PROJECT 10073 RECORD CARD

1. DATE

3 October 1951

2. LOCATION

Kadena AFB, Okinawa

3. DATE-TIME GROUP

Local _____

GMT 03/13277

4. TYPE OF OBSERVATION

☐ Ground-Visual ☒ Ground-Radar

☐ Air-Visual ☐ Air-Intercept Radar

5. PHOTOS

☐ Yes

☒ No

6. SOURCE

Military

7. LENGTH OF OBSERVATION

N/A

8. NUMBER OF OBJECTS

N/A

9. COURSE

N/A

10. BRIEF SUMMARY OF SIGHTING

SEE CASE FILE.

11. COMMENTS

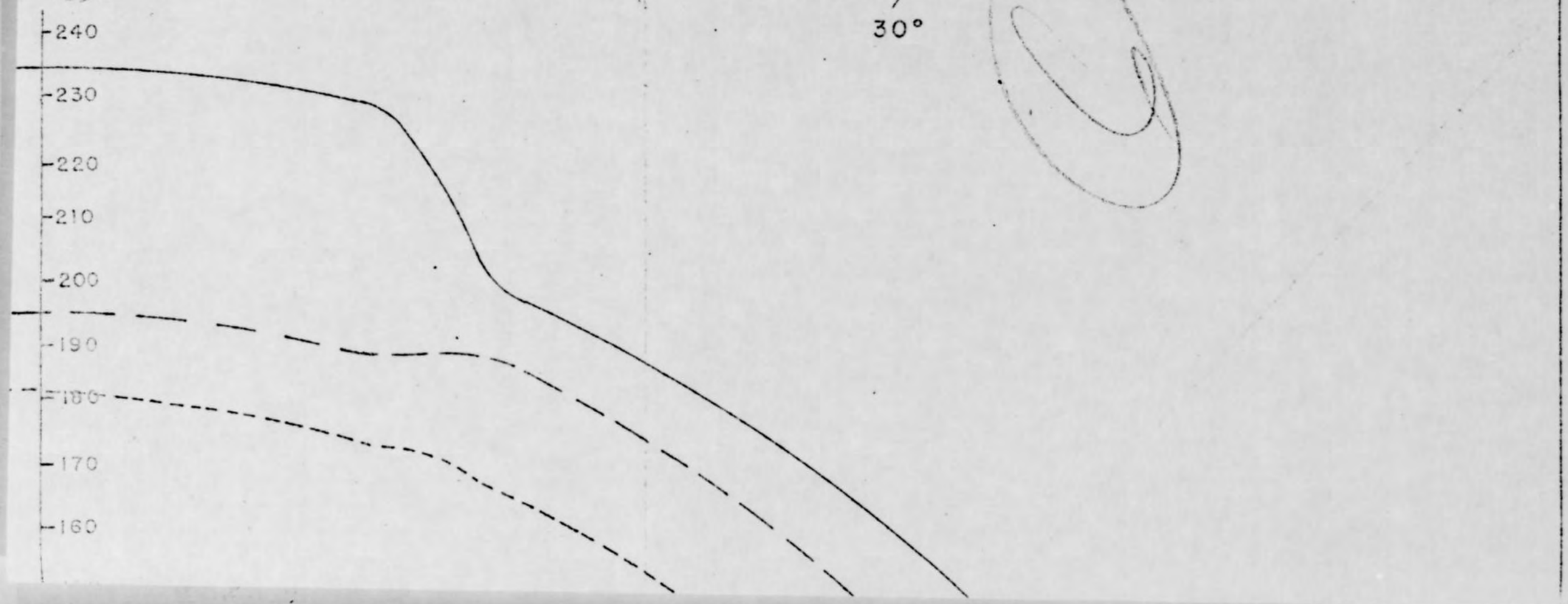
UNIDENTIFIED

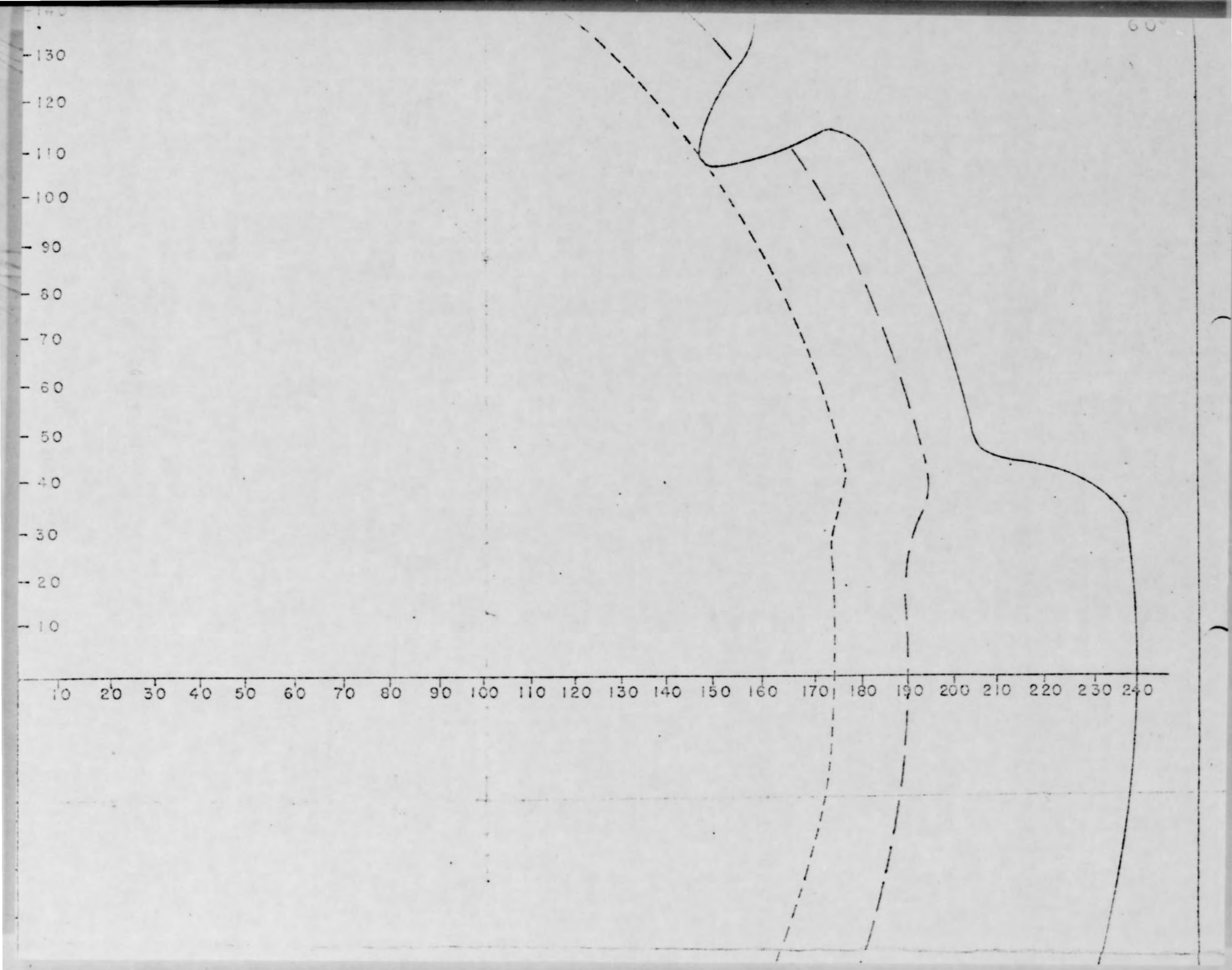
12. CONCLUSIONS

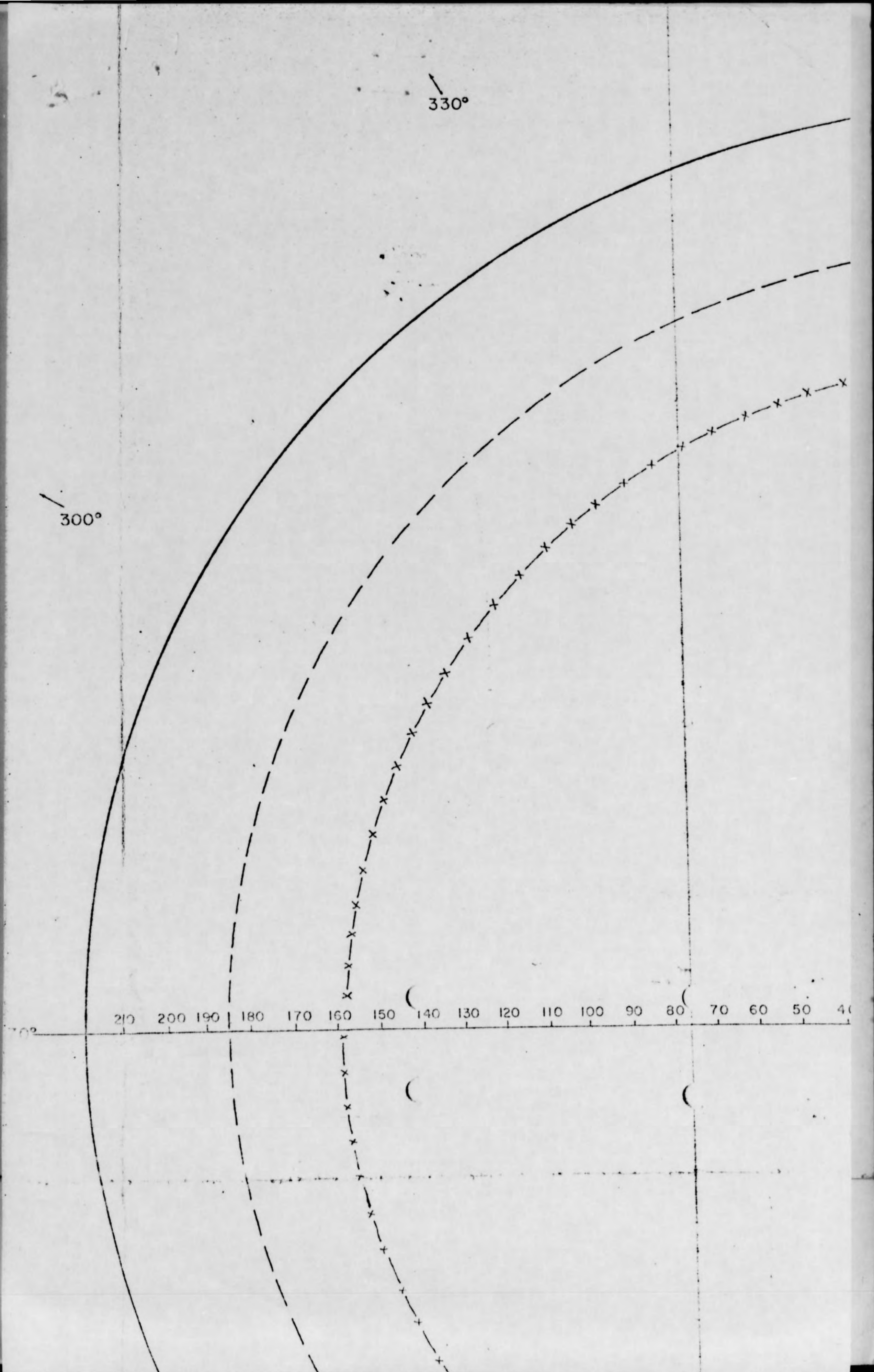
- ☐ Was Balloon
- ☐ Probably Balloon
- ☐ Possibly Balloon
- ☐ Was Aircraft
- ☐ Probably Aircraft
- ☐ Possibly Aircraft
- ☐ Was Astronomical
- ☐ Probably Astronomical
- ☐ Possibly Astronomical
- ☒ Other UNIDENTIFIED
- ☐ Insufficient Data for Evaluation
- ☐ Unknown

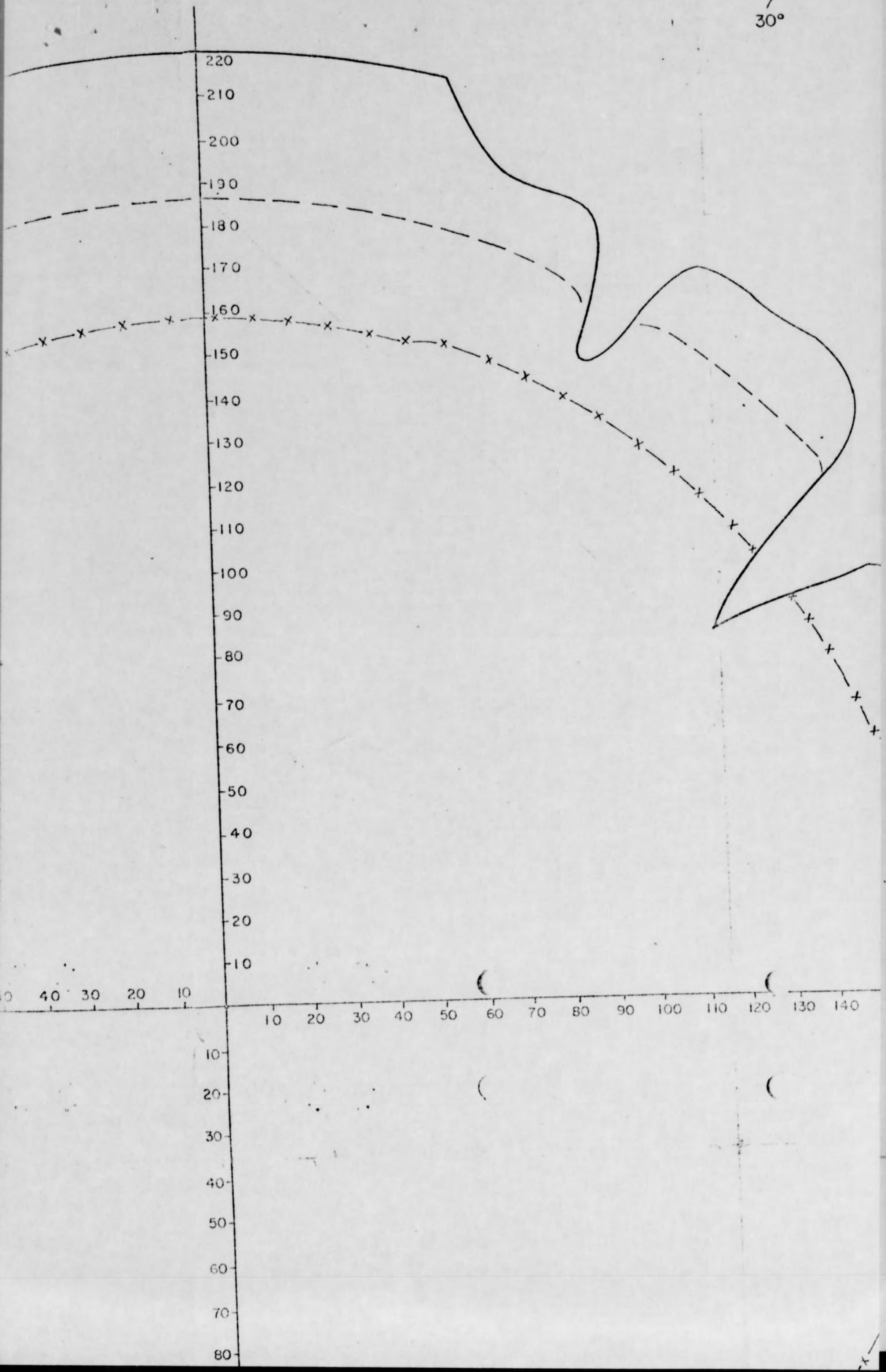
ATIC FORM 329 (REV 26 SEP 52)

