905  | -.00049 | .00012  | .01518  | -.00606 | -.07770 |

C-2  


REFERENCE DATA

BREF = 30.3300 30. IN. XMRP = .0000 IN.  
 LREF = 12.9000 10. IN. YMRP = .0000 IN.  
 RREF = 12.9000 10. IN. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

BETA = 5.000 ELEV2 = .000  
 ALLCOM = .000 RUDDER = -20.000  
 SPDORS = .000

PARAMETRIC DATA

RUN NO. 21/ 0 RM/L = .96 GRADIENT INTPAVAL = -9.00/ 9.00

| WACH     | ALPHA   | BETA    | CM      | CA      | CLM     | Col     | CYM     | CY      | CL      | CD      | L/D     |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330   | -10.632 | 4.71982 | -27055  | .24170  | -.0484  | -.02228 | .05932  | -.13484 | -.22131 | .20747  | -.76906 |
| 10.330   | -8.643  | 4.78359 | -22516  | .22840  | .09358  | -.02341 | .05049  | -.13276 | -.18628 | .25964  | -.72513 |
| 10.330   | -6.477  | 4.82138 | -18000  | .21484  | .07834  | -.02224 | .05010  | -.14892 | -.15462 | .23378  | -.66130 |
| 10.330   | -4.330  | 4.87775 | -14054  | .20260  | .06839  | -.02052 | .04889  | -.14039 | -.12484 | .21203  | -.59711 |
| 10.330   | -2.273  | 4.91832 | -09637  | .18814  | .04937  | -.02041 | .04335  | -.13475 | -.08884 | .19182  | -.48313 |
| 10.330   | -.179   | 4.93601 | -.05499 | .17672  | .03358  | -.01989 | .04151  | -.12903 | -.05444 | .17609  | -.30776 |
| 10.330   | 1.903   | 4.93266 | -.01633 | .16718  | .02345  | -.01908 | .03710  | -.12106 | -.02211 | .16652  | -.13276 |
| 10.330   | 4.039   | 4.96309 | .02034  | .15753  | .01711  | -.01825 | .03290  | -.11315 | .00913  | .15837  | .05760  |
| 10.330   | 6.141   | 4.98258 | .05894  | .14825  | .00724  | -.01751 | .02940  | -.10788 | .04274  | .15370  | -.27009 |
| 10.330   | 8.246   | 4.99972 | .09968  | .14047  | -.00434 | -.01700 | .02875  | -.10402 | .07850  | .15332  | .51201  |
| 10.330   | 10.315  | 4.99847 | .14177  | .13332  | -.01737 | -.01658 | .02291  | -.10115 | .11560  | .15655  | -.73842 |
| 10.330   | 13.354  | 4.89086 | .25209  | .12377  | -.04965 | -.01885 | .02502  | -.10658 | .20913  | .18076  | 1.10791 |
| 10.330   | 20.585  | 4.78134 | .38889  | .12327  | -.09810 | -.02192 | .02324  | -.10951 | .32185  | .29248  | 1.27398 |
| 10.330   | 22.866  | 4.67543 | .46849  | .12431  | -.13132 | -.0.144 | .02820  | -.11451 | .38337  | .29659  | 1.29262 |
| GRADIENT |         | .00973  | .01910  | -.00528 | -.00383 | .00026  | -.00188 | .00326  | -.01591 | -.00634 | .07793  |

IA-50 CFMT-107 RI-1398 MODEL 32-OT (01 + 11)

(NR0023) ( 13 MAR 74 )

## REFERENCE DATA

REF = 30.7360 90 IN. ZMRP = .0000 IN.  
 LREF = 12.9000 IN. YMRP = .0000 IN.  
 BRP = 12.9000 IN. ZMRP = -3.3300 IN.  
 SCALE = .0100 SCALE

