

QCX
Avro
CF105
P-WT-III

ANALYZE

G-105

Classification cancelled / Changed / WT/III

By authority of

0.03 LANGLEY W/T TESTS

Date

M = 1.41 - APRIL 1956

Signature

(HSAL)

Copy 2

Unit / Rank / Department

AVES

2 Sept 66

AB-03

AVES

Temple

ANALYZED

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AÉRO / G.M.
CNRC - ICIST

15855181

N.A.C.A. LANGLEY W/T TESTS

.03 SCALE C-105

M = 1.41

APRIL 1956

	1	2	3	4	5	6	7	8	9	10
RUN NO.	1	3	4	13	14	15	16	11	12	9
POINTS	14 to 23	1 to 10	1 to 11	1 to 11	1 to 10	1 to 10	1 to 10	1 to 10	1 to 10	1 to 11
δ_e° L	0	0	0	0	-30.0	0	0	0	0	0
δ_a° R	0	0	0	0	+4.2	0	0	0	0	+4.2
δ_R°	0	0	0	0	0	-	-	+9.7	+20.0	0
α°	-4 to +12	-4 to +14	-4 to +14	-4 to +14	-4 to +14	-4 to +14	-4 to +14	-4 to +14	-4 to +14	-4 to +14
β°	0	0	0	0	0	0	0	0	0	0
CONFIGURATION	B ₁ V ₁ W ₁	B ₁ V ₁ W ₁	B ₁ V ₁ W ₁	B ₁ -1 V ₁	B ₁ V ₁ W ₁	B ₁ W ₁	B ₁ W ₁	B ₁ V ₁ W ₁		
SECTION	E ₁₀ N ₅	E ₁₀ N ₅	E ₁₀ N ₅	W ₁ E ₁₀ N ₅	E ₁₀ N ₅	E ₁₀ N ₅	E ₁₀ N ₅	E ₁₀ N ₅	E ₁₀ N ₅	
	D8.4	D8.4 F _D	D8.4 R _N	D8.4	D8.4	D8.4 F ₄	D8.4	D8.4		
SHEET NO.	Also 5,	1			2	3	4	5		
1 C _M vs C _L	X	X	X	X			X		X	
2 C _D vs C _L	X	X	X	X			X			
3 C _D vs C _L ²	X			X						
4 C _L	X (Sht 7)	X	X							
5 C _M	X									
6 C _D										
7 C _n	X							X	X	
8 C _y	X							X	X	
9 C _z	X							X	X	X
10 C _{Mf}					X (Sht 5)			X	X	
11 C _{MfLE}					X (Sht 5)			X	X	
12 C _{MfR}					X (Sht 5)			X	X	
13 C _{H_e}			X (Sht 7)	X (Sht 7)						
14 C _{H_a}	X (Sht 6)				X					X (Sht 2)
15 C _H				X (Sht 5)				X	X	
16 C _{MfLE} vs C _{Nf}										
17 C _{MfR} vs C _{Nf}										
18	BASIC	FAIRED DUCTS	TRANSITION FIXED	30° NOSE	ELEVS. -30° RAWN +4.2°	TAIL OFF FAIRED DUCTS	TAIL OFF BASIC	RUDDER EFFECT		AIL EFF

MALTON, ONTARIO
ENGINEERING DIVISION — AIRCRAFT

DATE . . April 1956

PREPARED BY D. Ewart

5% Notch
 .4 Droops
 Faired Ducts
 Transition Fixed

WEIGHT

C-105

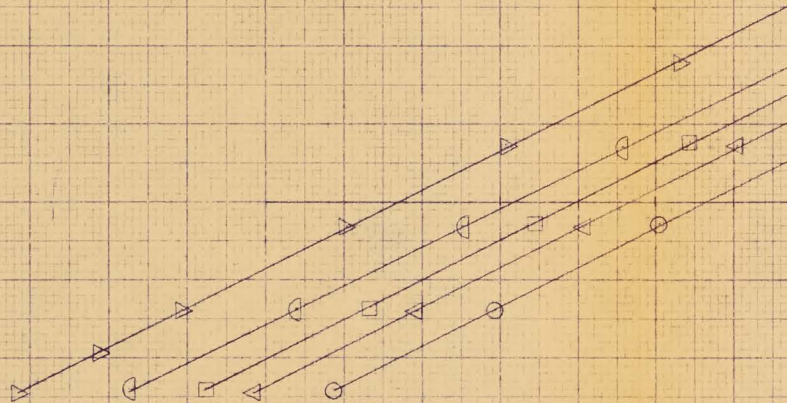
28 c

[illegible]

C-105
0.3 LANGLEY MODEL

Sm HSC
M = 1.11

RUN	CONFIGURATION	RADOME	INTAKES
1	B, V, W, E ₁₀ NS D ₈₋₄	50°	OPEN
4	B, V, W, E ₁₀ NS D ₈₋₄ , R ₈	50°	OPEN TRANS. FIXED
16	B, W, E ₁₀ NS D ₈₋₄	50°	OPEN TAIL DEF
3	B, V, W, E ₁₀ NS D ₈₋₄ FD	50°	FAIRED
13	B ₁₋₁ , V, W, E ₁₀ NS D ₈₋₄	30°	OPEN



▽ RUN 13
PTS. 1-11
○ RUN 3
PTS. 1-10
□ RUN 16
PTS. 1-10
△ RUN 4
PTS. 1-11

C-105

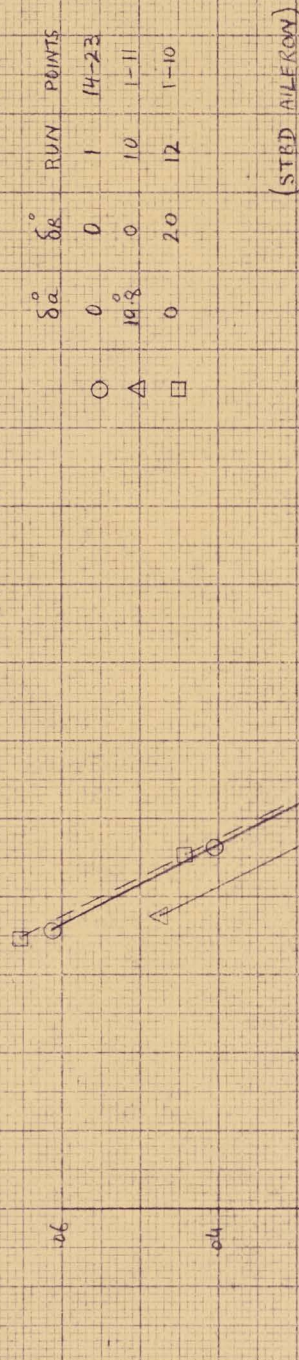
OR LANGLEY MODEL

C_m vs C_L

RUDDER AND AILERON EFFECT

$M = 1.11$

CONFIG. B, $V_d/E_0 M_0 D_0 = 4$
50° CONICAL RADOME, INTAKES OPEN



C-105

03 LANGLEY MODEL

Cm vs δe

M = 1-11

CONFIG. B, V, W, E, G, NS Dg-4

.16

.14

.12

.10

.08

.06

.04

Cm

(meas'd) $\delta e = -3.0^\circ$

(meas'd) $\delta e = -10.2^\circ$

(meas'd) $\delta e = -4.9^\circ$

O RUN 5 PTS. 1-11

Δ RUN 6 PTS. 1-11

$\square$ RUN 8 PTS. 1-10

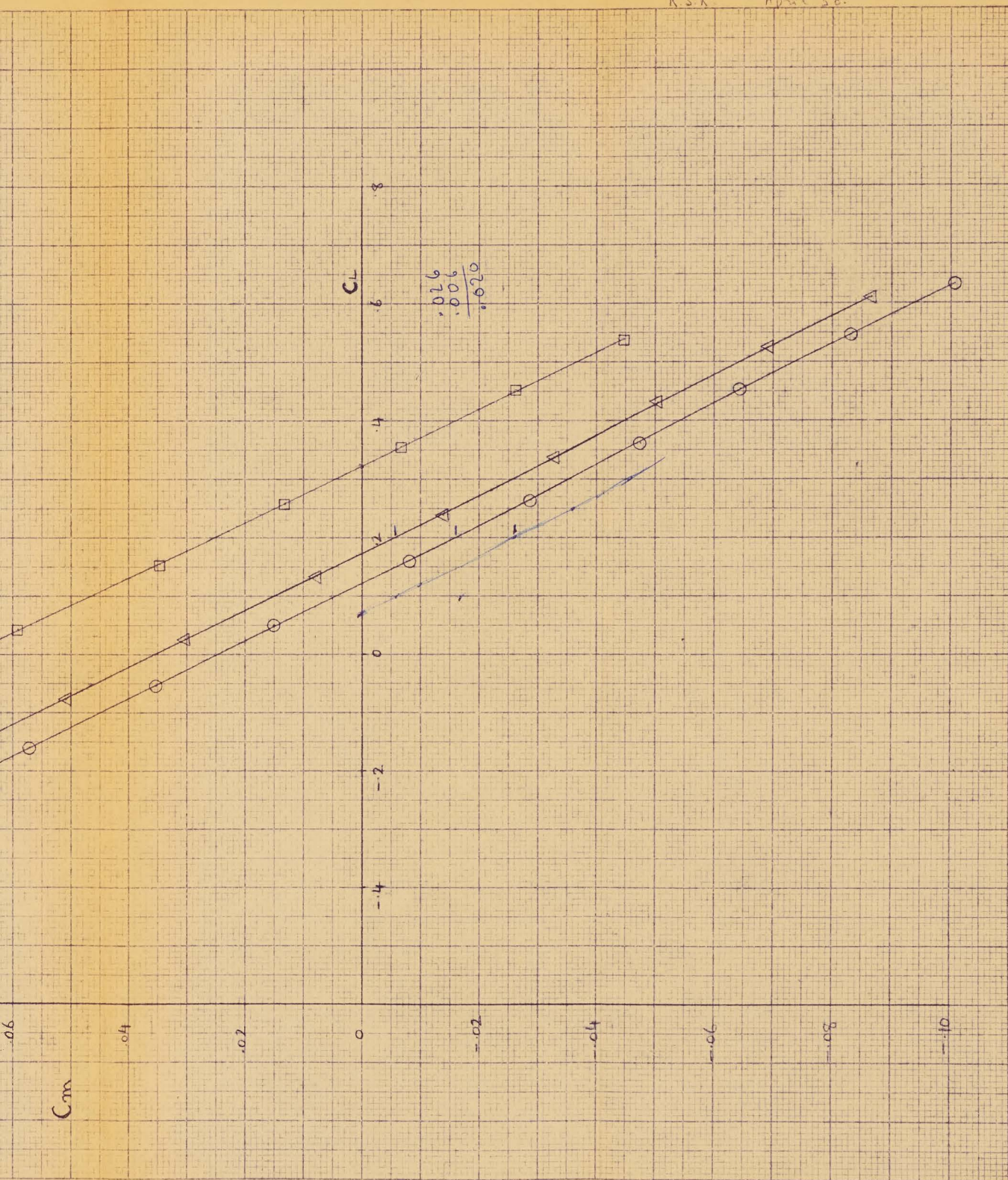


PIWT/ 111

Str. 17

R.S.R.

April 56.



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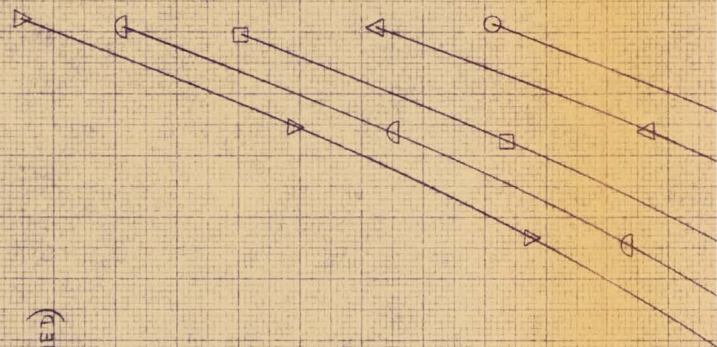
DELANGLEY MODEL

CD VS CL

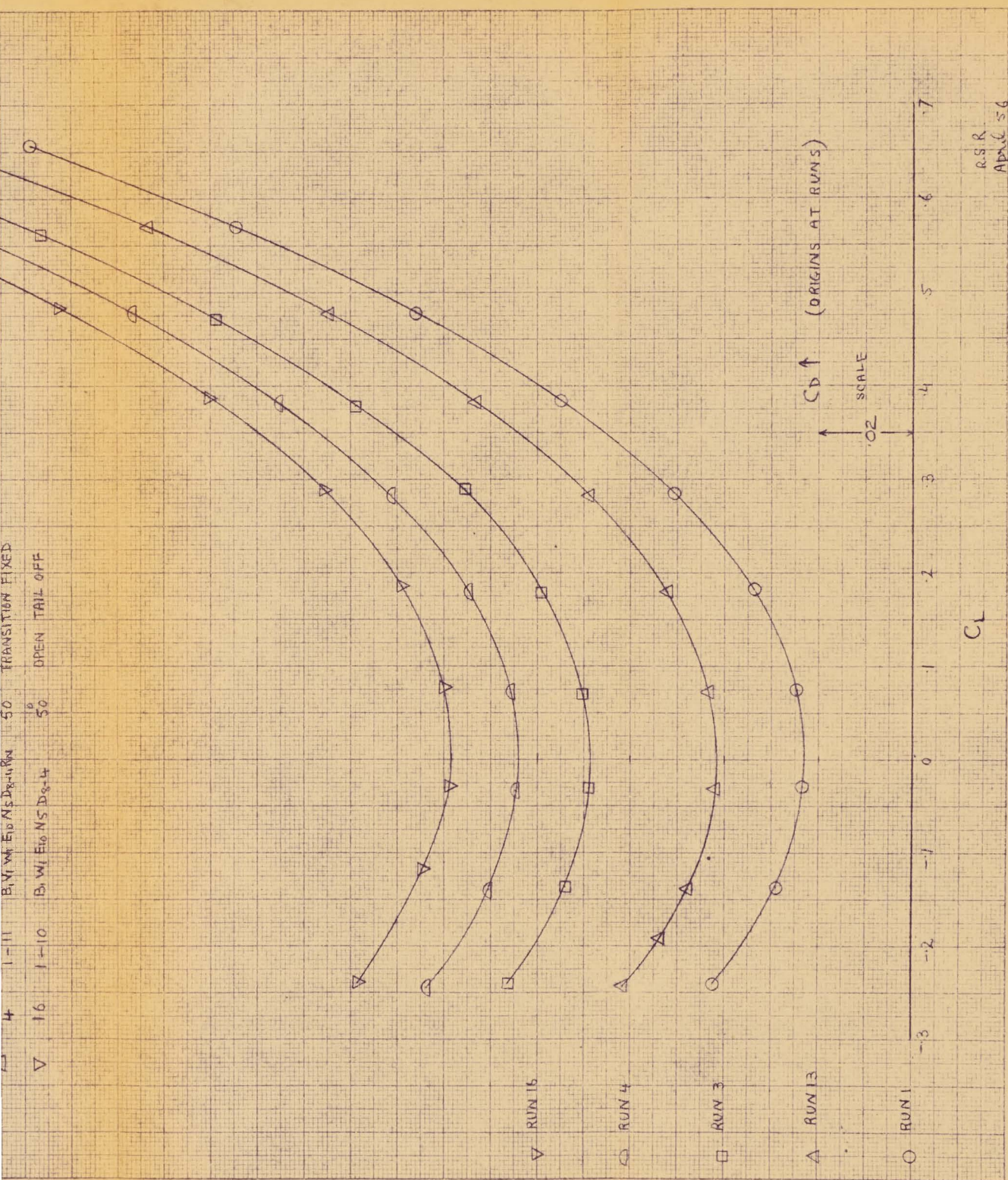
M = 1.41

(BASE PRESSURE CORRECTION NOT APPLIED)

RUN	POINTS	CONFIGURATION	RADOME	INTAKES
1	14-23	B ₁ V ₁ W ₁ E ₁₀ NSD ₈₋₄	50°	OPEN
13	1-11	B ₁ -V ₁ W ₁ E ₁₀ NSD ₈₋₄	30°	OPEN
3	1-10	B ₁ V ₁ W ₁ E ₁₀ NSD ₈₋₄ FD	50°	FAIRED
4	1-11	B ₁ V ₁ W ₁ E ₁₀ NSD ₈₋₄ FW	50°	TRANSITION FIXED
16	1-10	B ₁ W ₁ E ₁₀ NSD ₈₋₄	50°	OPEN TAIL OFF