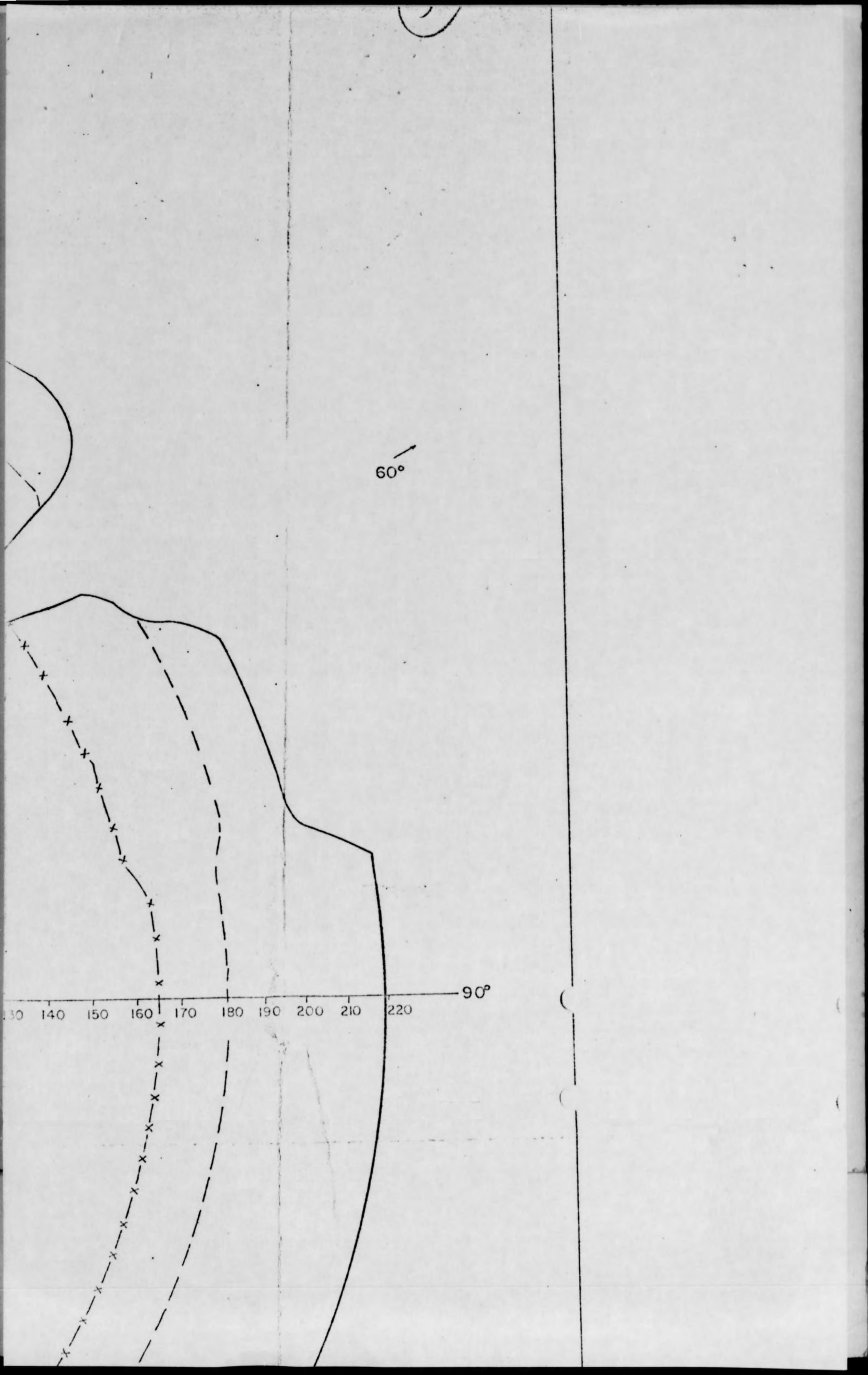
IFIED

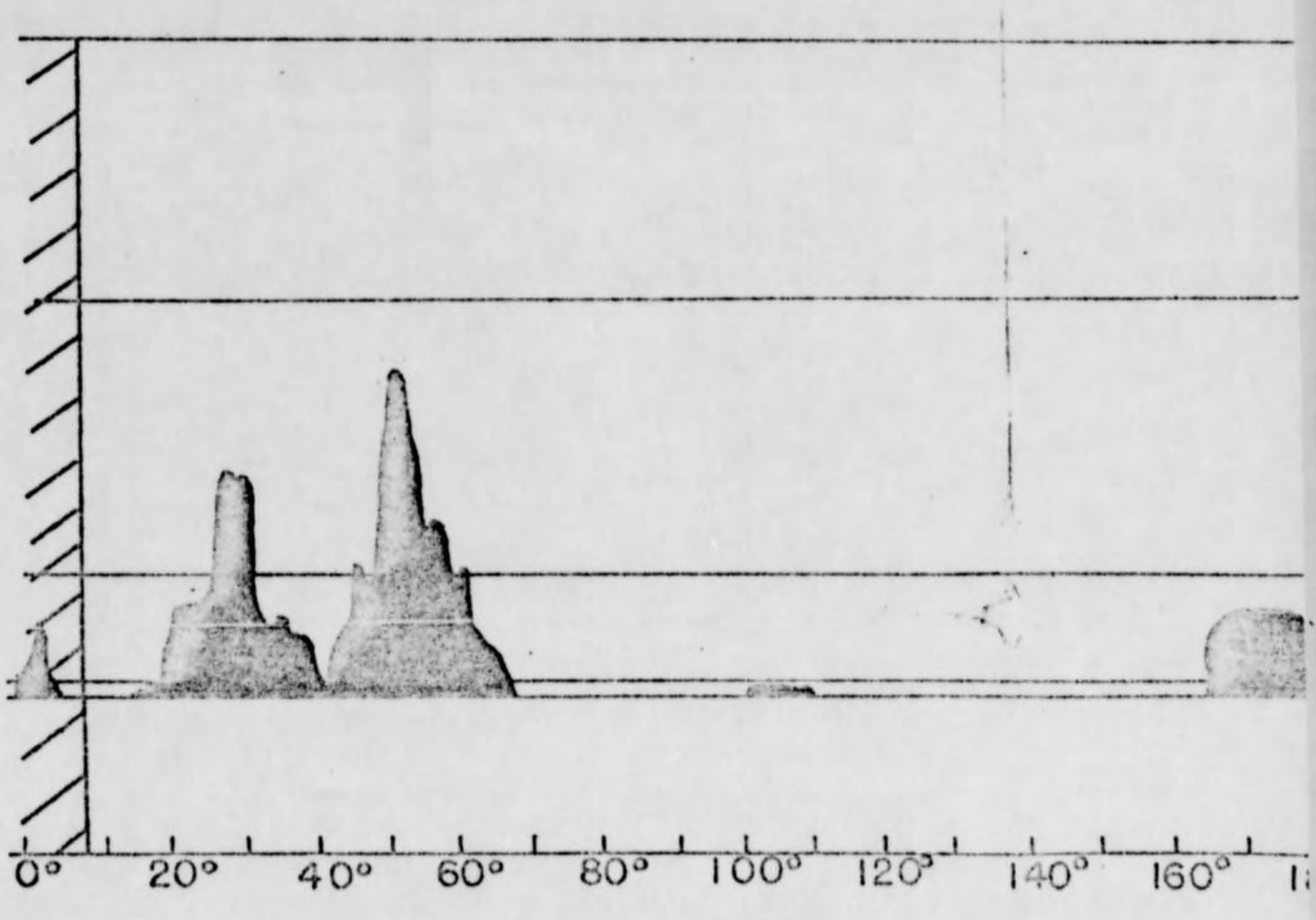



130
120
110
100
90
80
70
60
50
40
30
20
10
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240


330°
300°
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50


30°
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
40 30 20 10
10 20 30 40 50 60 70 80 90 100 110 120 130 140

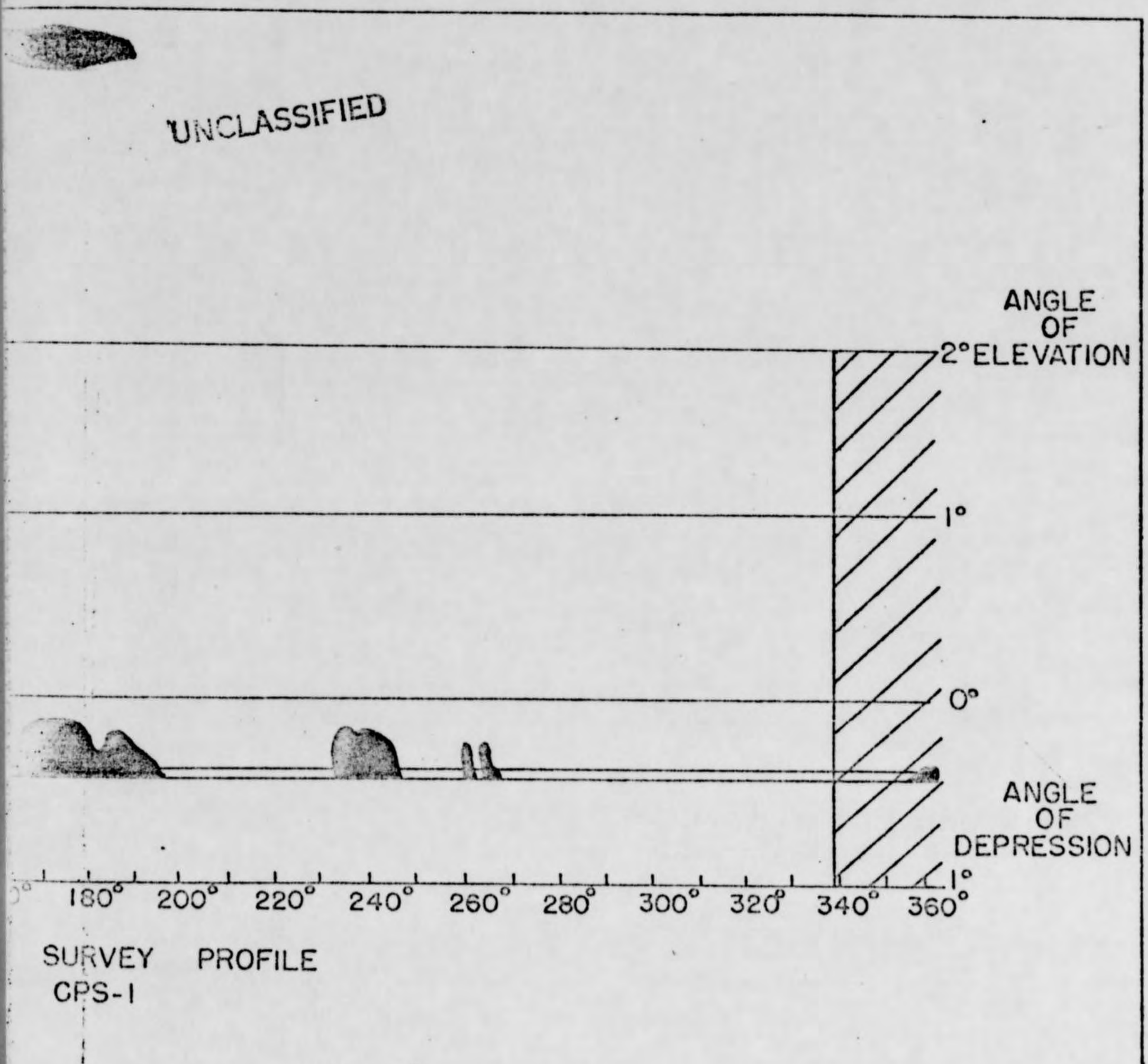

60°
90°
130
140
150
160
170
180
190
200
210
220



LAND SU
CF

INCLOSURE # 7
FEAF 112 # 12-25-52

UNCLASSIFIED



SURVEY PROFILE
CPS-1

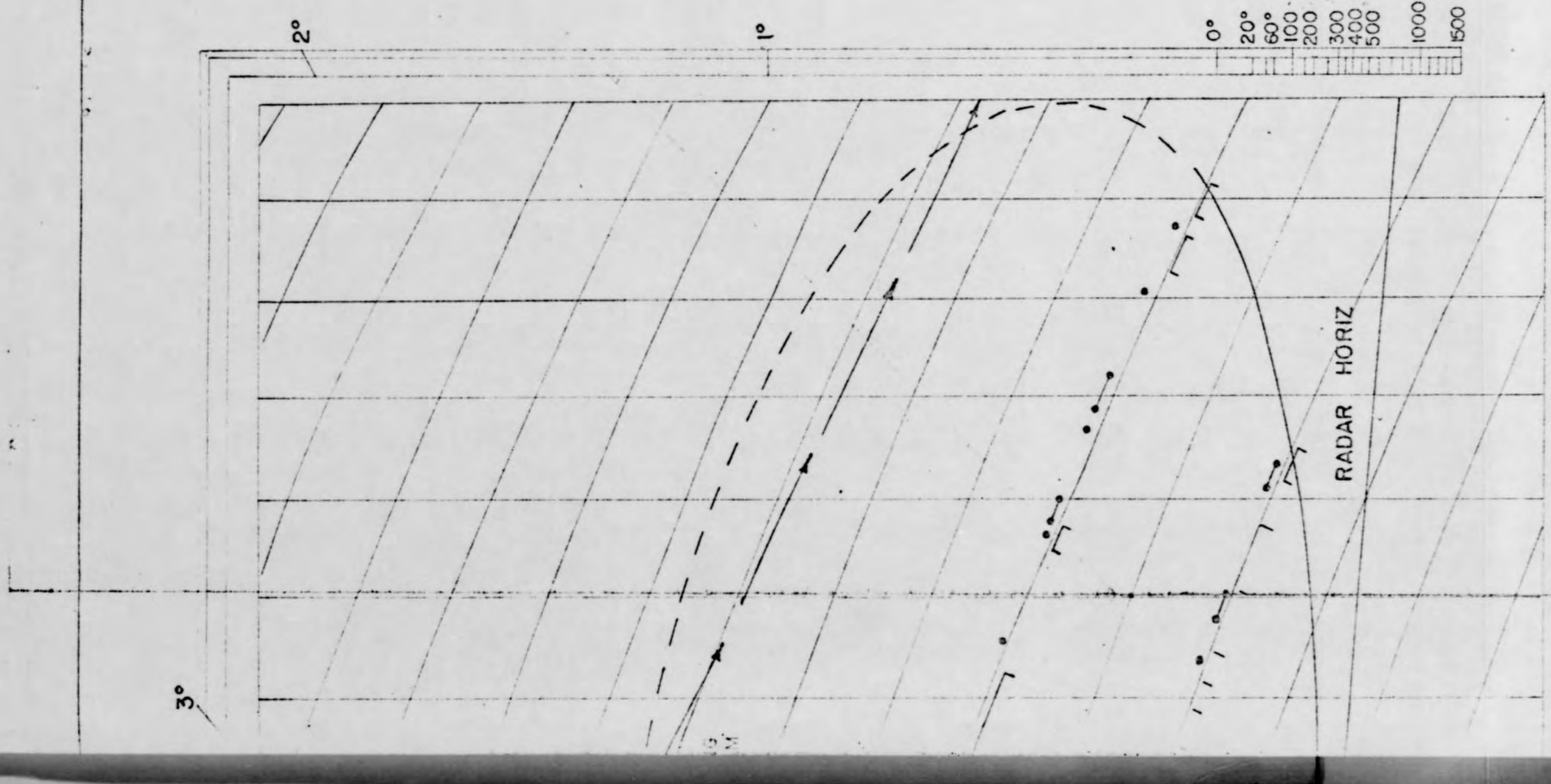
UNCLASSIFIED

ALTITUDE OF STATION IN FEET

-6' | -12' | -18' | -24'

ANGLE OF DEPRESSION

ANGLE OF ELEVATION



8° 7° 6° 5° 4°

CALCULATED
HIGH LOBE
PATTERN

OBJECT
LEAVING
HIGH BEAM

OBJECT
ENTERII
LOW BE.

