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AVRO AIRCRAFT LIMITED
PERIODIC PERFORMANCE REPORT 15

PERFORMANCE OF THE ARROW 2
APPENDIX 1

SECRET

DECEMBER 1958



AVRO AIRCRAFT LIMITED

MALTON

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TECHNICAL DEPARTMENT (Aircraft)

AIRCRAFT: ARROW 2

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Appendix I
to Periodic Performance
Report No. 15

REPORT NO:

FILE NO: 72/PERF/36

NO. OF SHEETS

TITLE:

APPENDIX 1 TO PERIODIC PERFORMANCE REPORT No. 15

Classification cancelled/changed to.....
(date).....
by authority of.....
Signature.....

PREPARED BY

Performance Group

DATE DEC. 1958

RECOMMENDED
FOR APPROVAL

DATE Dec/58

APPROVED

DATE Dec/58.

APPROVED
FOR RELEASE

DATE Dec/58.

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ARROW 2

APPENDIX 1 TO PERIODIC PERFORMANCE REPORT #15

Summary

The following are working performance curves of the Arrow 2 given in as general a form as possible, to enable the user to estimate additional mission profiles.

It should be noted that all Mach Numbers referred to in the following figures are True Mach Numbers.

The data given in this Appendix are based on the drag data given in Avro Report 71-2/Aero Data/17 (Revised Arrow drag based on preliminary flight test results) & propulsion data given in 72/Int. Aero/33 (Developed Iroquois Series 2 with 8050 maximum N_H rpm & developed afterburner).

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S E C R E T

ARROW 2 WITH IROQUOIS SERIES 2 ENGINES

TAKE OFF AT MAXIMUM THRUST (A/B ON)
TO UNSTICK

SL STANDARD DAY (15°C)

FUEL

TIME

REF: DRAG 71-2/AERO DATA/17
PROPULSION 72/INT. AERO/33

80000

70000

60000

50000

AIRCRAFT WEIGHT AT START OF T.O. ~ LB.

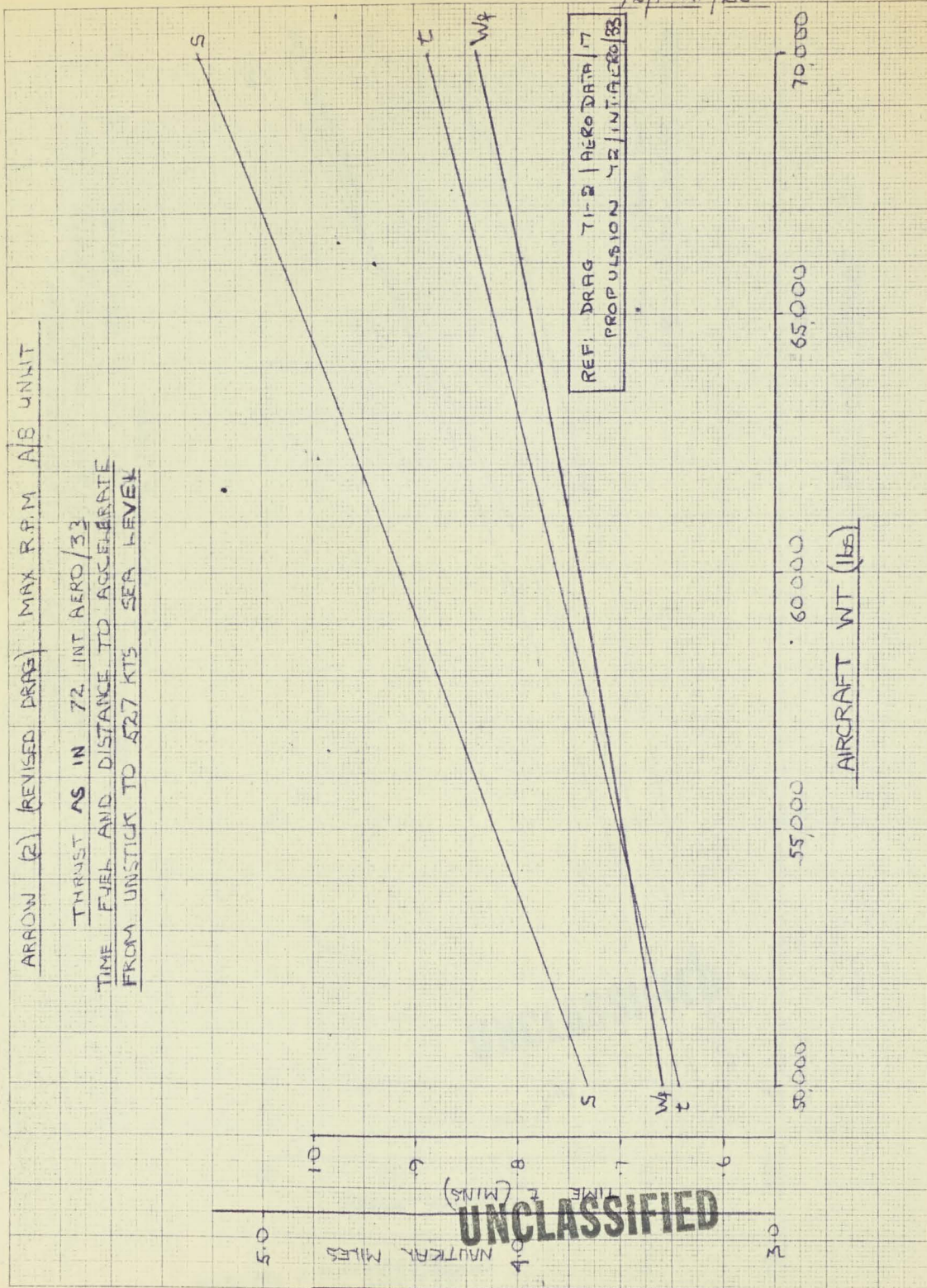
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FIG. 1B

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72/PERF/36



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TIG 2 A

ARROW 2 (REVISED DRAG)
TIME, FUEL AND DISTANCE TO ACCELERATE
FROM UNSTICK TO 527 KTS. — SEA LEVEL
WITH VENTRAL TANK

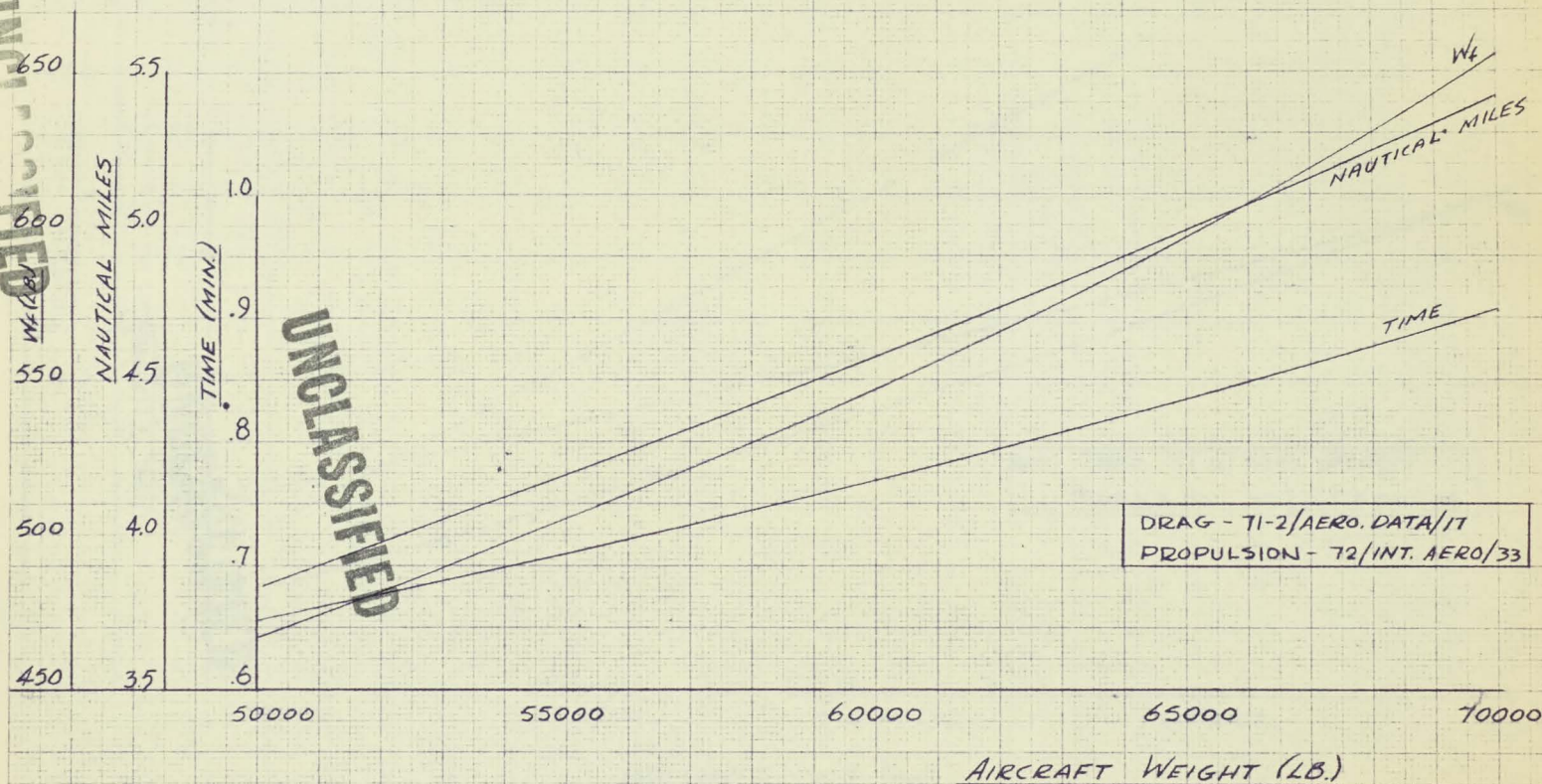


FIG 28

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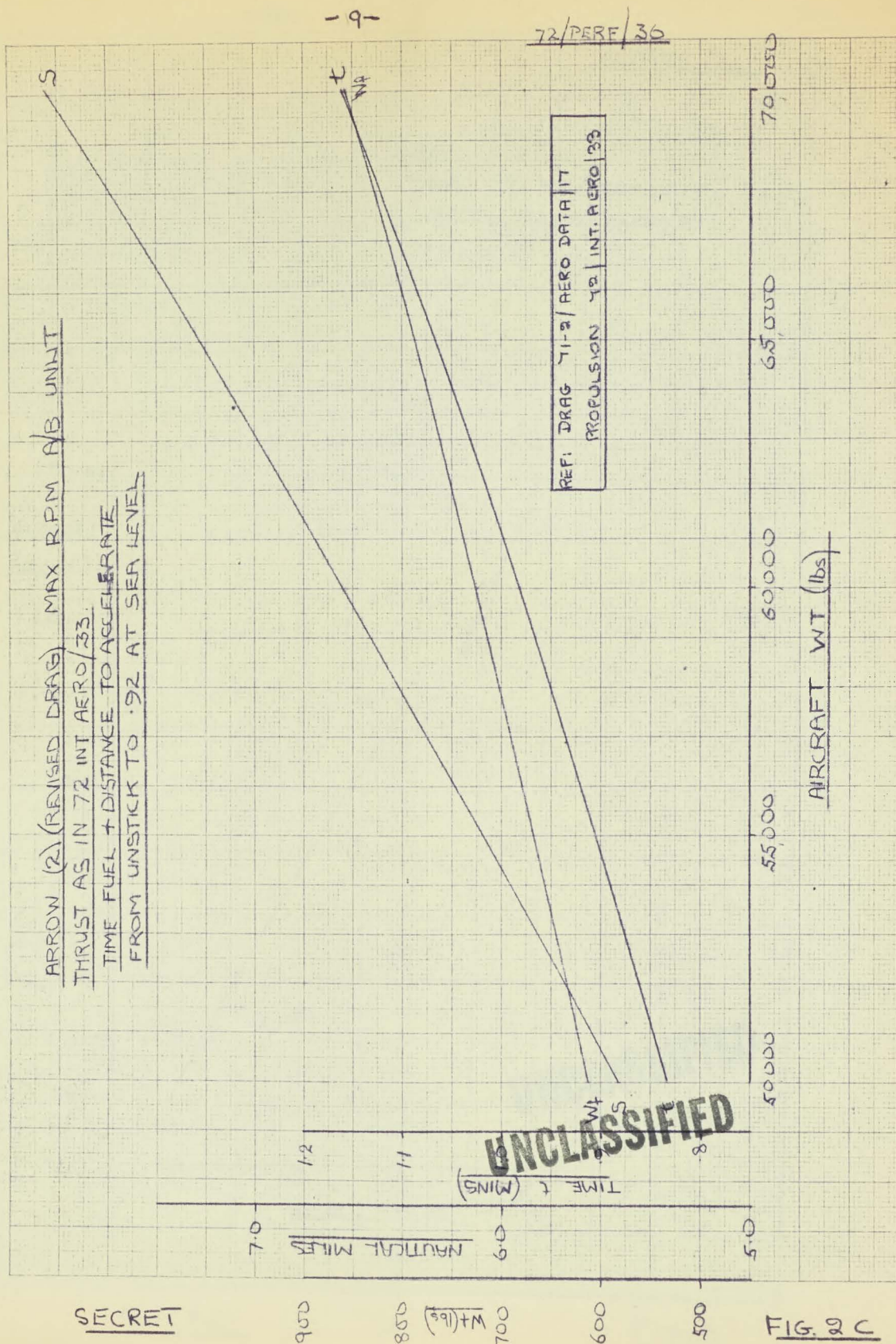
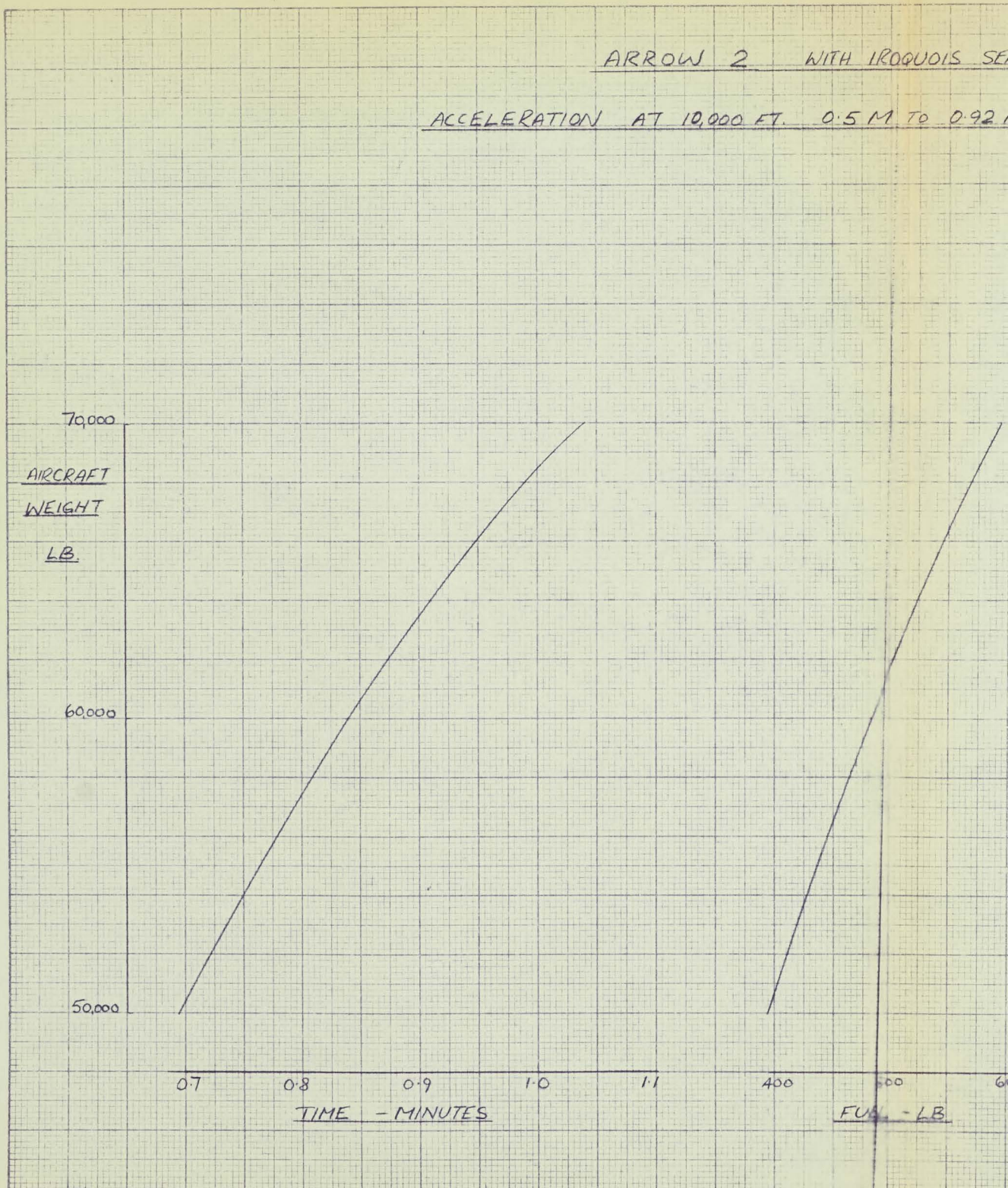