P/WT/III Shr. 2.1
2.4



RSR
APR 25 6

C-105

ORLANDALEY MODEL

C_p vs C_L

$M = 1.41$

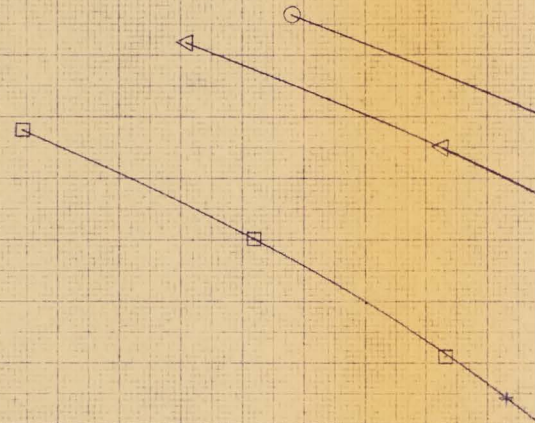
CONFIGURATION

B₁ V₁ W₁ E₁₀ N₅ D₈₋₄

50° CONICAL RADOME

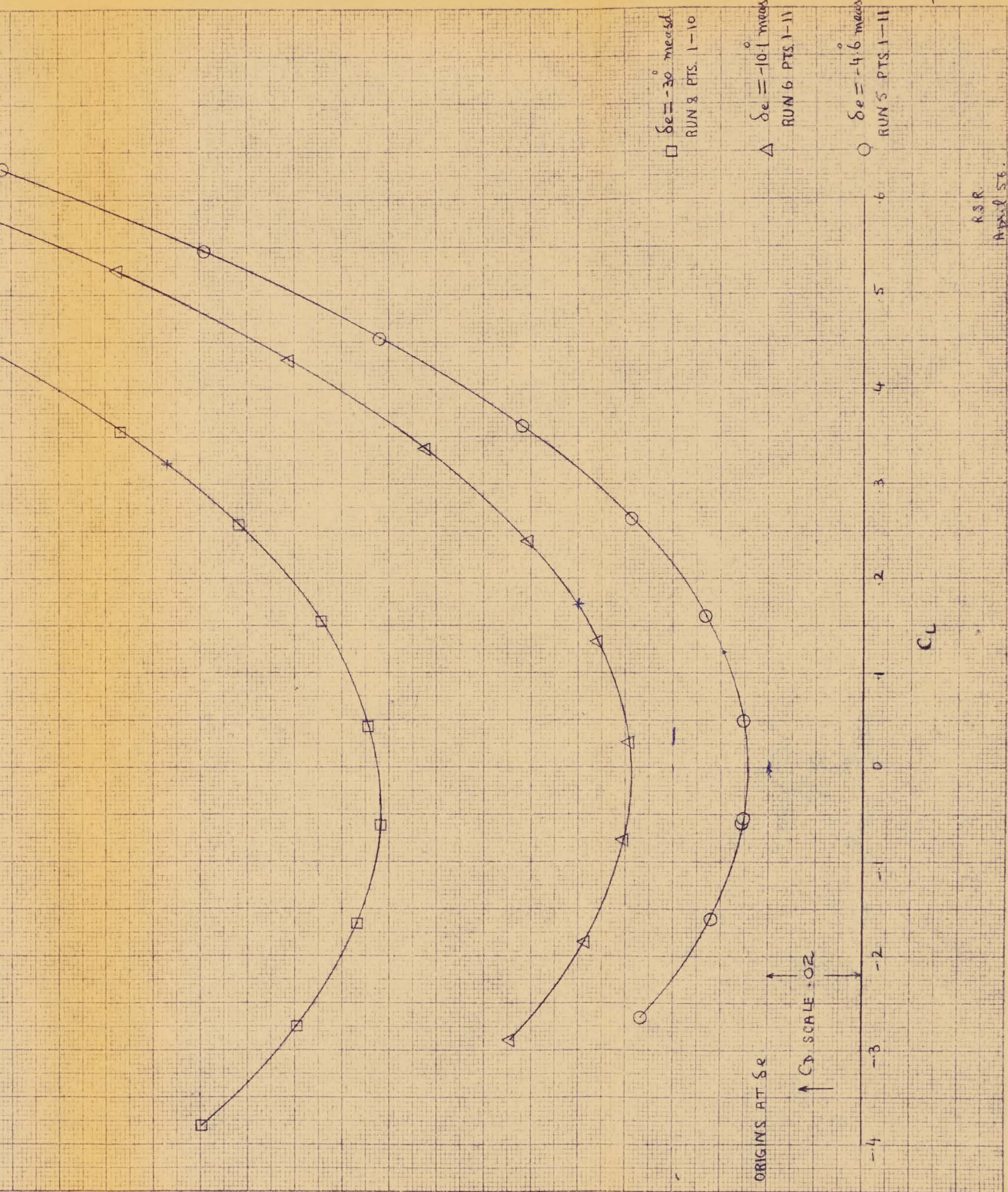
INTAKES OPEN

(BASE PRESSURE CORRECTION NOT APPLIED)



RSR P/WT/III

Sheet. 2.7
April 56



RSR
April 56

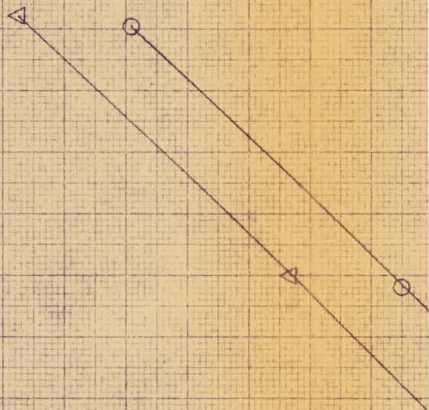
C-105

0.3 LANGLEY MODEL

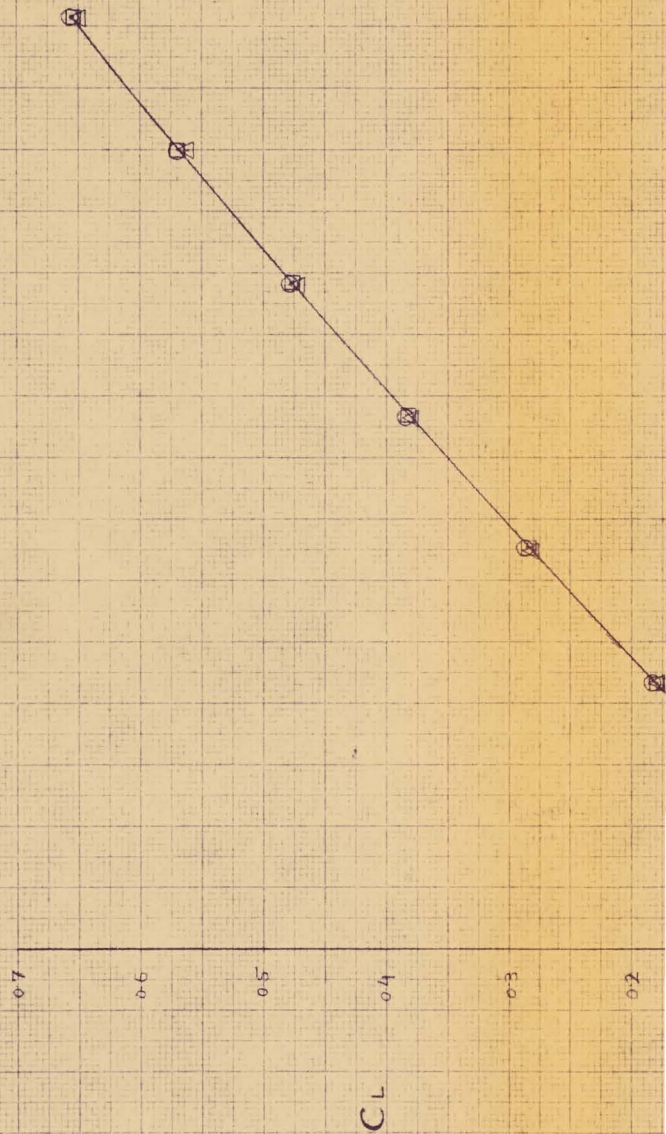
$$C_D \propto (C_L - C_{L, \text{min}})^2$$

$$M = 1.41$$

RUN	CONFIGURATION	RADOME	INTAKE
1	B ₁ V ₁ W ₁ E ₁₀ N ₅ D ₈ -4	50°	OPEN
13	B ₁ -1V ₁ W ₁ E ₁₀ N ₅ D ₈ -4	30°	OPEN



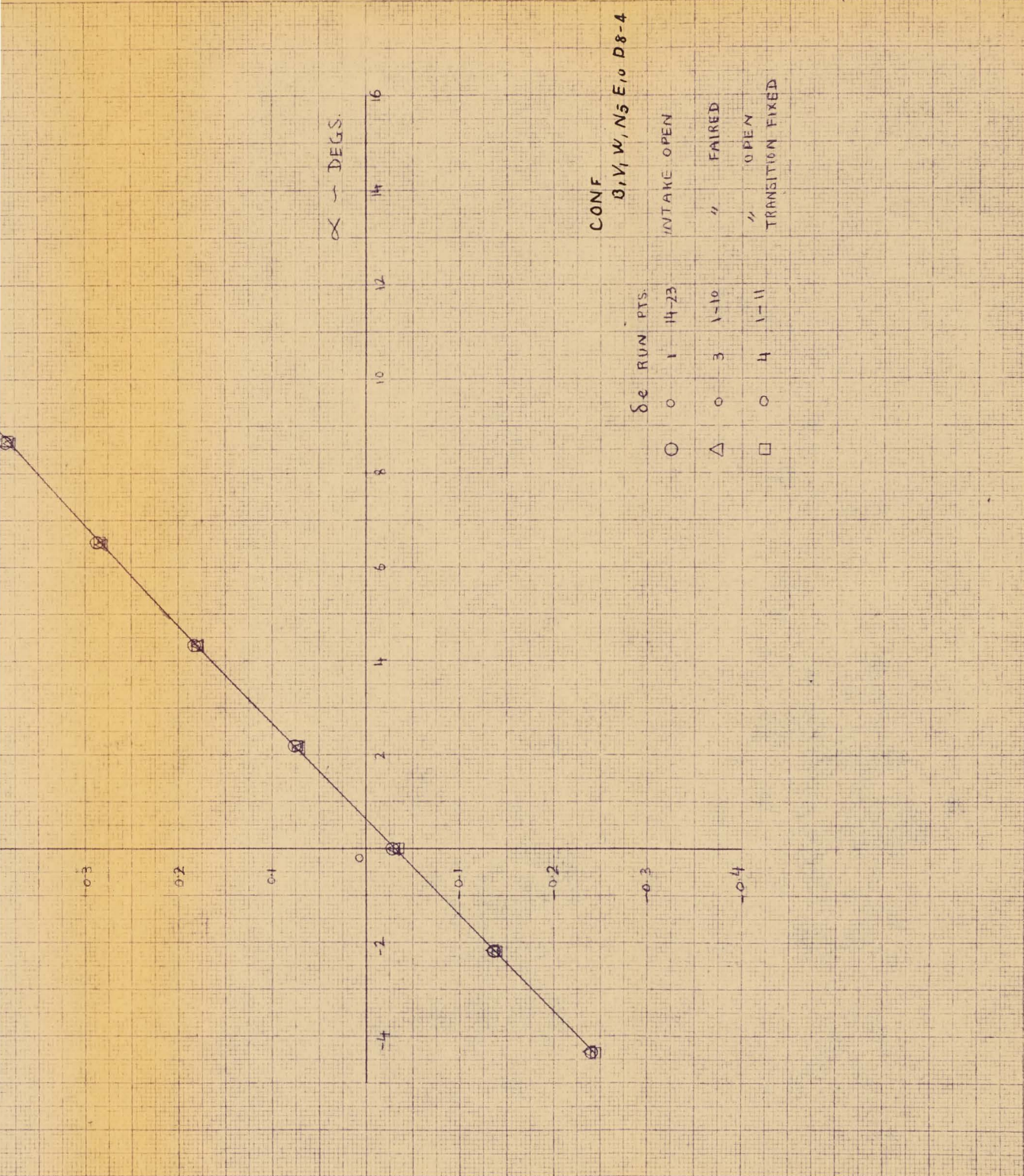
C-105
0.3 LANGLEY MODEL
C_L vs α
M = 1.41



P/WT/111

Sht. 4.1.

RSR April 53



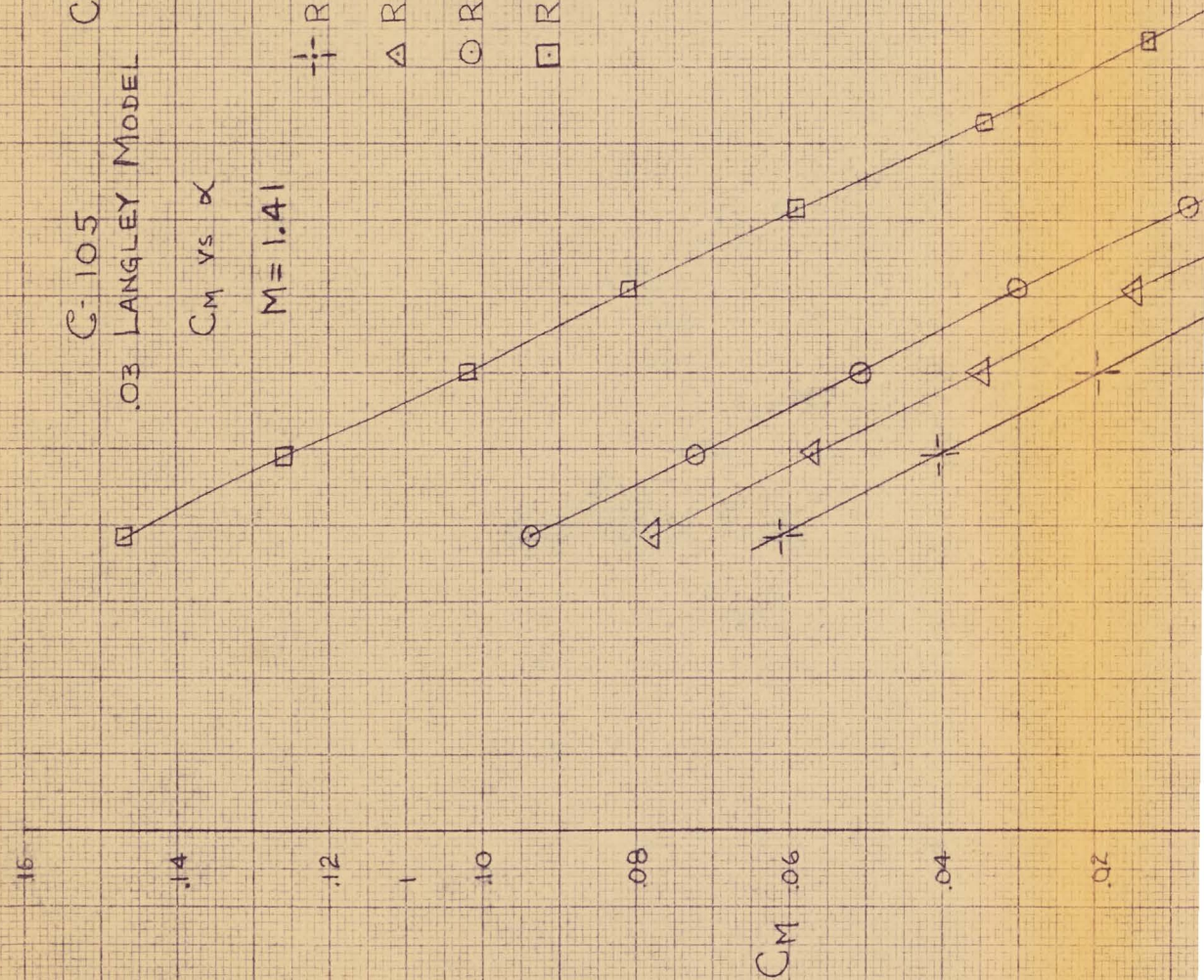
C-105
.03 LANGLEY MODEL

CONFIG. B, V, W, E, N, Dg-4
50° CONICAL RADOME
INTAKES OPEN

C_M vs α

$M = 1.41$

1- Run 1 Pts. 14-23 (meas'd) $\delta_e^\circ = 0$
 Δ Run 5 Pts. 1-11 (meas'd) $\delta_e^\circ = -4.9$
 $\circ$ Run 6 Pts. 1-11 (meas'd) $\delta_e^\circ = -10.2$
 $\square$ Run 8 Pts. 1-10 (meas'd) $\delta_e^\circ = -30.0$

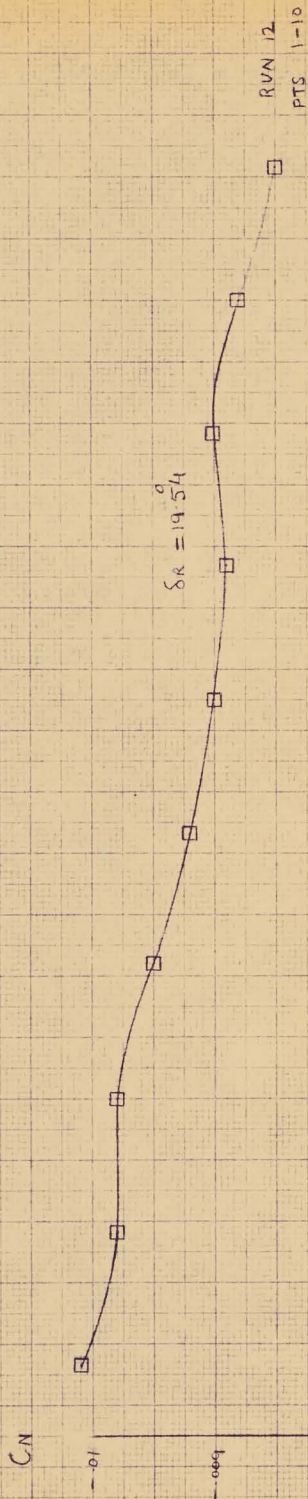


C-105

03 LANGLEY MODEL

CN VS α
M=1.41

CONFIG. BY M. E. O. N. S. Dg-4
50 CONICAL RADOME
INTAKES OPEN



P/WT/111 Sht 7.5
 RSR. Apr. 56.

RUN II
 PTS. 1-10

$\delta R = 9.49^\circ$



RUN I
 PTS 14-23

$\delta R = 0^\circ$



$\alpha \sim \text{DEG}$

RSR.
 April 56

YAWING
MOMENT COEFF.