70 80 90 100 110 120 130 140 150 160 170 180

...ES ARE THOSE OBTAINED ON THE 100° FLIGHT LEGS

30° 25° 20° 15° 10° 9° 8° 7° 6° 5°

10 20 30 40 50 60 70 80 90 100 110 120

VERTICAL LOBE DIAGRAM

CPS-1 HIGH & LOW BEAM

LEGENDS

91-3

DISPOSITION FORM

SECURITY CLASSIFICATION (if any)

UNCLASSIFIED

FILE NO.

SUBJECT Request for Analysis of Electronic Sighting

TO ATIAE
Attn: Capt James

FROM ATIAA-5

DATE 19 Sept 52

COMMENT NO. 1

Lt Olsson/jos
65365/B263D/PD28

1. It is requested that you review the inclosed electronic sighting at Kadena AFB, Okinawa, 3 October 1951.

2. The report is extremely detailed and should prove interesting as a possible unidentified aerial object.

3. If inclosure 1 is withdrawn (or not attached), the classification of this correspondence will be downgraded to Restricted in accordance with paragraph 25E, AFR205-1.

1 Incl
Sealed Envelope

for F. W. Brown, Jr., Major, USAF
F. HERMAN, Major, USAF
Chief, Aircraft and Propulsion Branch
Technical Analysis Division
Air Technical Intelligence Center

TO ATIAA-5

FROM ATIAE-2

DATE 1 Oct 52

COMMENT NO. 2

Capt James/mk
55170/Bldg 263A

1. The inclosed report has been reviewed as requested in Comment No. 1.

2. Based on the available information and the fact that two radar experts have advanced conflicting explanations of the phenomena, it is considered that further theorizing by ATIAE would be pure conjecture.

1 Incl
n/c

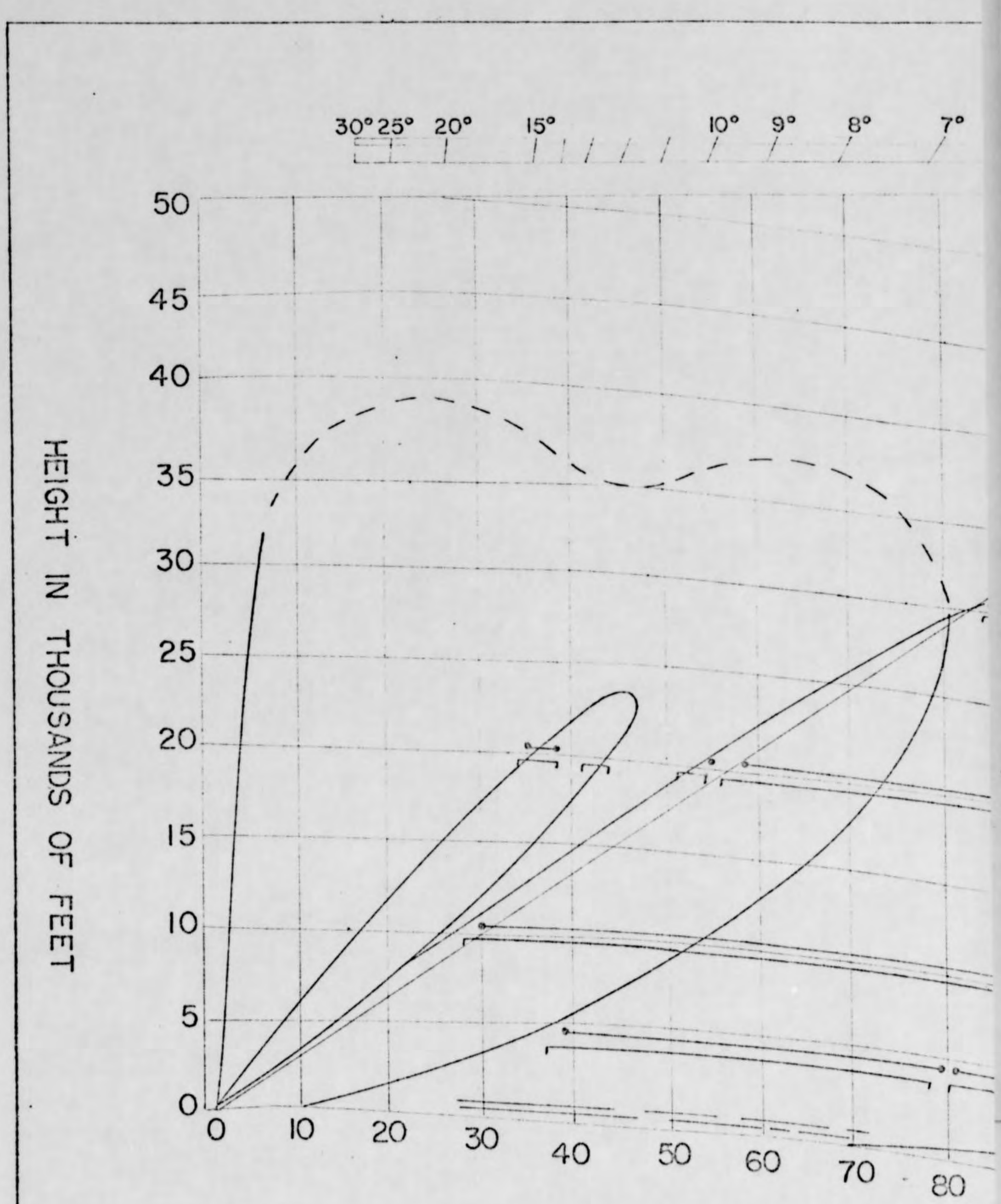
for W. C. Arensberg
H. C. JOHNSTON, Lt. Col., USAF
Chief, Electronics Branch
Technical Analysis Division

DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS.
DOD DIR 5200.10

UNCLASSIFIED

[redacted]

T52-16651



VERTICAL LOBE DIAGRAM

CPS-1 HIGH & LOW BEAM

ALTITUDE OF STATION IN FEET

ANGLE OF ELEVATION

-6' -12' -18' -24'

ANGLE OF DEPRESSION

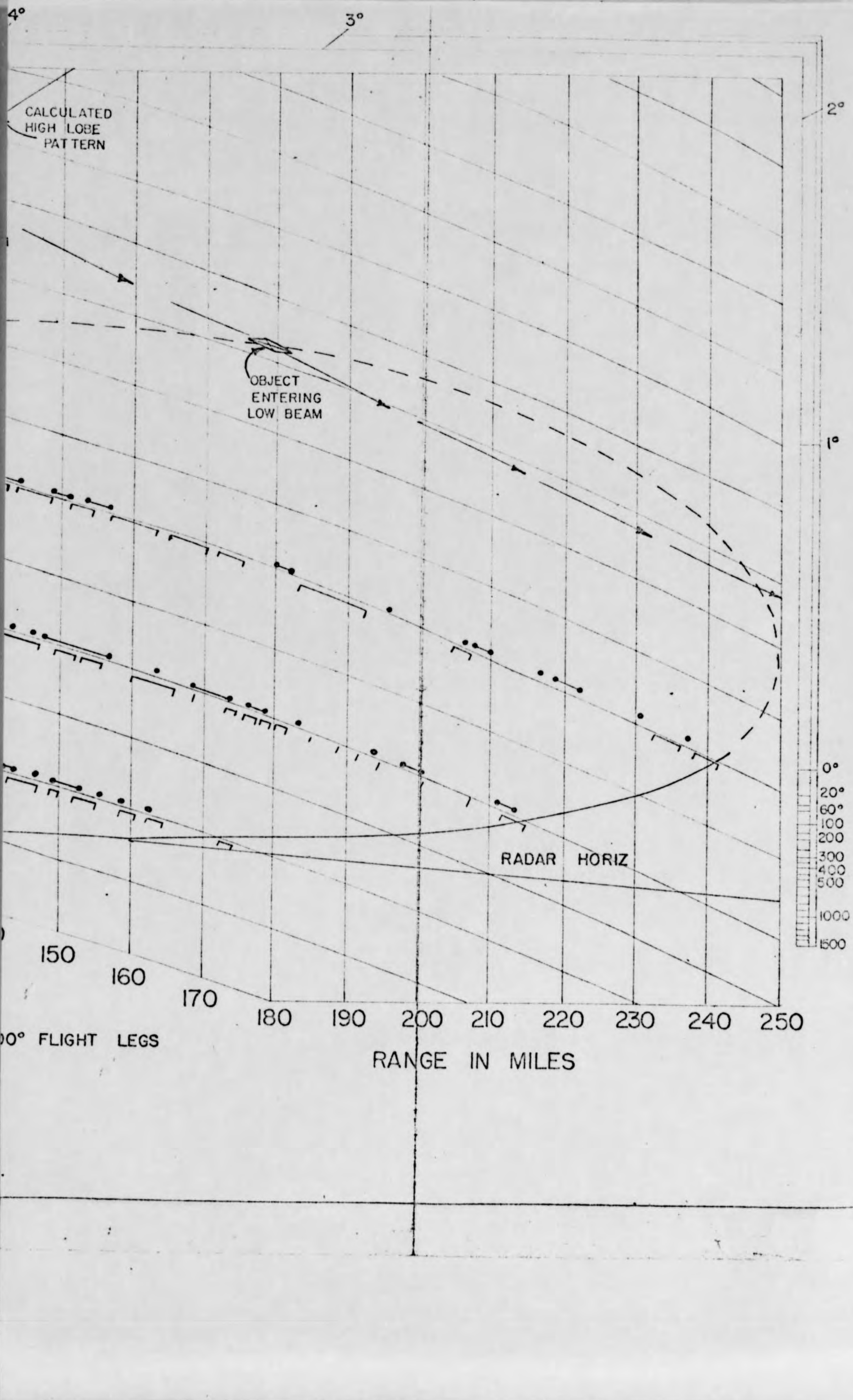
2° 1° 0° 20' 60' 100 200 300 400 500 1000 1500