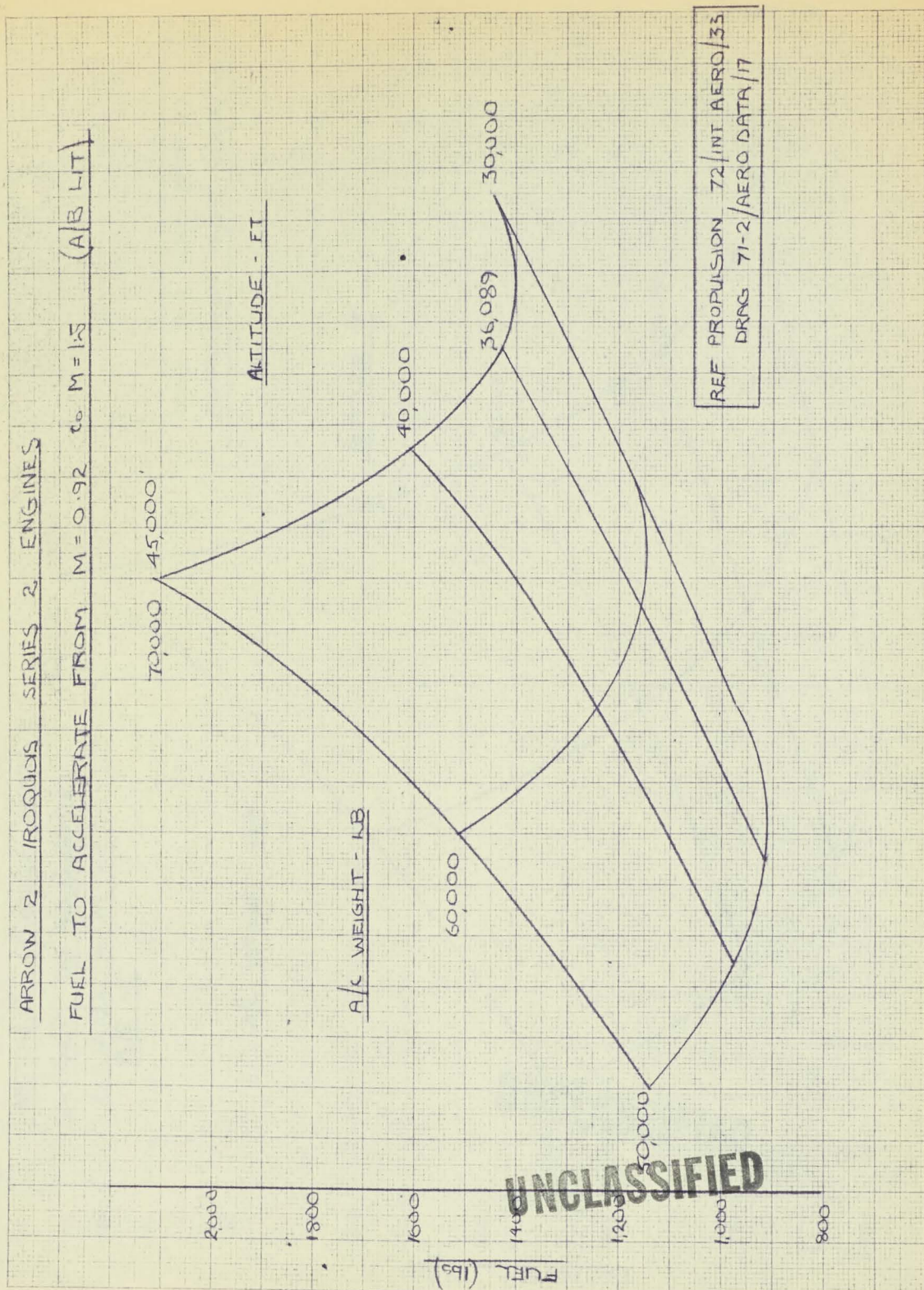
FIG. 2 C

ARROW 2 WITH IROQUOIS SE

ACCELERATION AT 10,000 FT. 0.5 M TO 0.92

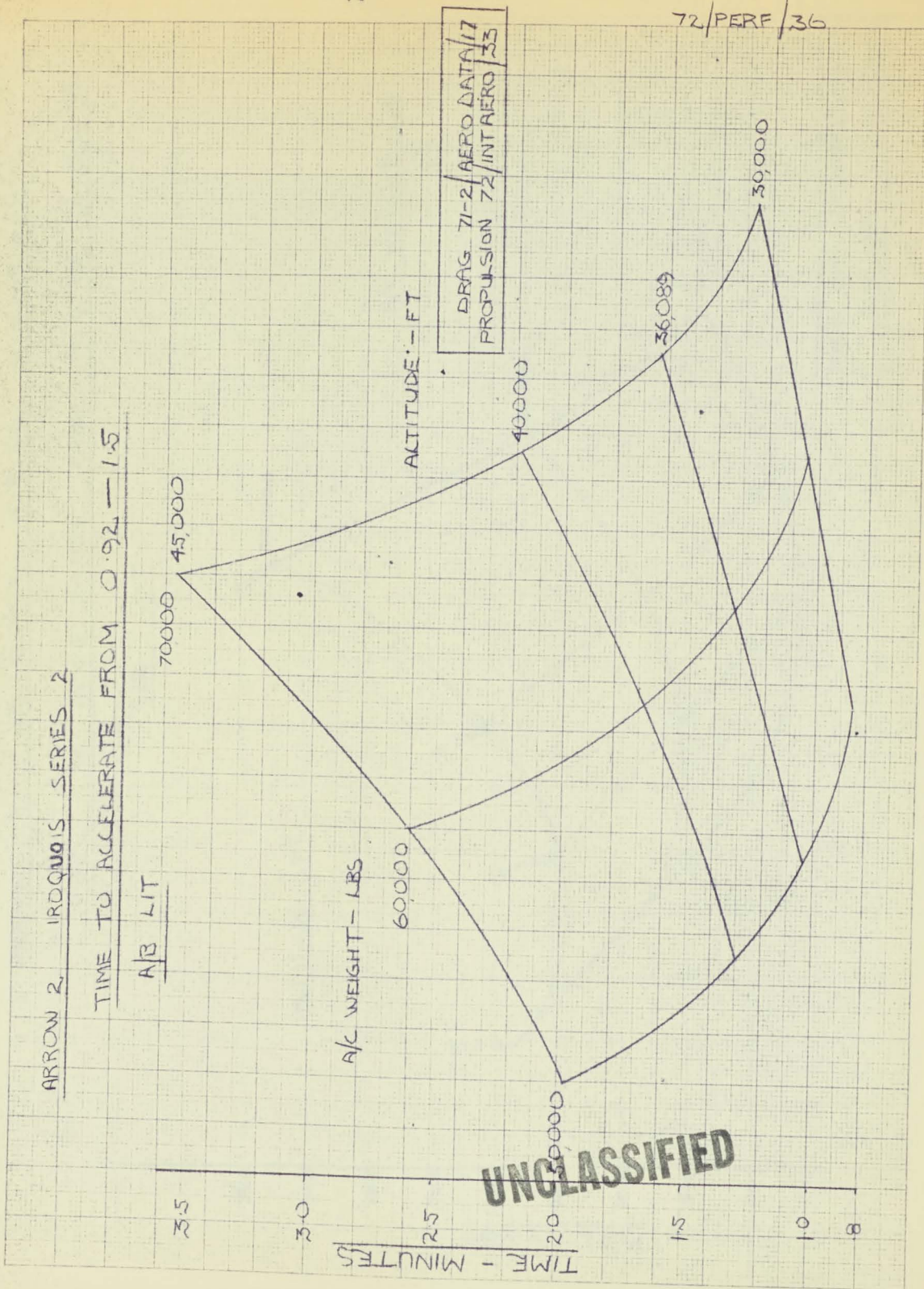


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FIG. 4A



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FIG. 4C

ARROW 2 - IRROQUOIS SERIES 2 ENGINES

DISTANCE TO ACCELERATE FROM M=0.92 TO M=1.80

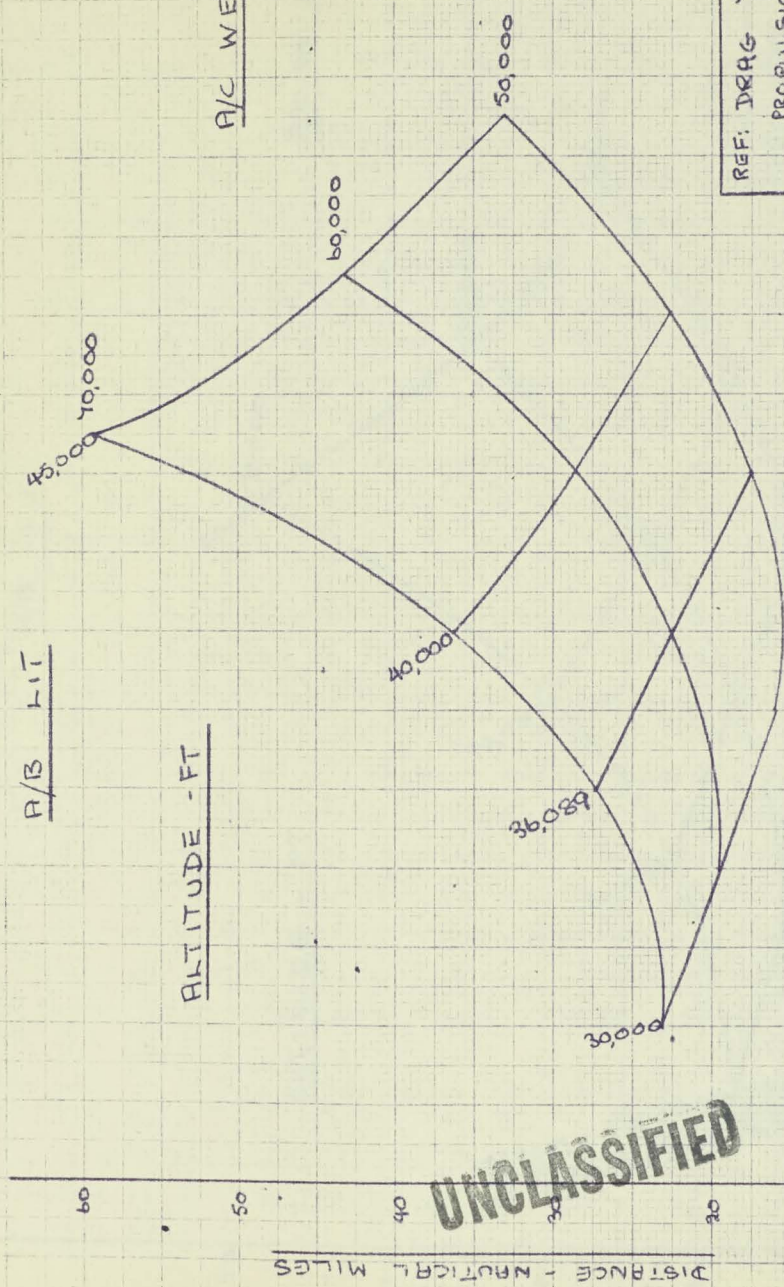
A/B LIT

ALTITUDE - FT

A/C WEIGHT - LB

REF: DRAG Y1-2 | AERODATA 7
PROPULSION Y2/INT. AERO | 35

N.W. DEC. '58



ARROW 2 - IROQUOIS SERIES 2 ENGINES

TIME TO ACCELERATE FROM M=0.92 TO M=1.80

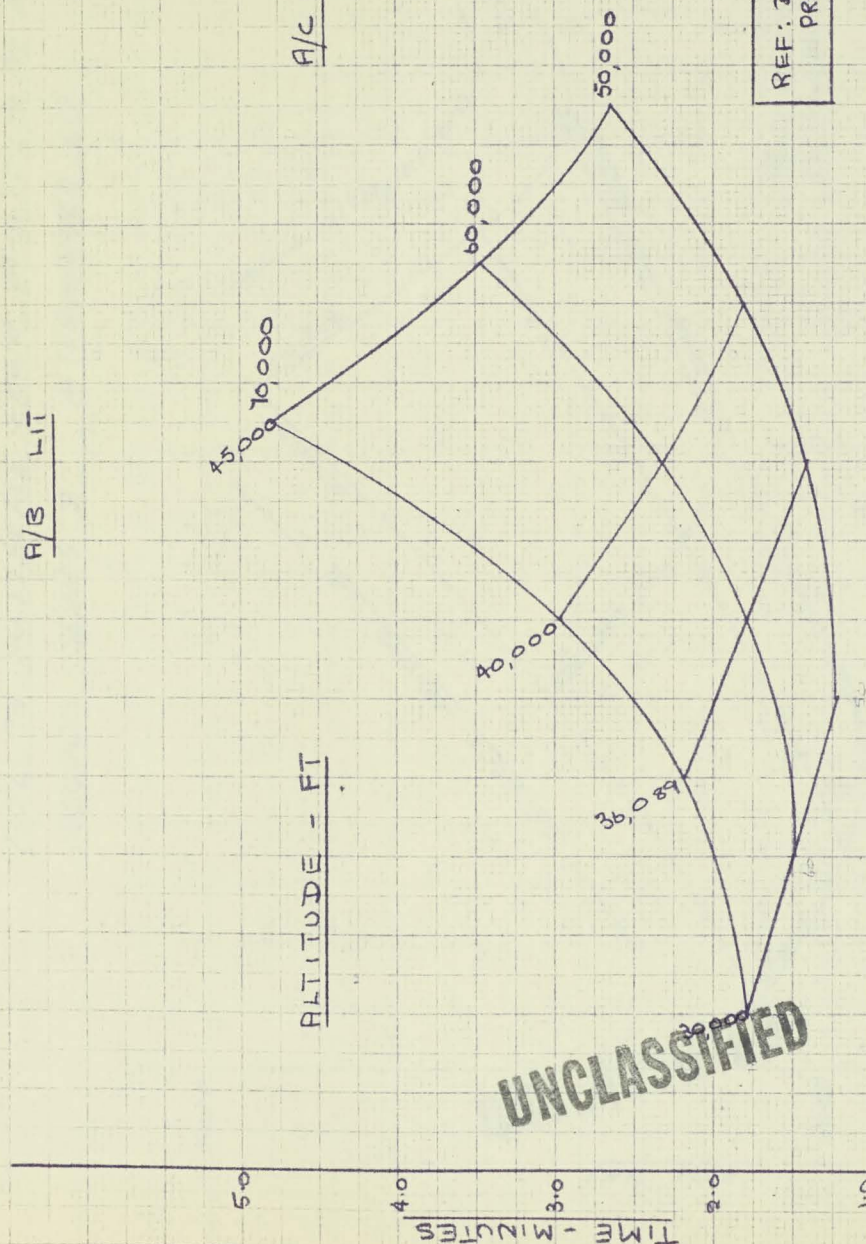
A/B LIT

A/C WEIGHT - LB

ALTITUDE - FT

REF: DRAG T1-2/AERO DATA/17
PROPULSION T2/INT. REGD/33

N.W. DEC '58



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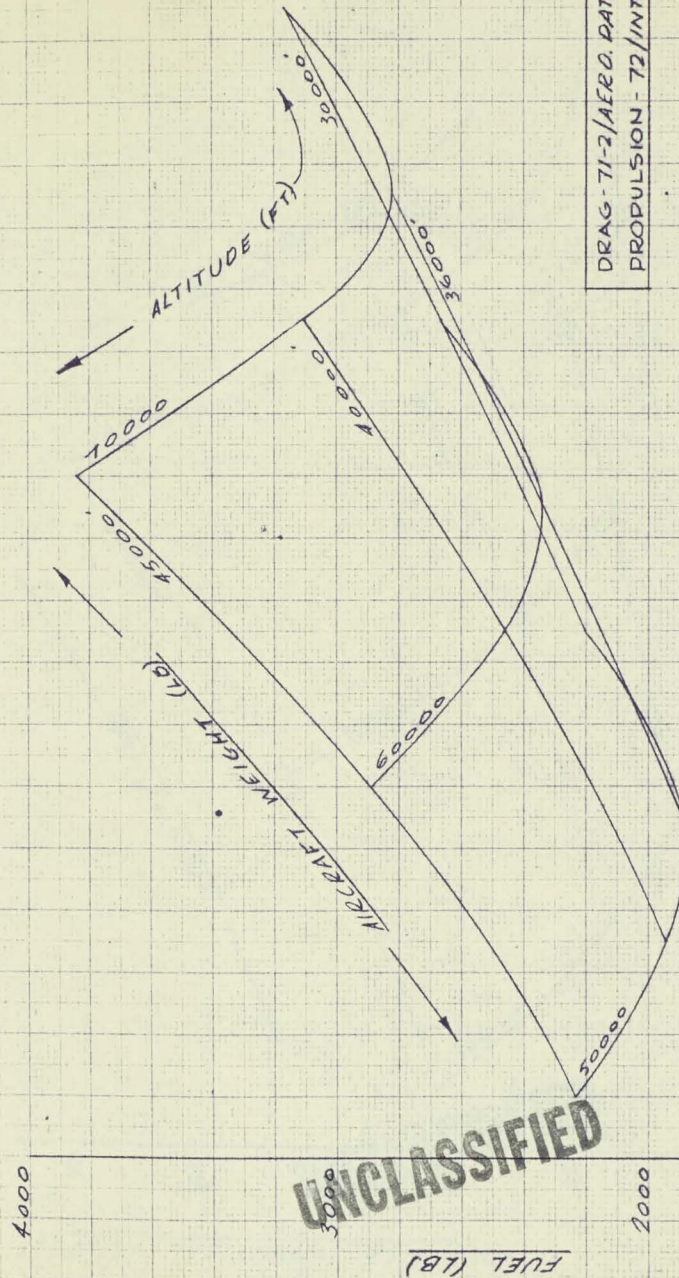
SECRET