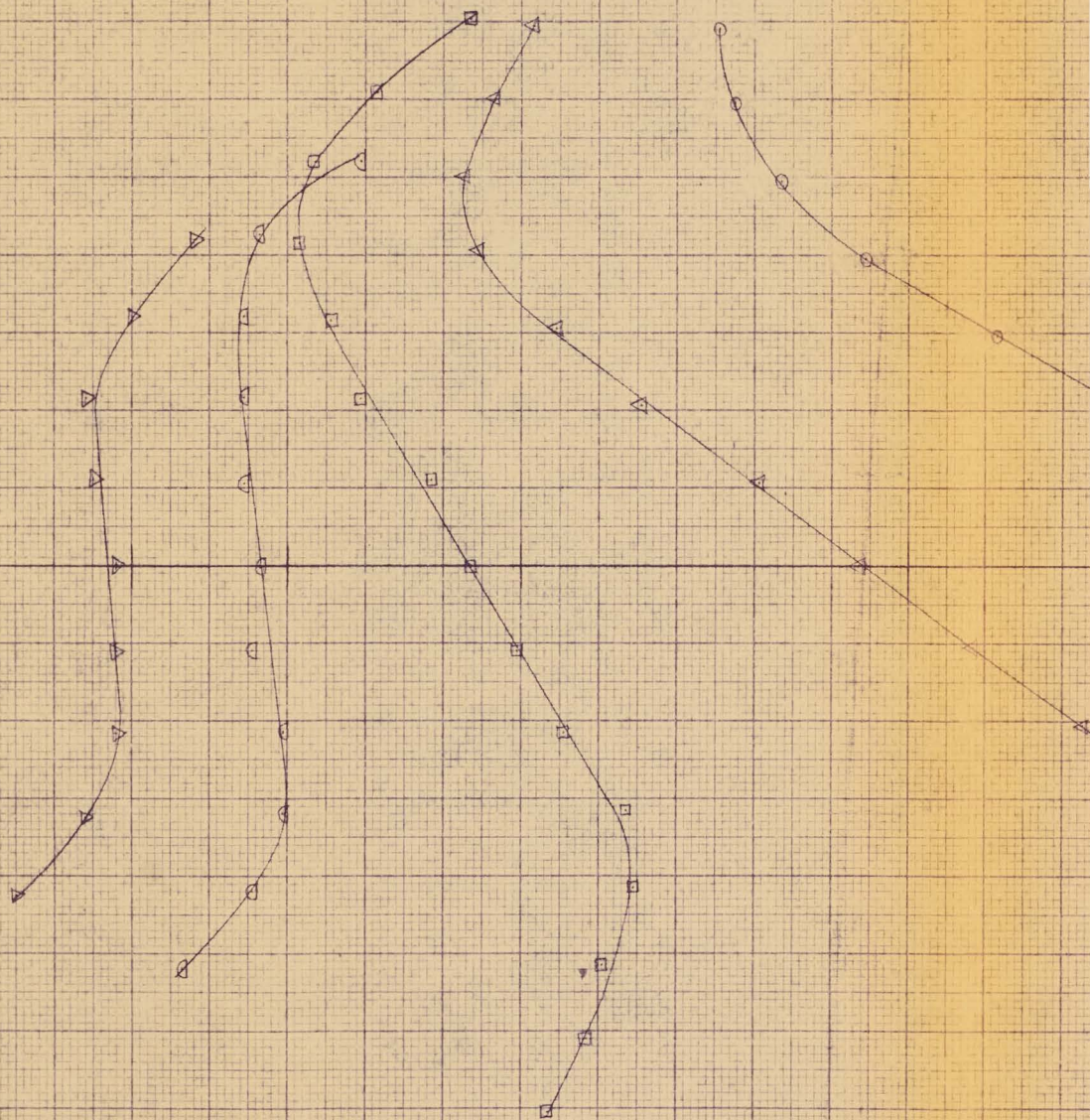
C_n

$\alpha \doteq 15.0^\circ$ (∇)

$\alpha \doteq 12.8^\circ$ ($\square$)

$\alpha \doteq 8.4^\circ$ ($\square$)

$\alpha \doteq 4.2^\circ$ (Δ)



$\alpha \approx 4.2^\circ$ (A)

$\alpha \approx 0^\circ$ (O)

C-105

.03 LANGLEY MODEL

$M = 1.41$

1 C_n SCALE
.001

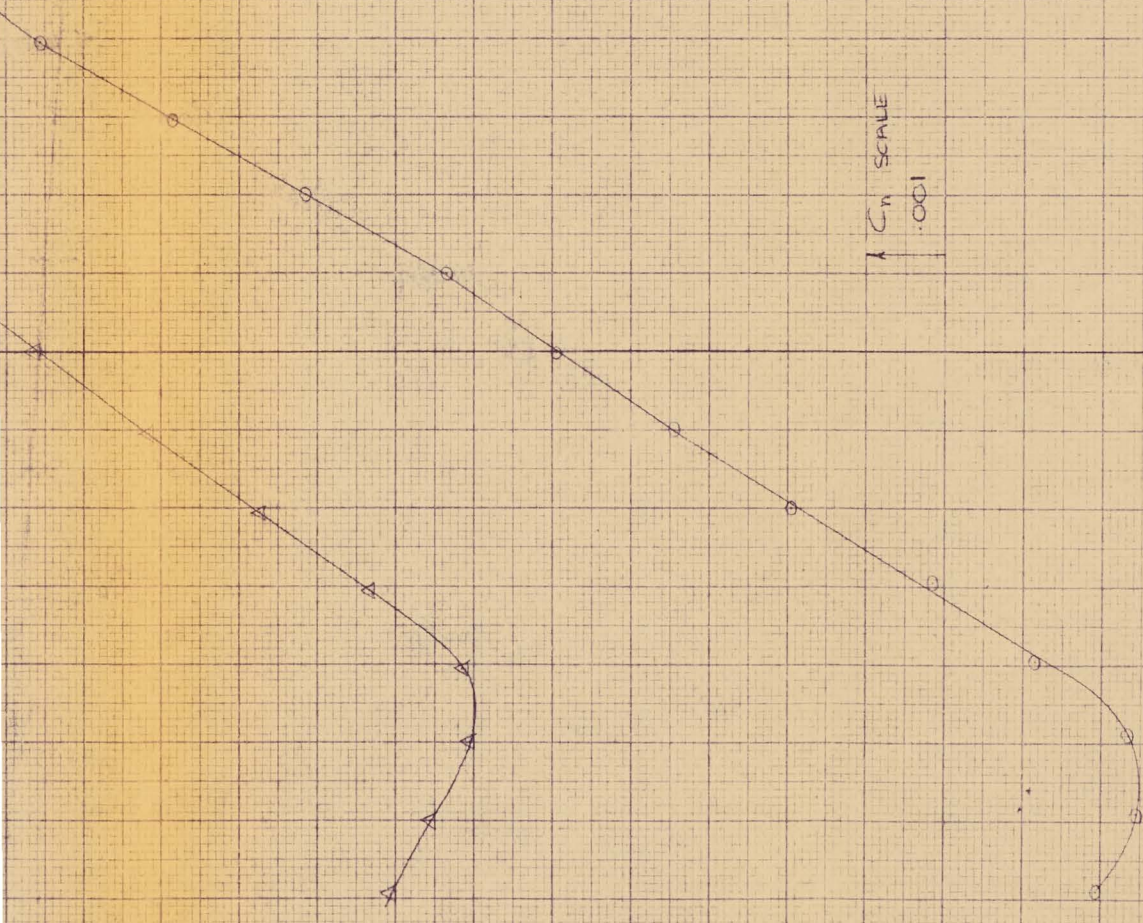
C_n vs β

CONFIG. B, V, W, E, N, S, P, A
(50° CONICAL RADOME)