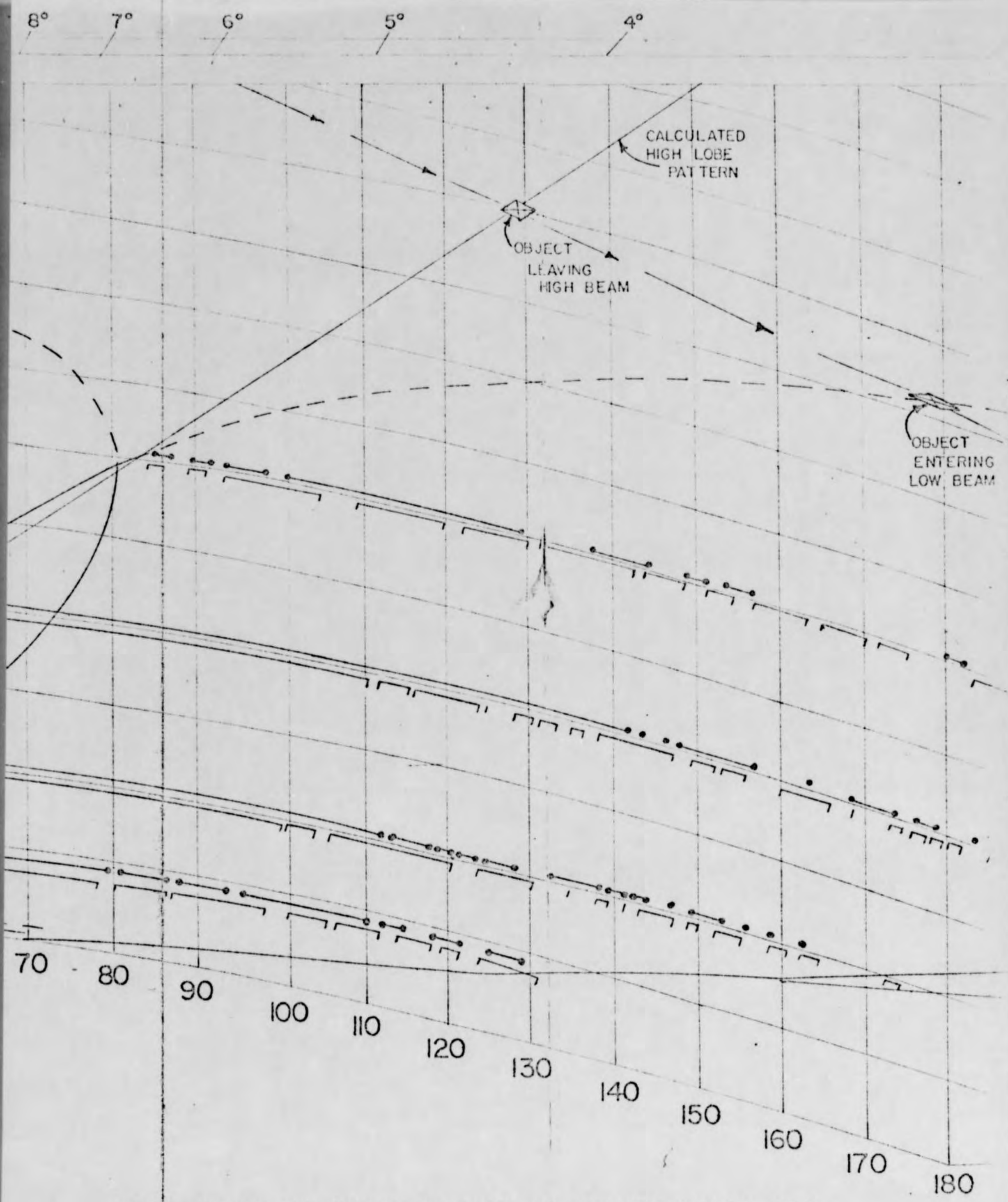
3°

RADAR HORIZ

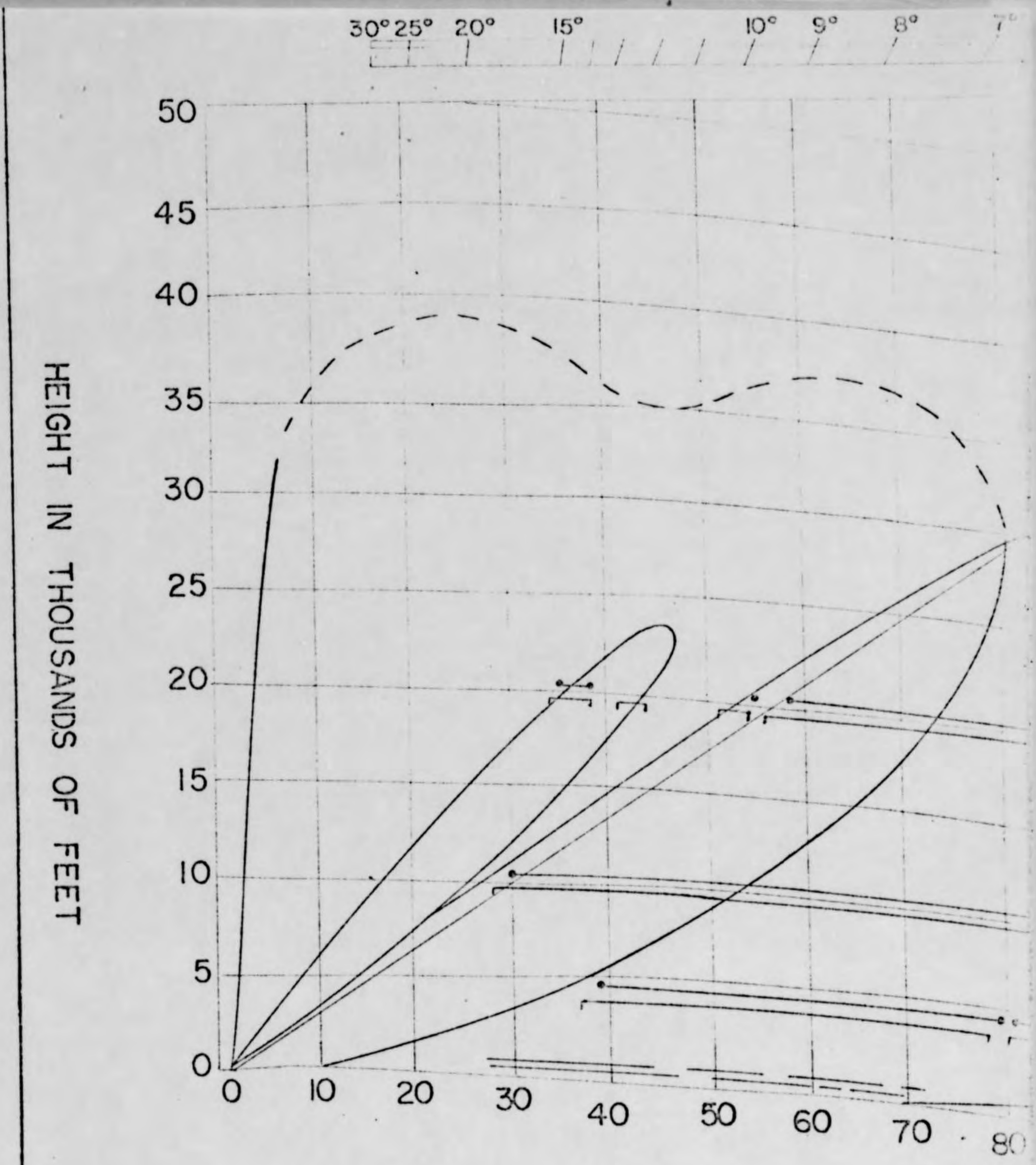
190 200 210 220 230 240 250

RANGE IN MILES


4°
3°
2°
1°
CALCULATED
HIGH LOBE
PATTERN
OBJECT
ENTERING
LOW BEAM
RADAR HORIZ
0°
20°
60°
100
200
300
400
500
1000
1500
150
160
170
180
190
200
210
220
230
240
250
00° FLIGHT LEGS
RANGE IN MILES



ACTUAL PLOTS ARE THOSE OBTAINED ON THE 100° FLIGHT LEGS



VERTICAL LOBE DIAGRAM

CPS-1 HIGH & LOW BEAM

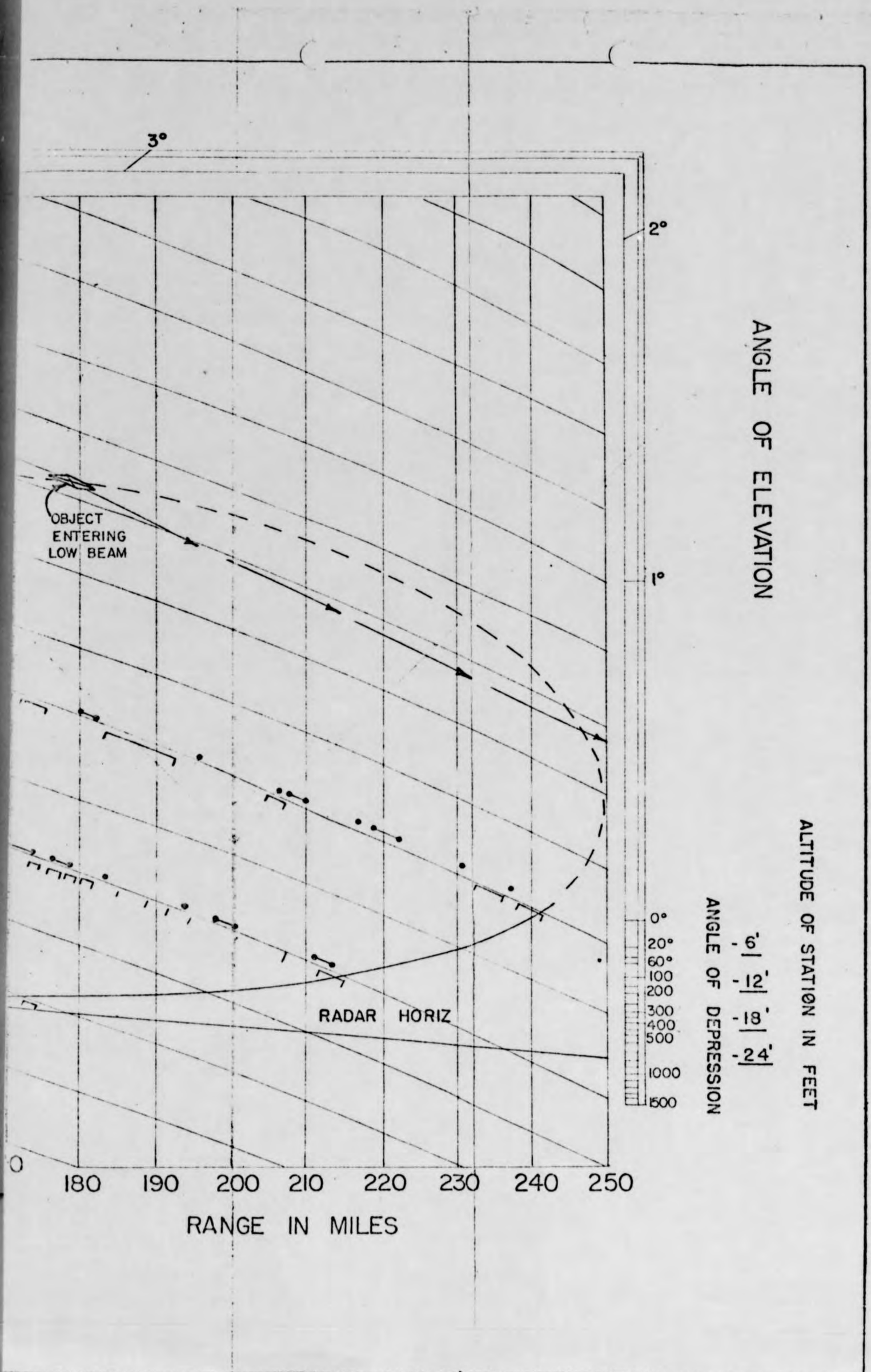
LEGENDS

OUTBOUND PLOT

INBOUND PLOT

---- APROX LOB PATTERN

INCLOSURE NO. 8
FEAF 112 NO. IR-25-52


3°
2°
1°
0
ANGLE OF ELEVATION
OBJECT ENTERING LOW BEAM
RADAR HORIZ
0°
20°
60°
100
200
300
400
500
1000
1500
ALTITUDE OF STATION IN FEET
ANGLE OF DEPRESSION
-6'
-12'
-18'
-24'
180
190
200
210
220
230
240
250
RANGE IN MILES