FIG. 5C

ARROW 2

FUEL TO ACCELERATE FROM M=0.92 TO M=2.0

IROQUOIS SERIES 2 AFTERBURNER LIT

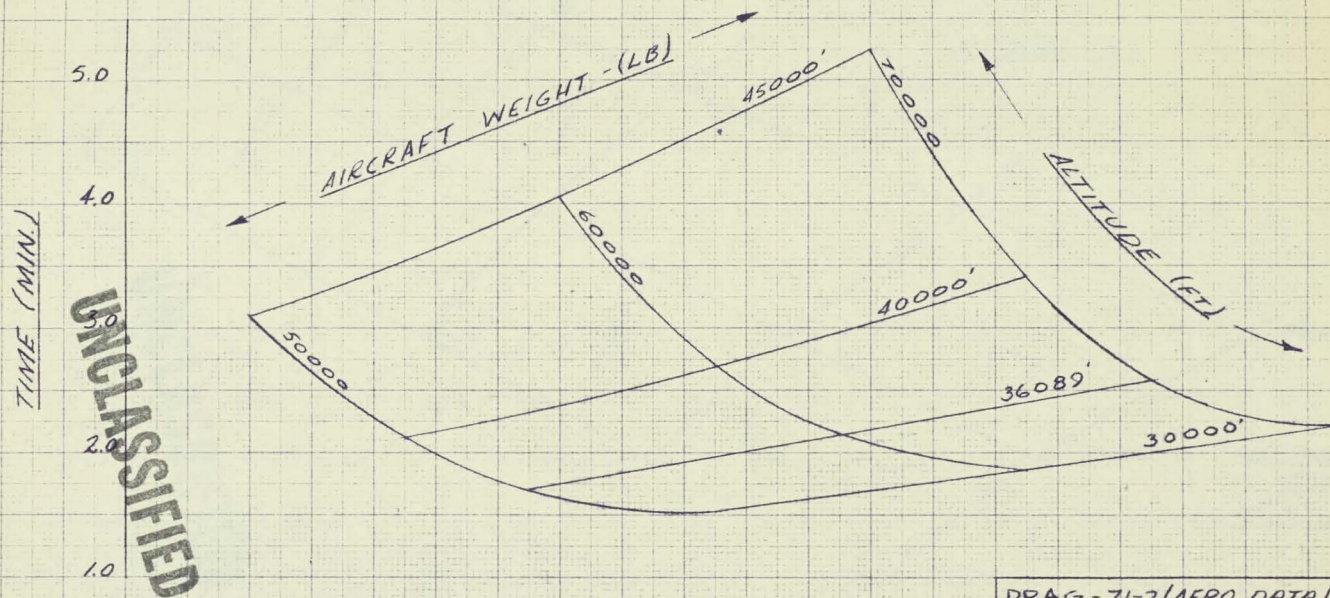


DRAG-TI-2/AERO. DATA/17
PROPULSION-72/INT. AERO/33

ARROW 2

TIME TO ACCELERATE FROM $M=0.92$ TO $M=2.0$

IROQUOIS SERIES 2 AFTERBURNER LIT



DRAG - 71-2/AERO DATA/17
PROPULSION - 72/INT. AERO/33

SECRET

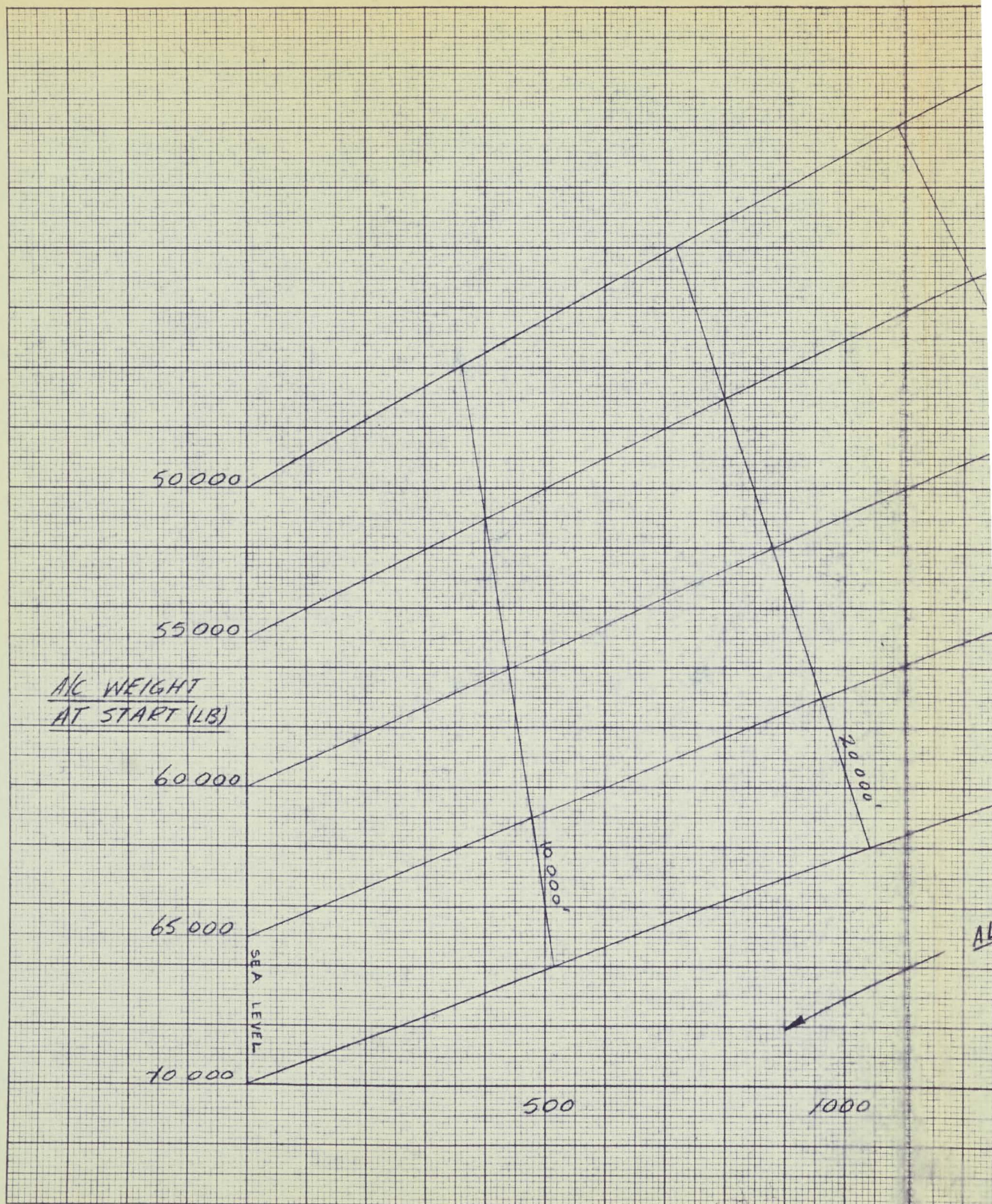
FIG. 6c

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REPORT NO. 72/PERF/36

-19-

G9-11L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA

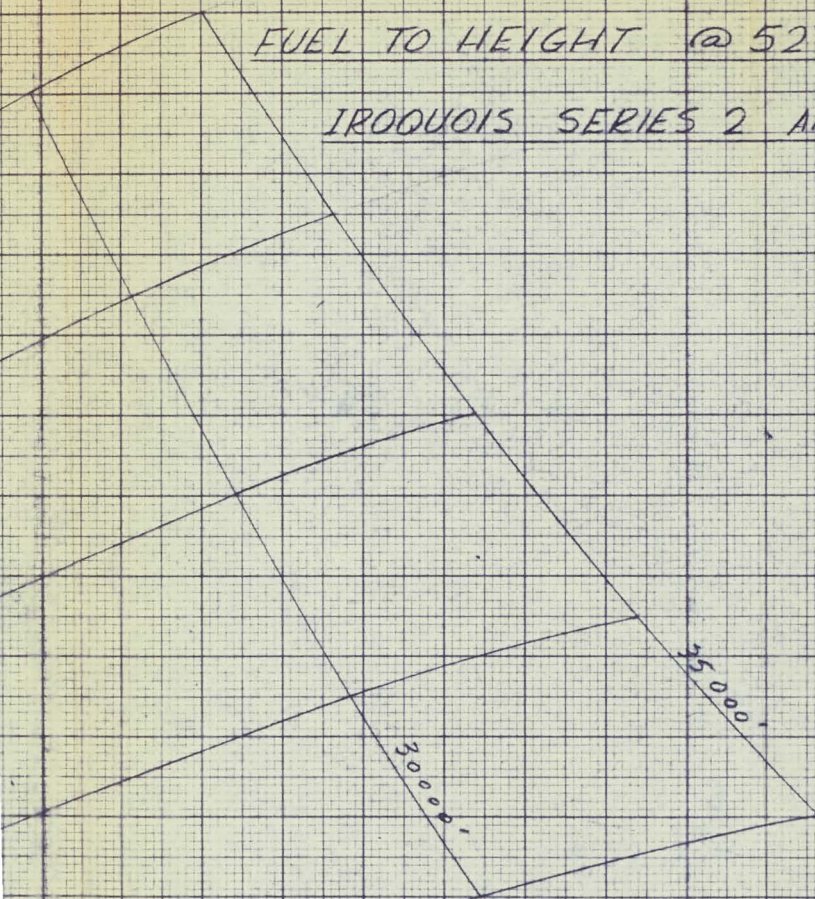


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ARROW 2 - CLIMB

FUEL TO HEIGHT @ 527 Kts TAS - STANDARD DAY

IROQUOIS SERIES 2 AFTERBURNER UNLIT



DRAG - 71-2/AERO.DATA/17
PROPULSION - 72/INT.AERO/33

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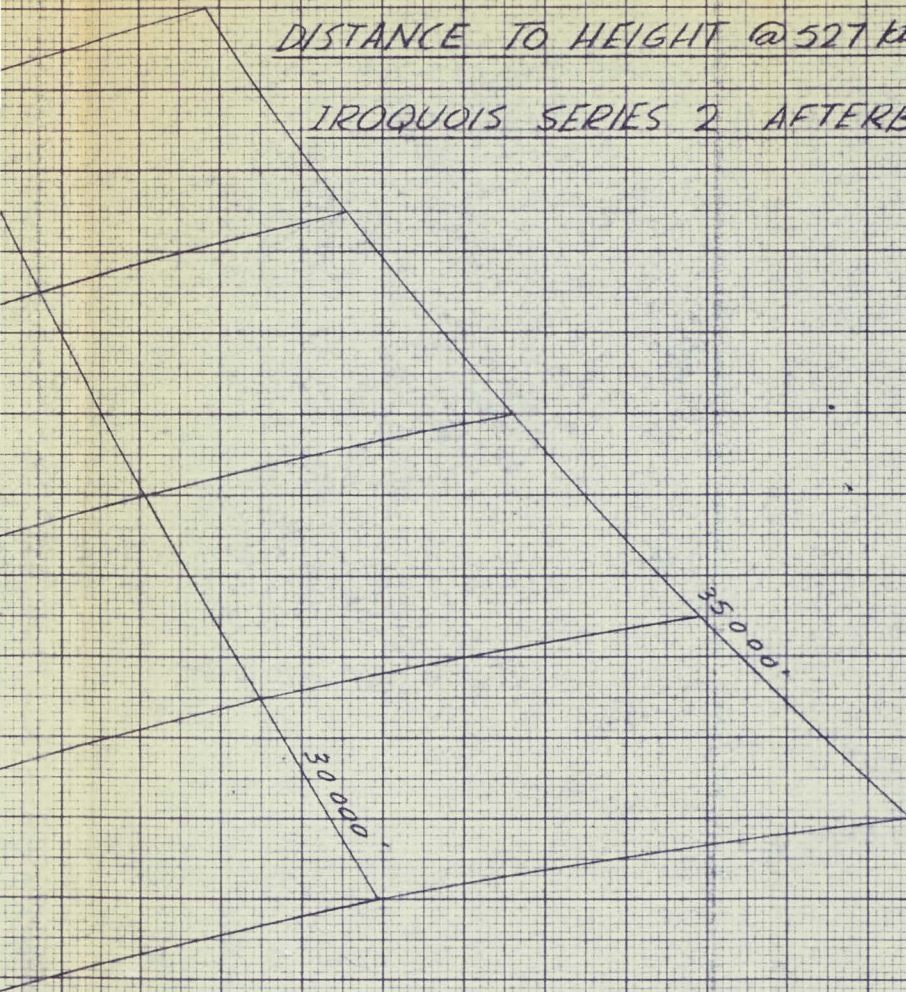
FUEL USED (LB)

FIG. 7 B

ARROW 2 - CLIMB

DISTANCE TO HEIGHT @ 527 KTS - STANDARD DAY

IROQUOIS SERIES 2 AFTERBURNER UNLIT



DRAG-T1-2/AERO DATA/17
PROPULSION-T2/INT. AERO/33

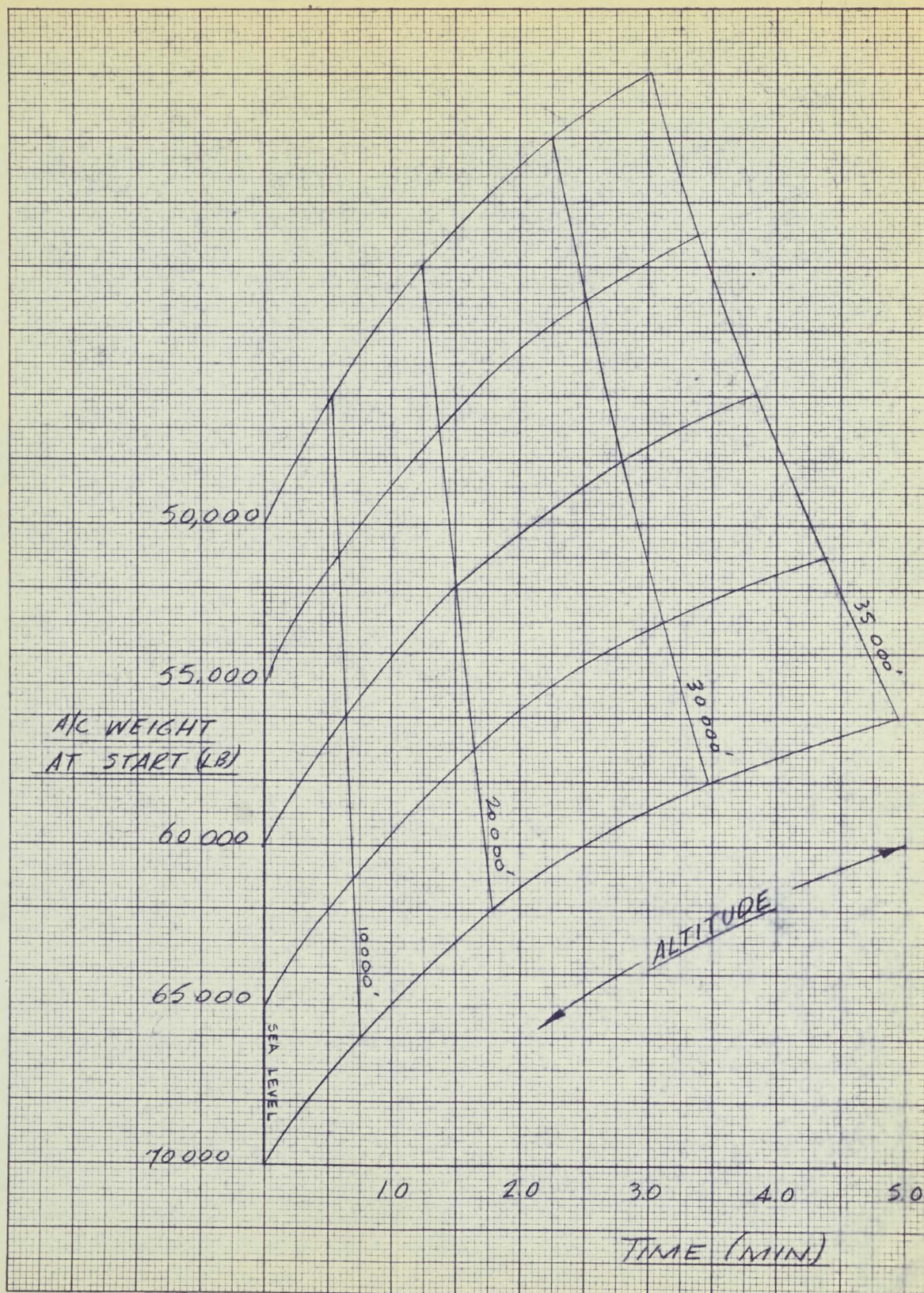
25 30 35 40

NAUTICAL MILES

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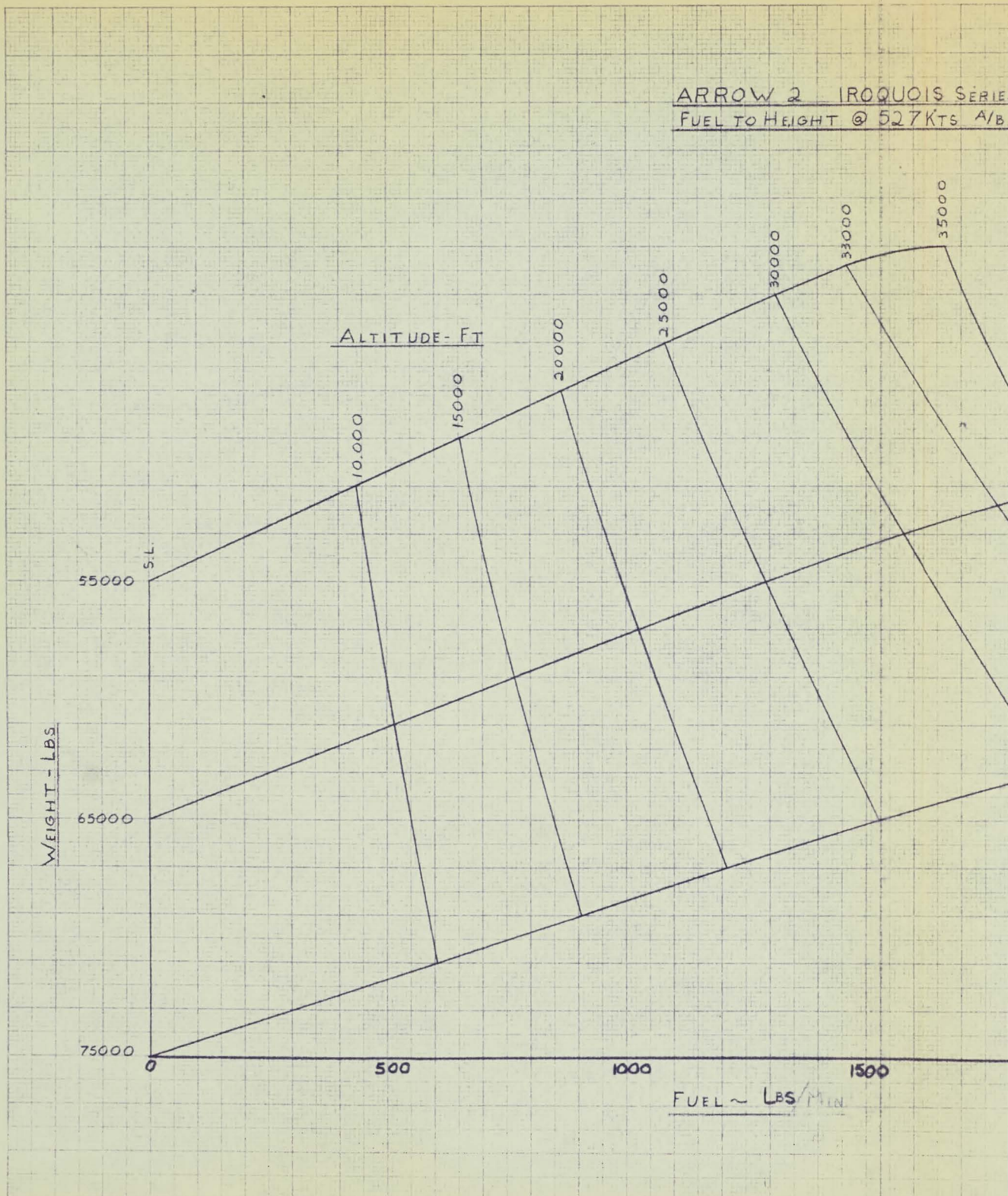
FIG 7C

G 9-11L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA



SECRET

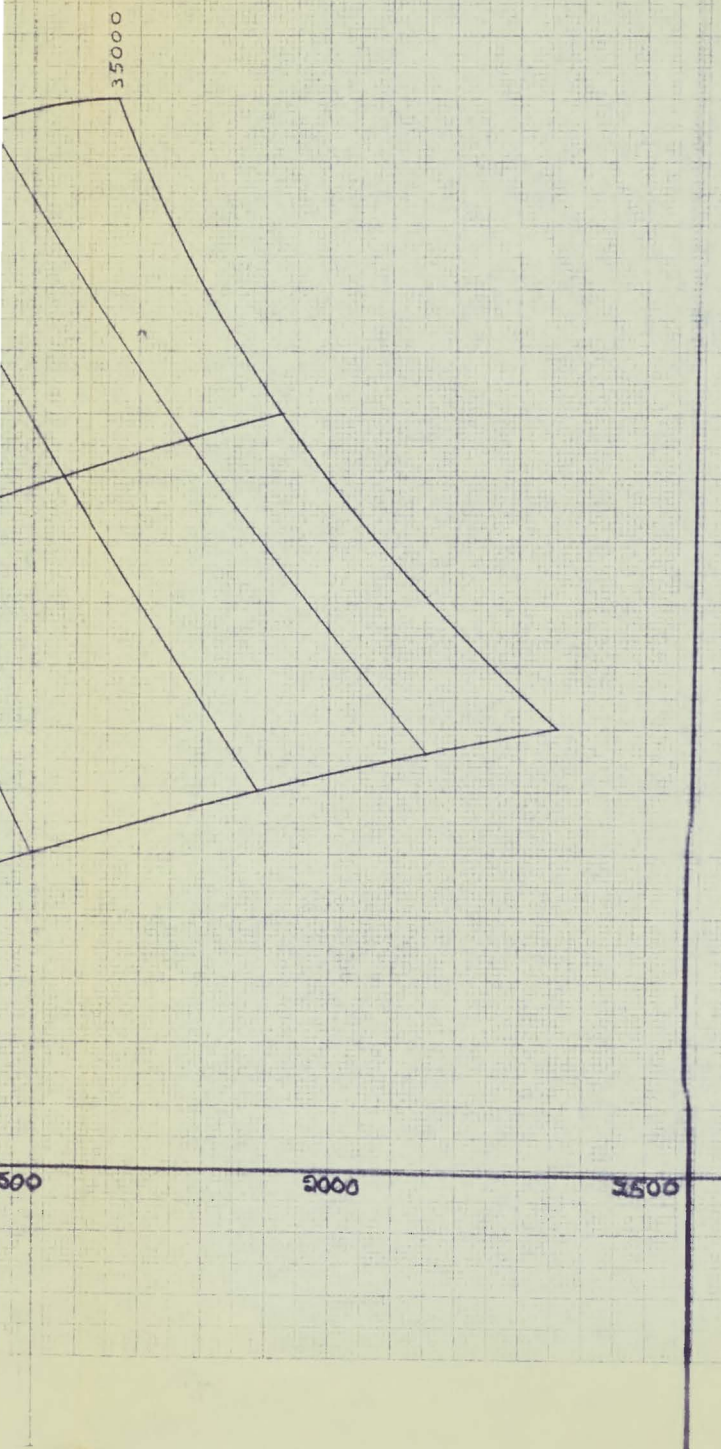
ARROW 2 IROQUOIS SERIES
FUEL TO HEIGHT @ 527 KTS A/B