P/W T, III

Sht. 7.8
Rps '56

-14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 β DEGS.
SIDESLIP



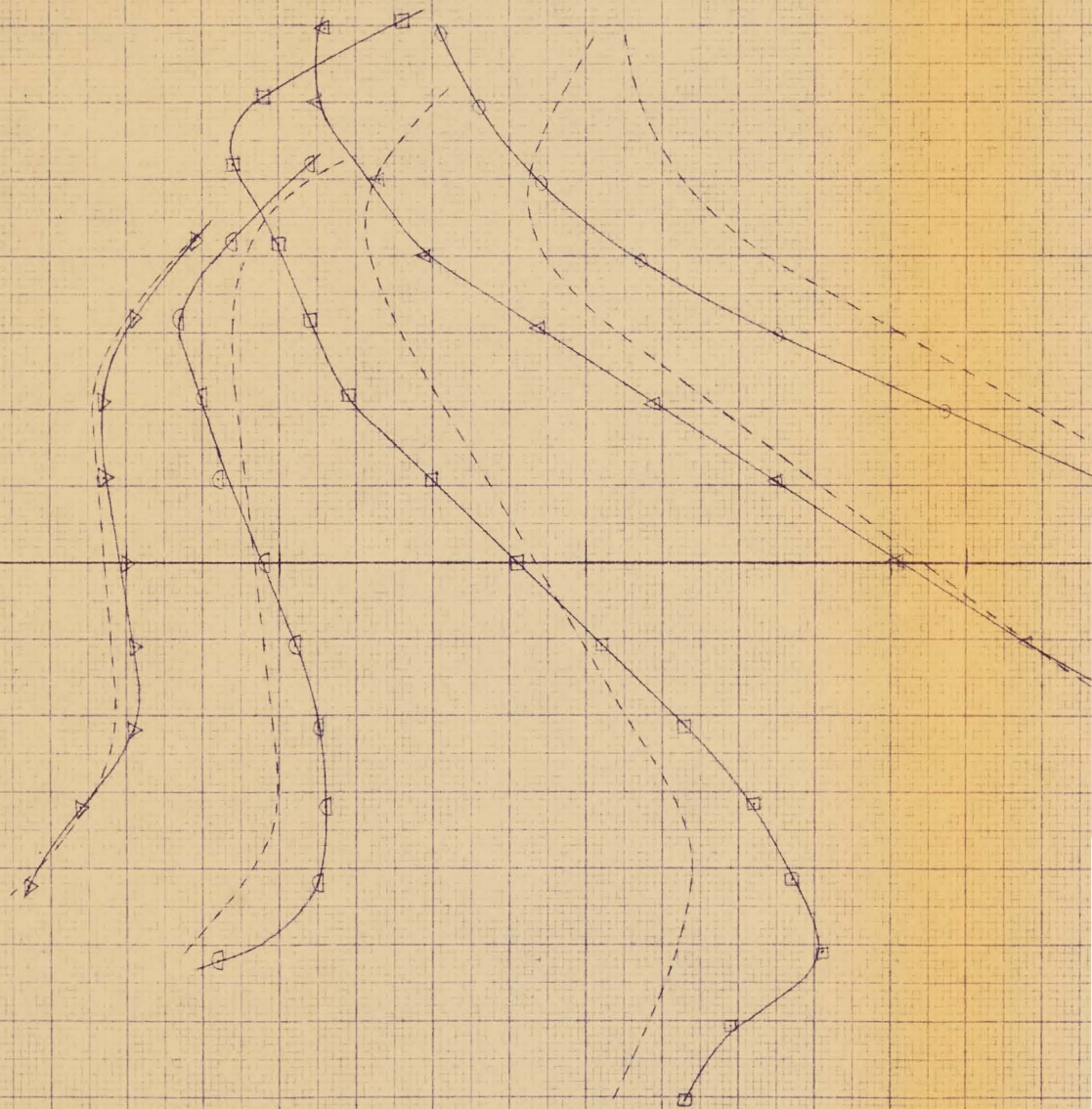
G_n

(V) $\alpha \approx 15.0^\circ$

(B) $\alpha \approx 12.7^\circ$

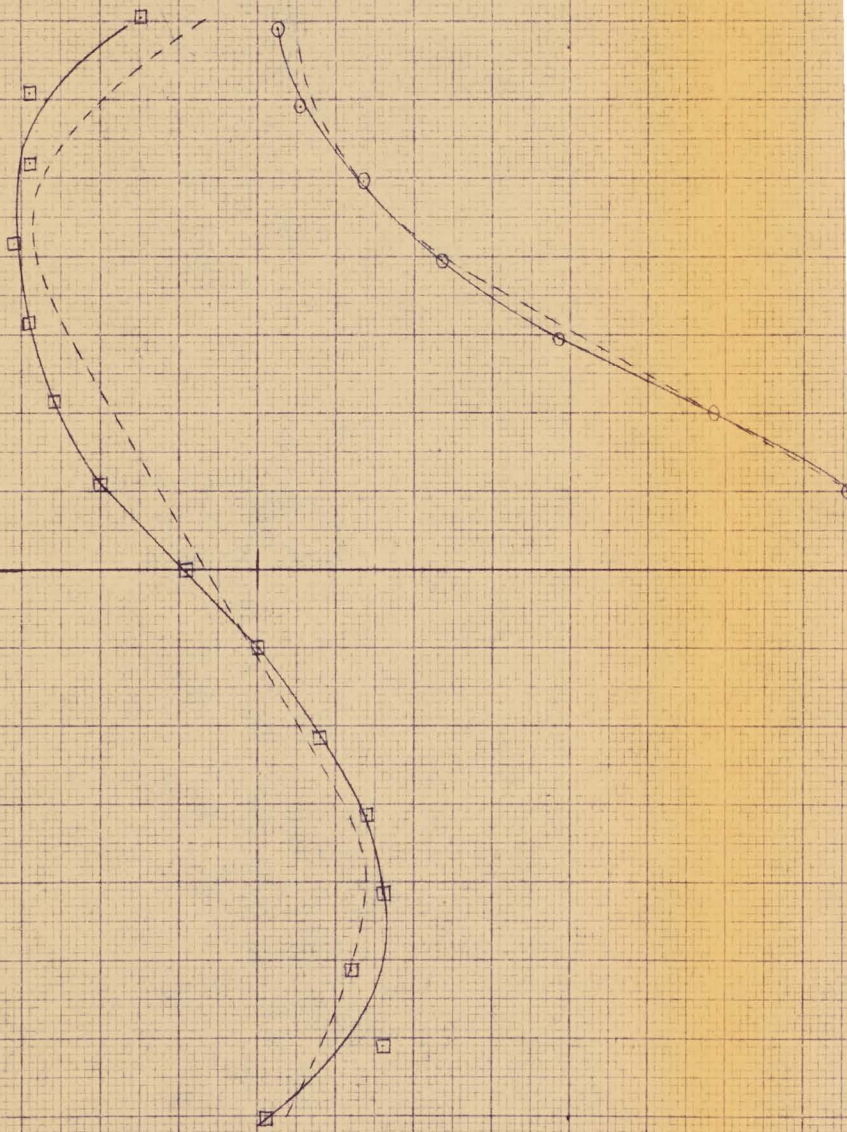
(H) $\alpha \approx 8.3^\circ$

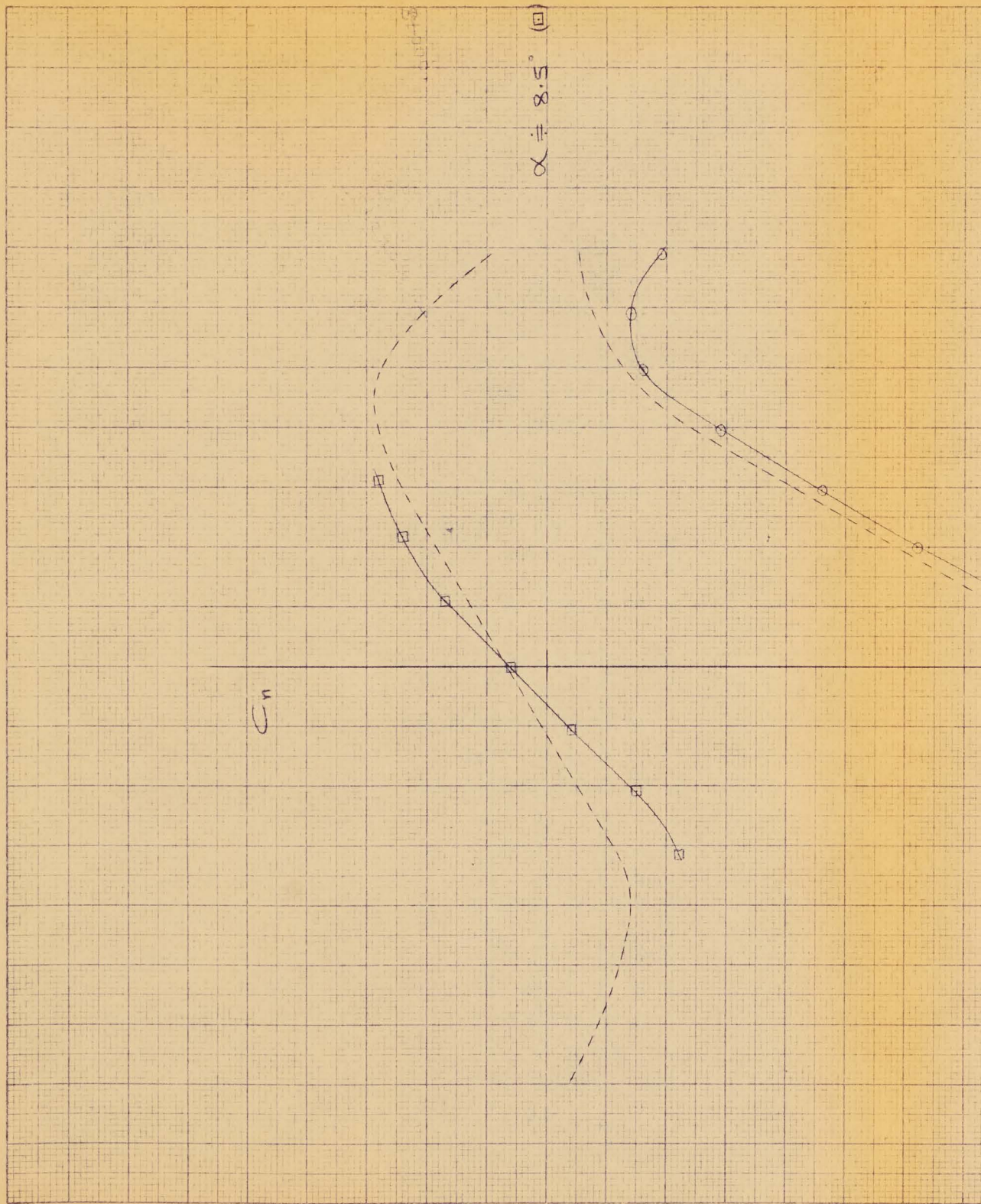
(A) $\alpha \approx 4.1^\circ$



u

$\alpha \approx 8.4^\circ (\square)$





C_n

C_n SCALE

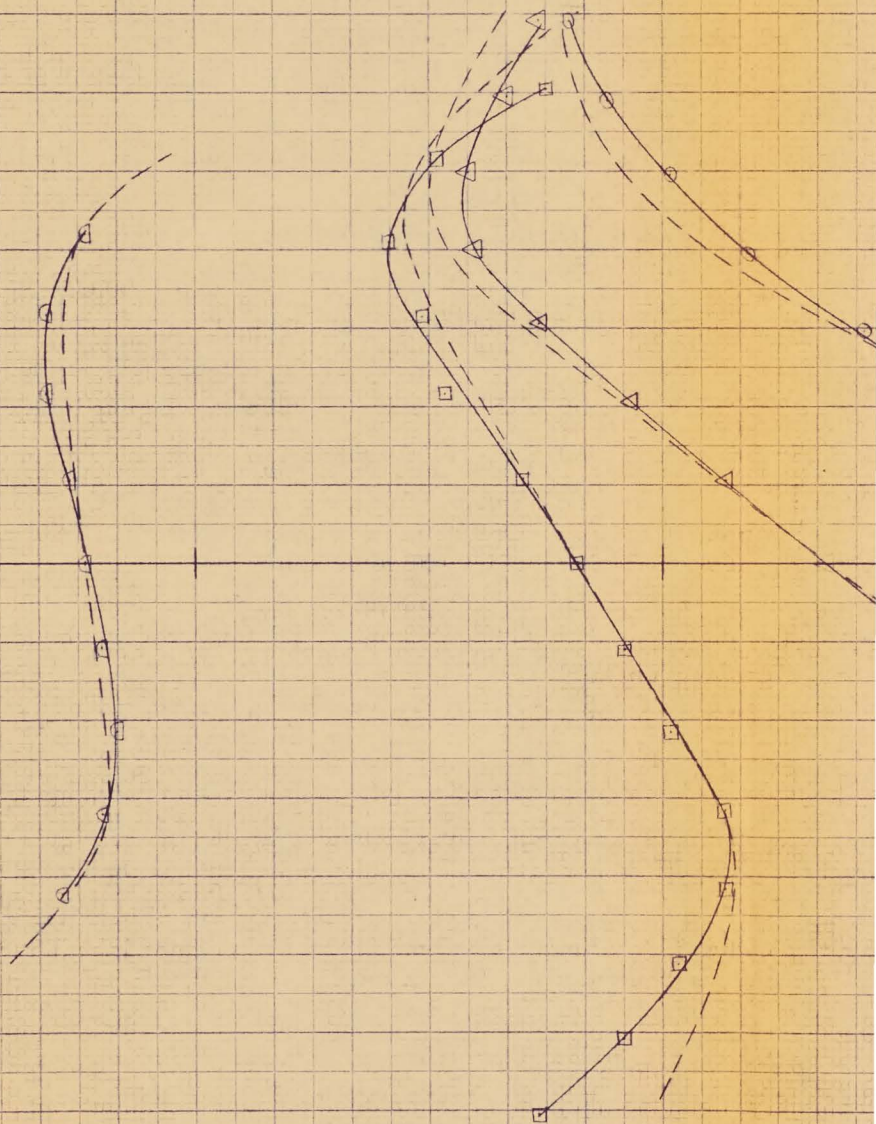
0.001

$C_n = 0.01$ AT DATUMS

--- $\delta_R = 0^\circ$ MEASURED
 ($C_n = 0$ AT DATUMS MARKED)

$\alpha = 12.7^\circ$
 RUN 12, Pgs. 57-65

$\alpha = 8.4^\circ$
 RUN 12, Pgs. 42-56



C_n

$$\alpha = 12.8^\circ (\Delta)$$

$$\alpha = 8.4^\circ (\square)$$

$$\alpha = 4.1^\circ (\Delta)$$



C-105

0.3 LANGLEY MODEL

C_n vs β ABOUT STABILITY AXES

$M = 1.41$

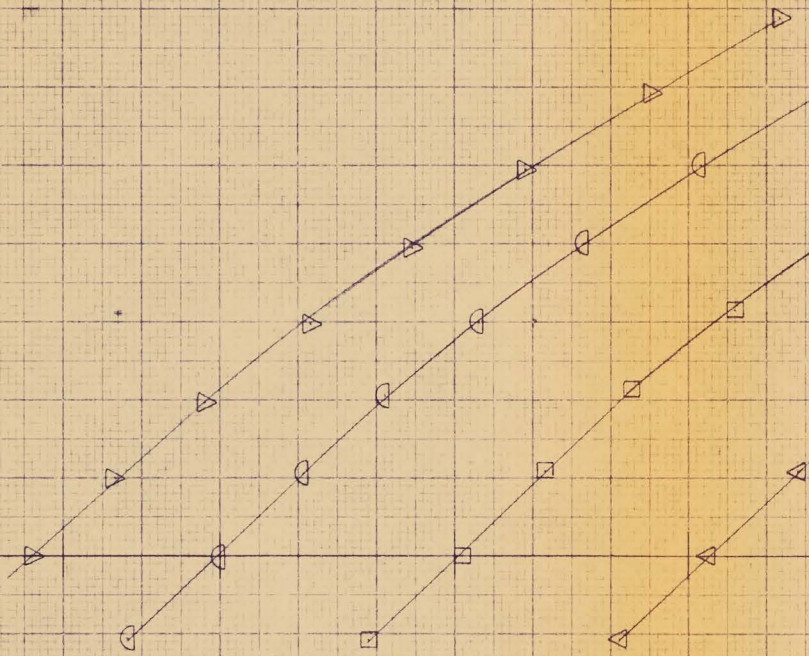
CONF. - $B, W, E, N_{10}, N_5, D_{8-4}, F_0$
- 50° CONICAL RADOME
- INTAKES FAIRED

$\alpha = 0^\circ$ ▽
RUN 15, PTS. 42-49.

$\alpha = 42^\circ$ ◯
RUN 15, PTS. 33-41

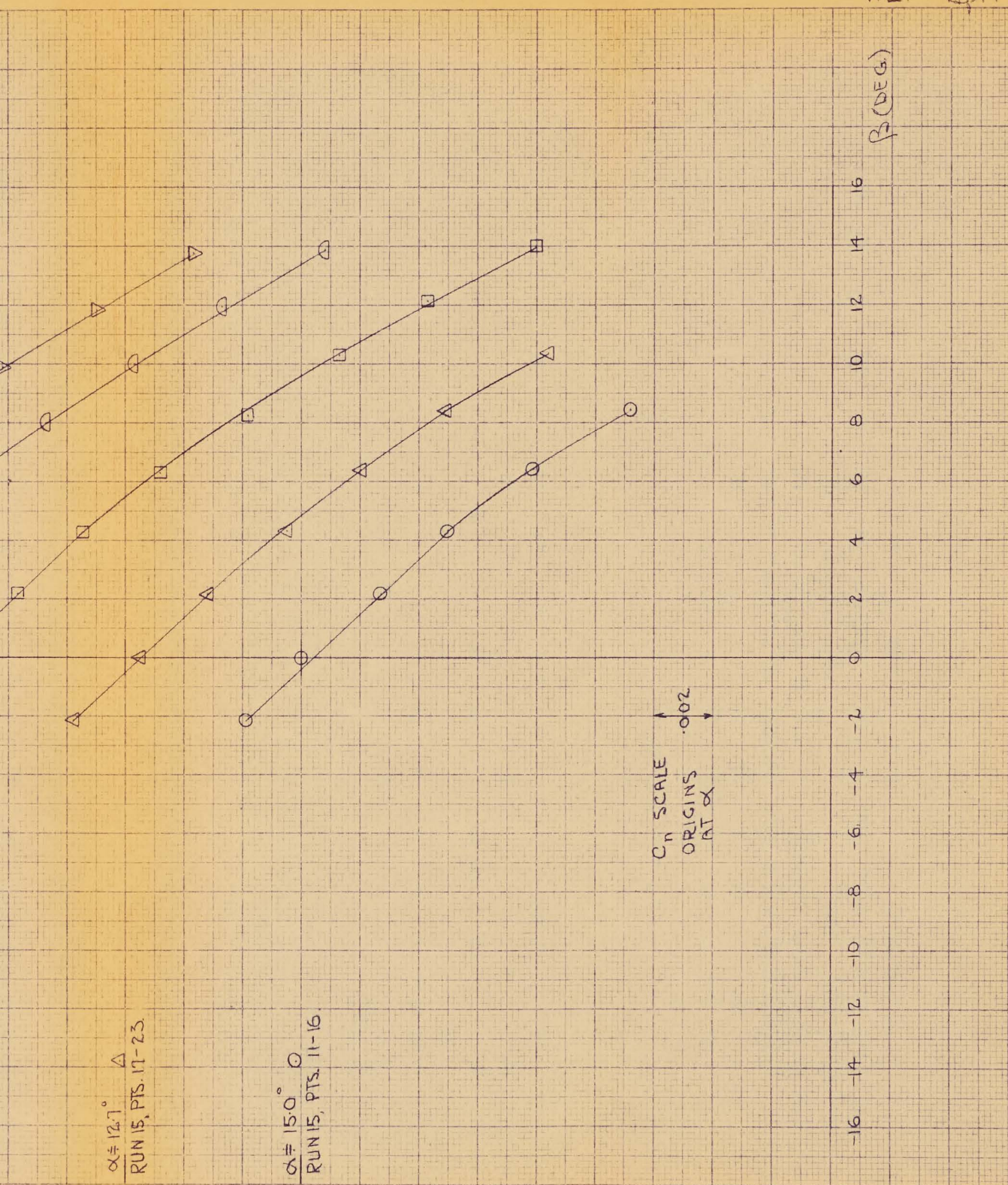
$\alpha = 84^\circ$ ◻
RUN 15, PTS. 24-32.

$\alpha = 126.7^\circ$ △
RUN 15, PTS. 17-23



P/WT/III Sht 7.16
V.L. Apr. 23.

April 18/56



$\alpha = 12.7^\circ$ Δ
RUN 15, PTS. 17-23

$\alpha = 15.0^\circ$ $\circ$
RUN 15, PTS. 11-16

C_n SCALE
ORIGINS
AT α

β (DEG)

7-16-A.

P/W T III

RUN 14, PTS. 14-22

$\alpha = 12.7^\circ \Delta$
RUN 15, PTS. 17-23.

$\alpha = 15.0^\circ \square$
RUN 15, PTS. 17-16.

C_R SCALE
↑
ORIGINS
AT α

-16 -14 -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 14 16 β (DEG)

APR 18 1956

C-105

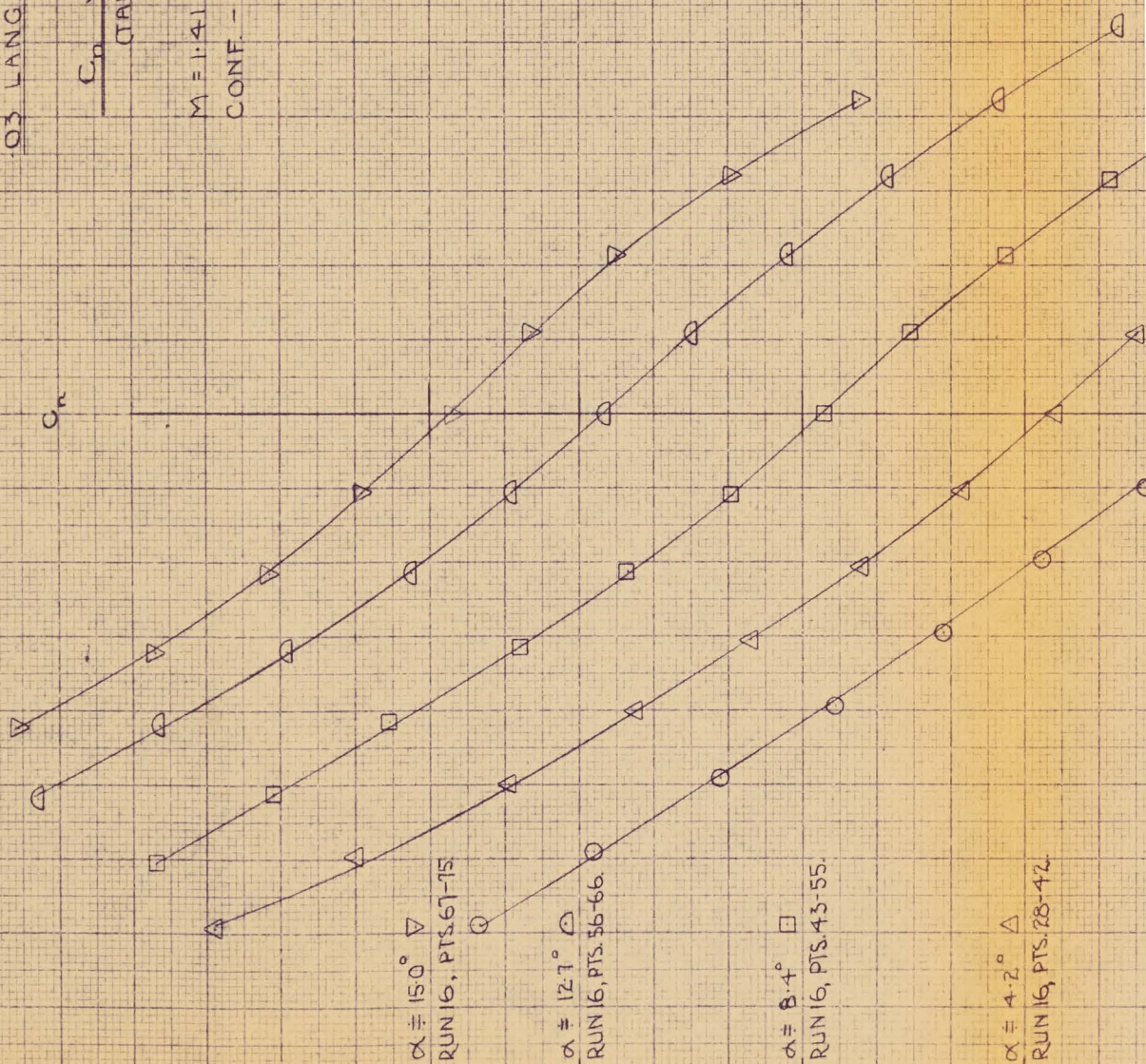
03 LANGLEY MODEL

C_D vs β ABOUT STAB. AXES
(TAIL OFF)

$M = 1.41$

CONF. - B, W, E, N, D, α
- 50° CONICAL RADOME
- INTAKES OPEN

α°	
0	○
4.2	△
8.4	□
12.7	◇
15.0	▽



$\alpha = 15.0^\circ$ ▽
RUN 16, PTS. 67-75

$\alpha = 12.7^\circ$ ◇
RUN 16, PTS. 56-66

$\alpha = 8.4^\circ$ □
RUN 16, PTS. 43-55

$\alpha = 4.2^\circ$ △
RUN 16, PTS. 28-42

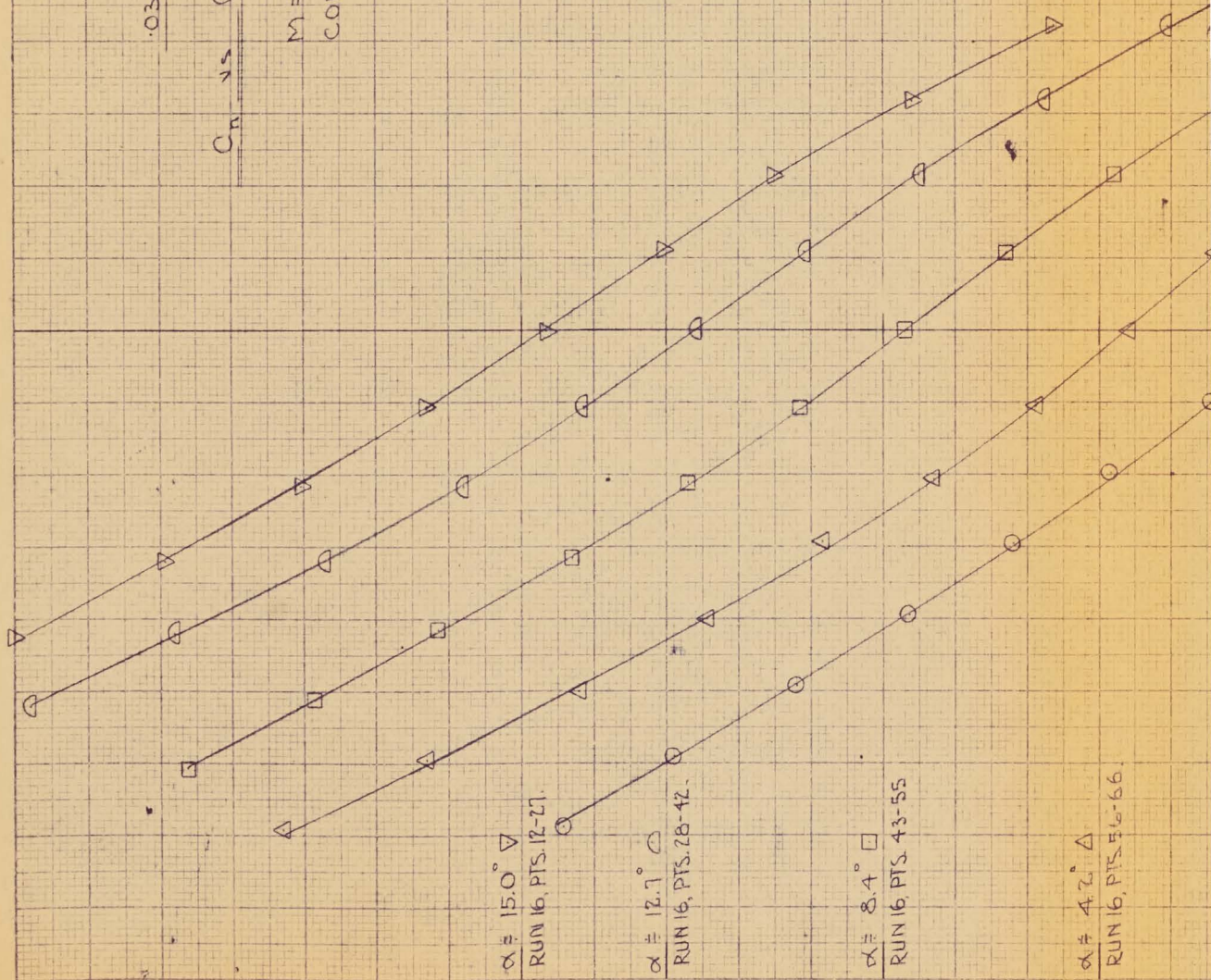
C-105

.03 LANGLEY MODEL

C_n vs β ABOUT BODY AXES

$M = 1.41$

CONE - B, W, E, N, D_{2-4}
- 50° CONICAL RADOME
- INTAKES OPEN



C-105

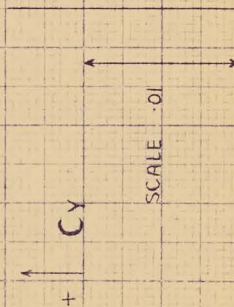
OBTLANGLEY MODEL

CY 223 α

M = 141

CONFIG. B, V, W, E, W, N, S, P, S-4

50° CONICAL RADOME INTAKES OPEN



(ORIGINS AT RUNS)