6°

5°

4°

3°

CALCULATED
HIGH LOBE
PATTERN

OBJECT
LEAVING
HIGH BEAM

OBJECT
ENTERING
LOW BEAM

90

100

110

120

130

140

150

160

170

180

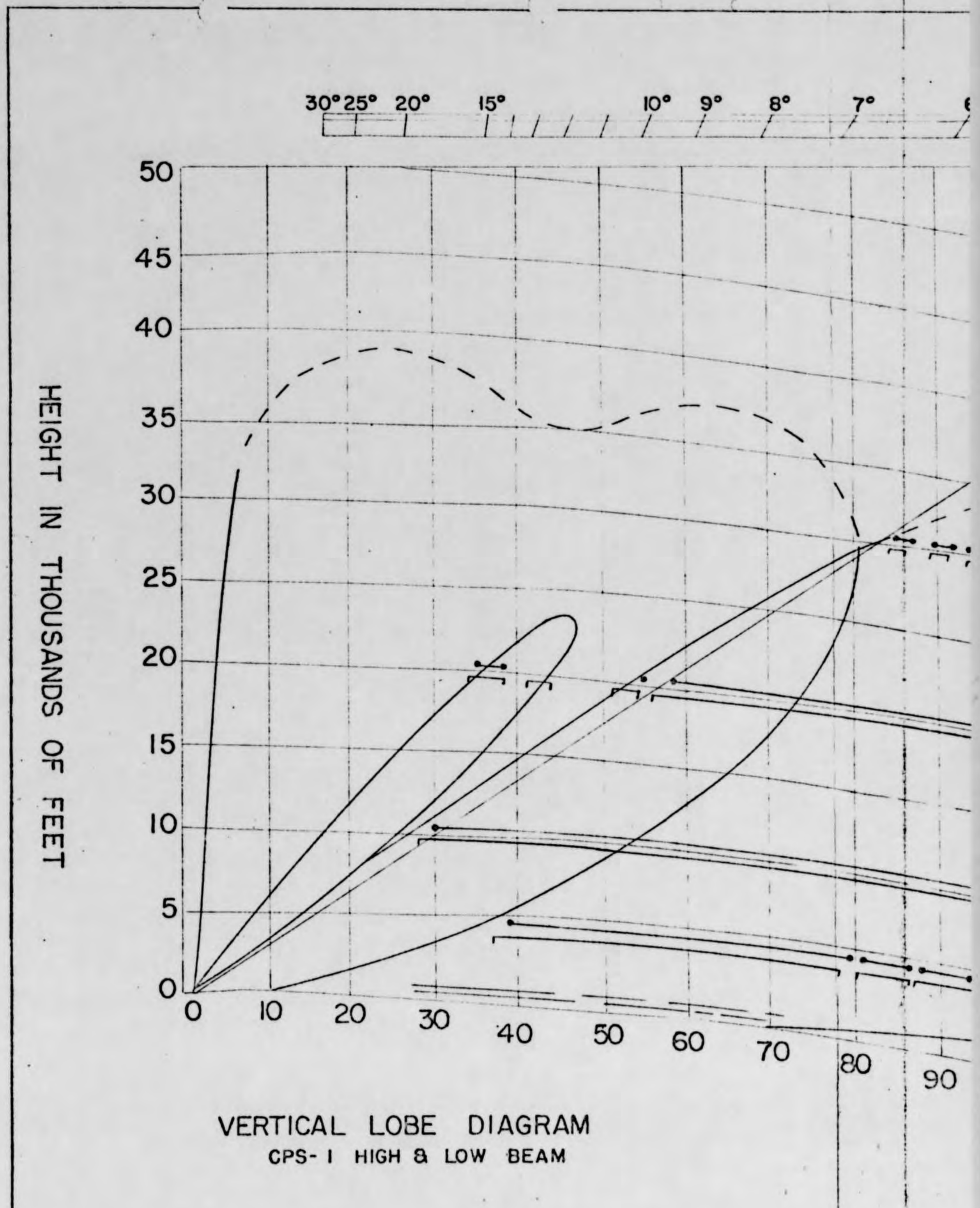
190

20

CTUAL PLOTS ARE THOSE OBTAINED ON THE 100° FLIGHT LEGS

RANG

T-3712-52



VERTICAL LOBE DIAGRAM

CPS-1 HIGH & LOW BEAM

LEGENDS

OUTBOUND PLOT

INBOUND PLOT

APROX LOB PATTERN

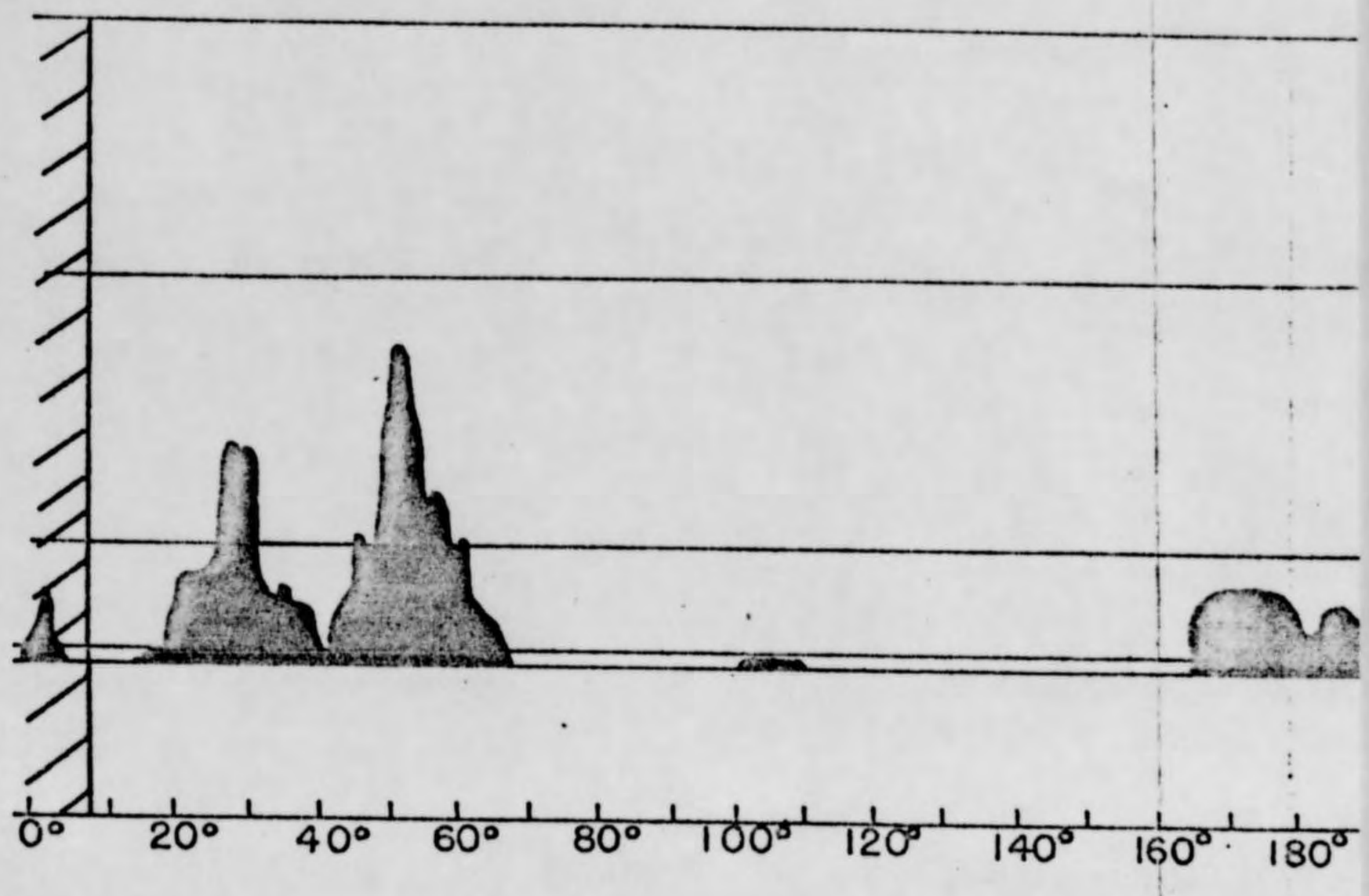
ACTUAL PL

INCLOSURE NO. 8
FEAF 112 NO. IR-25-52

TS2-13258-54

T-3712-35

UNCLASSIFIED

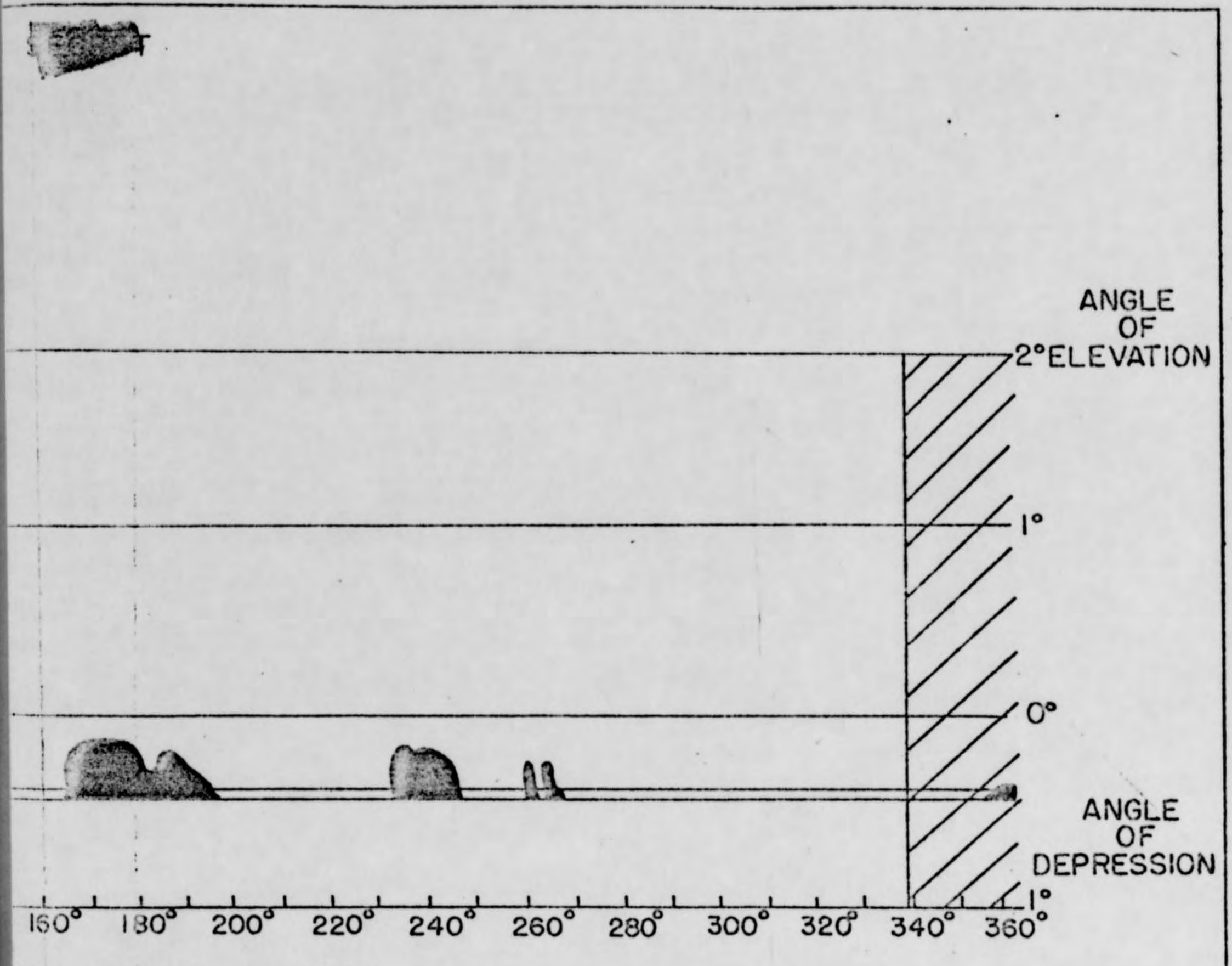


LAND SURVE
CPS-1

INCLOSURE # 7
FEAF 112 # 12-25-52

UNCLASSIFIED

TS2-13258-8

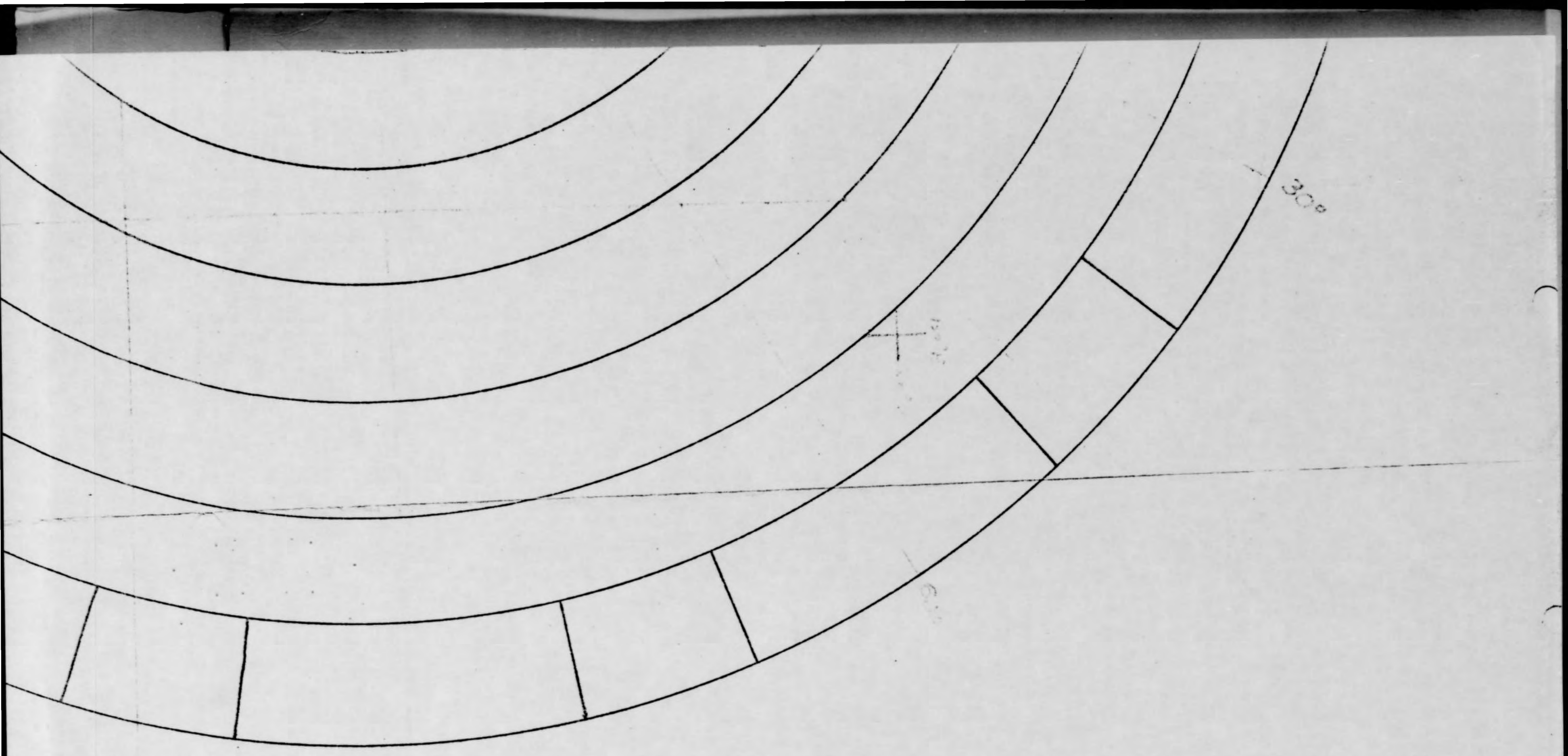


ND SURVEY PROFILE
CPS-1

120°

150°

SCALE : 1:500,000


30°

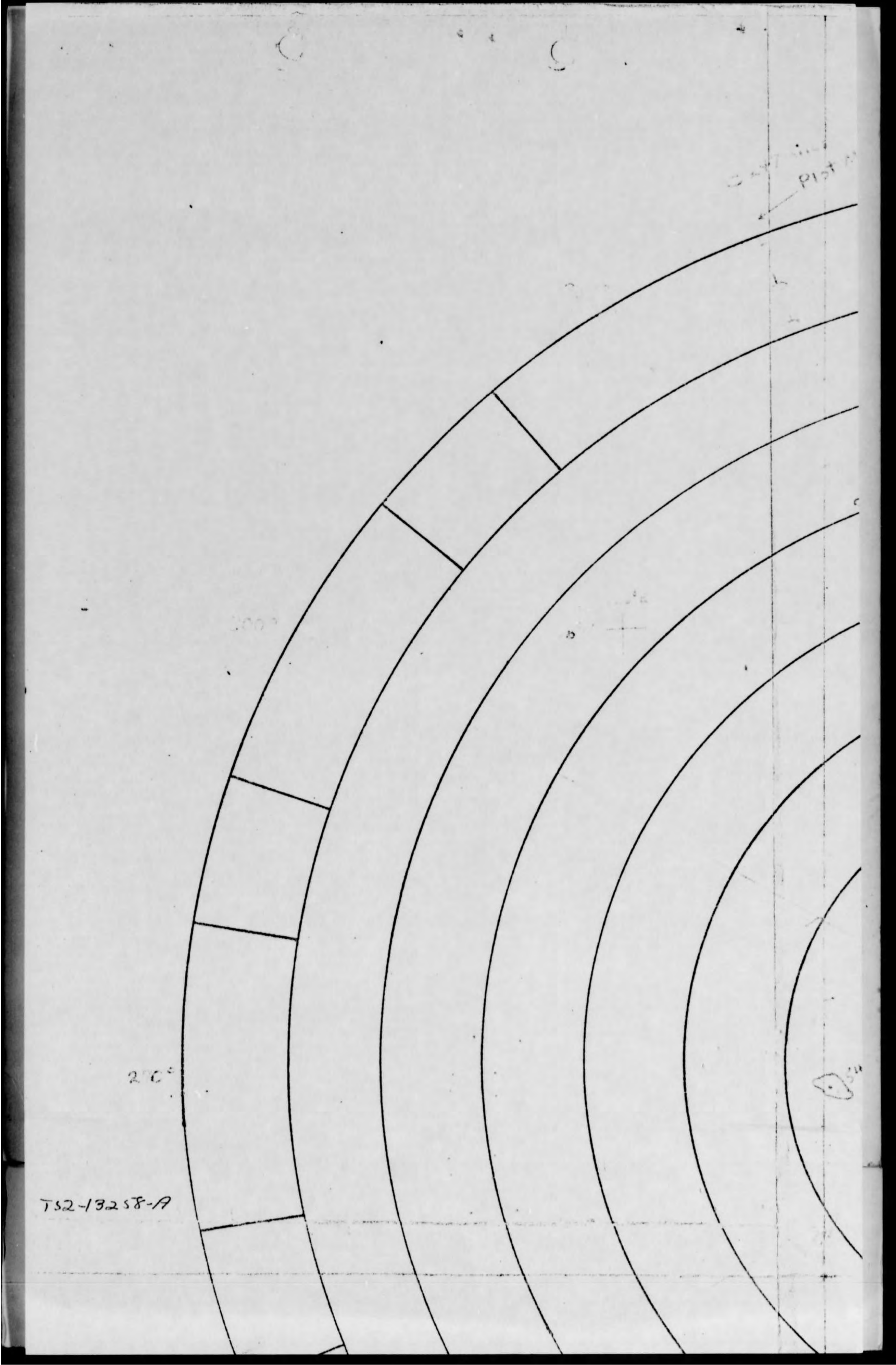
[redacted]