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ILLINOIS SERIES 2

3 527 KTS A/B UNLIT WITH VENTRAL TANK



PROPULSION 72/INT. AERO/33
DRAG 71-2/AERO DATA/17

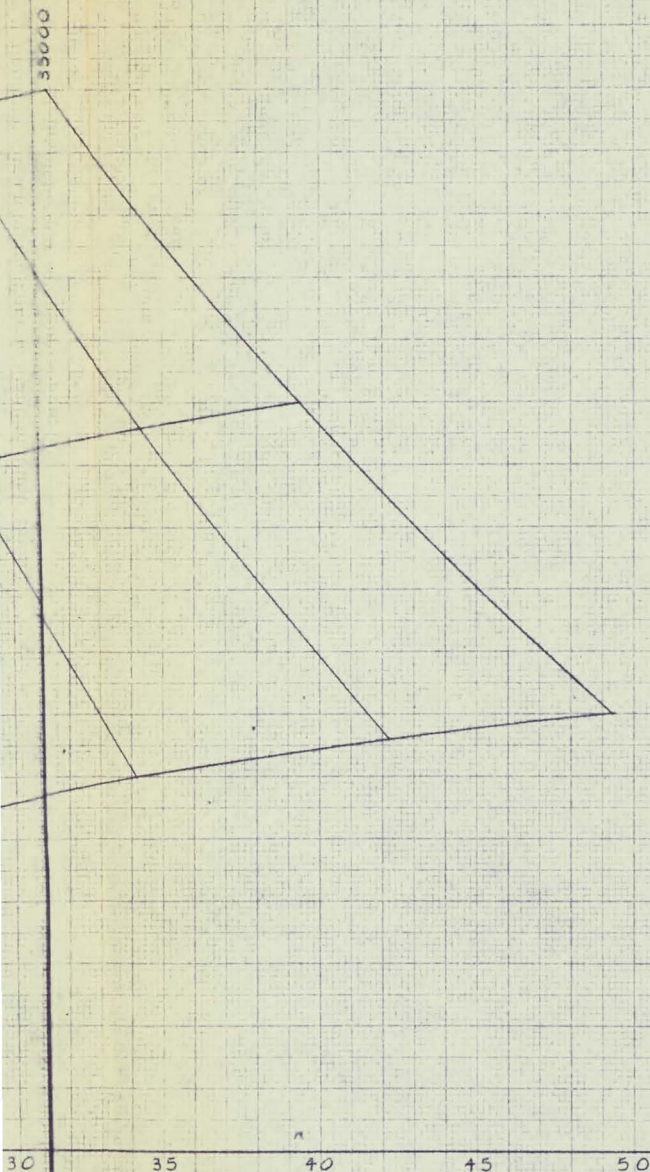
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REPORT NO 72/PERF/36

FIG. 8B

QUOIS SERIES 2

@ 527 KTS A/B UNLIT WITH VENTRAL TANK



PROPULSION: 72/INT. AERO/33
DRAG: 71-2/AERO DATA/17

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Report No. 72/PERF/36

FIG. 8c

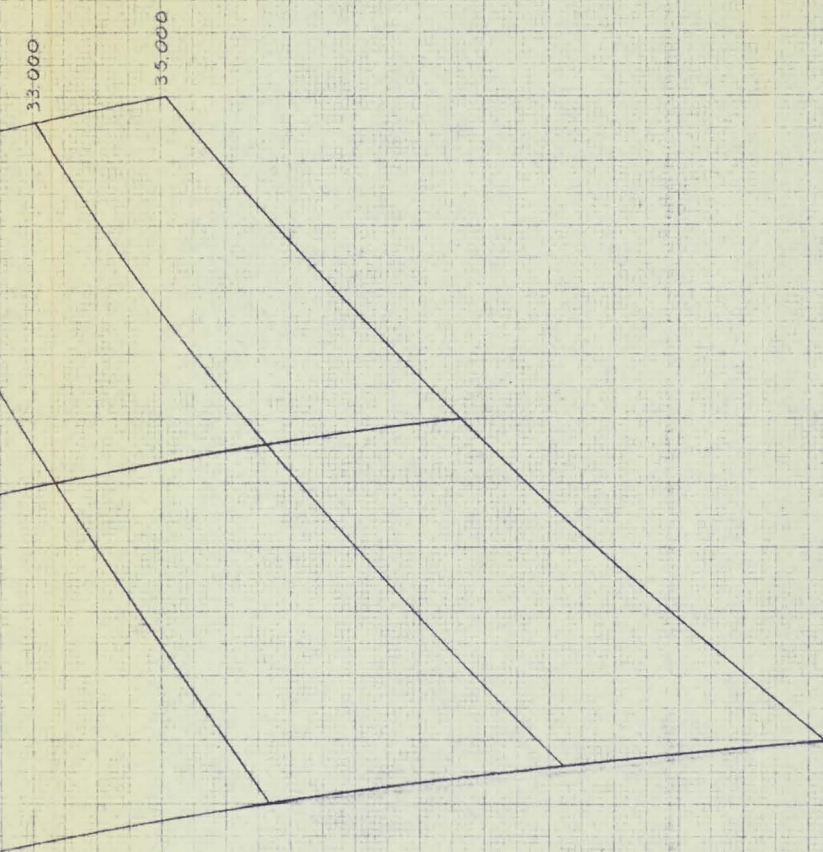
ARROW 2 IROQUOIS SE
TIME TO HEIGHT @ 527 KTS



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VOIS SERIES 2

527 KTS A/B UNLIT WITH VENTRAL TANK



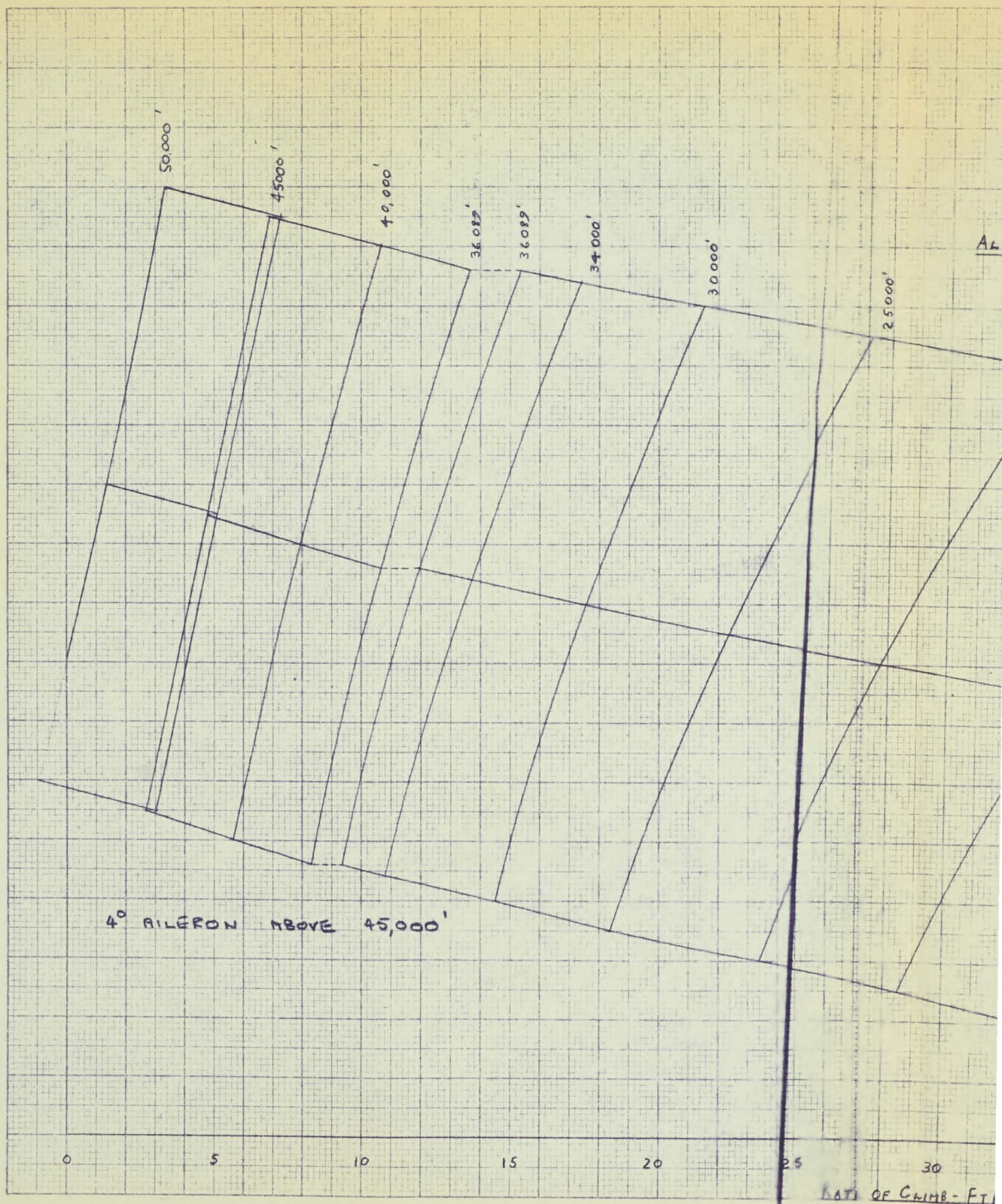
PROPULSION: 72/INT. AERO/33
DRAG: 71-2/AERO DATA/17

MINS.

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FIG. 8D



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ARROW 2 IROQUOIS SERIES 2 ENGINE

RATE OF CLIMB AT $M.N. = 0.92$ A/B LITALTITUDE - FT

REF: DRAG 41-2/AERO DATA/17

PROPULSION 78/INT. AERO/33

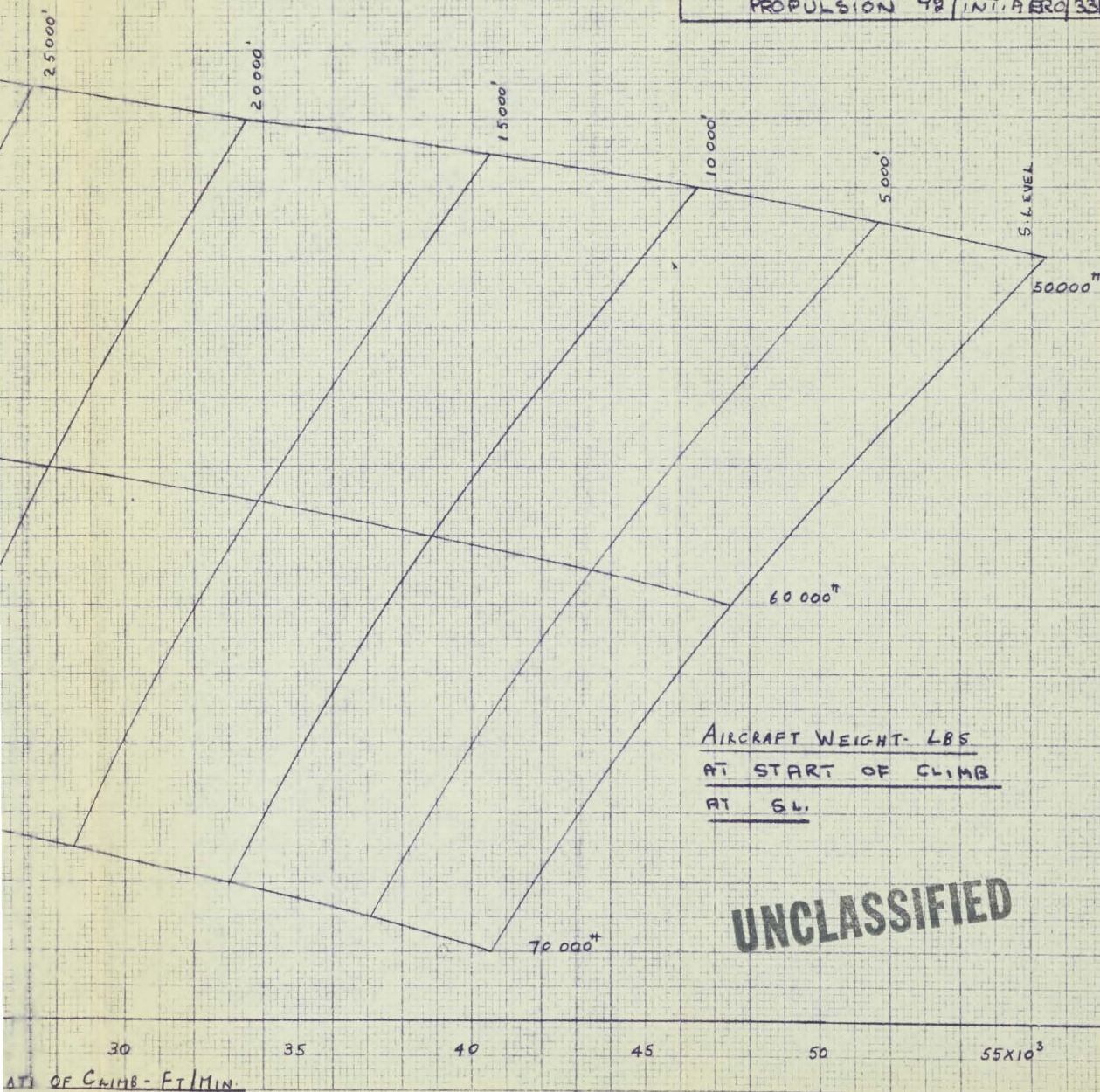
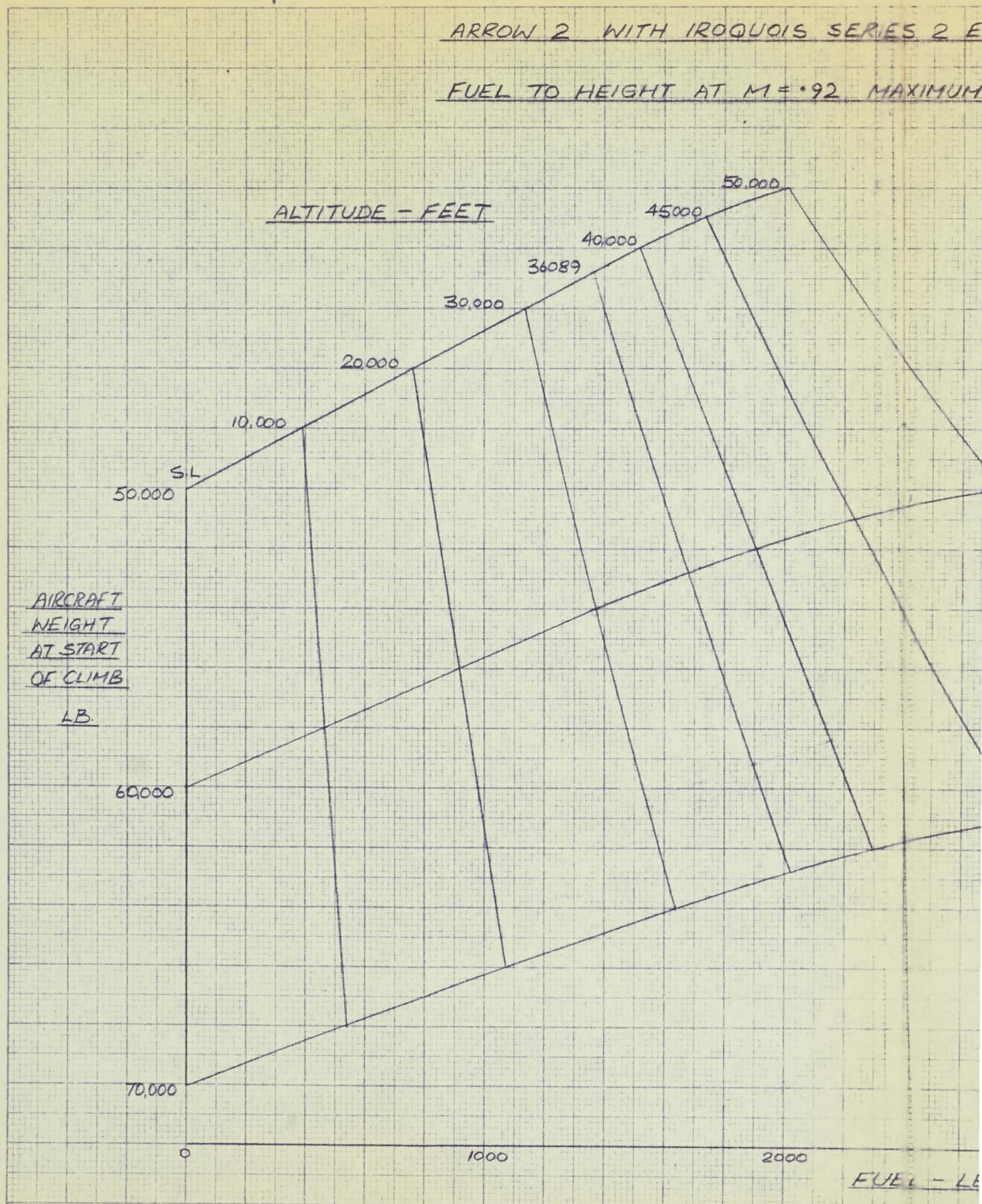


FIG. 9A

ARROW 2 WITH IROQUOIS SERIES 2 E

FUEL TO HEIGHT AT $M = .92$ MAXIMUM



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72/PERF/36

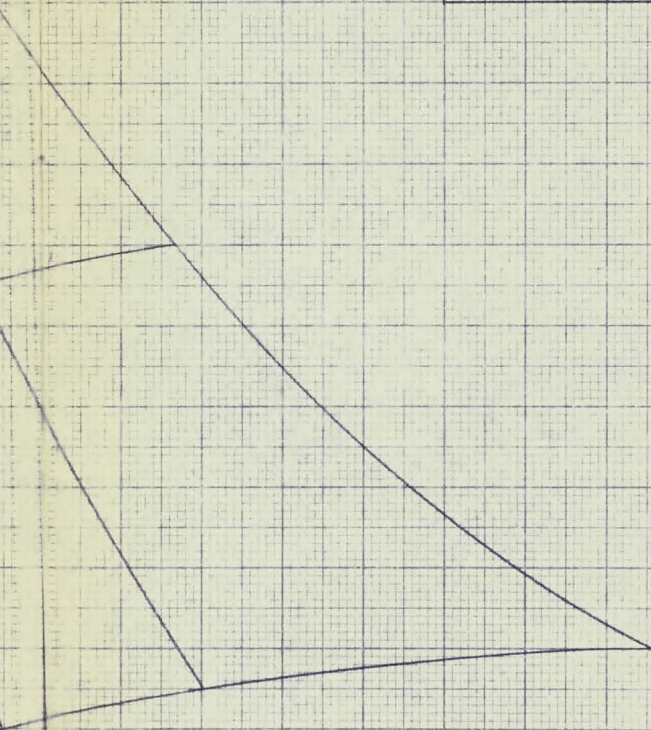
2 ENGINES

MAXIMUM THRUST A/B LT

REF :