## PARAMETRIC DATA

BETA = 5.000 ELEVTR = .000  
 AIRLON = .000 RUDDER = .000  
 SPOBRK = .000

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

| MACH   | ALPHA    | BETA    | CW      | CA      | CLM     | CBL     | CTM     | CT      | CL      | CD      | L/D     |
|--------|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.628  | 4.81592 | -26905  | .23047  | .10545  | -.01695 | .04795  | -1.4505 | -.22046 | .28399  | -7.7629 |
| 10.330 | -8.459   | 4.86107 | -21925  | .22427  | .08861  | -.31840 | -.04703 | -1.4316 | -.18370 | .25421  | -7.7262 |
| 10.330 | -6.348   | 4.90688 | -18044  | .21258  | .07592  | -.01766 | .04436  | -1.3914 | -.13502 | .23177  | -6.6883 |
| 10.330 | -4.408   | 4.95066 | -14112  | .20109  | .06456  | -.01707 | .04109  | -1.3455 | -.12325 | .21134  | -5.9263 |
| 10.330 | -2.356   | 4.98859 | -09661  | .18630  | .04799  | -.01741 | .03765  | -1.2960 | -.08907 | .19012  | -4.6848 |
| 10.330 | -.212    | 5.00924 | -.09571 | .17468  | .03398  | -.01691 | .03401  | -1.2373 | -.05506 | .17489  | -3.1483 |
| 10.330 | 1.918    | 5.02136 | -.01670 | .16332  | .02393  | -.01630 | .03077  | -1.1603 | -.02222 | .16467  | -1.3494 |
| 10.330 | 4.082    | 5.02902 | .02141  | .15567  | .01526  | -.01574 | .02672  | -.10855 | .01027  | .15680  | -.06552 |
| 10.330 | 6.146    | 5.01994 | .06064  | .14665  | .00542  | -.01344 | .02470  | -.10409 | .04459  | .15230  | -.29278 |
| 10.330 | 8.352    | 5.01084 | .10181  | .13911  | -.00603 | -.01150 | .02323  | -.10212 | .08065  | .15235  | -.32941 |
| 10.330 | 10.357   | 5.00366 | .14336  | .13208  | -.01805 | -.01168 | .02098  | -.10049 | .11728  | .15571  | -.75323 |
| 10.330 | 15.568   | 4.92250 | .23189  | .12521  | -.05013 | -.01871 | .02273  | -.10747 | .20924  | .18000  | 1.11299 |
| 10.330 | 20.602   | 4.76488 | .39364  | .12323  | -.10093 | -.02226 | .02384  | -.11108 | .32510  | .25386  | 1.26083 |
| 10.330 | 22.644   | 4.71038 | .48161  | .12407  | -.12874 | -.02417 | .02568  | -.11437 | .37815  | .29236  | 1.29343 |
|        | GRADIENT | .00889  | .01906  | -.00928 | -.00977 | .00018  | -.00168 | .00309  | .01589  | -.00632 | -.07769 |

DATE 11 JUN 74

TABULATED SOURCE DATA. LARC CFHT 107

(IRK024) ( 13 MAR 74 )

1A-56 CFHT-107 RI-1398 MODEL 32-OT (01 + 12)

PARAMETRIC DATA

REFERENCE DATA

SREF = 38.7360 SB-IM. YMRP = .0000 IM.  
 LREF = 12.9000 IM. YMRP = .0000 IM.  
 BREF = 12.9000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