(mean α) $\delta R = 2.0^\circ$



C-105
03 LANGLEY MODEL

C_Y vs β

$M = 1.41$

CONFIG- B1W1E₀N₀D₀-4
(BASIC)

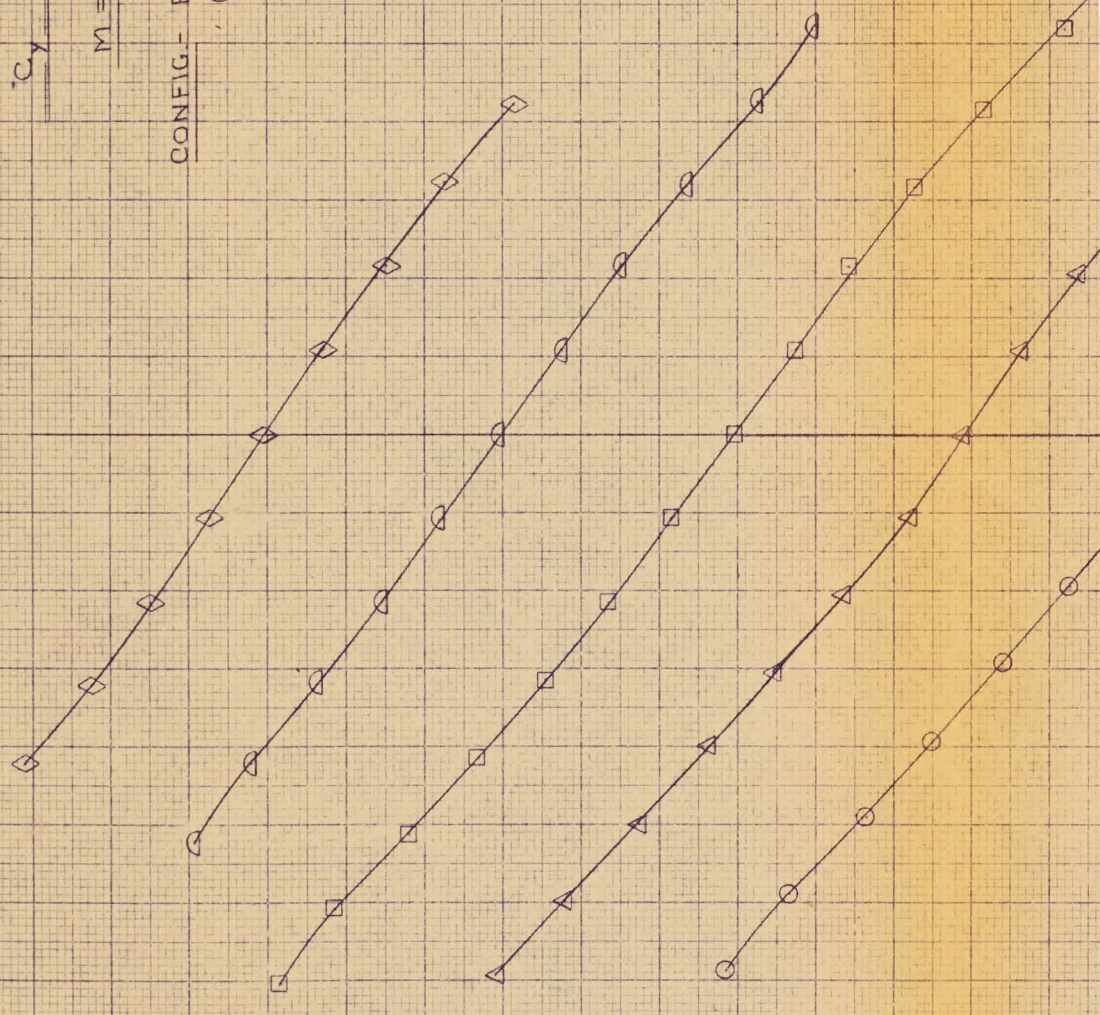
C_Y

$\alpha = 15.0^\circ$ $\diamond$
RUN 2, PTS 47-56

$\alpha = 12.7^\circ$ $\square$
RUN 2, PTS 35-46

$\alpha = 8.4^\circ$ $\square$
RUN 2, PTS 19-34

$\alpha = 4.2^\circ$ $\triangle$
RUN 2, PTS 3-17



C-105
03 LANGLEY MODEL

C_Y vs β

$M = 1.41$

CONFIG. $B_1 V_1 W_1 E_{10} N_5 D_{84} F_0$
FAIRED DUCTS

C_Y

$\alpha \approx 15.0^\circ$ $\diamond$

RUN 3, PTS. 68-76

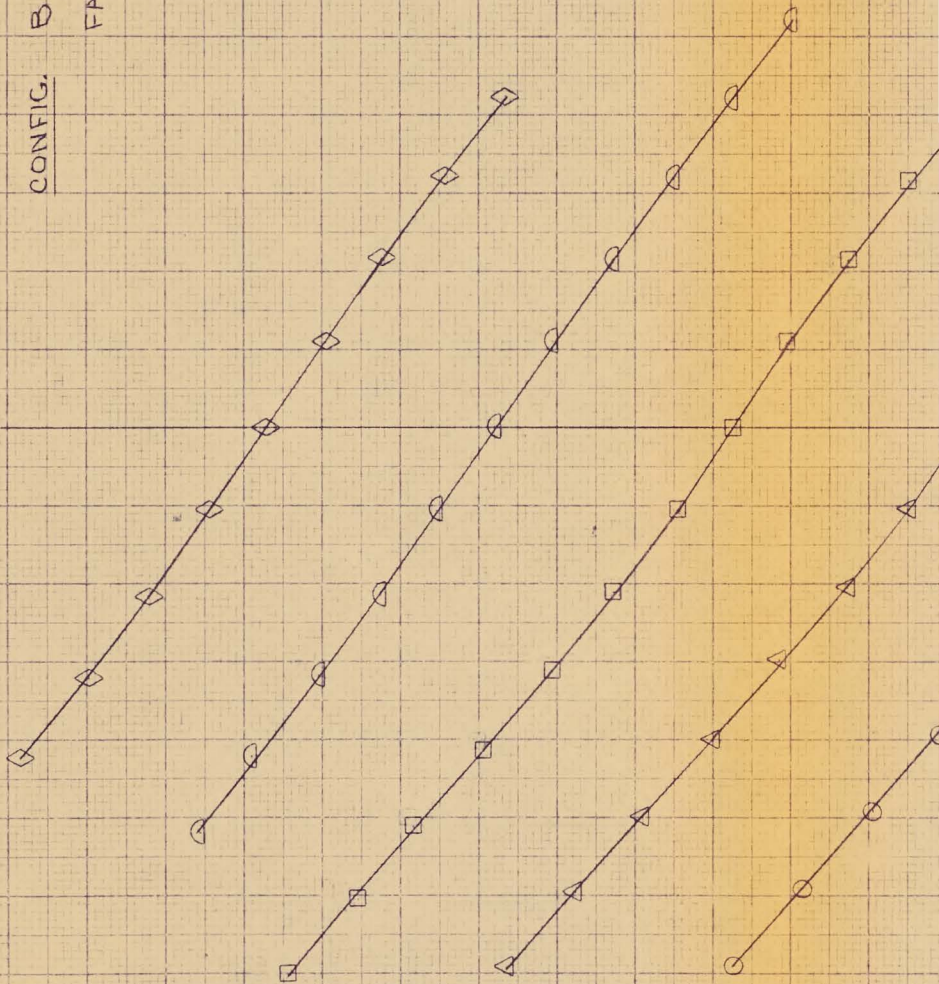
$\alpha \approx 12.7^\circ$ $\triangle$

RUN 3, PTS. 57-67

$\alpha \approx 8.4^\circ$ $\square$

RUN 3, PTS. 47-56

$\alpha \approx 4.2^\circ$ $\triangle$



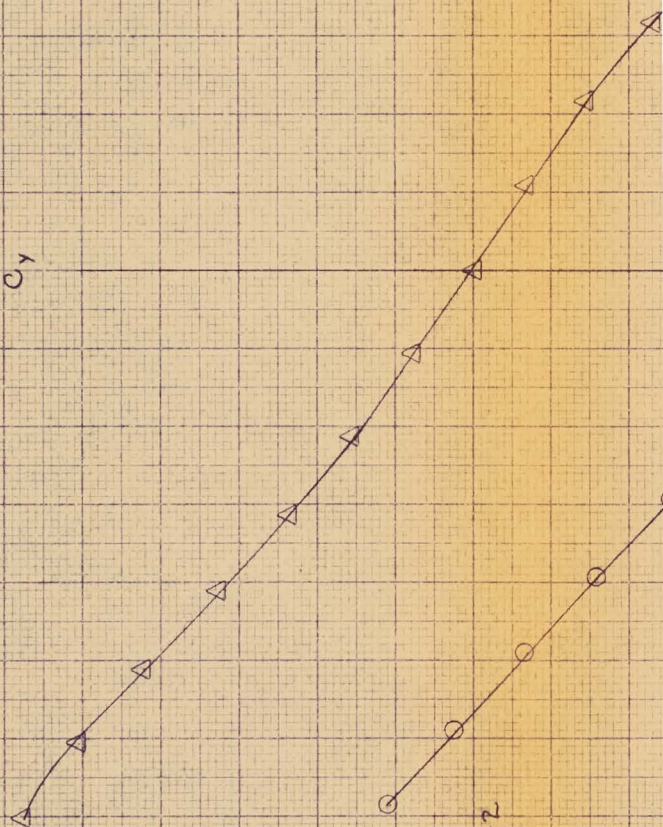
C-105
.03 LANGLEY MODEL

C_y vs β

$M = 1.41$

CONFIG. $B_1 V, W_1 E_{10} N_5 D_{B-4} R_N$
TRANSITION FIXED

C_y



$\alpha \neq 8.4^\circ \Delta$
RUN 4. PTS. 28-42

C-105
-03 LANGLEY MODEL

C_y vs. β
 $M = 1.41$

CONFIGURATION

B, V, W, E₁₀, N₅, D₈₋₄

α PTS. RUN 10

○ 0° 12-20

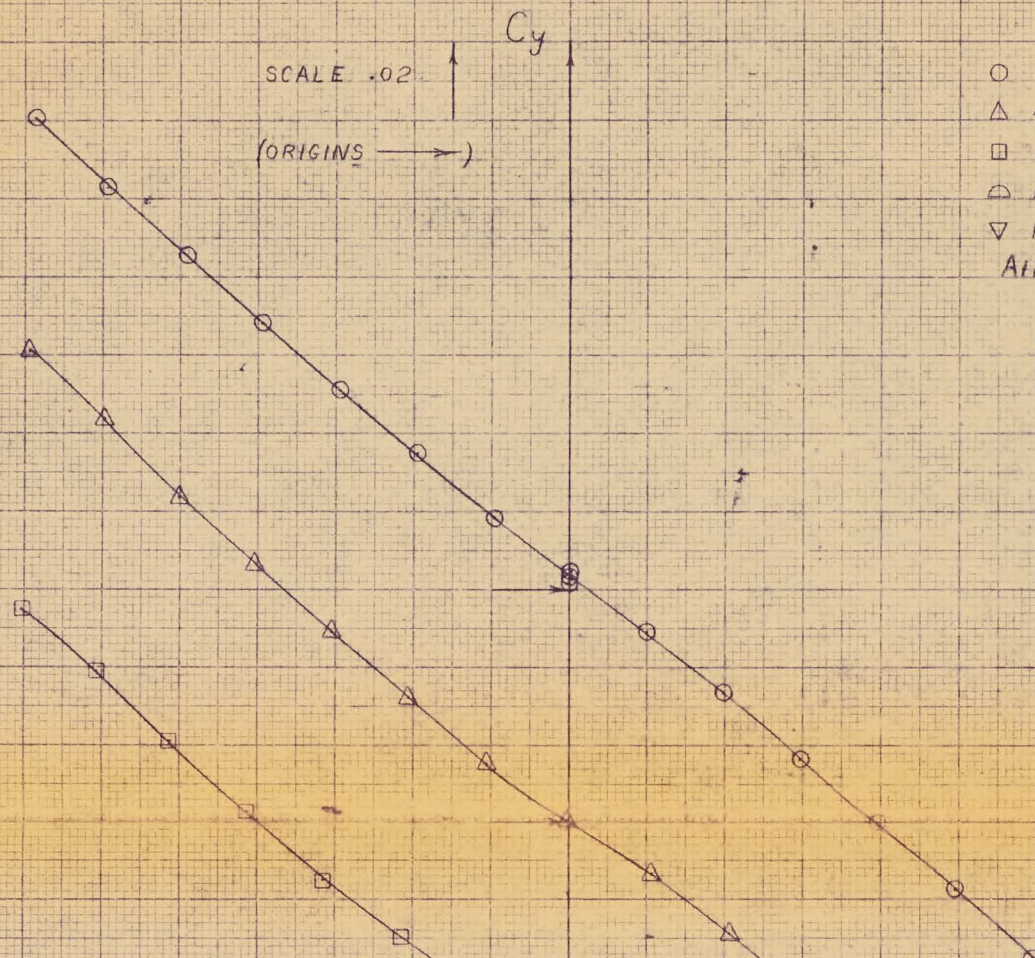
△ 4.2° 21-31

□ 8.4° 32-46

⊕ 12.7° 47-61

▽ 15.0° 62-78

AILERON EFFECT $\delta\alpha_R = 19.8^\circ$



C-105

.03 LANGLEY MODEL

Cy NS β

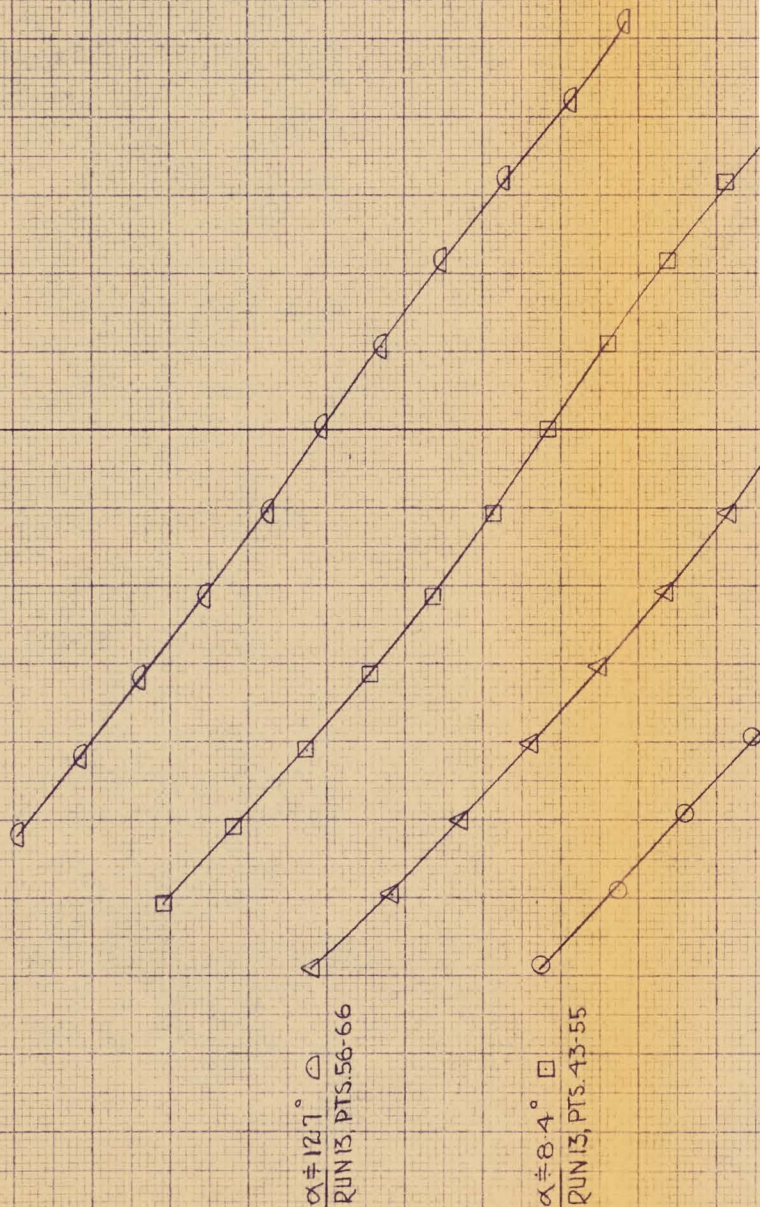
M = 1.41

CONFIG. $B_{1-1} V_1 W_1 E_{10} N_5 D_{8.4}$
30° CONICAL RADOME

Cy

$\alpha \neq 12.7^\circ$ $\triangle$
RUN 13, PTS. 56-66

$\alpha \neq 8.4^\circ$ $\square$
RUN 13, PTS. 43-55



C-105

.03 LANGLEY MODEL

C_y vs β

$M = 1.41$

CONFIG.