DRAG: 71-2/AERO DATA/17

THRUST: 72/INT AERO/33



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VELOCITY - LB

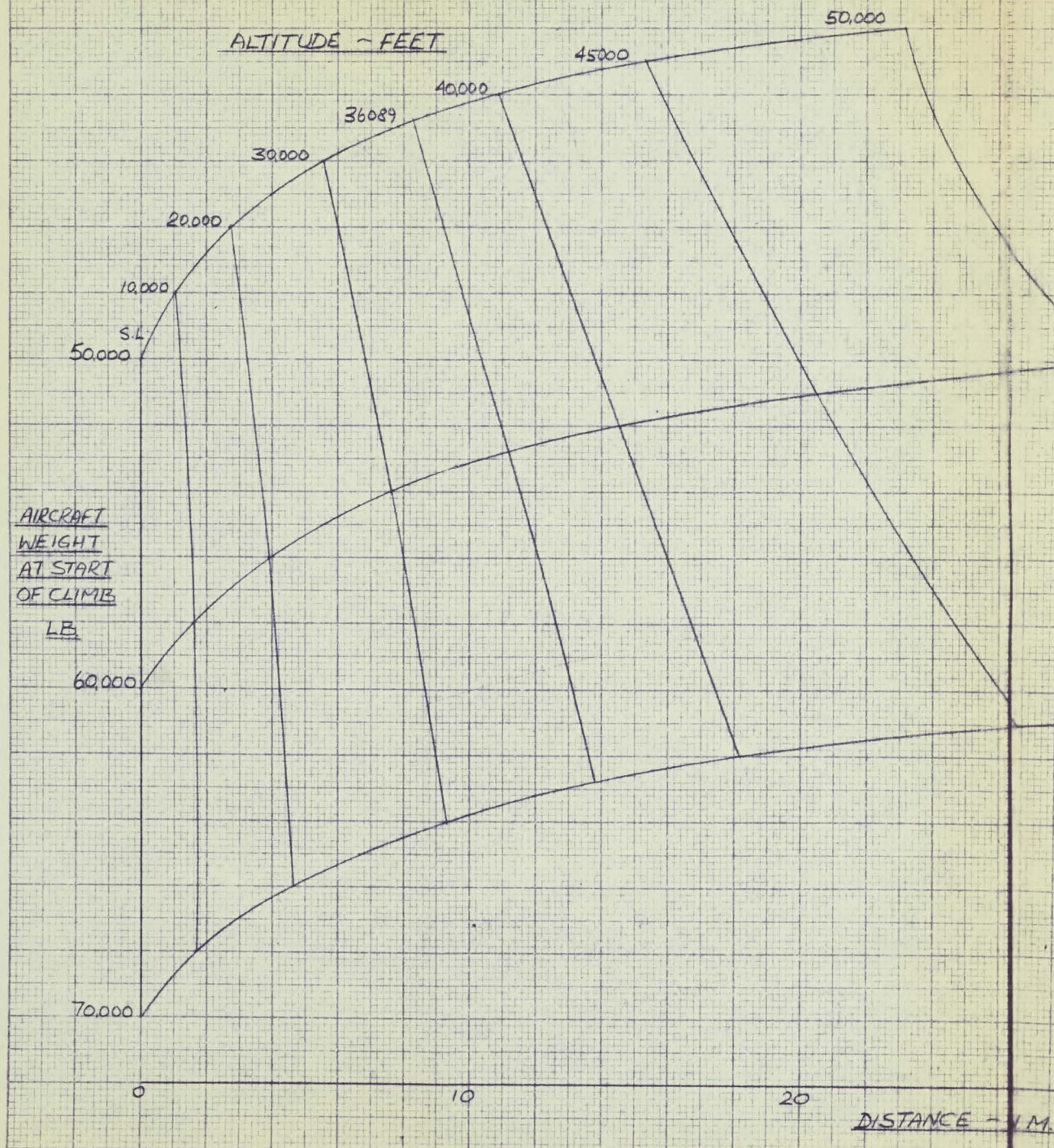
3000

4000

FIG. 9B

ARROW 2 WITH IROQUOIS

DISTANCE TO HEIGHT AT



AIRCRAFT
WEIGHT
AT START
OF CLIMB

LB

60,000

70,000

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359-111

10 X 10 TO THE 1/2 INCH
KEUFFEL & ESSER CO.

MADE IN U.S.A.

72/PERF/36

DUOIS SERIES 2 ENGINES

AT $M = .92$ MAXIMUM THRUST A/B LIT

REF:

DRAG: 71-2/AERO DATA/17

THRUST: 72/INT AERO/33

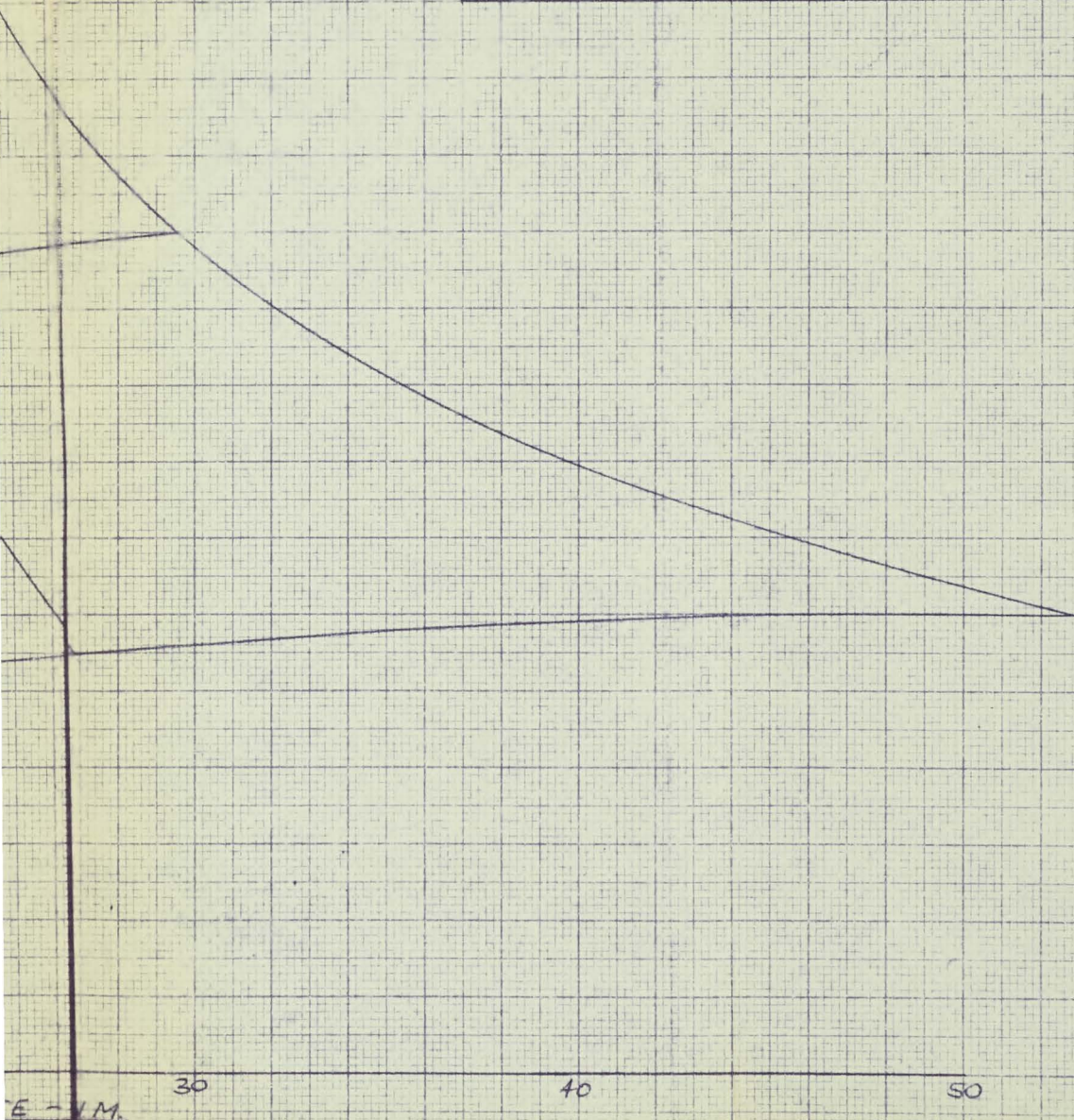
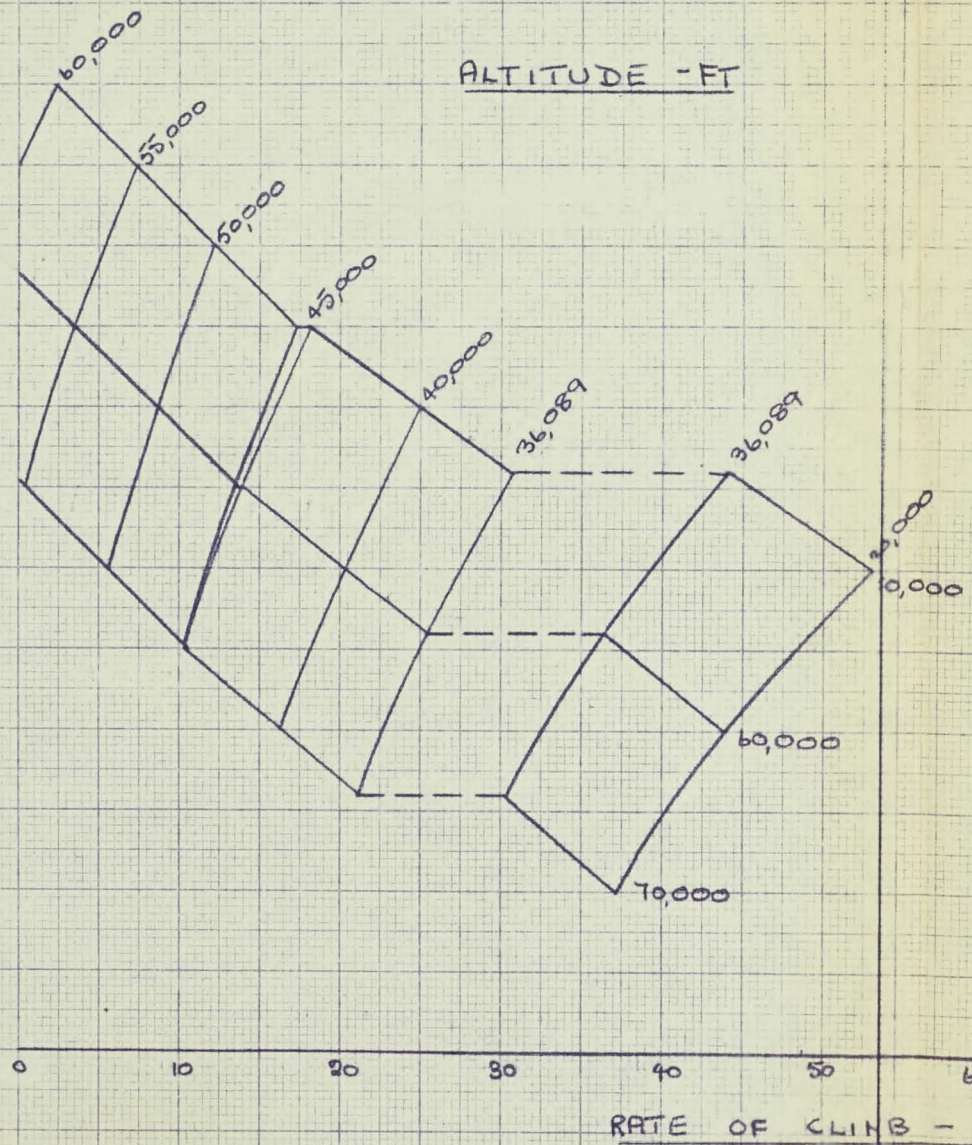


FIG. 9c

ARROW 2 - IROQUOIS

RATE OF CLIMB AT

A/B LIT



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IROQUOIS SERIES 2 ENGINES

MB AT M=1.5

B LIT

0° AILERON BELOW 45,000'
4° UP AILERON ABOVE 45,000'

REF: DRAG 71-2/AERODATA/17
PROPULSION 72/INT.AERO/33

30,000
0,000

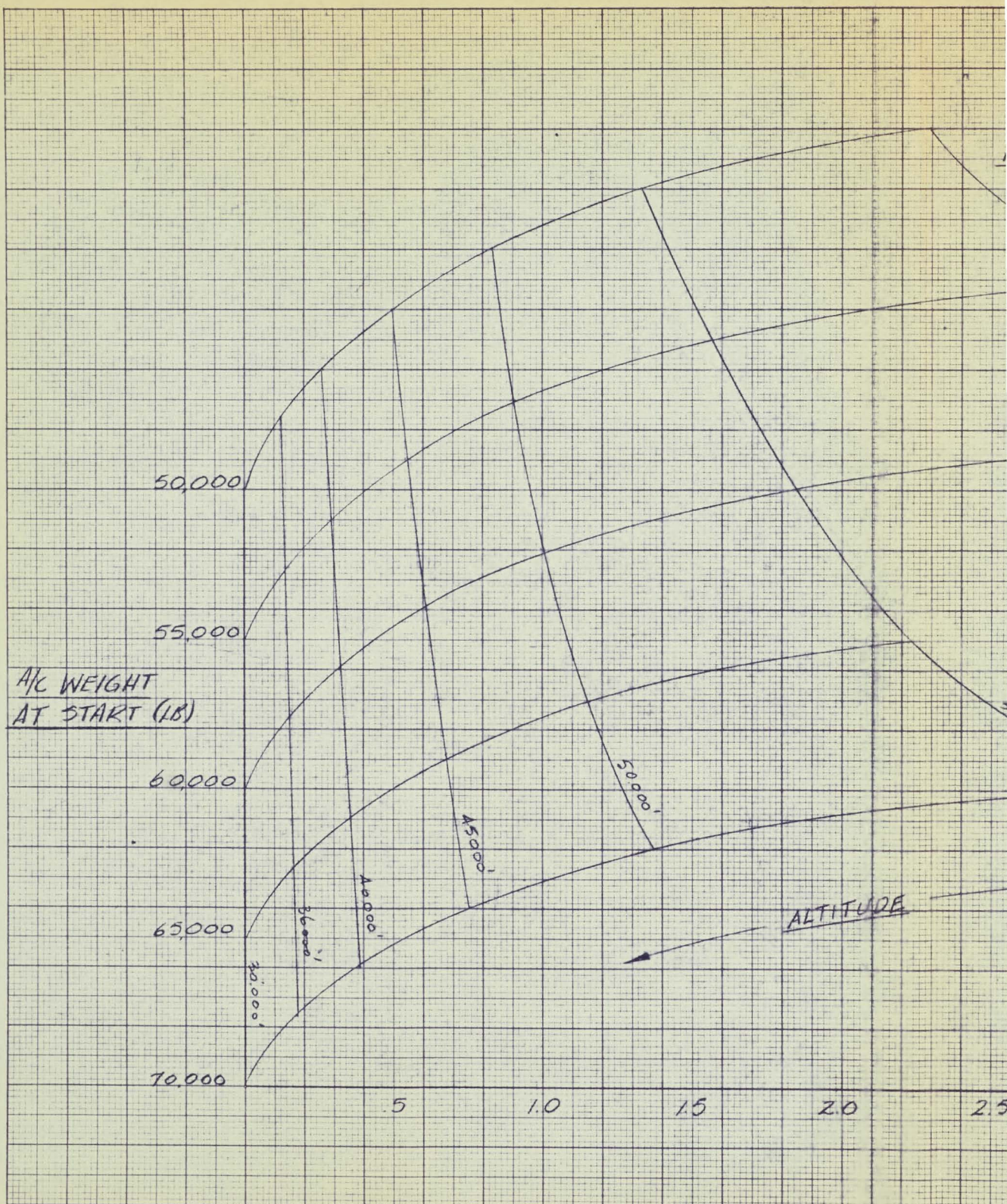
A/C WEIGHT - 16
AT START OF CLIMB
AT 30,000'

UNCLASSIFIED

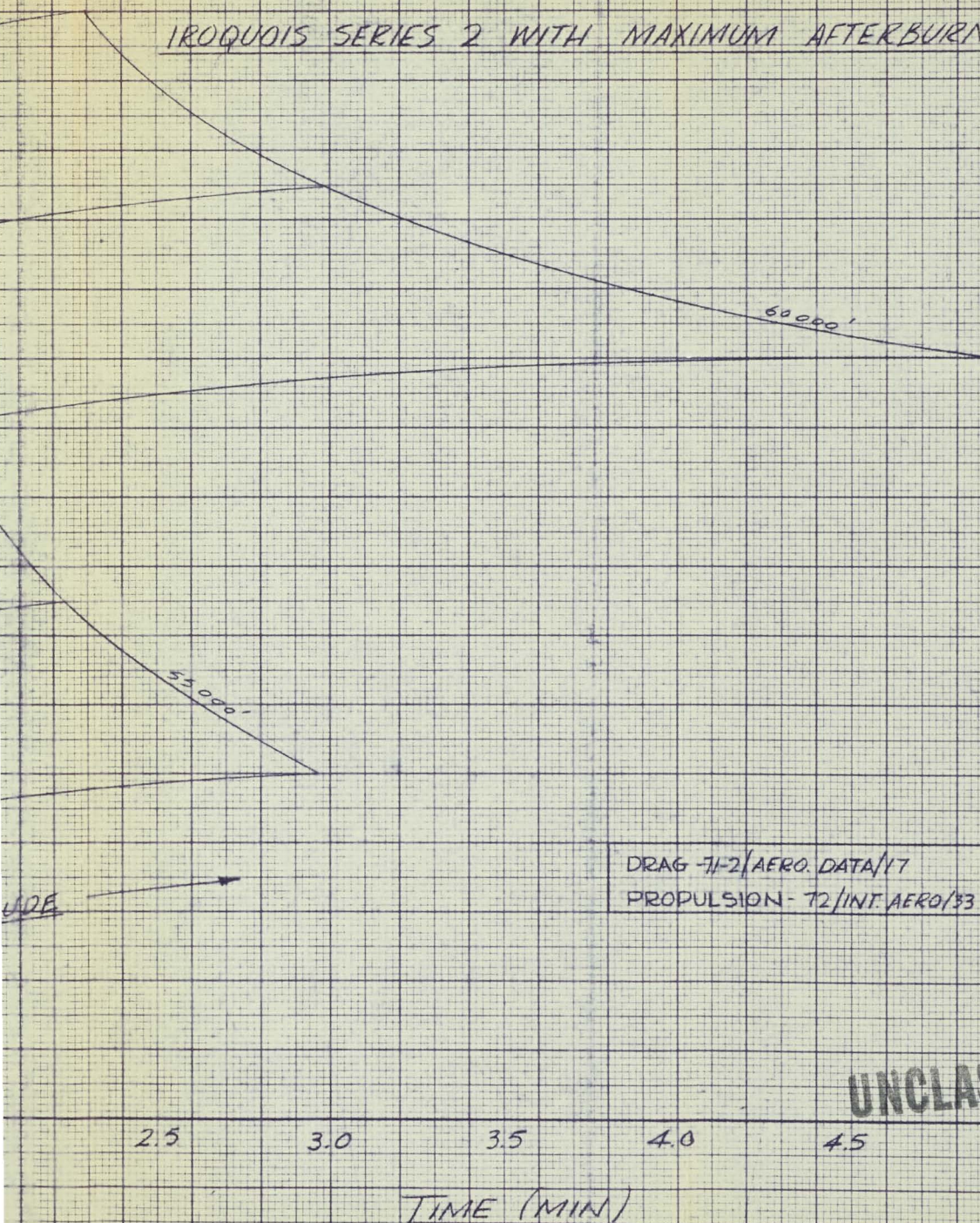
60 70
CLIMB - FT/MIN. $\times 10^{-3}$

FIG. 10A

G9-11L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA



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ARROW 2TIME TO HEIGHT AT CONSTANT MACH No. of 1.5IROQUOIS SERIES 2 WITH MAXIMUM AFTERBURNER