RUN NO. 22/ 0 RM/L = .97 GRADIENT INTERVAL = -3.00/ 5.00

| WACH   | ALPHA   | BETA    | CM      | CA      | CLM     | CBL     | CTM     | CY      | CL      | CD      | L/D     |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 10.330 | -10.979 | -.03644 | -.25963 | .22702  | .09998  | .00070  | .00214  | -.00306 | -.21339 | .27181  | -.78563 |
| 10.330 | -8.376  | -.03037 | -.21611 | .21411  | .08649  | .00013  | .00210  | -.00377 | -.18262 | .24331  | -.75056 |
| 10.330 | -6.415  | -.02593 | -.17882 | .20267  | .07337  | .00003  | .00213  | -.00451 | -.15504 | .22158  | -.69970 |
| 10.330 | -4.342  | -.02277 | -.14062 | .19790  | .06302  | -.00007 | .00208  | -.00489 | -.12599 | .19881  | -.63626 |
| 10.330 | -2.210  | -.01482 | -.09395 | .17323  | .04508  | -.00040 | .00167  | -.00543 | -.08720 | .17772  | -.49346 |
| 10.330 | -.134   | -.00966 | -.05440 | .16302  | .03272  | -.00040 | .00090  | -.00504 | -.05402 | .16314  | -.33112 |
| 10.330 | 2.171   | -.00208 | -.01733 | .13347  | .02481  | -.00057 | .00035  | -.00532 | -.02314 | .15270  | -.15191 |
| 10.330 | 4.144   | -.00029 | .01549  | .14500  | .01786  | -.00081 | .00049  | -.00611 | -.04574 | .14574  | .03413  |
| 10.330 | 6.153   | .00126  | .04839  | .13779  | .01066  | -.00092 | .00093  | -.00704 | .03334  | .14219  | .23459  |
| 10.330 | 8.397   | .00323  | .08861  | .13193  | .00330  | -.00104 | .00116  | -.00820 | .06859  | .14348  | .47804  |
| 10.330 | 10.330  | .00462  | .12656  | .12690  | -.01033 | -.00111 | .00120  | -.00802 | .10175  | .14754  | .68966  |
| 10.330 | 15.422  | -.00229 | .22606  | .11669  | -.00359 | -.00205 | .00144  | -.00802 | .00144  | .17260  | 1.08279 |
| 10.330 | 20.645  | .01095  | .36326  | .11188  | -.04455 | -.00286 | .00271  | -.01327 | .30048  | .23277  | 1.29092 |
| 10.330 | 22.663  | .00586  | .43237  | .11290  | -.11211 | -.00345 | .00398  | -.01572 | .35549  | .27078  | 1.31285 |
| 10.330 |         | .00271  | .01821  | -.00494 | -.00008 | -.00008 | -.00021 | -.00011 | .01926  | -.00602 | .07877  |

1A-56 CFHT-107 RI-1398 MODEL 32-OT (01 + 12)

(IRK023) ( 13 MAR 74 )

PARAMETRIC DATA

REFERENCE DATA

SREF = 38.7360 SB-IM. YMRP = .0000 IM.  
 LREF = 12.9000 IM. YMRP = .0000 IM.  
 BREF = 12.9000 IM. ZMRP = -3.3300 IM.  
 SCALE = .0100 SCALE

RUN NO. 24/ 0 RM/L = .93 GRADIENT INTERVAL = -5.00/ 5.00

| WACH   | BETA  | ALPHA     | CM      | CA     | CLM    | CBL     | CTM    | CY      | CL      | CD     | L/D     |
|--------|-------|-----------|---------|--------|--------|---------|--------|---------|---------|--------|---------|
| 10.330 | -.028 | -10.95993 | -.23928 | .22769 | .08974 | .00062  | .00220 | -.00336 | -.21310 | .27134 | -.74568 |
| 10.330 | 1.995 | -10.95913 | -.26320 | .23058 | .10218 | -.00603 | .02119 | -.06172 | -.21836 | .27500 | -.78676 |
| 10.330 | 4.786 | -10.89072 | -.28559 | .23612 | .10386 | -.01613 | .04636 | -.14079 | -.21738 | .28114 | -.77319 |
| 10.330 |       | -.01002   | -.00128 | .00177 | .00080 | -.00349 | .00916 | -.02893 | -.00084 | .00205 | .00273  |