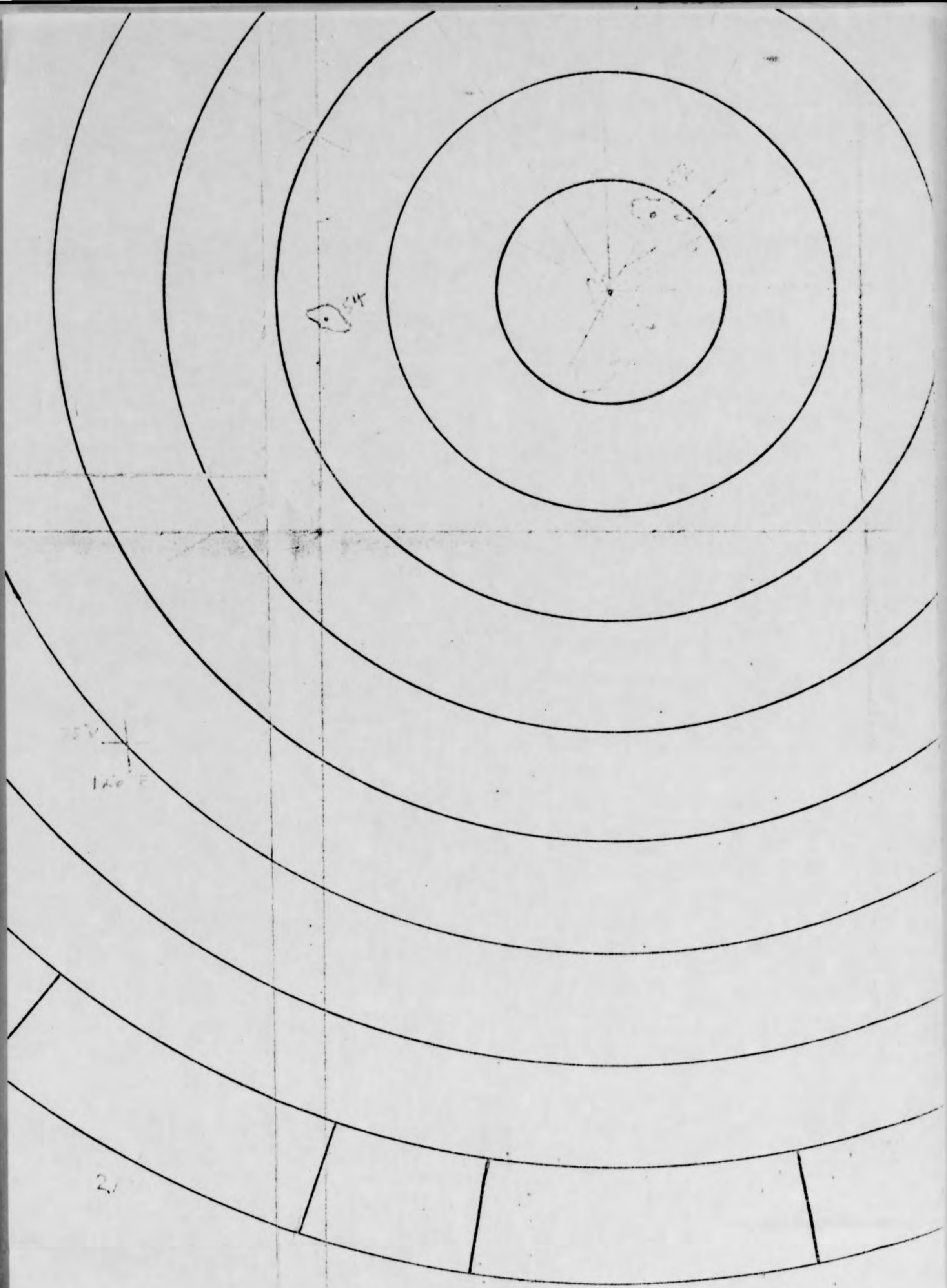
UNCLASSIFIED

Plot Missed

360°

Plot missed


PLOT
2 C°
TS2-13258-A



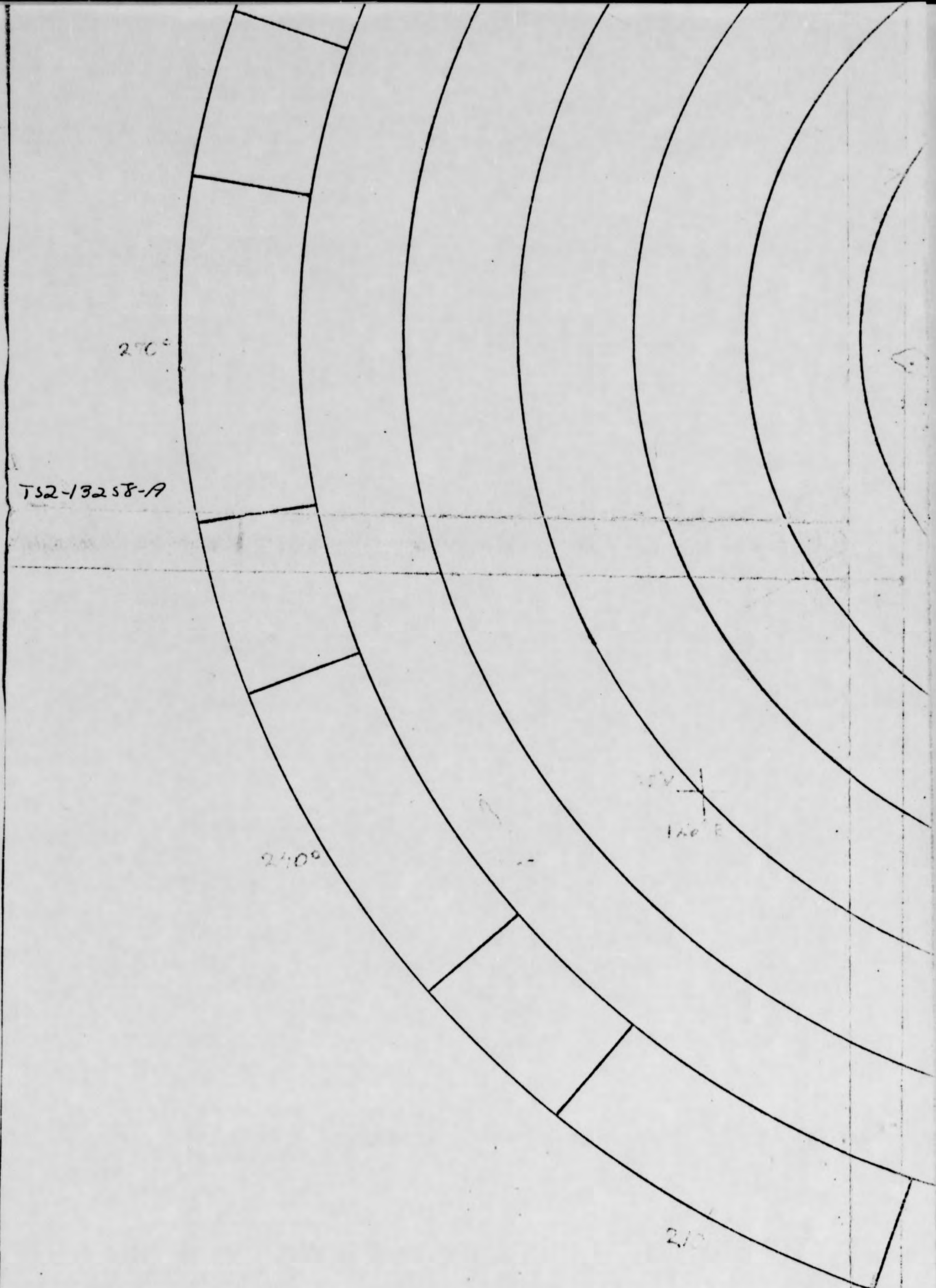
Reference Key

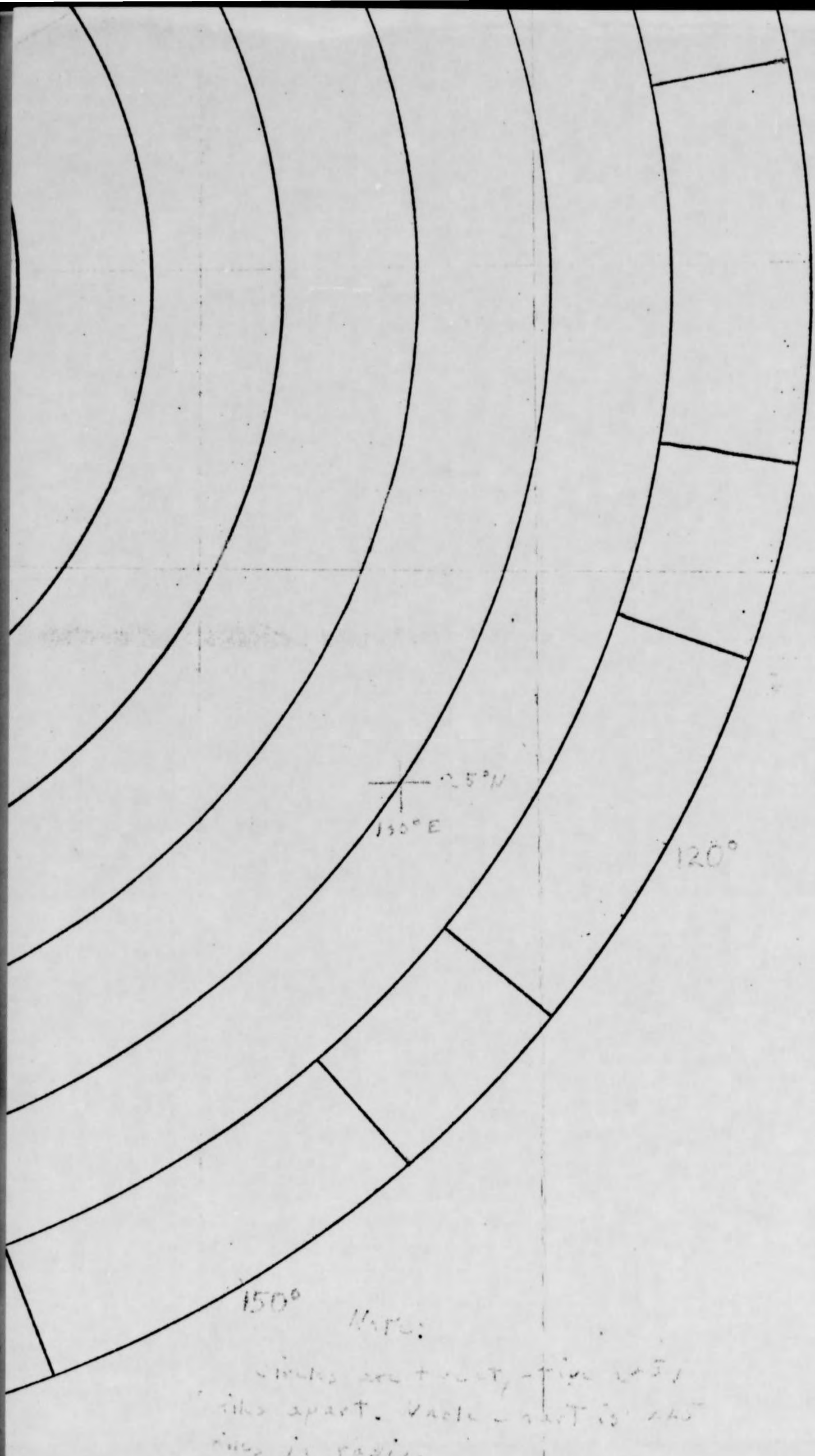
S...