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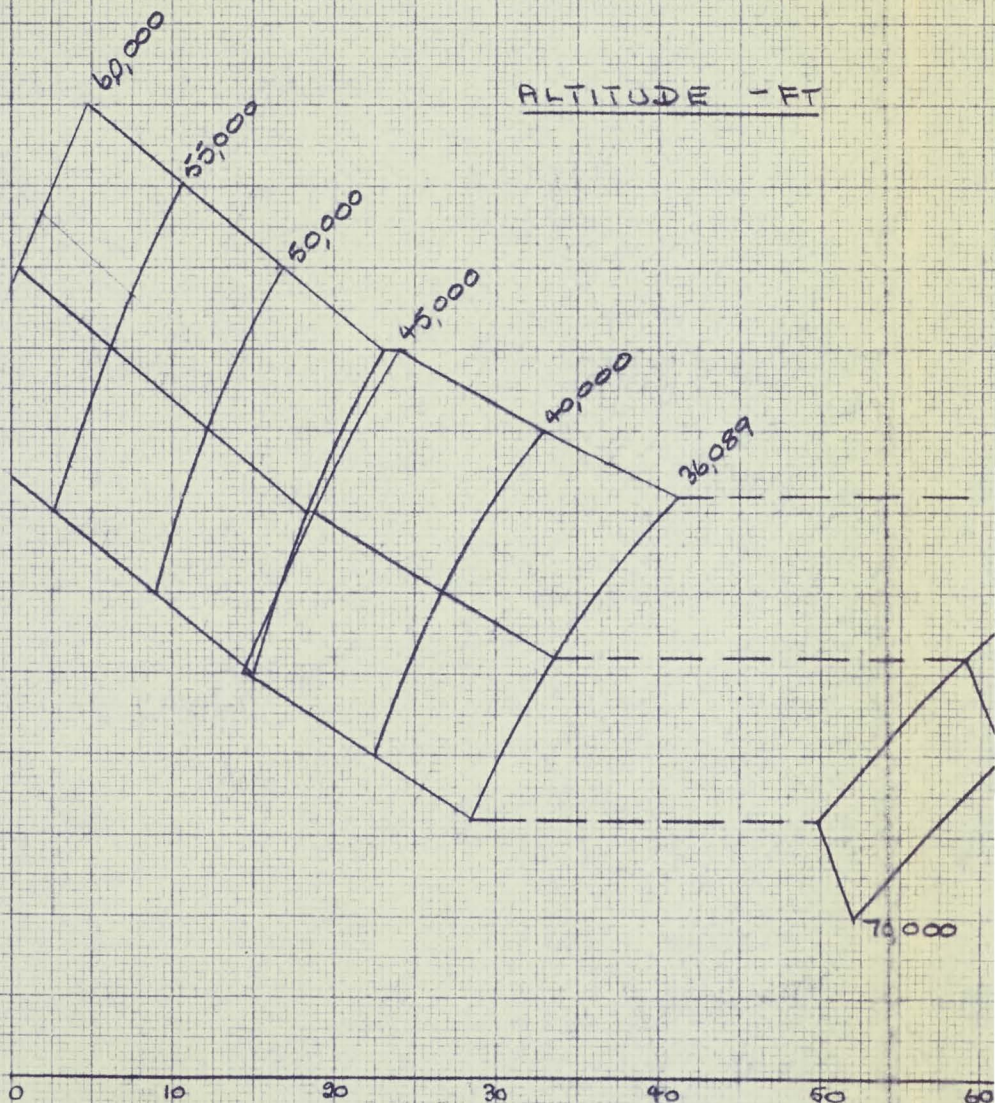
FIG. 10D