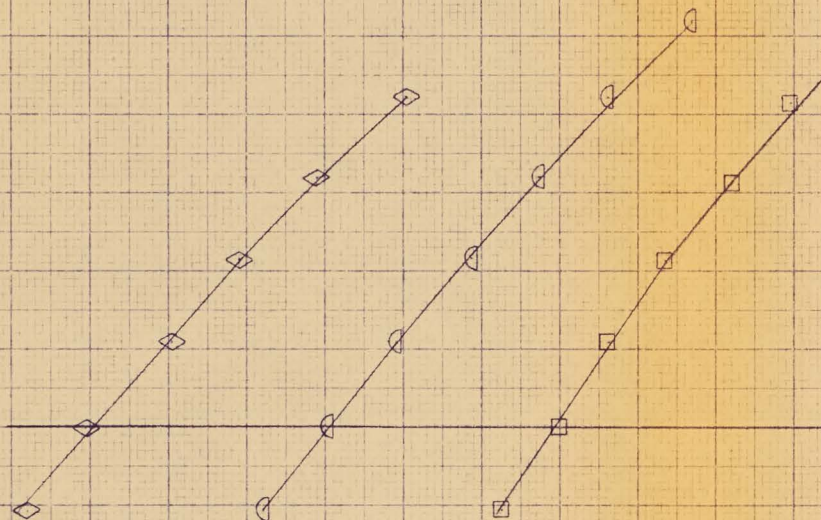
$B_1 W_1 E_{10} N_5 D_{3.4} F_D$

TAIL OFF, FAIRED DUCTS

$\alpha \approx 15.0^\circ$ $\diamond$
RUN 15, PTS. 11-16

$\alpha \approx 12.7^\circ$ $\triangle$
RUN 15, PTS. 17-23

$\alpha \approx 8.4^\circ$ $\square$
RUN 15, PTS. 24-32



PWT/111

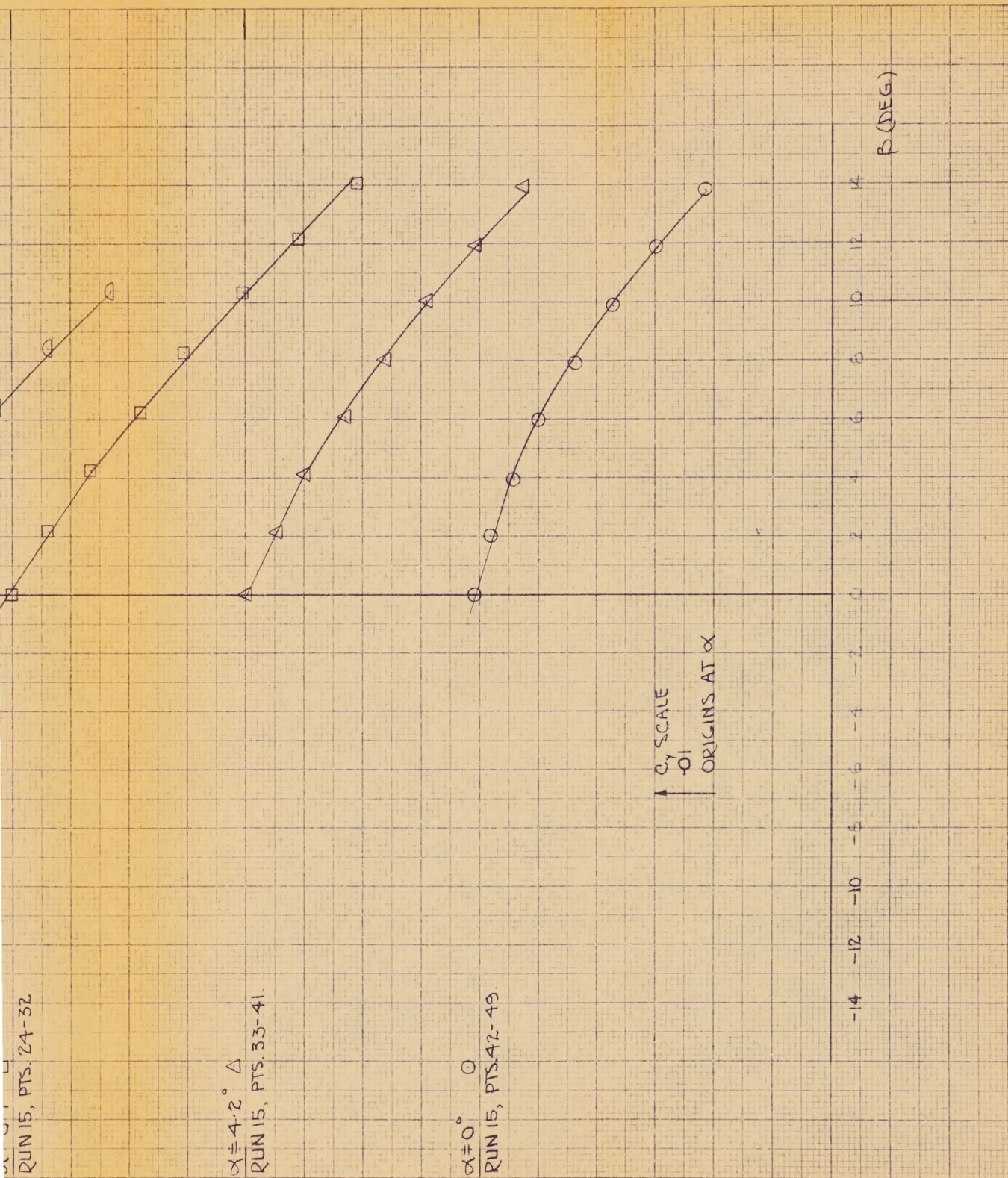
slat 8.16

May 11/52 sh

RUN 15, PTS. 24-32

$\alpha = 4.2^\circ \Delta$
RUN 15, PTS. 33-41

$\alpha = 0^\circ \bigcirc$
RUN 15, PTS. 42-49



C-105

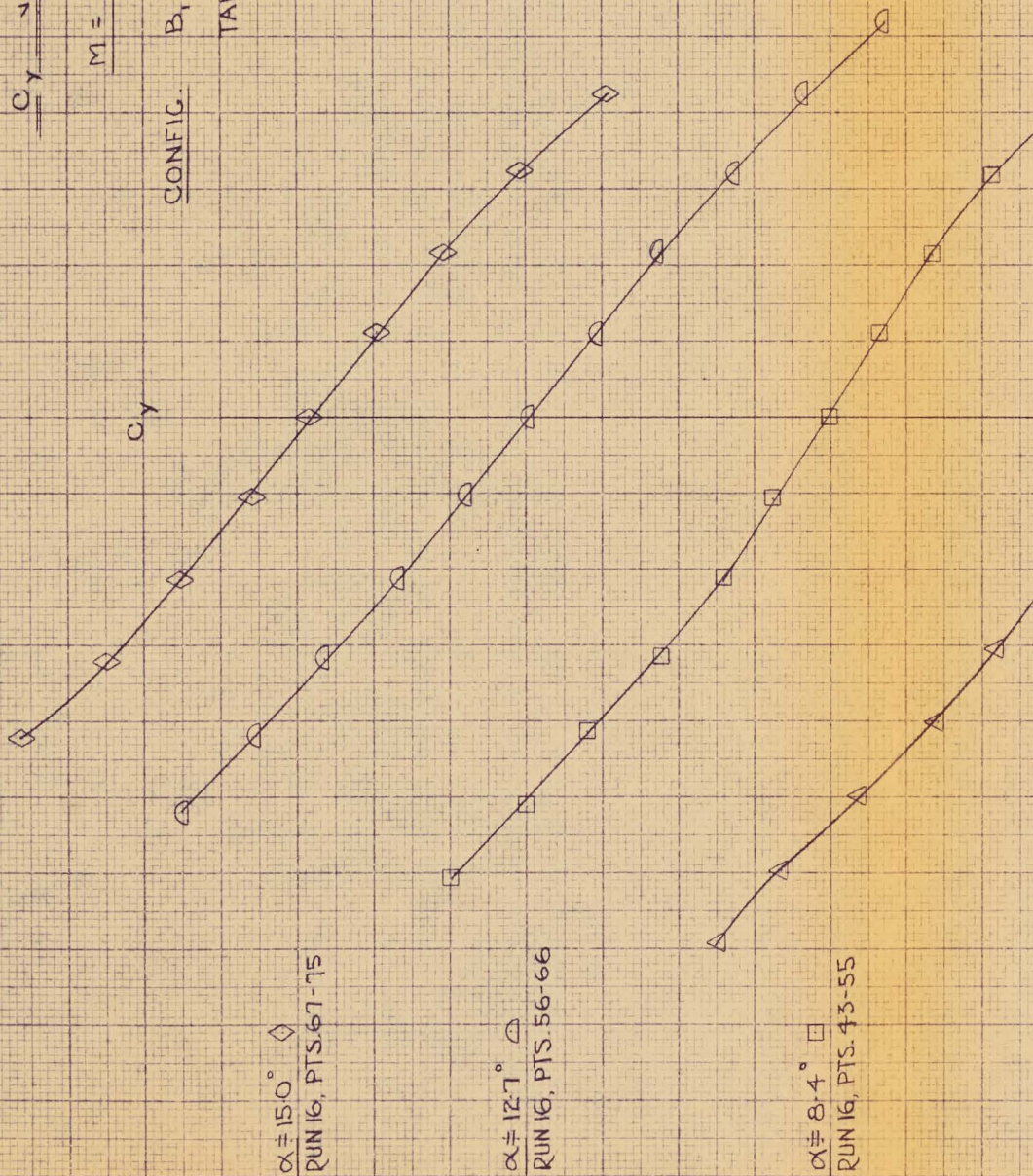
03 LANGLEY MODEL

C_L vs β

$M = 1.41$

CONFIG. $B_1 W_1 E_{10} N_5 D_{2.4}$

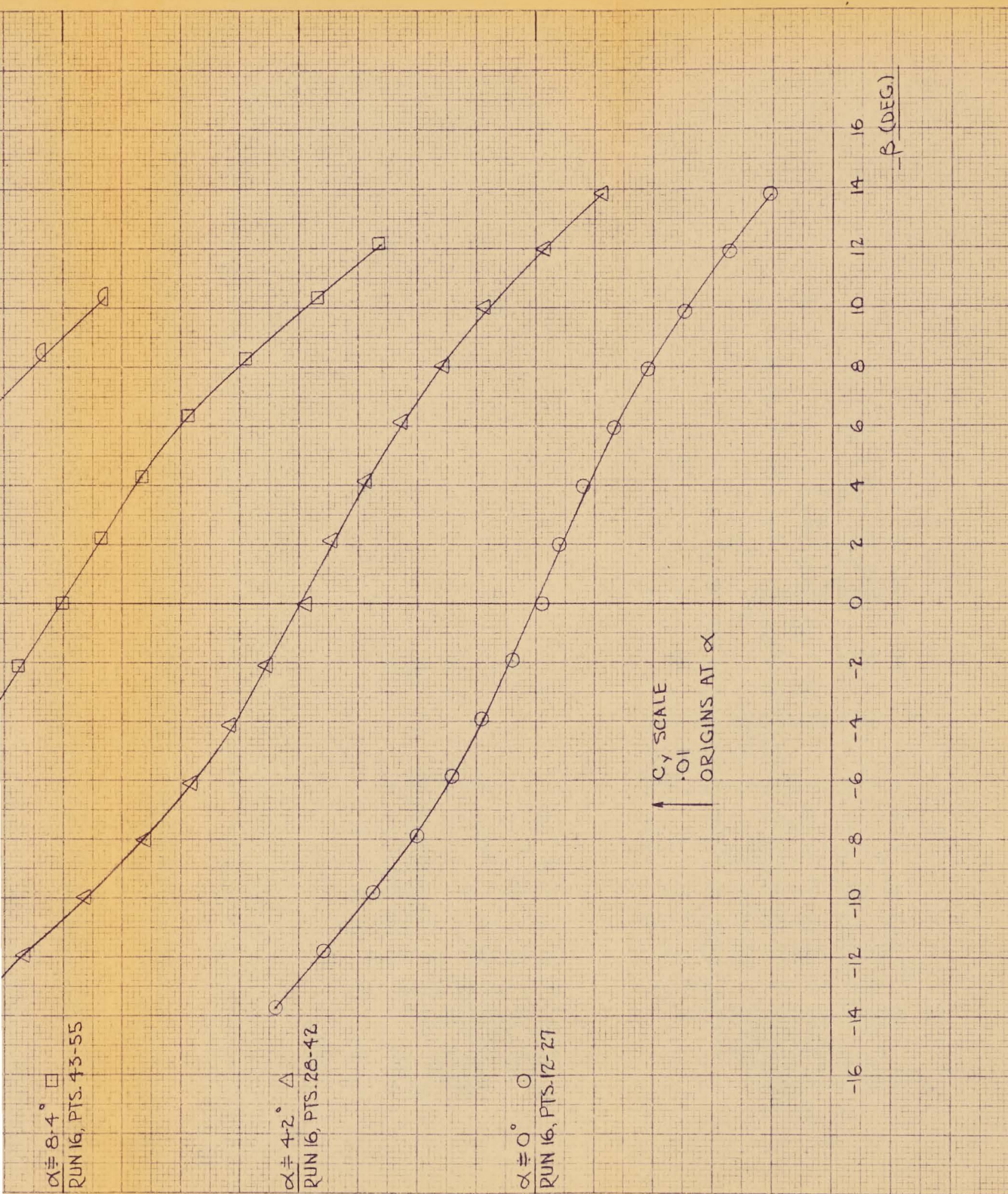
TAIL OFF, DUCTS OPEN



$\alpha = 15.0^\circ$ $\diamond$
RUN 16, PTS. 67-75

$\alpha = 12.7^\circ$ $\triangle$
RUN 16, PTS. 56-66

$\alpha = 8.4^\circ$ $\square$
RUN 16, PTS. 43-55



May 2/56 Jm

C-105
03 LANGLEY MODEL

C₁ W₁ α

M = 1.41

CONF.

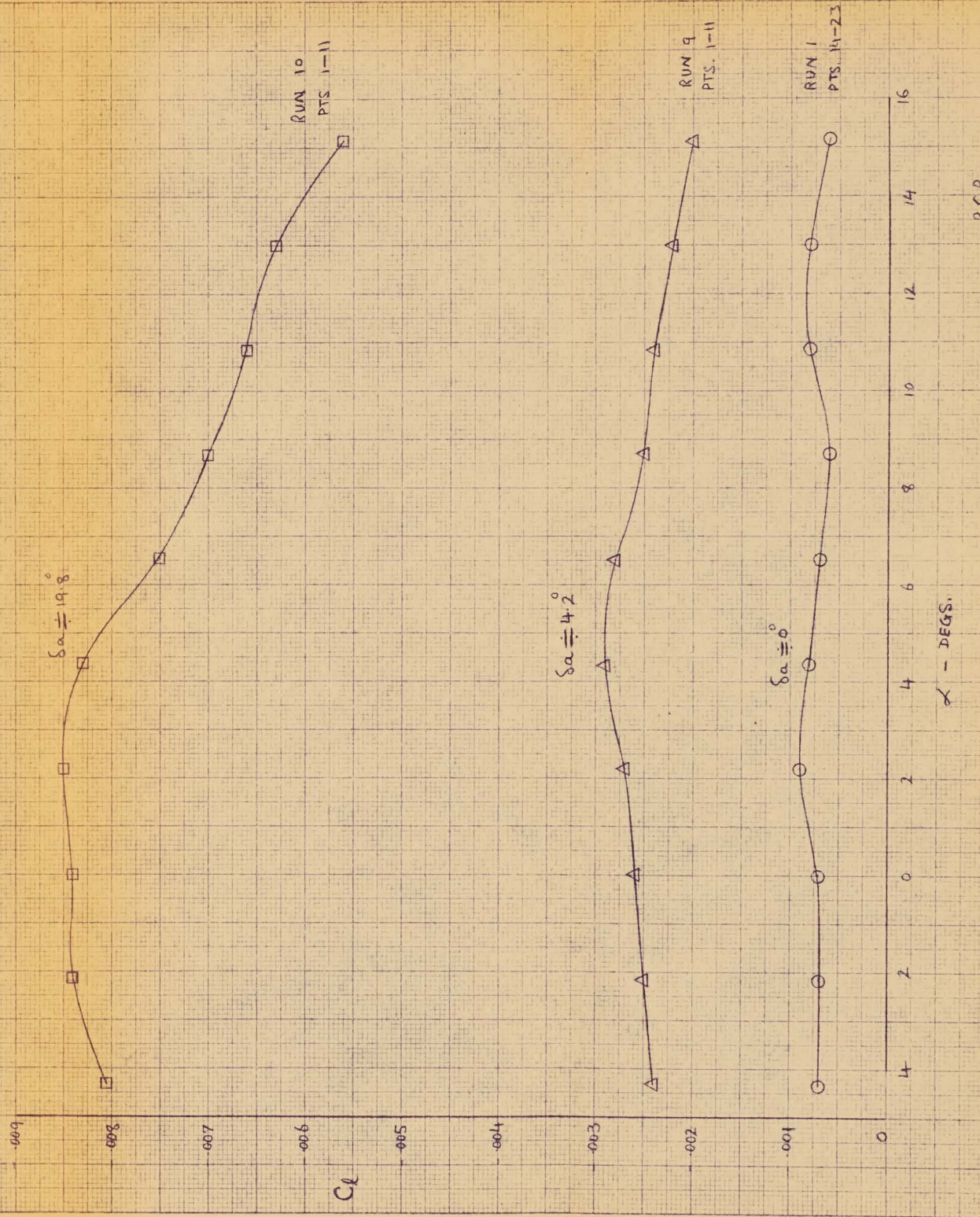
B₁ V₁ W₁ N₅ E₁₀ D₈₋₄

+ C₁

SCALE 0.002

(ORIGINS AT α)