ALPHA = -10.000  
 AILROM = .000  
 SPOBRK = .000  
 ELEVTR = .000  
 RUDDER = .000

## TABULATED SOURCE DATA, LARC CFHT 107

IA-50 CFHT-107 RI-1398 MODEL 32-0T (01 + 12)

(IRK026) ( 13 MAR 74 )

PAGE 10

## REFERENCE DATA

SREF = 30.7300 SB. IN. YMRP = .0000 IN.  
 LREF = 12.9050 IN. YMRP = .0000 IN.  
 OREF = 12.9000 IN. YMRP = .0000 IN.  
 SCALE = .0100 SCALE

## PARAMETRIC DATA

ALPHA = 10.000 ELEVTR = .000  
 AIRLON = .000 RUDDER = .000  
 SPDRK = .000

RUN NO. 25/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 9.00

| MACH     | BETA    | ALPHA    | CN     | CA     | CLM     | CBL     | CYN     | CY      | CL     | CD     | L/D    |
|----------|---------|----------|--------|--------|---------|---------|---------|---------|--------|--------|--------|
| 10.330   | -2.172  | 10.47852 | .14479 | .13193 | -.01931 | -.01290 | -.01039 | .06460  | .11030 | .19006 | .75050 |
| 10.330   | -2.041  | 10.47510 | .13320 | .12701 | -.01320 | -.00360 | -.00474 | .02612  | .10775 | .14990 | .71001 |
| 10.330   | -.029   | 10.48035 | .12931 | .12620 | -.01134 | -.00129 | .00114  | -.00890 | .10410 | .14769 | .70536 |
| 10.330   | 2.015   | 10.48035 | .13160 | .12754 | -.01260 | -.00684 | .00010  | -.04394 | .10621 | .14935 | .71114 |
| 10.330   | 4.970   | 10.46487 | .14311 | .13065 | -.01957 | -.01573 | .02133  | -.09971 | .11700 | .19447 | .75747 |
| GRADIENT | -.50153 |          | .00151 | .00046 | -.00096 | -.00279 | .00373  | -.01791 | .00141 | .00072 | .00370 |

IA-50 CFHT-107 RI-1398 MODEL 32-0T (01 + 12)

## REFERENCE DATA

SREF = 30.7300 SB. IN. YMRP = .0000 IN.  
 LREF = 12.9000 IN. YMRP = .0000 IN.  
 OREF = 12.9000 IN. YMRP = .0000 IN.  
 SCALE = .0100 SCALE

## PARAMETRIC DATA

ALPHA = 20.000 ELEVTR = .000  
 AIRLON = .000 RUDDER = .000  
 SPDRK = .000

(IRK027) ( 13 MAR 74 )

RUN NO. 26/ 0 RN/L = .95 GRADIENT INTERVAL = -5.00/ 9.00

| MACH     | BETA    | ALPHA    | CN     | CA     | CLM     | CBL     | CYN     | CY      | CL     | CD     | L/D     |
|----------|---------|----------|--------|--------|---------|---------|---------|---------|--------|--------|---------|
| 10.330   | -1.914  | 20.64203 | .30672 | .11392 | -.00606 | .00372  | -.00294 | .02155  | .30302 | .23500 | 1.20400 |
| 10.330   | .126    | 20.64910 | .36306 | .11232 | -.00434 | -.00320 | .00296  | -.01924 | .30000 | .23341 | 1.20903 |
| 10.330   | 1.996   | 20.65451 | .36726 | .11603 | -.00509 | -.01012 | .00069  | -.04906 | .30245 | .23607 | 1.20615 |
| 10.330   | 4.775   | 20.63780 | .30154 | .12302 | -.10019 | -.02171 | .02283  | -.10910 | .32306 | .25313 | 1.27625 |
| GRADIENT | -.50056 |          | .00376 | .00149 | -.00210 | -.00381 | .00384  | -.01950 | .00300 | .00272 | -.00199 |