ARROW 2 - IROQUOIS

RATE OF CLIMB AT

A/B LIT

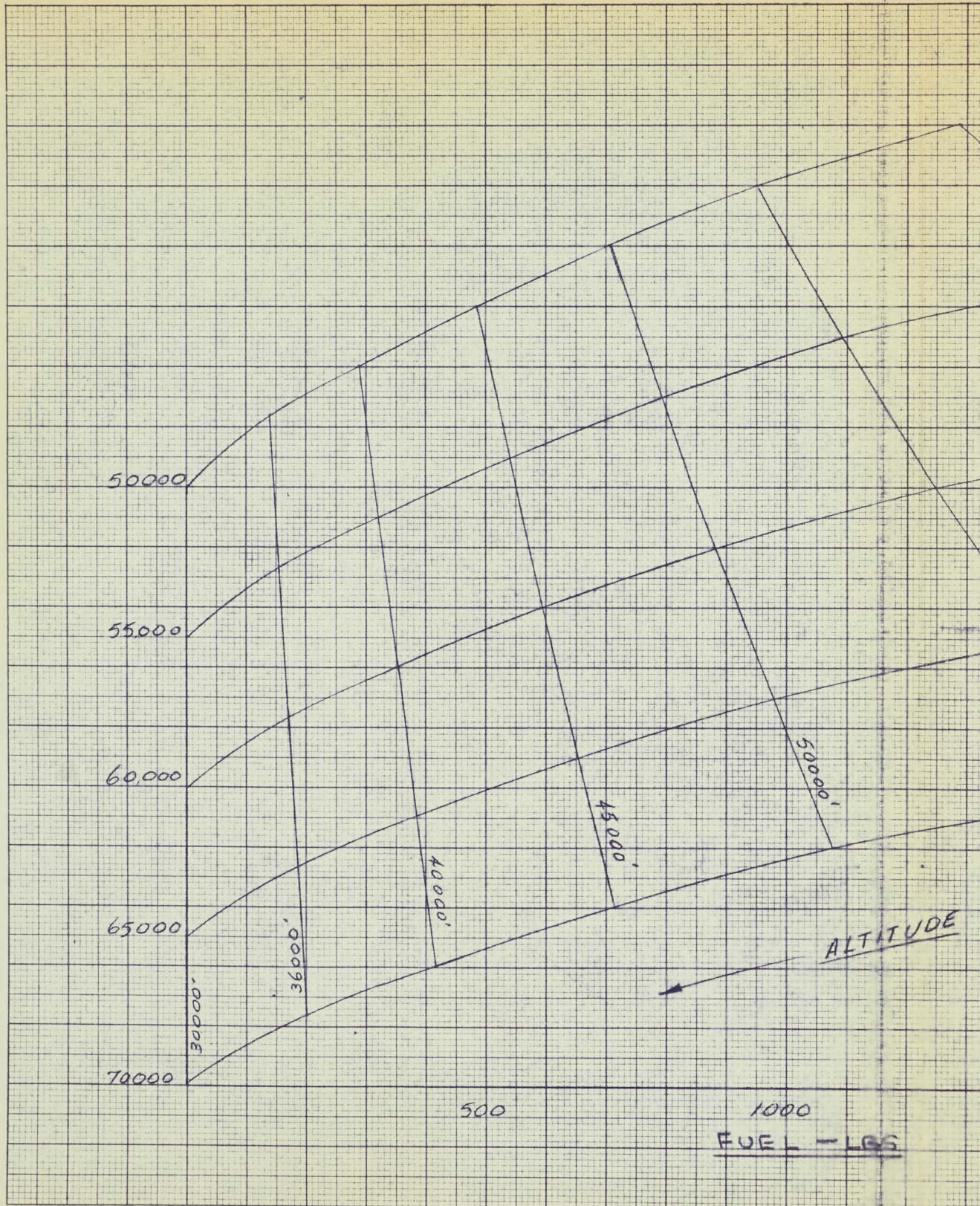
ALTITUDE - FT



10 X 10 TO THE 1/2 INCH
KEUFFEL & ESSER CO.
MADE IN U.S.A.

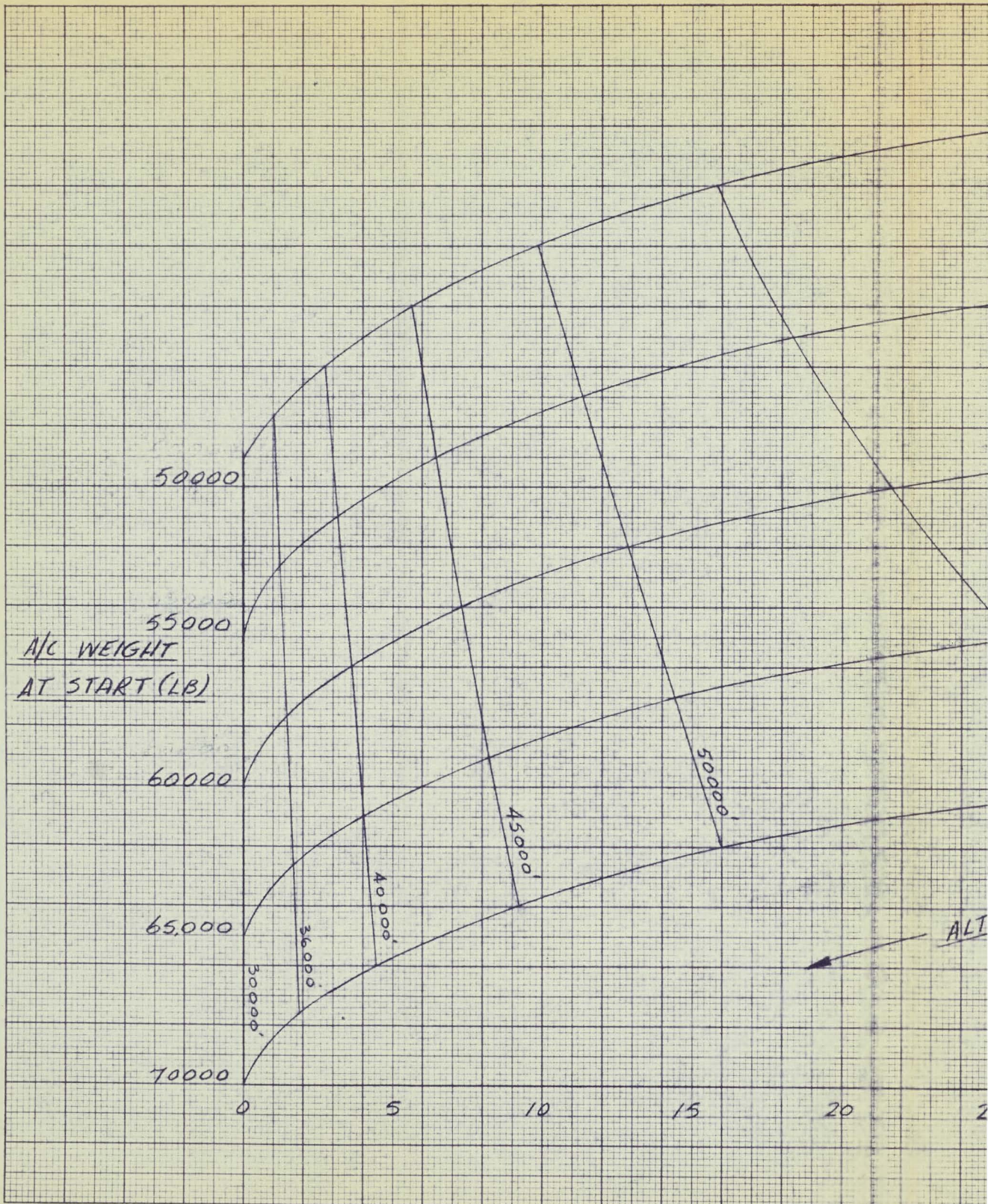
SECRET

G9-11L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA

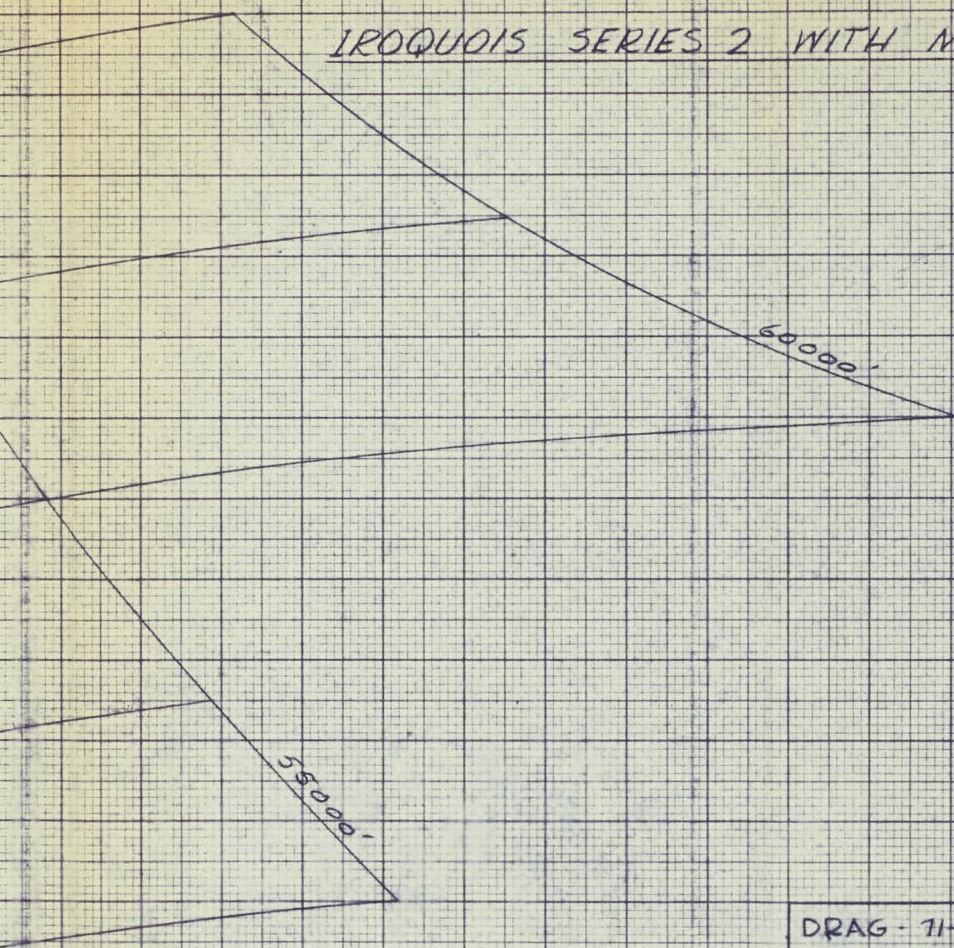


SECRET

G 9-11 L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA



SECRET

ARROW 2DISTANCE TO HEIGHT AT CONSTANT MACH No 1.8IROQUOIS SERIES 2 WITH MAXIMUM
AFTERBURNER

DRAG - 71-2/AERO DATA/17
PROPULSION - 72/INT. AERO/33

ALTITUDE

25

30

35

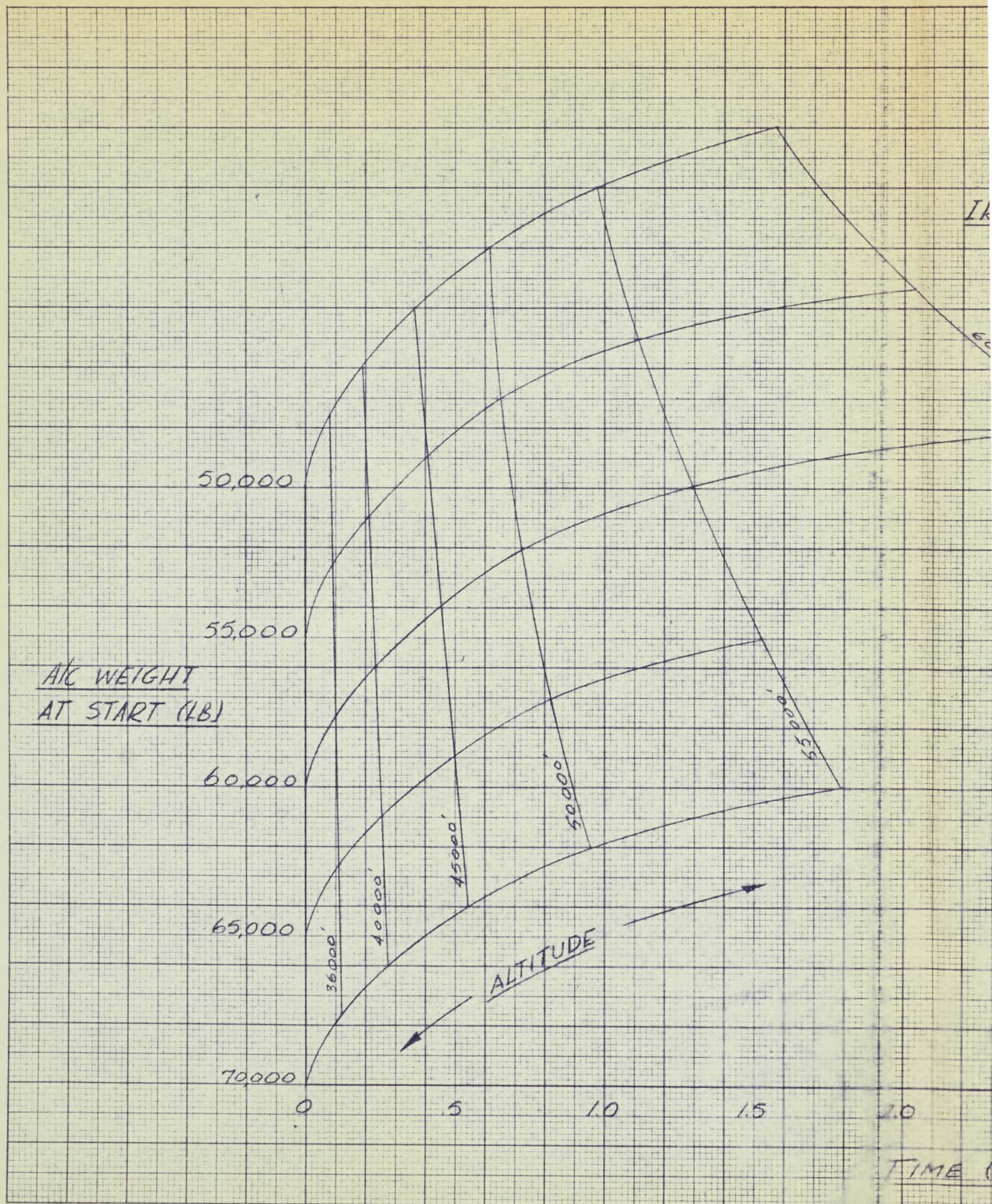
40

45

50

NAUTICAL MILES**UNCLASSIFIED**

FIG. 11 C



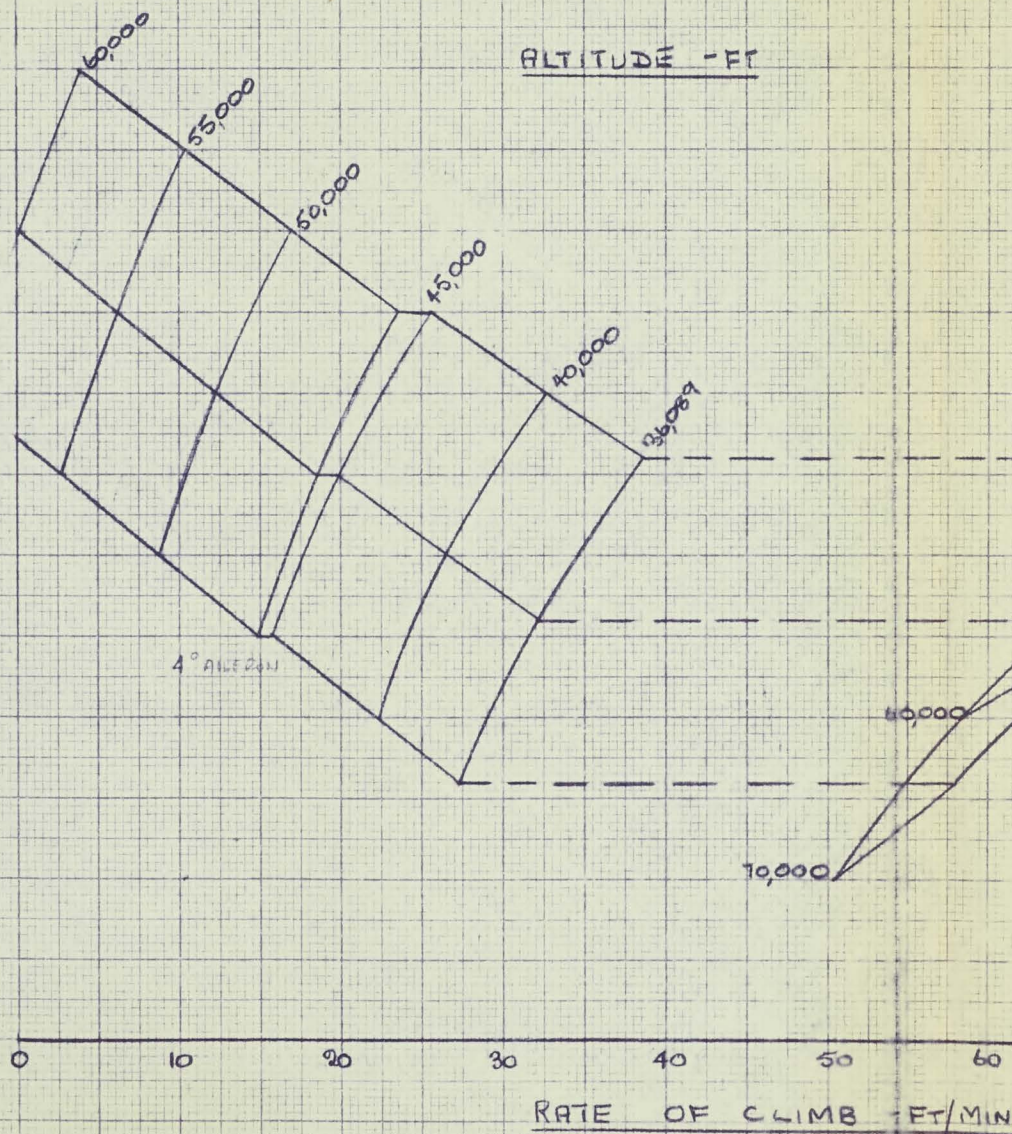
SECRET

ARROW 2 - IROQUOIS

RATE OF CLIMB AT

A/B LIT

ALTITUDE - FT



SECRET

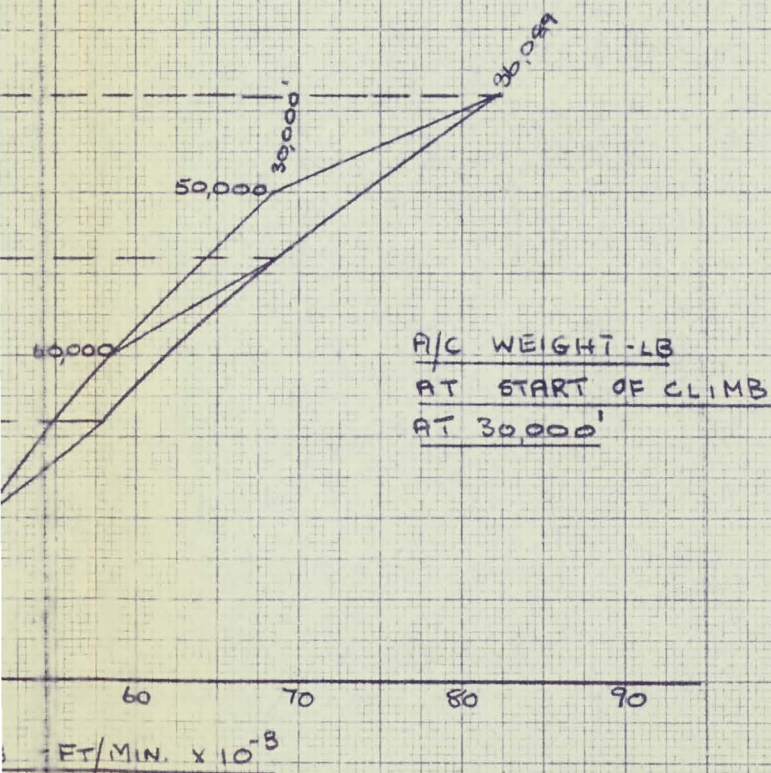
VOIS SERIES 2 ENGINES

MB AT $M = 2.0$

LIT

0° AILERON BELOW 45,000'
4° UP AILERON ABOVE 45,000'

REF: DRAG 71-2/AERO DATA/17
PROPULSION 72/INT.AERO/38



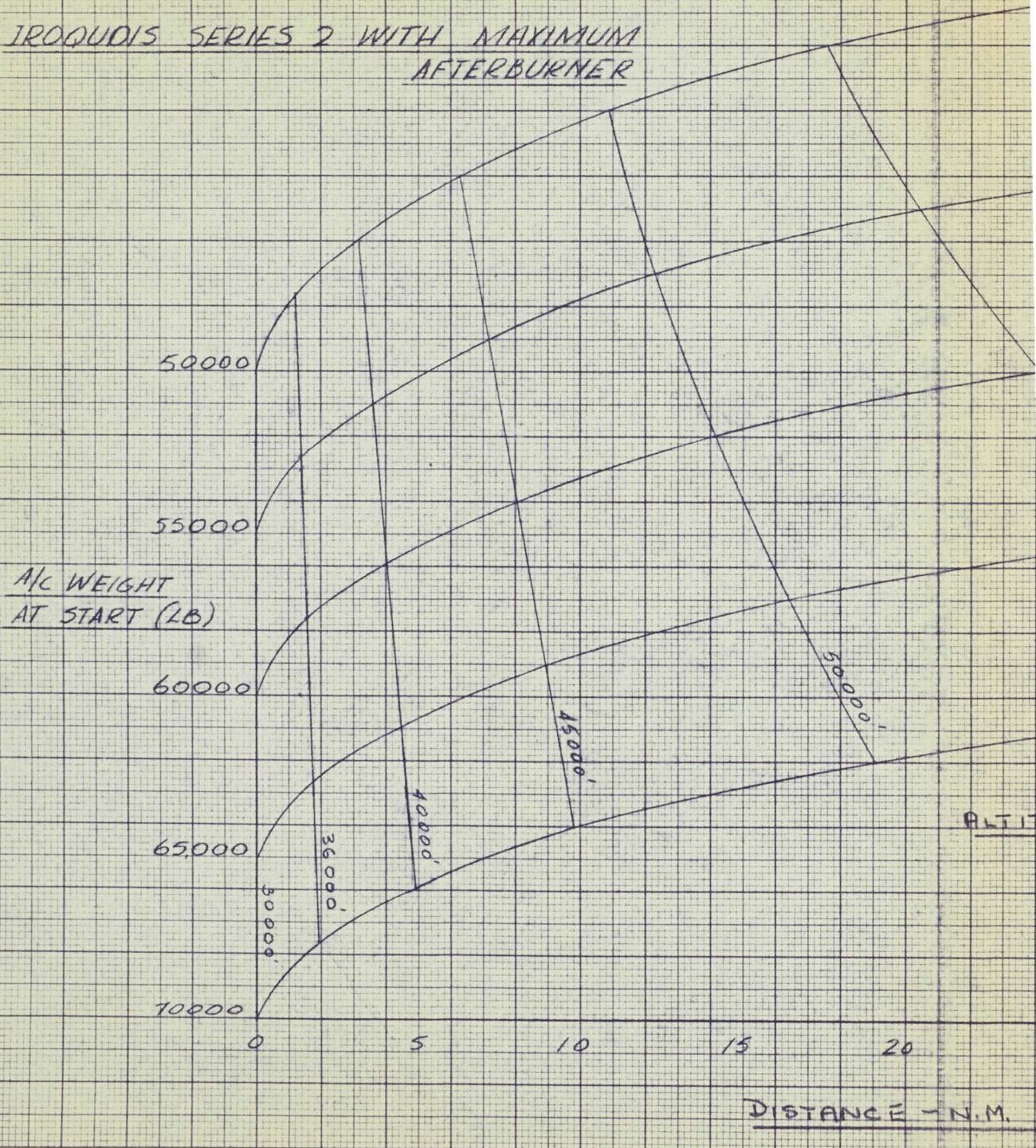
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FIG. 12A

ARROW 2

DISTANCE TO HEIGHT AT CONSTANT MACH No. of 2.0

IROQUOIS SERIES 2 WITH MAXIMUM
AFTERBURNER



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G9-11L
10 X 10 to the 3/4 inch, 5th lines accented
MADE IN CANADA



ALC WEIGHT
AT START (LB)

50,000

55,000

60,000

65,000

70,000

0

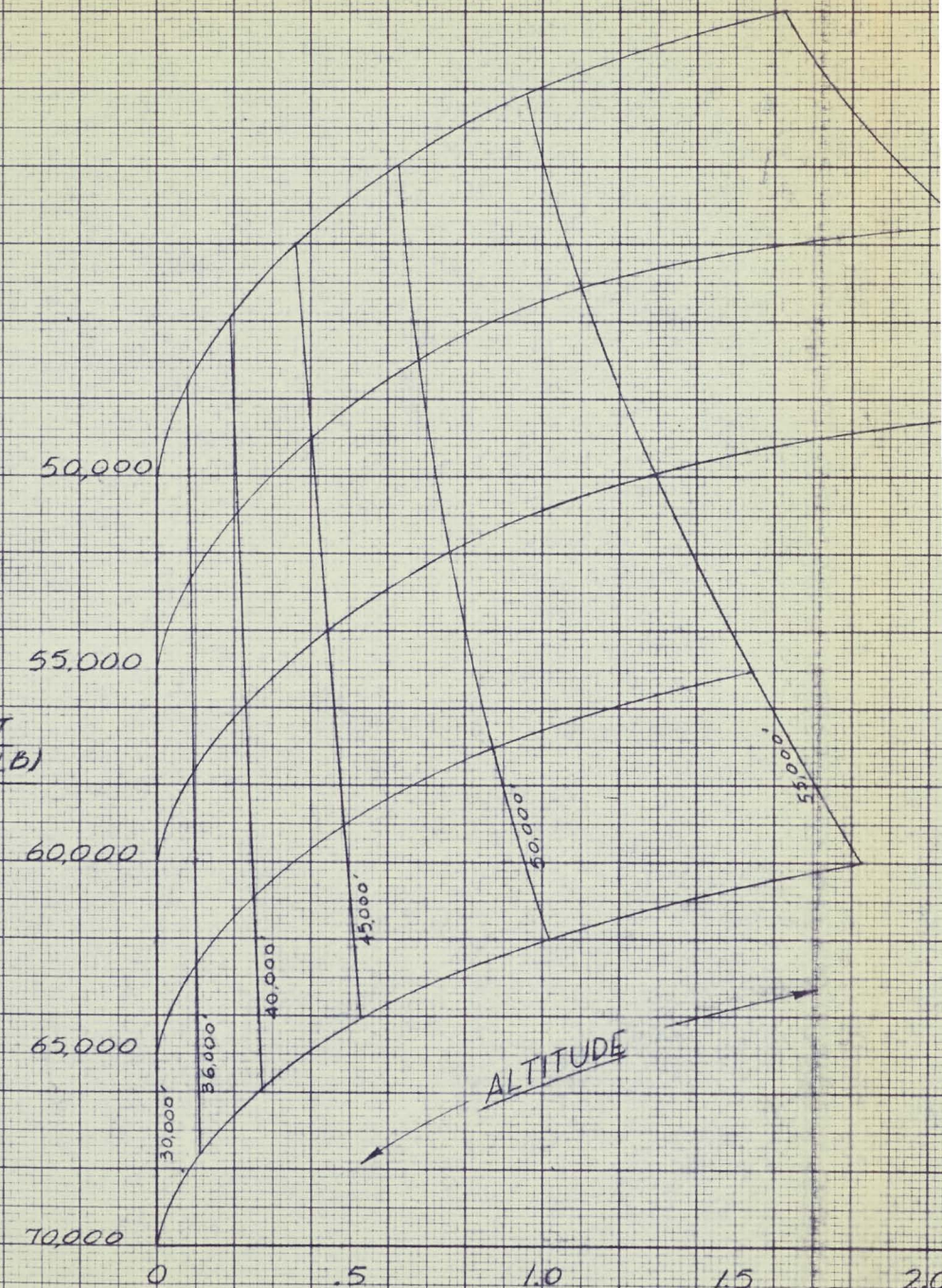
.5

1.0

1.5

2.0

TIME



SECRET

10 X 10 10 THE CM. 359.14
KEUFFEL & ESSER CO. BALTIMORE, MD.

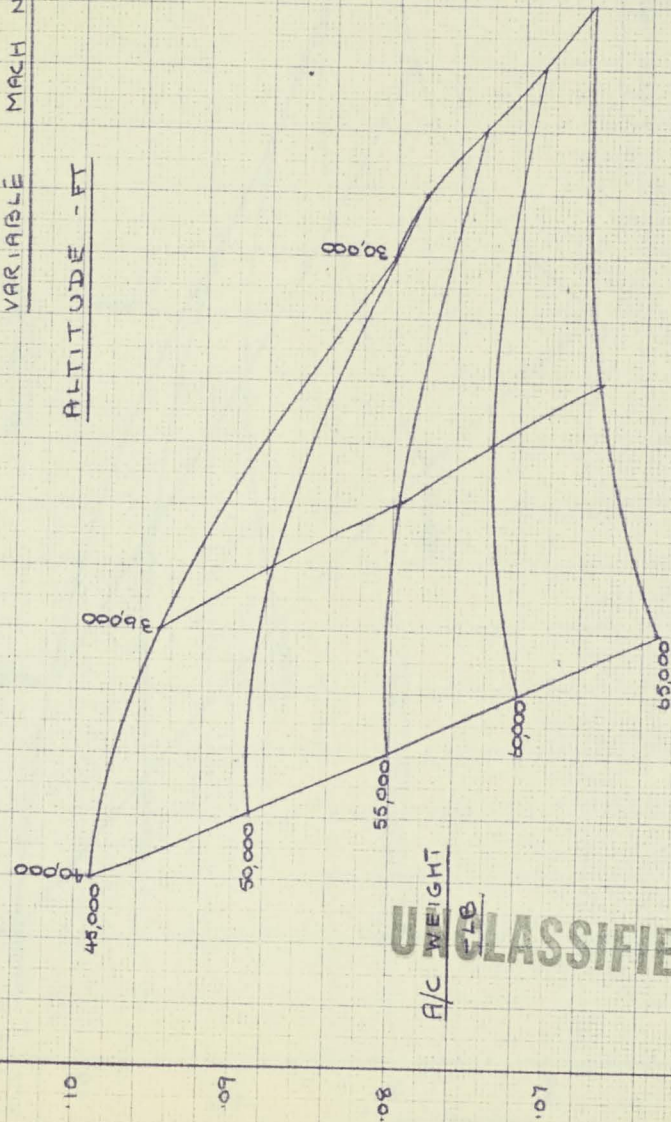
ARROW 2 IROQUOIS SERIES 2 ENGINES

A/B UNLIT NO VENTRAL TANK

CRUISE AT 99% MAX. N.A.M.P.P.

VARIABLE MACH NUMBER

ALTITUDE - FT



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REF. PROPULSION TR/INT. AERO/33
DRAG TT-2/AERO DATA/17

N.W. NOV '58.

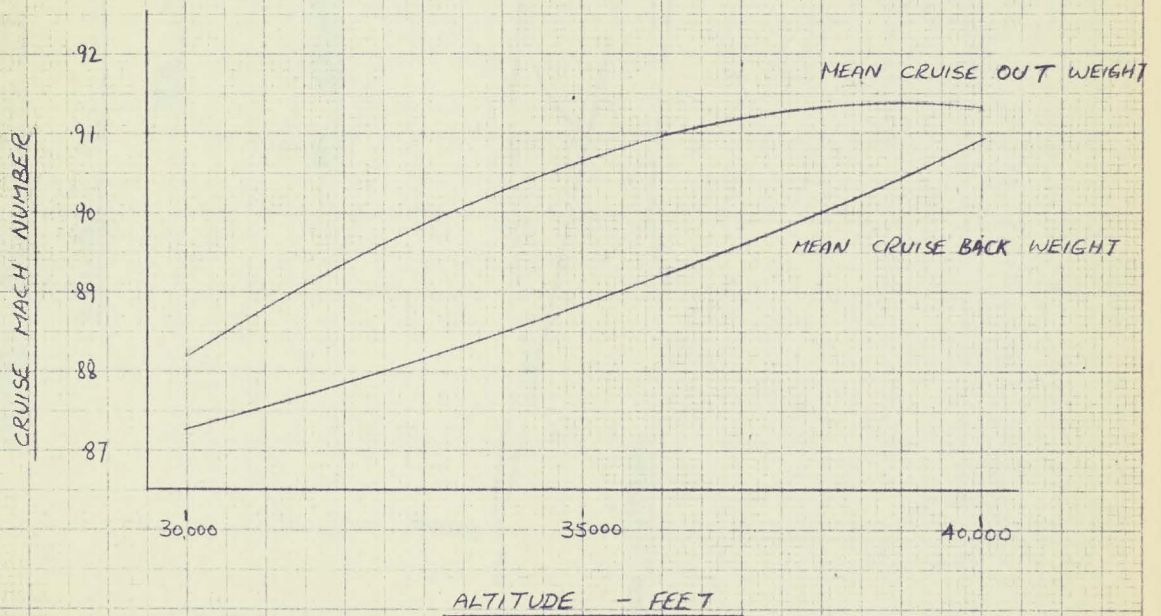
UNCLASSIFIED

FIG. 13

ARROW 2 WITH IROQUOIS SERIES 2 ENGINES

CRUISE MACH NUMBER

REF: DRAG 72-2 / PERC DATA / 17
THRUST 72 / INT AERO / 33

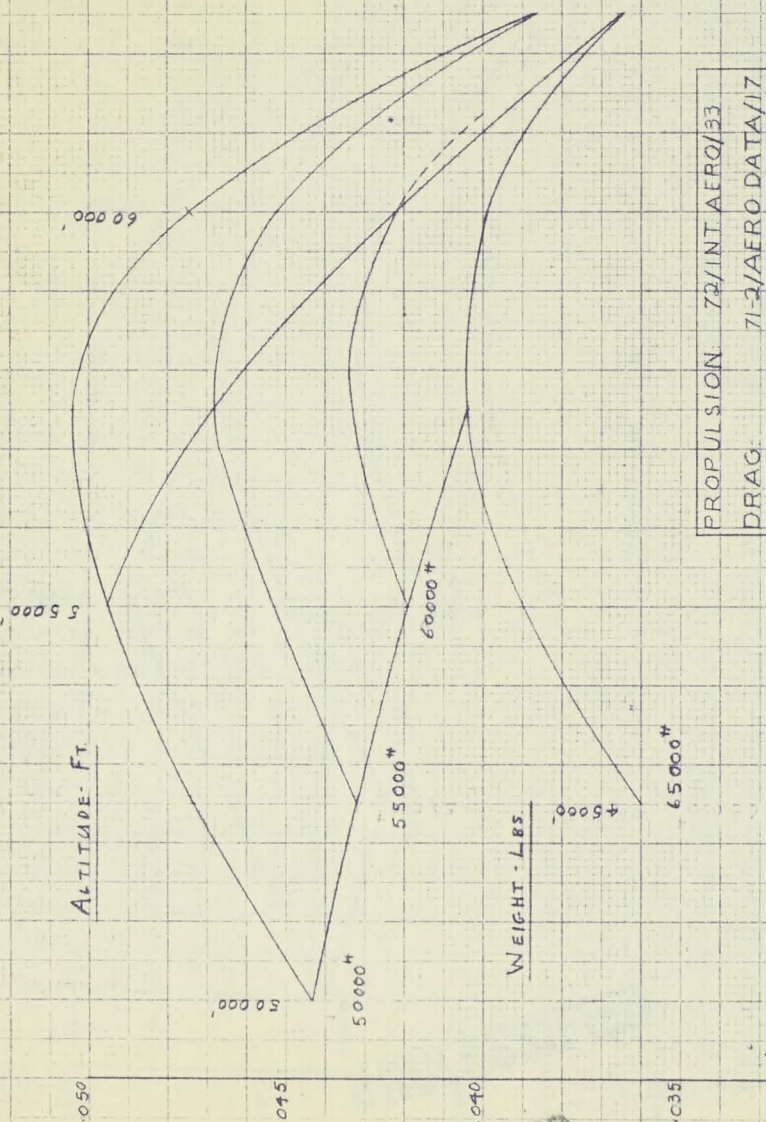


K&E
10 X 10 TO THE 1/2 INCH
359-12
MADE IN U.S.A.
KUPPEL & ESNER CO.