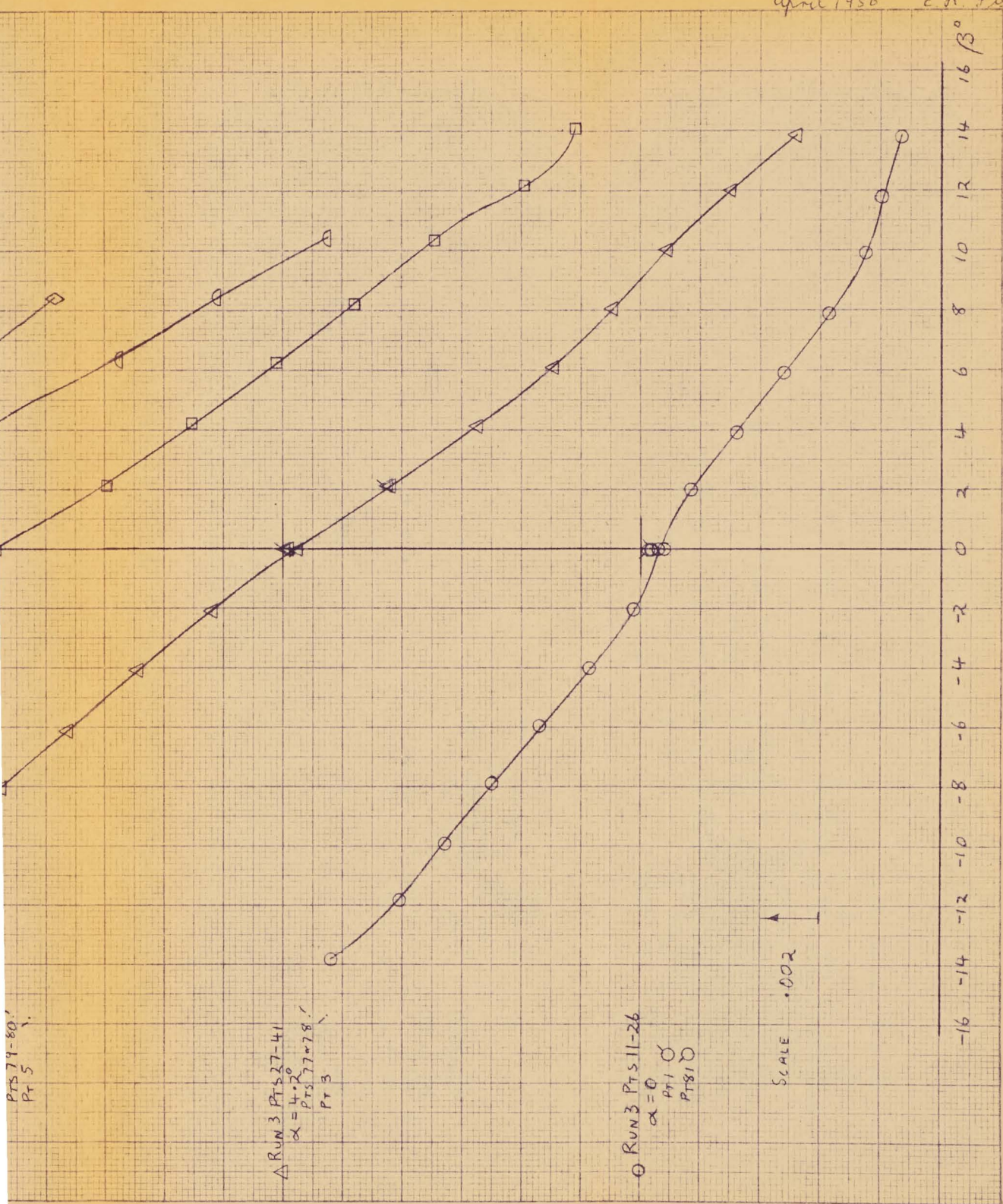
INCREASES OPEN



R.S.R.
April 56

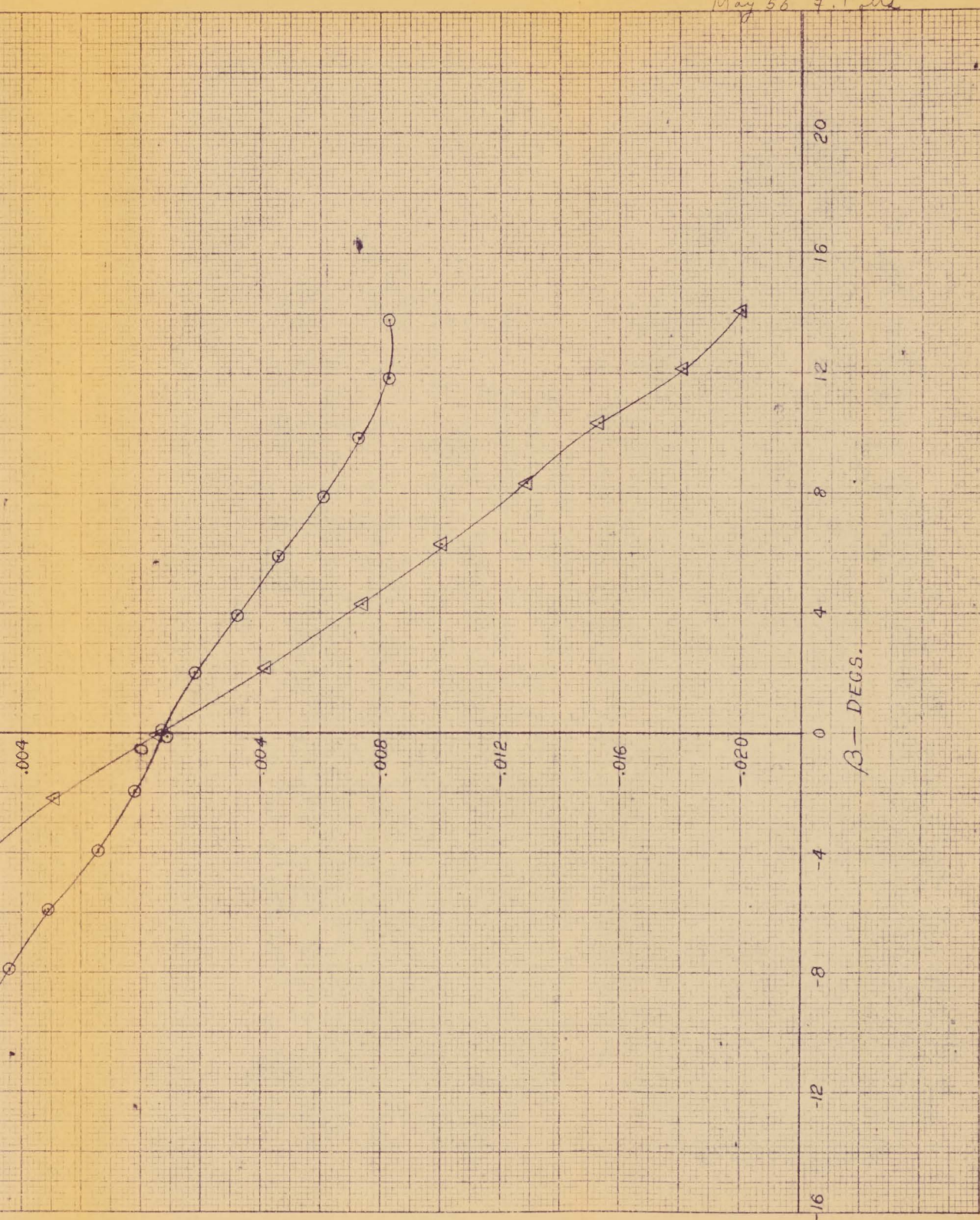
P/WT/III
April 1956

9.9
E.R. Fish



P/WT/III Sht 9.10

May 56 Y. Potts



C-105

.03 LANGLEY MODEL

C_L vs β

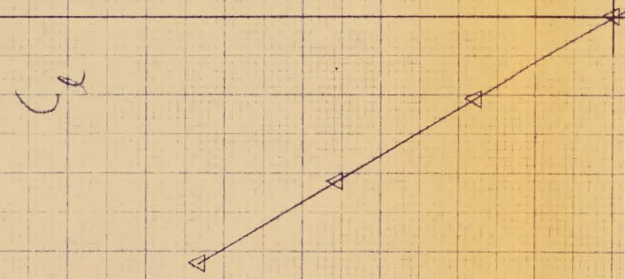
$\delta_c = -30^\circ$

$M=1.41$

CONFIGURATION:-

B, V, W, E, $N_5 D_{8-4}$
- 50° RADOME
- INTAKES OPEN

SCALE .002



ORIGINS

A Run 8 P1527-33

C-105

03 LANGLEY MODEL

C_l vs β

$\delta_a = +20^\circ$

$M = 1.41$

CONFIGURATION:-

B, V, W, E, N, D_{R-4}

- 50° RADOME

- INTAKES OPEN

C_l

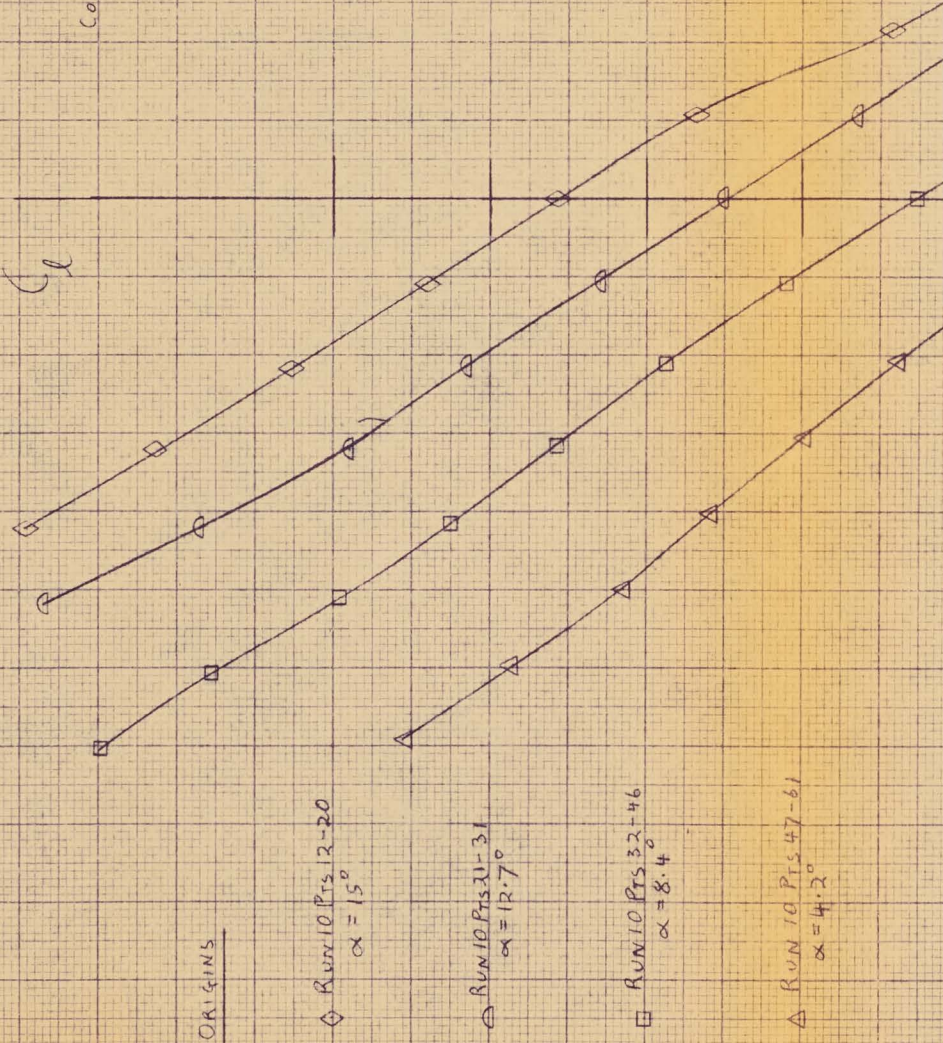
ORIGINS

◇ RUN 10 PTS 2-20
 $\alpha = 15^\circ$

△ RUN 10 PTS 31-31
 $\alpha = 12.7^\circ$

□ RUN 10 PTS 32-46
 $\alpha = 8.4^\circ$

△ RUN 10 PTS 47-61
 $\alpha = 4.2^\circ$



C-105

.03 LANGLEY MODEL

C_L vs β

TAIL OFF

$M=1.41$

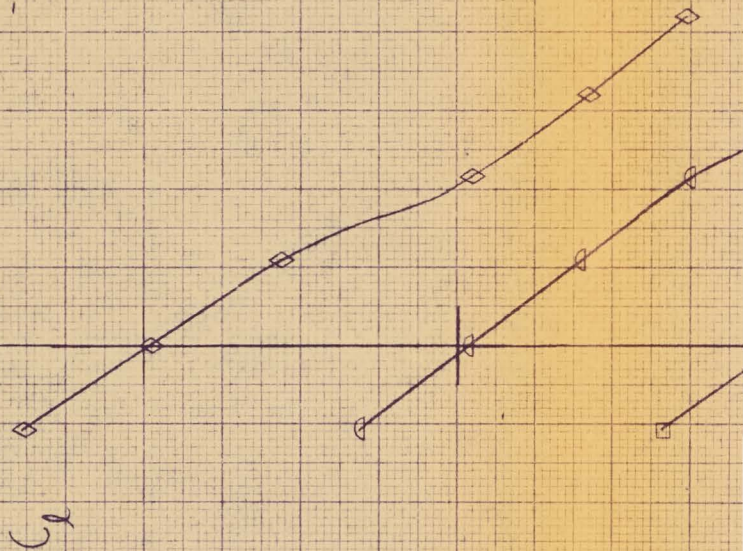
CONF:-

B₁W₁E₁N₅D₈₋₄F_D
- 50° RADOME
- INTAKES FAIRED

ORIGINS

Run 15 Pts II-16
 $\alpha = 15^\circ$

Run 15 Pts 17-23
 $\alpha = 12.7^\circ$



C-105

0.03 LANGLEY MODEL

C_L vs β

TAIL OFF

$M=1.41$

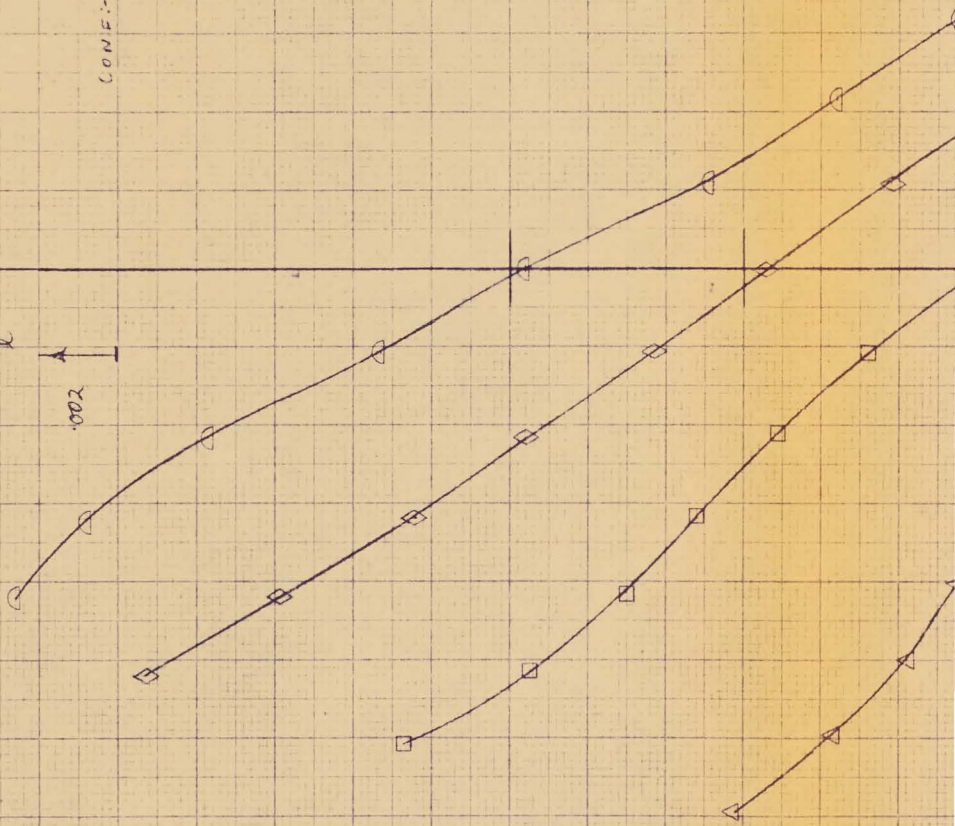
CONF: B, W, E, N, S, D, 8-4
- 50° RADOME
- INTAKES OPEN