Scale 1:1,500,000

UNCLASSIFIED

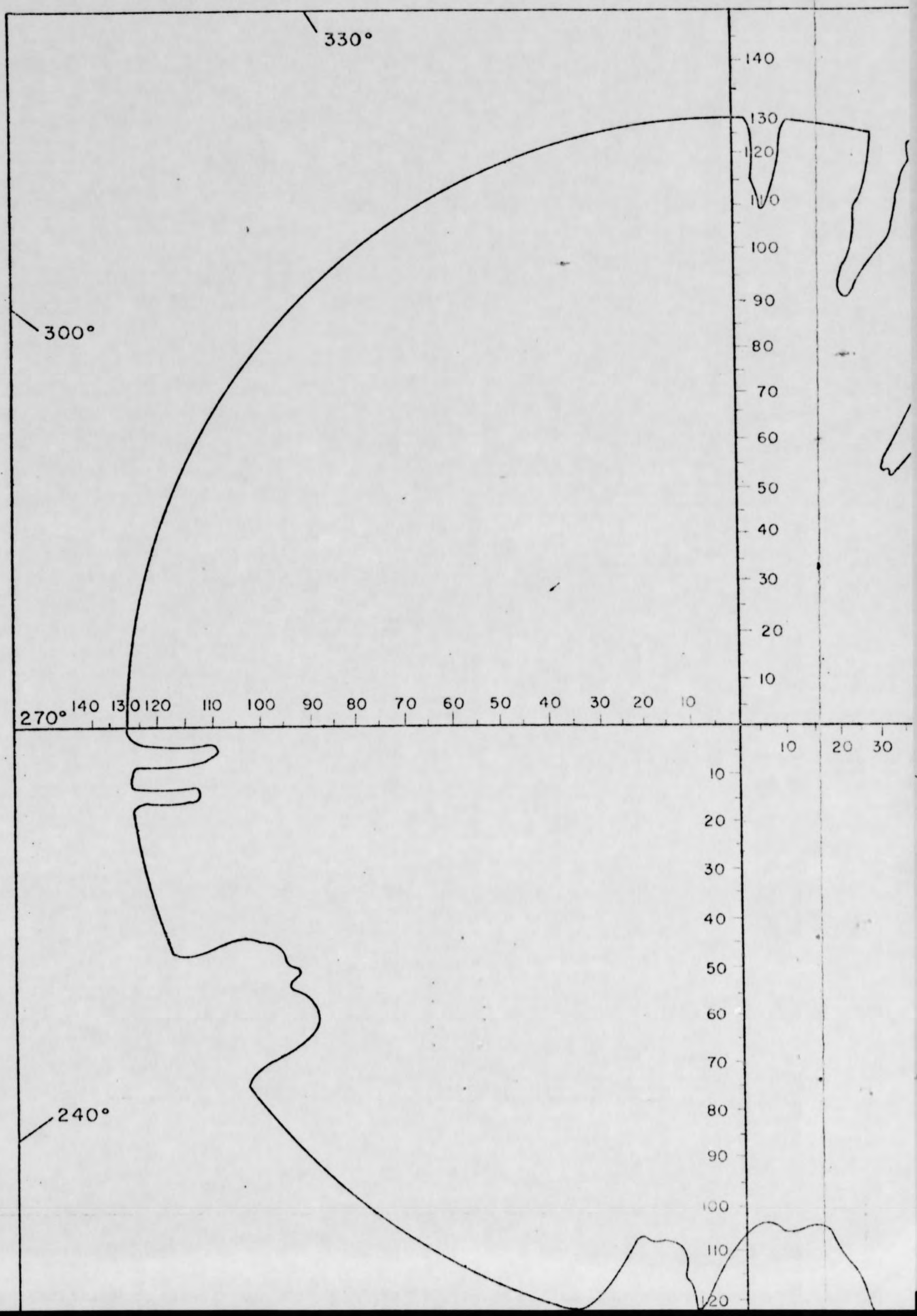
TS2-13258-A



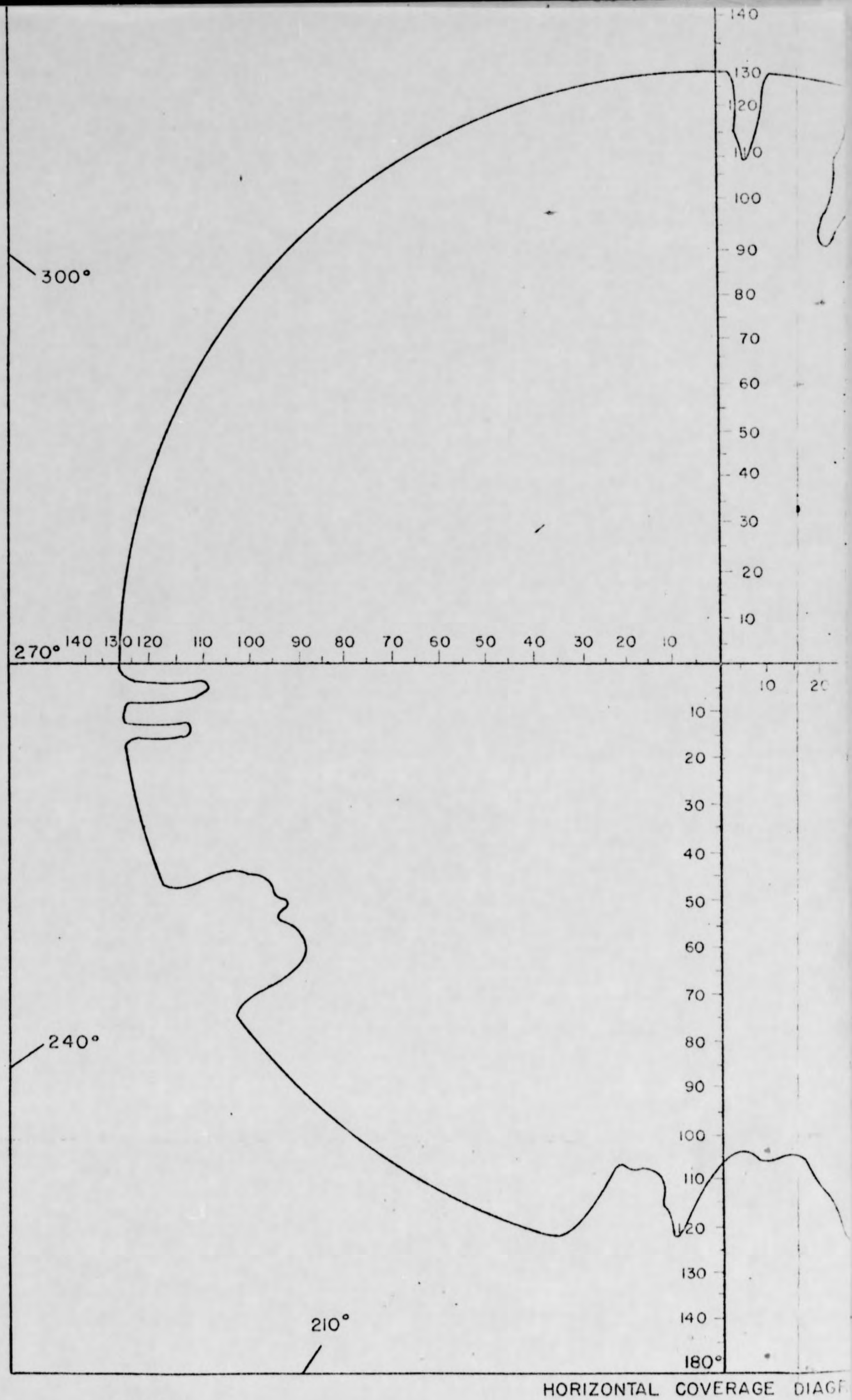


Note:

Circles are 1° apart. Radii are 15° apart.



[redacted]



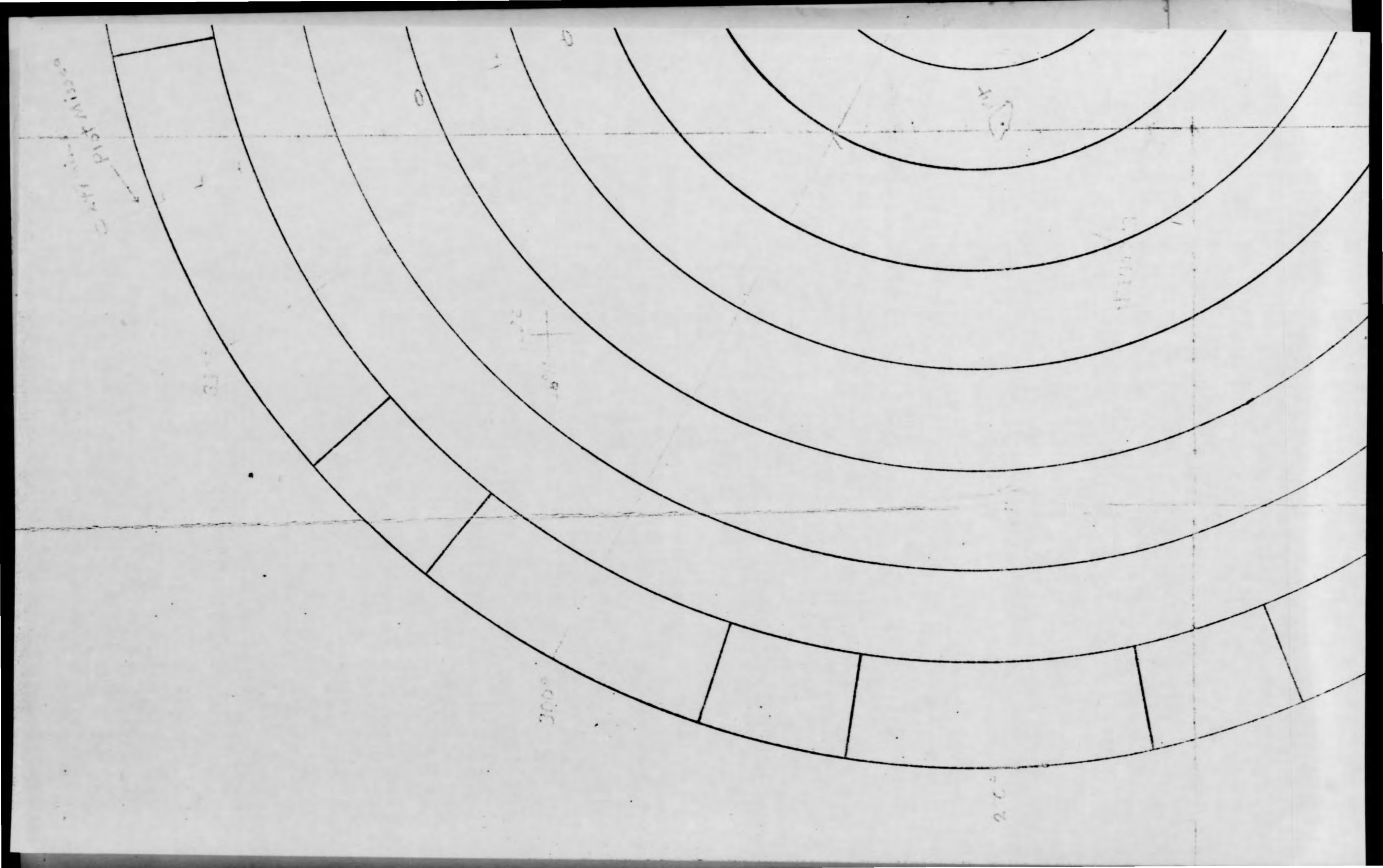
HORIZONTAL COVERAGE DIAGR

LEGEND:

~~~~~ MAXIMUM SEARCH RANGE (CPS-1)- 4,000

INCLOSURE 3
FEAF 112 IR-25-52

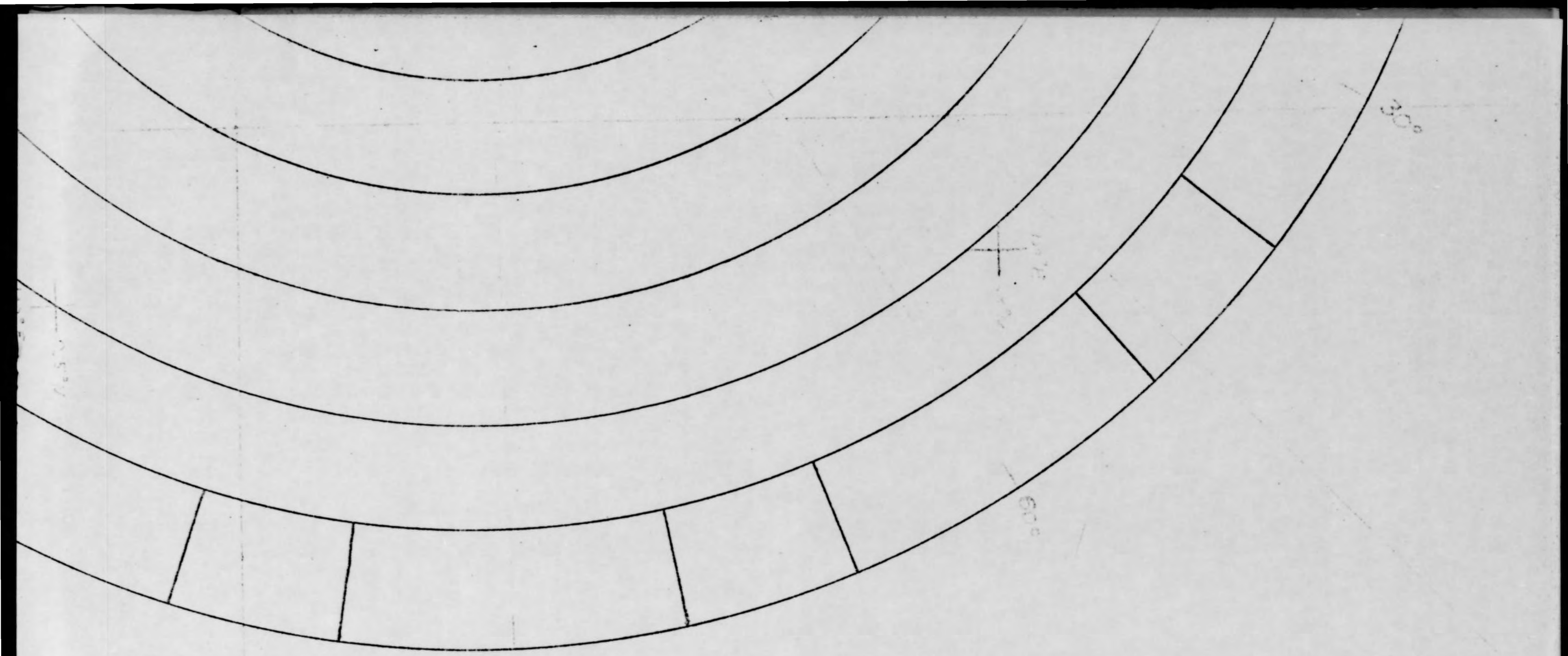
UNCLASS...
~~~~~