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FIG. 15

ARROW 2 IROQUOIS SERIES 2
99% MAX NAMPP M-1.5 A/B LIT



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FIG. 17

Arrow 2

INROUOIS SERIES 2

99% MAX NAMPP M=2.0 AIBLIT

ALTITUDE-FI

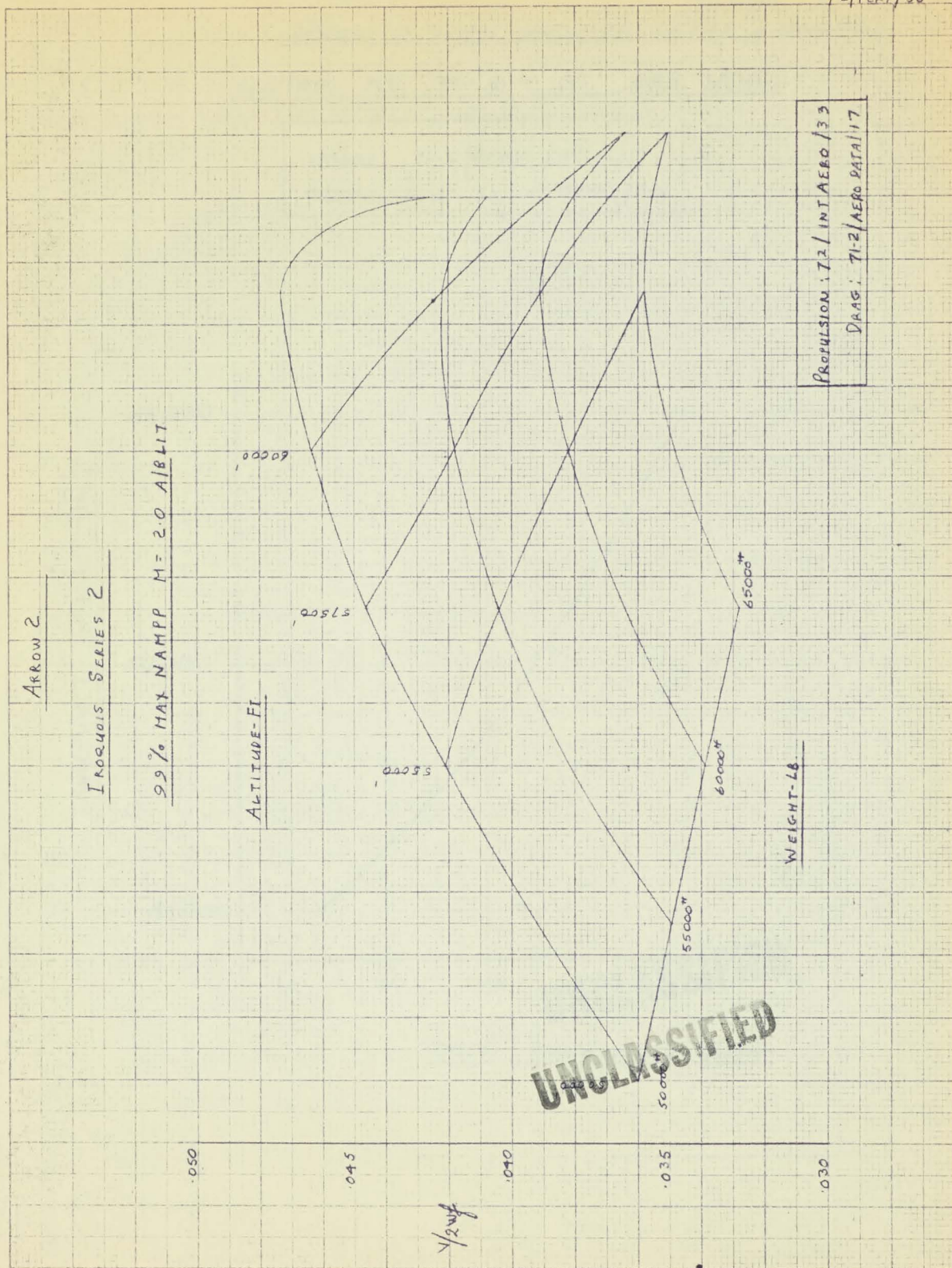
WEIGHT-LB

PROPULSION: T2/INTAERO/33
DRAG: T1-2/AERO DATA/17

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FIG. 19



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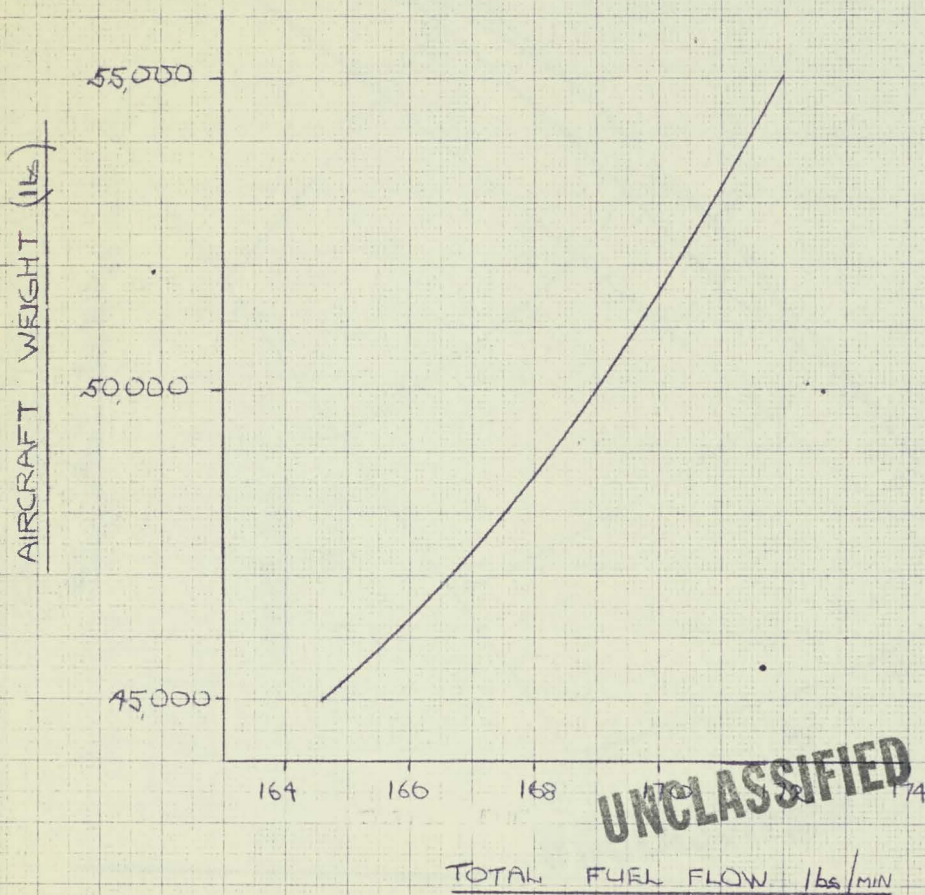
72/PERF/36

ARROW 2 WITH IROQUOIS SERIES 2 ENGINES

LOITER AT M=0.4 AT SEA LEVEL

DRAG 71-2/AERO DATA/17

PROPULSION 72 INT AERO/33



SECRET

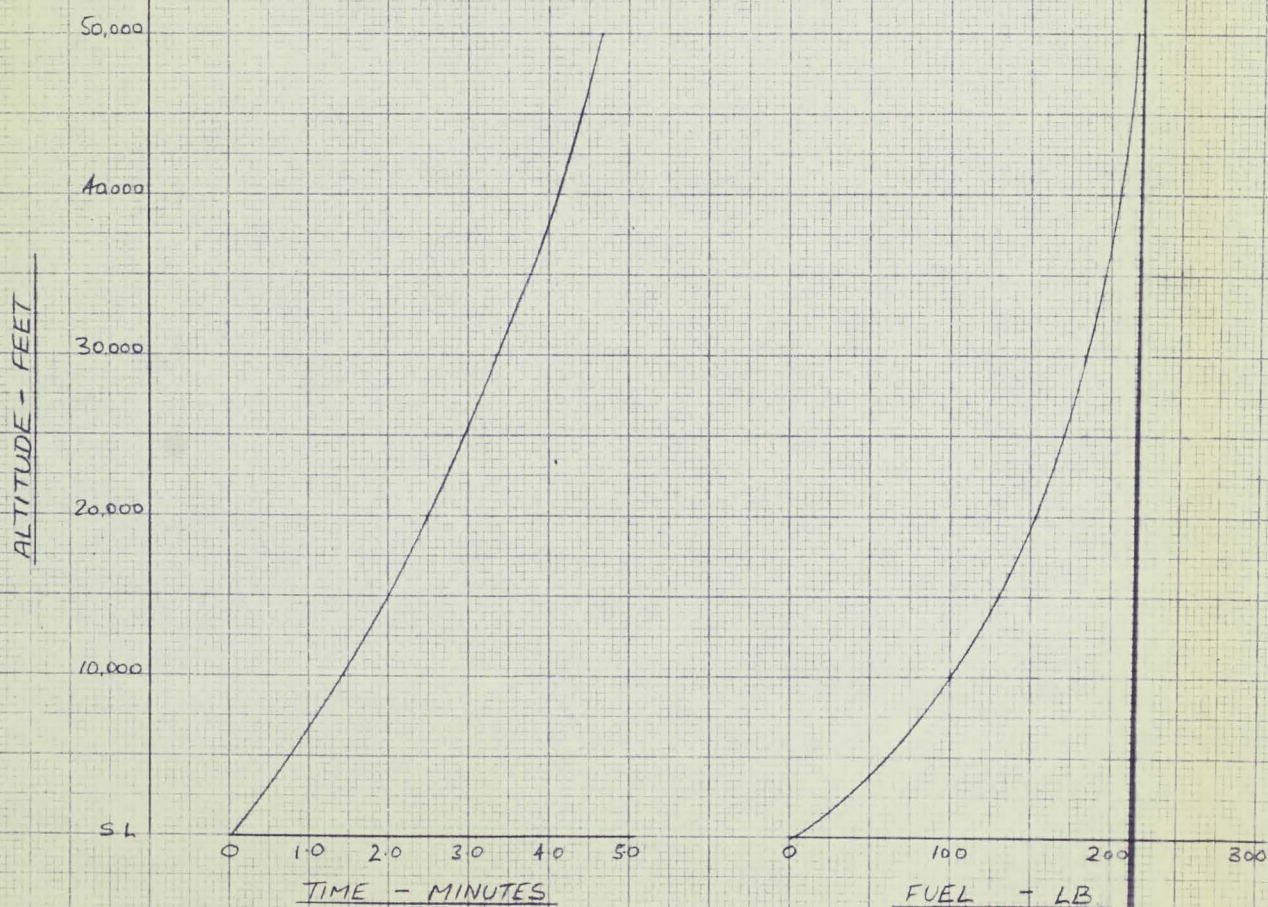
FIG. 20

ARROW 2 WITH IR000001

DESCENT FROM 50,000

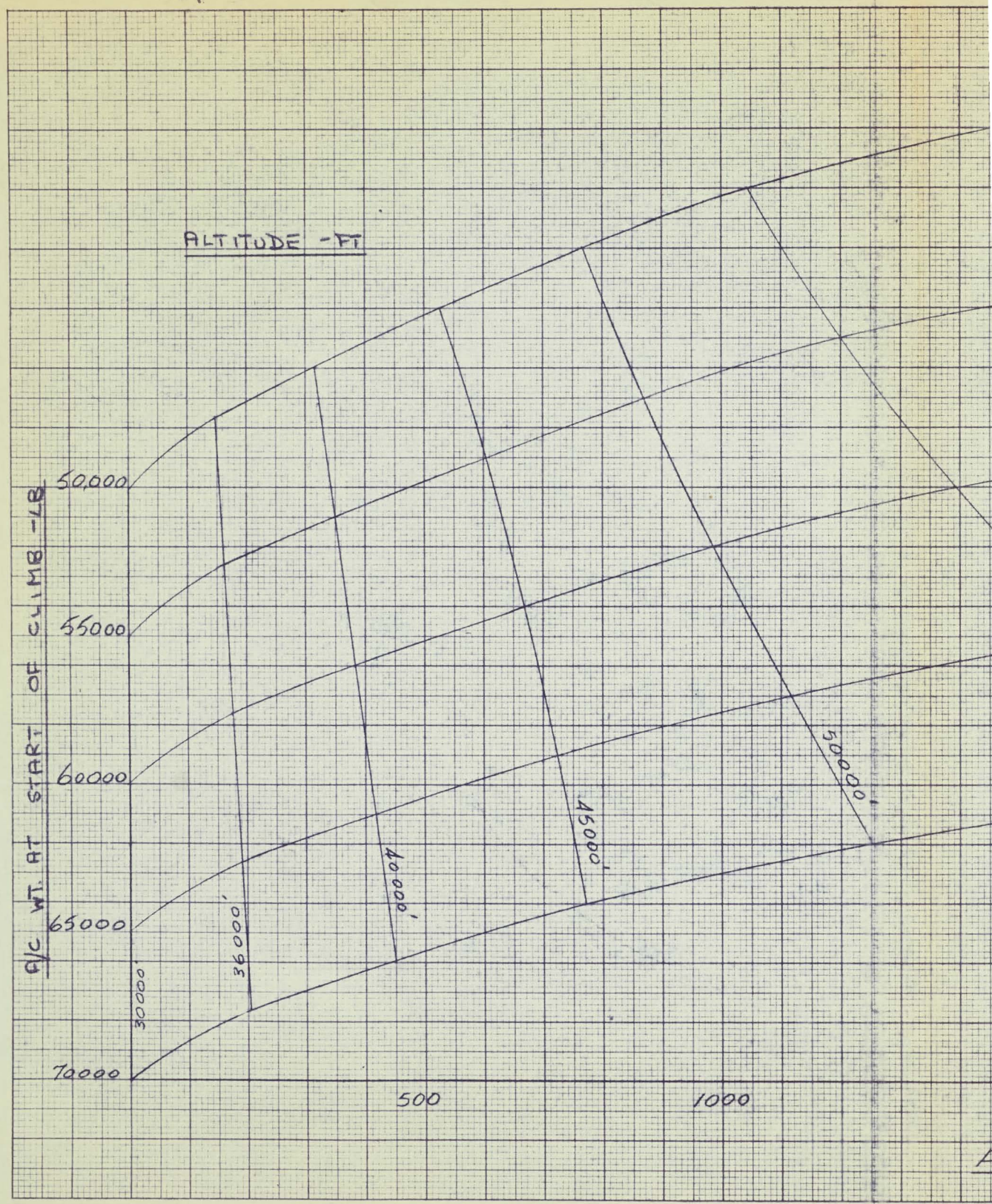
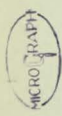
DESCENT TECHNIQUE : $1.1 V_{D_{MIN}}$, $m = 20$

$W = 45500$ lb.



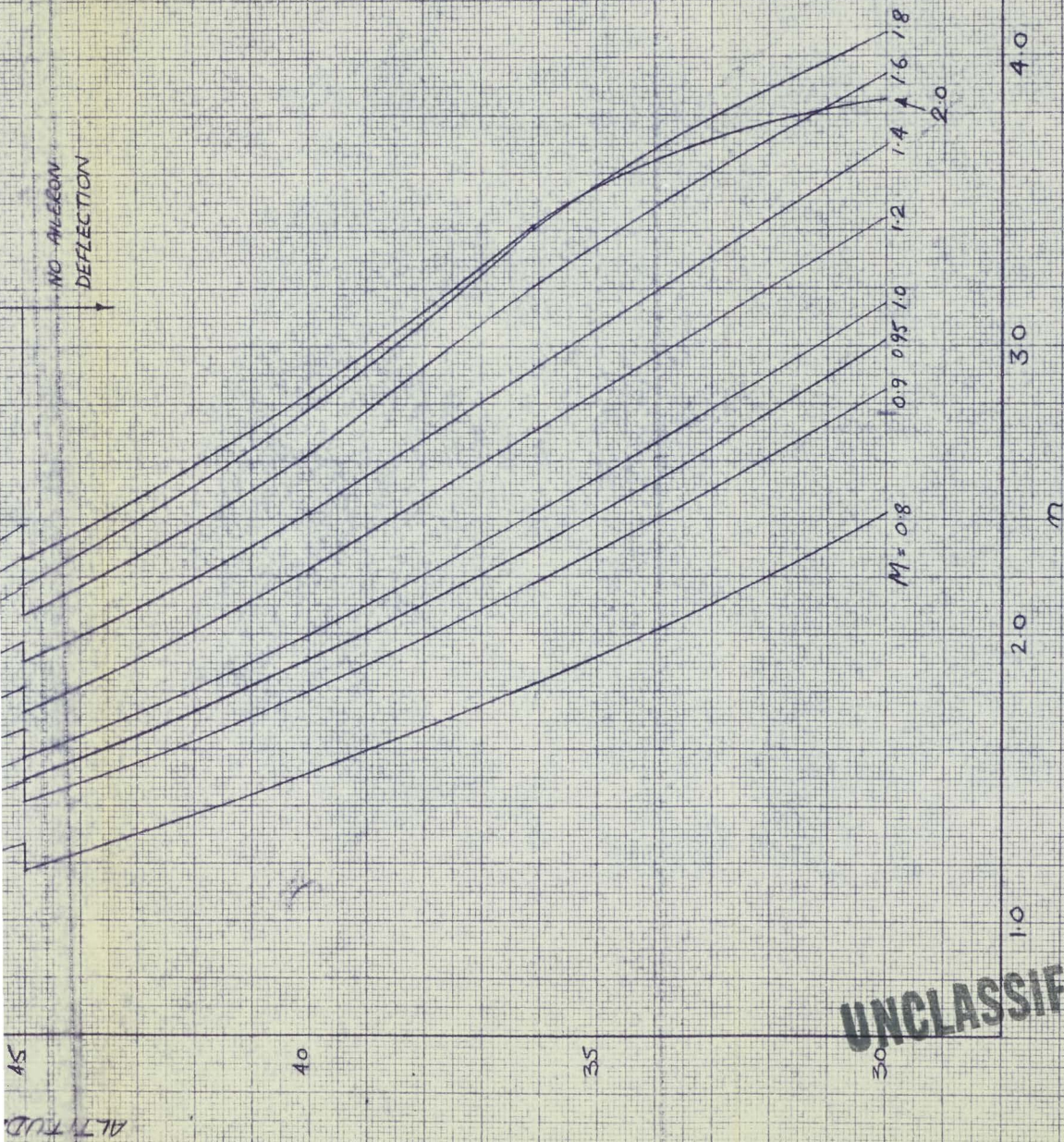
SECRET

G9-11L
10 X 10 to the 1/2 inch, 5th lines accented
MADE IN CANADA



SECRET

72 / PERF / 36



UNCLASSIFIED

FIG. 23