C_L
↑
0.002

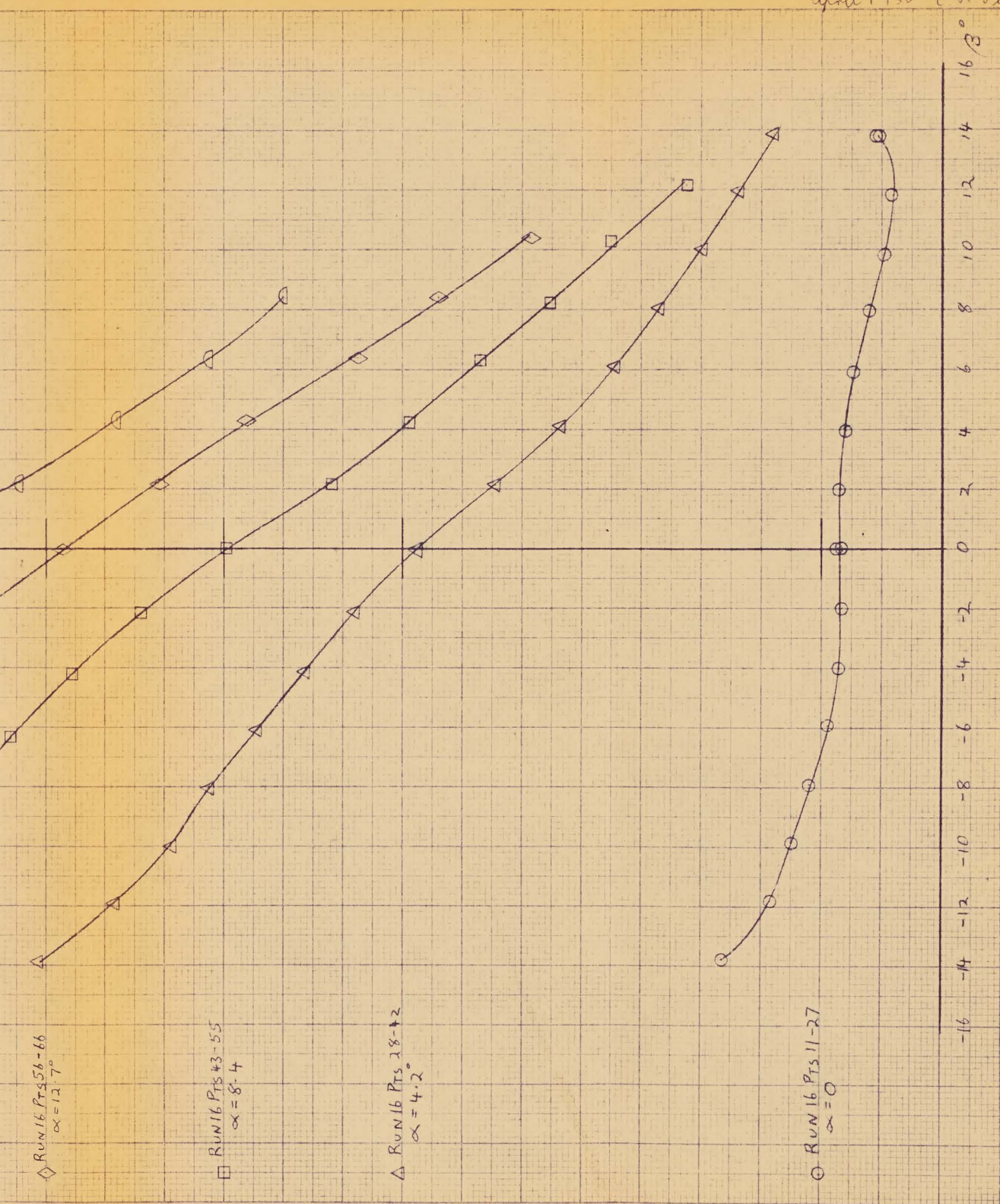
ORIGINS

RUN 16 PTS 67-75
 $\alpha = 15^\circ$

RUN 16 PTS 56-66
 $\alpha = 12.7^\circ$



P/WT/III 9.17
April 1956 E R Fish



C-105

03 LANGLEY MODEL

CNF 15 x

M = 1141

RUN	CONFIG.	RADOME	INTAKES
11	B-V-W-E-N-S-D-4	50°	OPEN
12	"	50°	"
13	B-V-W-E-N-S-D-4	30°	"

RUN WITH 50° RADOME AND 50°
NOT AVAILABLE

+ CNF

SCALE 0.1

(ORIGINS AT RUNS)

P/WT/111 Sk 1014
APR 1952 R.S.R.

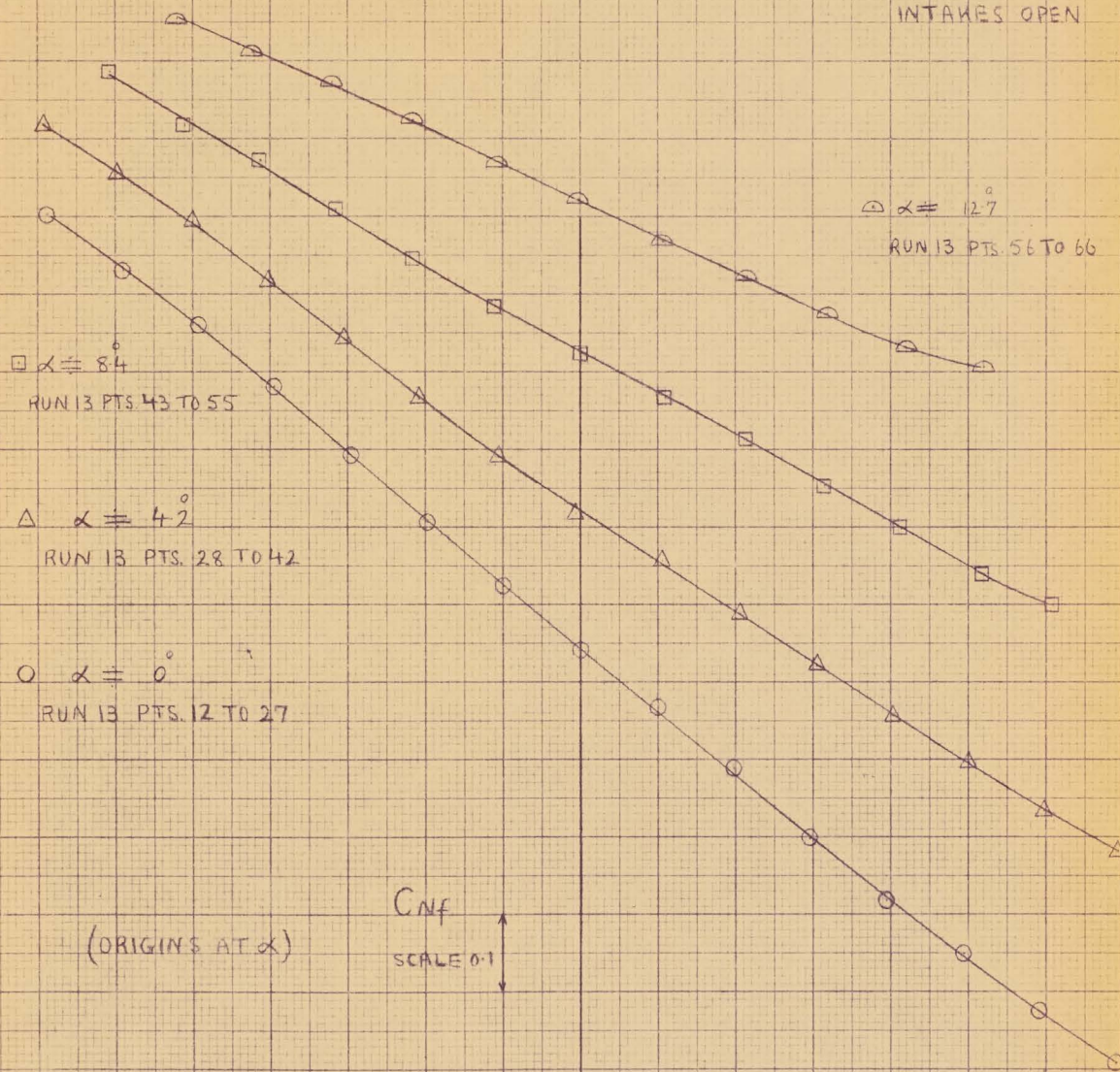
C-105

03 LANGLEY MODEL

Cnf vs β

M=1.41

CONFIG. B₁₋₁, V, W, E₁₀, N₅, D₄₋₁
30° CONICAL RADOME
INTAKES OPEN



β - DEGS

C-105

.03 LANGLEY MODEL

Cm fle. vs α

M = 141

-time
Cm fle.
SCALE .1

(ORIGINS AT RUNS)

$\delta R \approx 20^\circ$

RUN	CONFIG.	SADOME INTAKES
11	R.V. W. E. 10 N. 30 E. 4	50 OPEN
12	"	" "
13	E. 10 N. W. E. 10 N. 4 E. 4	30 "
RUN WITH SADOME AND $\delta R = 0$ NOT AVAILABLE.		

C-105

03 LANGLEY MODEL

Cmfr vs α

M = 1.41

+ Cmfr

SCALE 1

(ORIGINS AT RUNS)

RUN	CONFIG.	RADOME	INTAKES
11	BVWLENS ₄	50	OPEN
12	"	"	"
13	BVWLENS ₄	30	"

RUN WITH 50 RADOME AND $\delta R = 0$
NOT AVAILABLE

C-105

OB LANGLEY MODEL

C_{HE} vs β

$\delta = 30$

$M = 1.41$

C_{HE}

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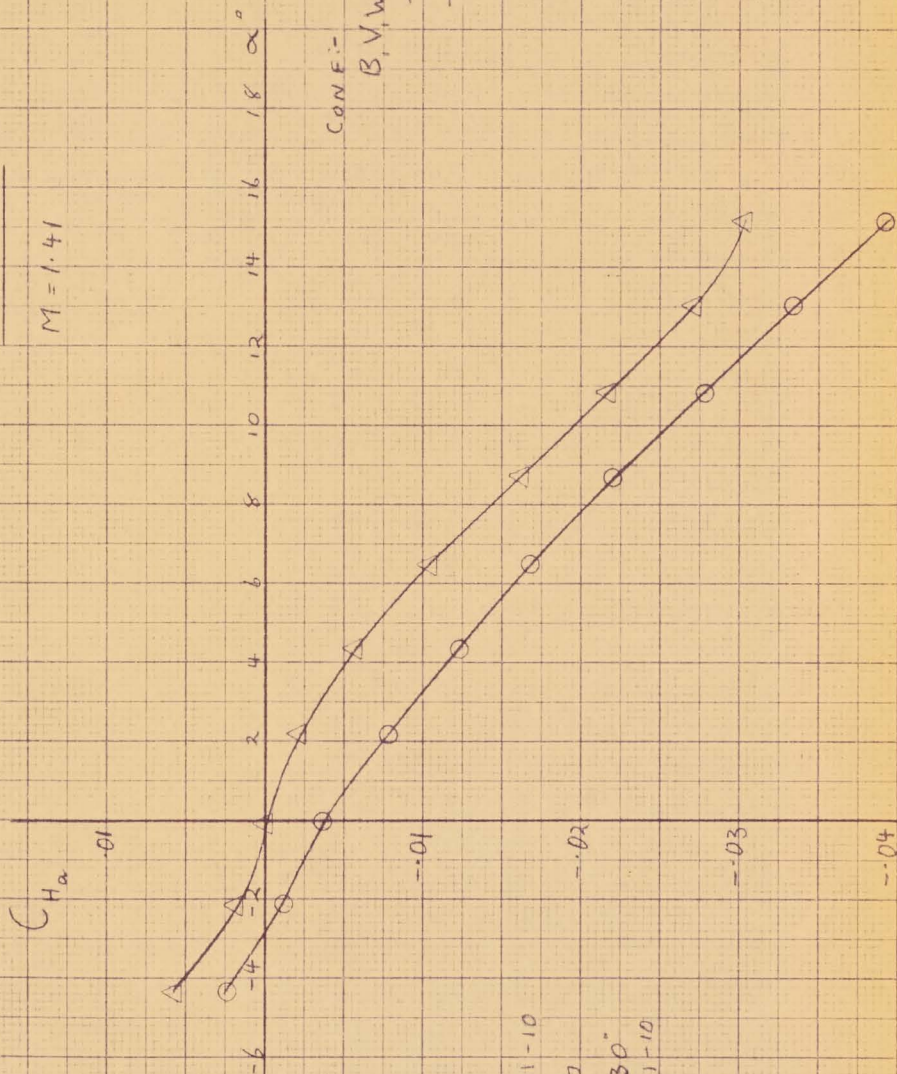
-.12

C-105

.03 LANGLEY MODEL

C_{H_a} vs α - δ_a (MEASURED) = 4.2°

$M = 1.41$



RUN 9 PTS 1-10
 $\delta_e = 0$
 $\delta_e = -30^\circ$
 RUN 14 PTS 1-10

C-105

03 LANGLEY MODEL

Cm_fLE vs C_{Nf}

M = 1.41

CONFIG. B₁V₁W₁E₁₀N₅D₈₋₄F₀

50° CONICAL RADOME

INTAKES FAIRED

▽ $\alpha \approx 15^\circ$

RUN 3 PTS. 68 TO 76

◐ $\alpha \approx 12.7^\circ$

RUN 3 PTS. 57 TO 67

◻ $\alpha \approx 8.4^\circ$

RUN 3 PTS. 42 TO 56

△ $\alpha \approx 4.2^\circ$

RUN 3 PTS. 27 TO 41

○ $\alpha \approx 0^\circ$

RUN 3 PTS. 11 TO 26

(ORIGINE AT α)

Cm_fLE
SCALE .1

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
C_{Nf}

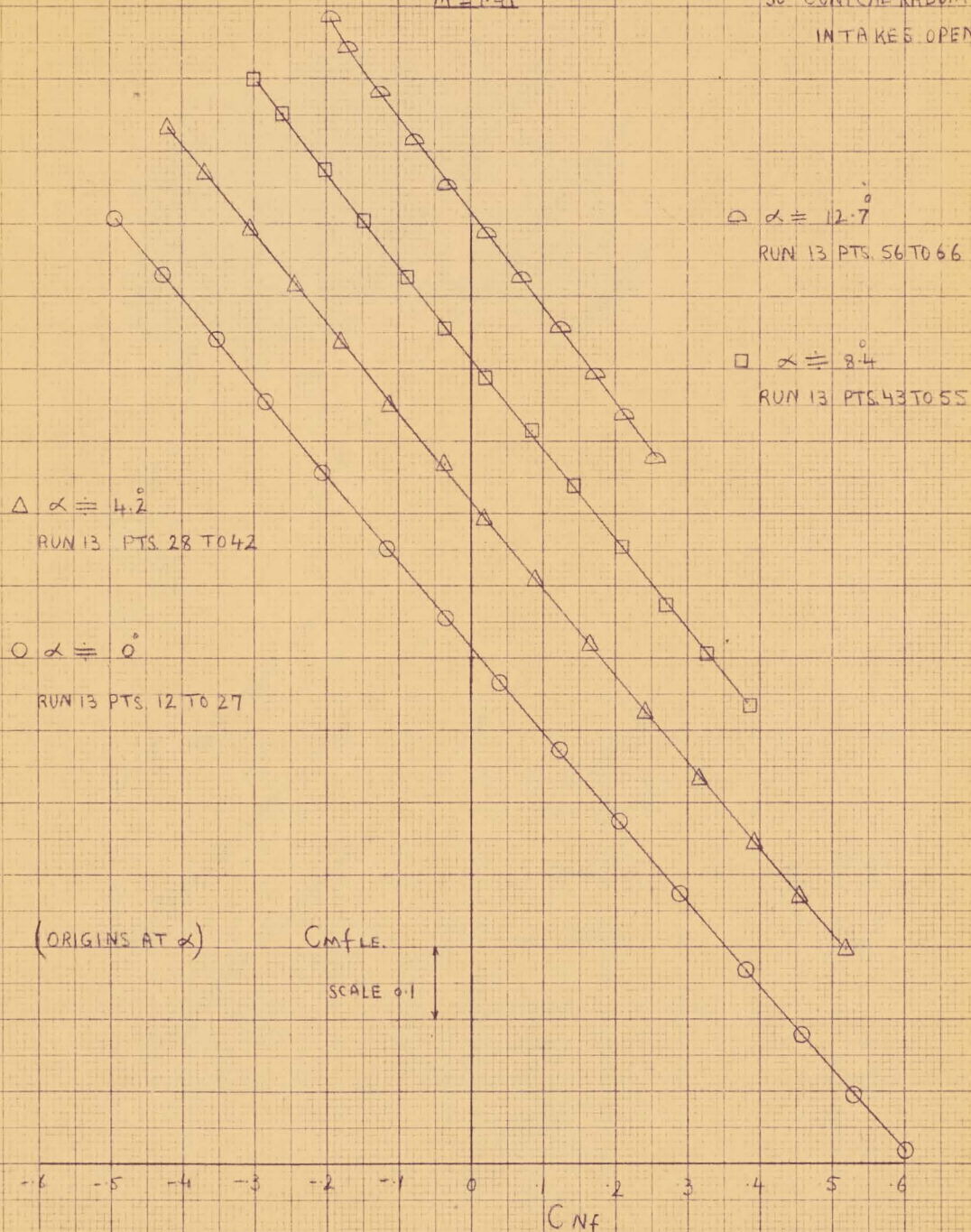
C-105

.03 LANGLEY MODEL

CmflE vs Cnf $M = 1.41$ CONFIG. B₁-V, W, E₁₀, N₅, D₈₋₄

30° CONICAL RADOM

INTAKES OPEN



C-105

0.3 LANGLEY MODEL

$C_{mfr} = C_{nf}$

$M = 1.41$

CONFIG. B₁, V₁, W₁, E₁₀, N₅, D₃, 4

30 CONICAL RADOME

INTAKES OPEN

$\Delta \alpha = 12.7^\circ$

RUN 13 PTS. 56 TO 66

$\square \alpha = 8.4^\circ$

RUN 13 PTS. 43 TO 55

$\triangle \alpha = 4.2^\circ$

RUN 13 PTS. 28 TO 42

$\circ \alpha = 0^\circ$

RUN 13 PTS. 12 TO 27

C_{mfr} (ORIGINS AT α)

0.1 SCALE

-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
 C_{nf}