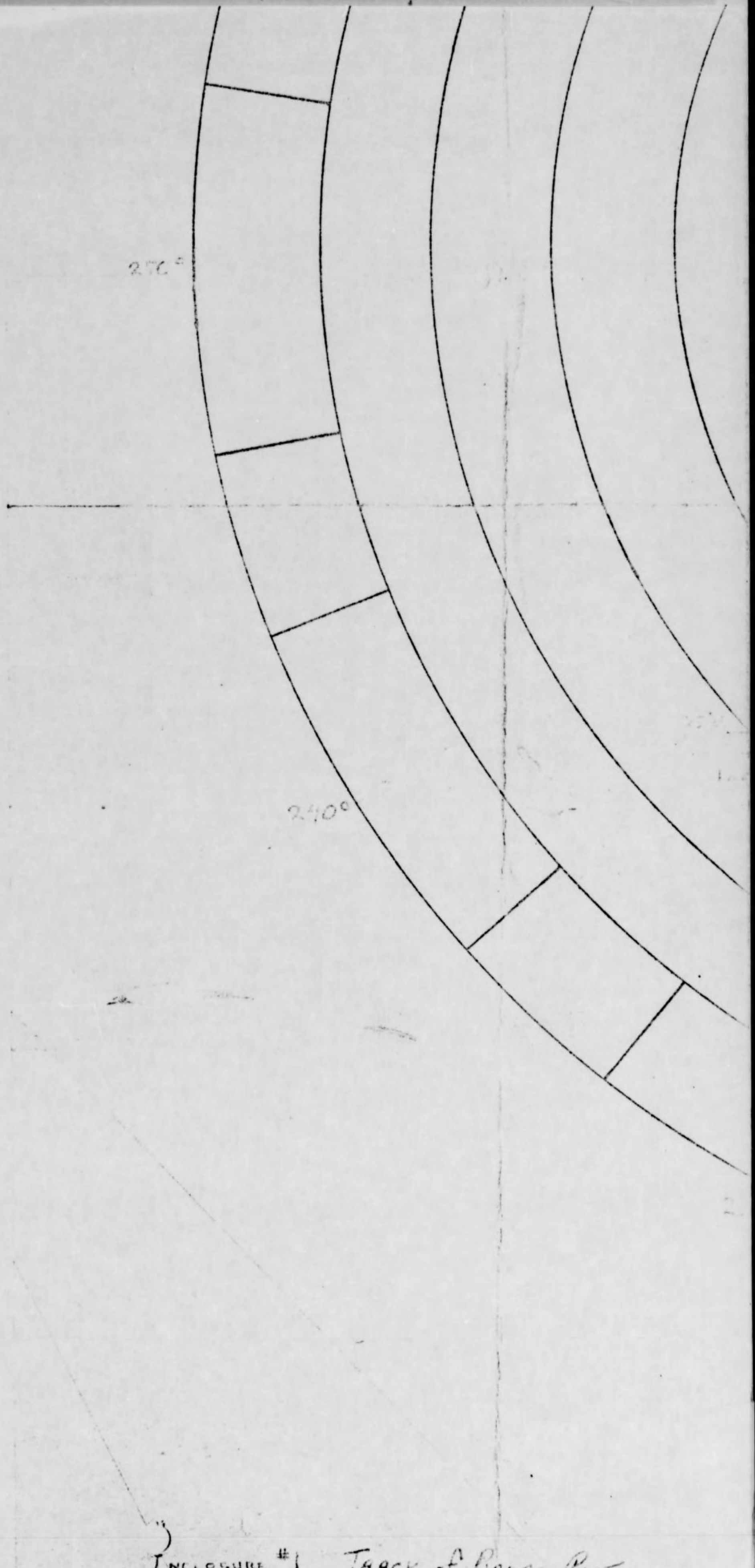


INCLOSURE #6

USAF 112 # IR-25-52

30°


30°
60°



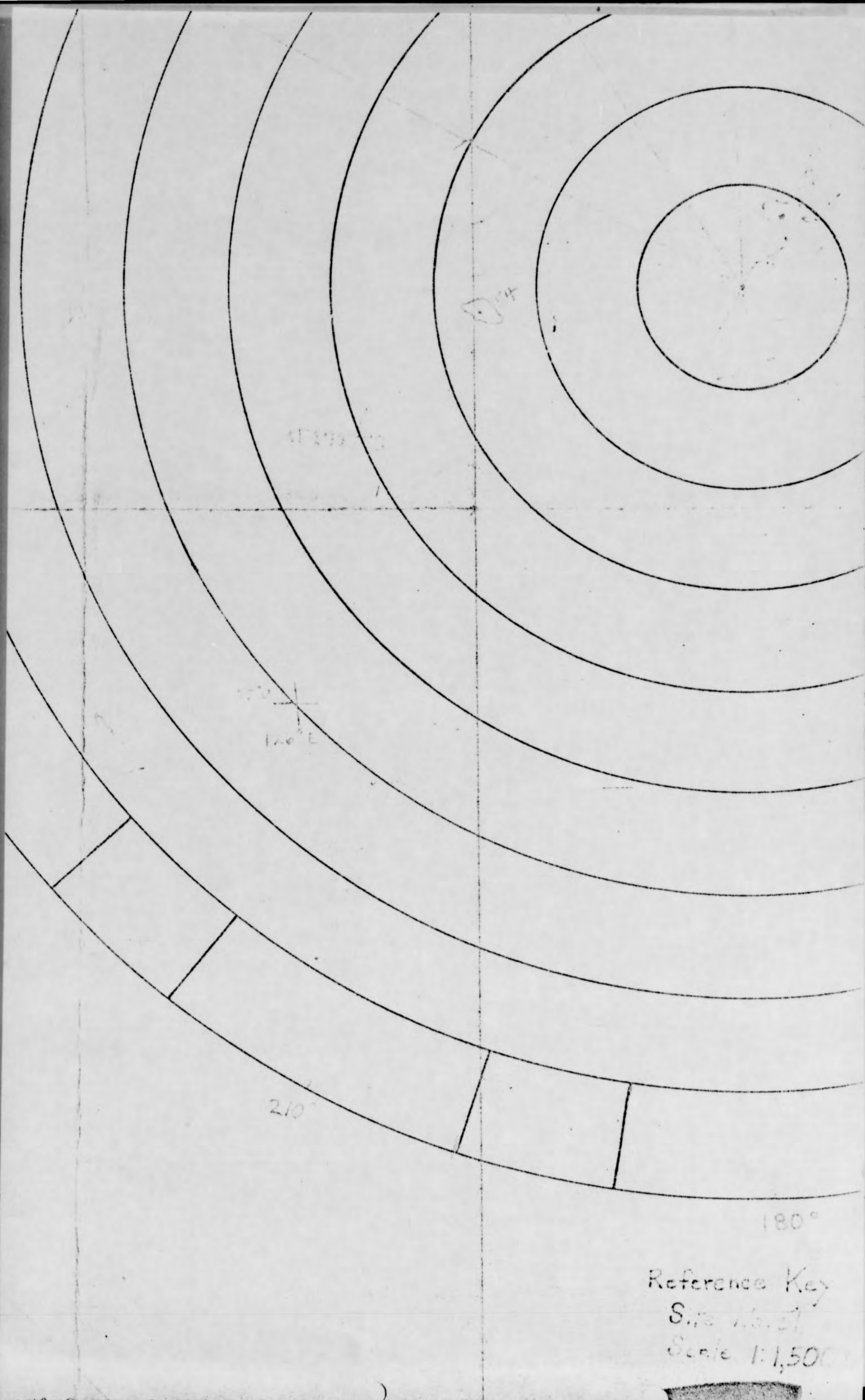
INCLOSURE #1 TRACK of RADAR PLOT

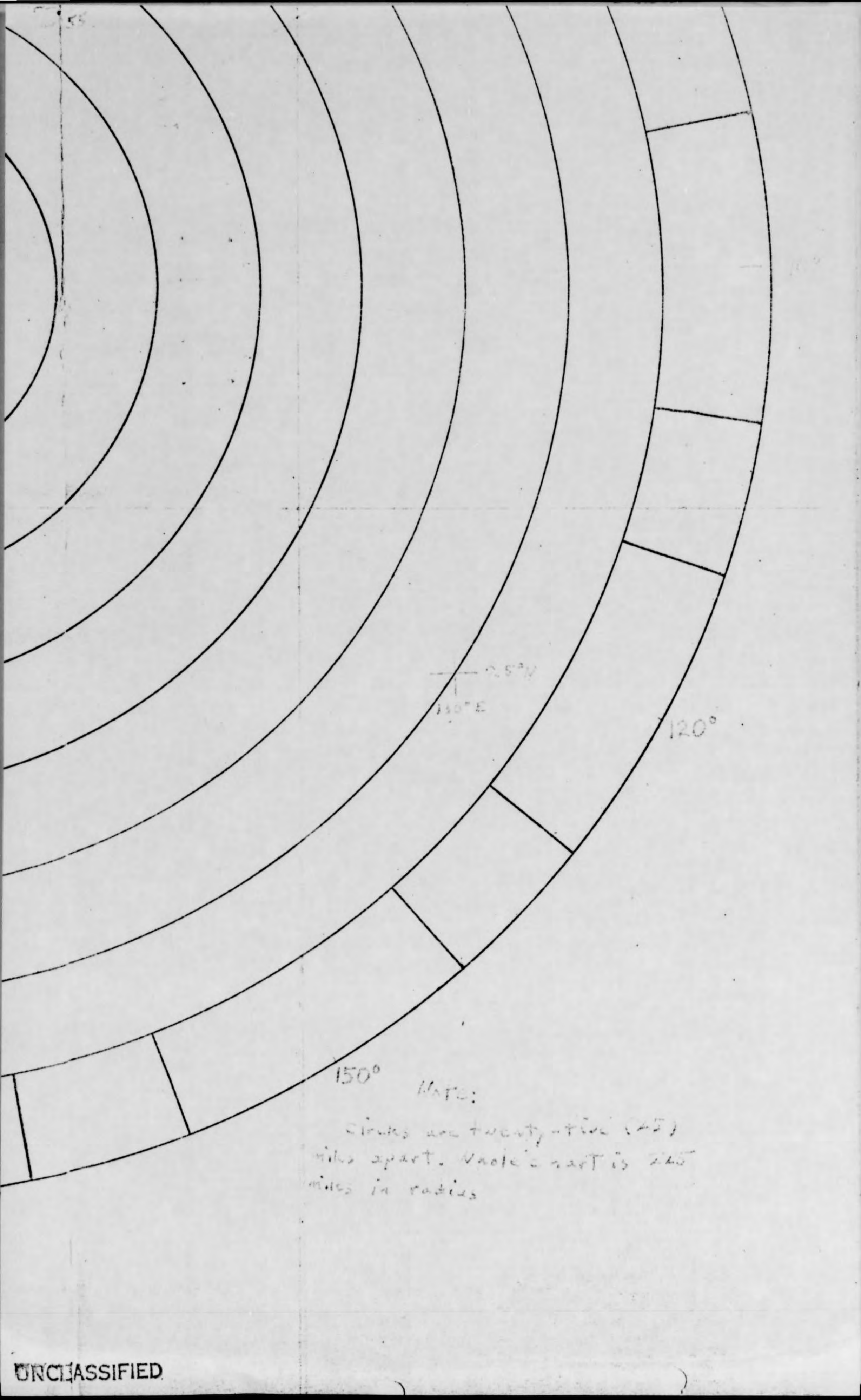
270°

240°

210°

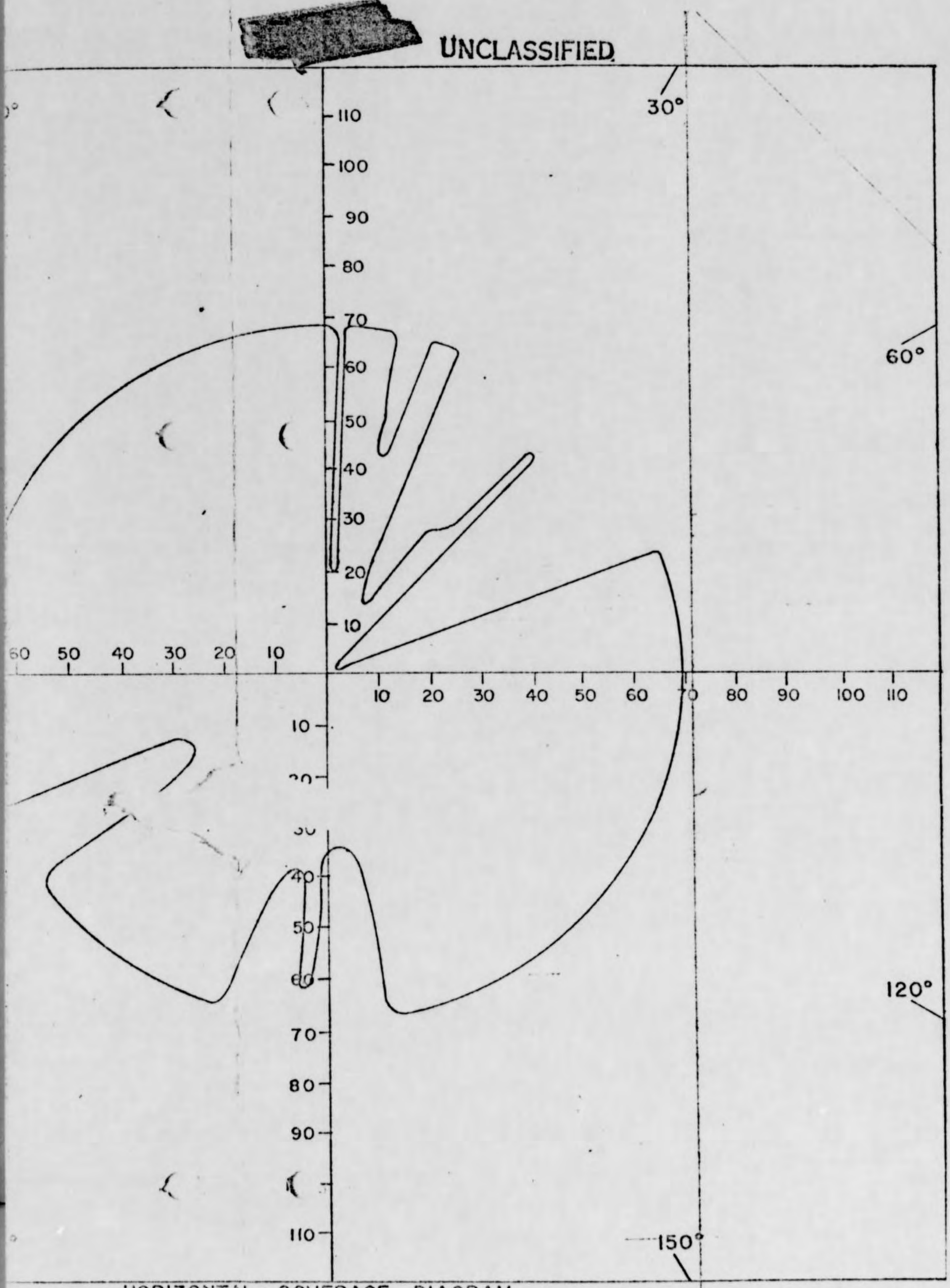
Enclosure #1 Track of Racer Pilot


210°
180°
Reference Key
Scale 1:1,500



NOTE:

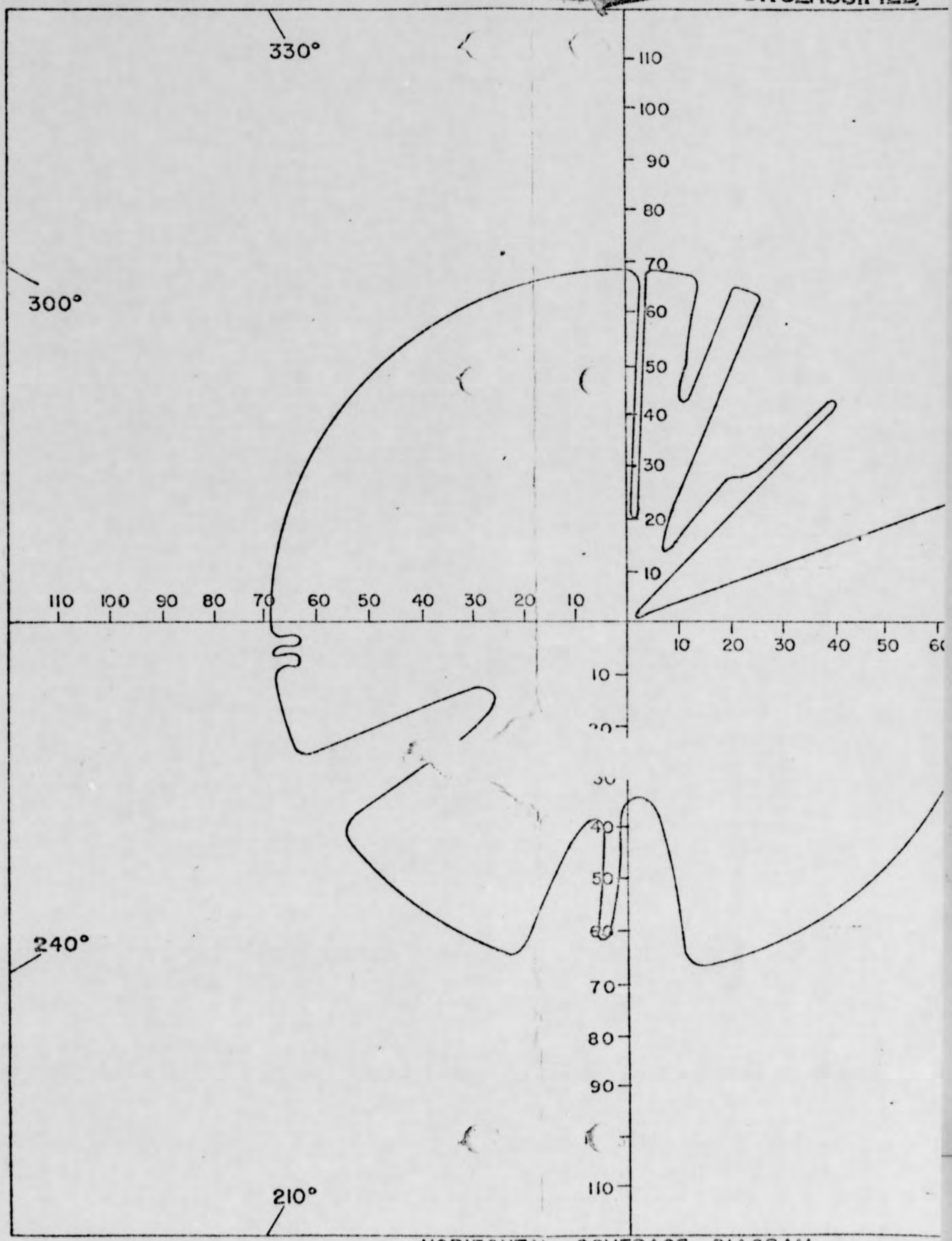
Circles are twenty-five (25) miles apart. Radial chart is 225 miles in radius



HORIZONTAL COVERAGE DIAGRAM

(CPS-1) -500 FEET

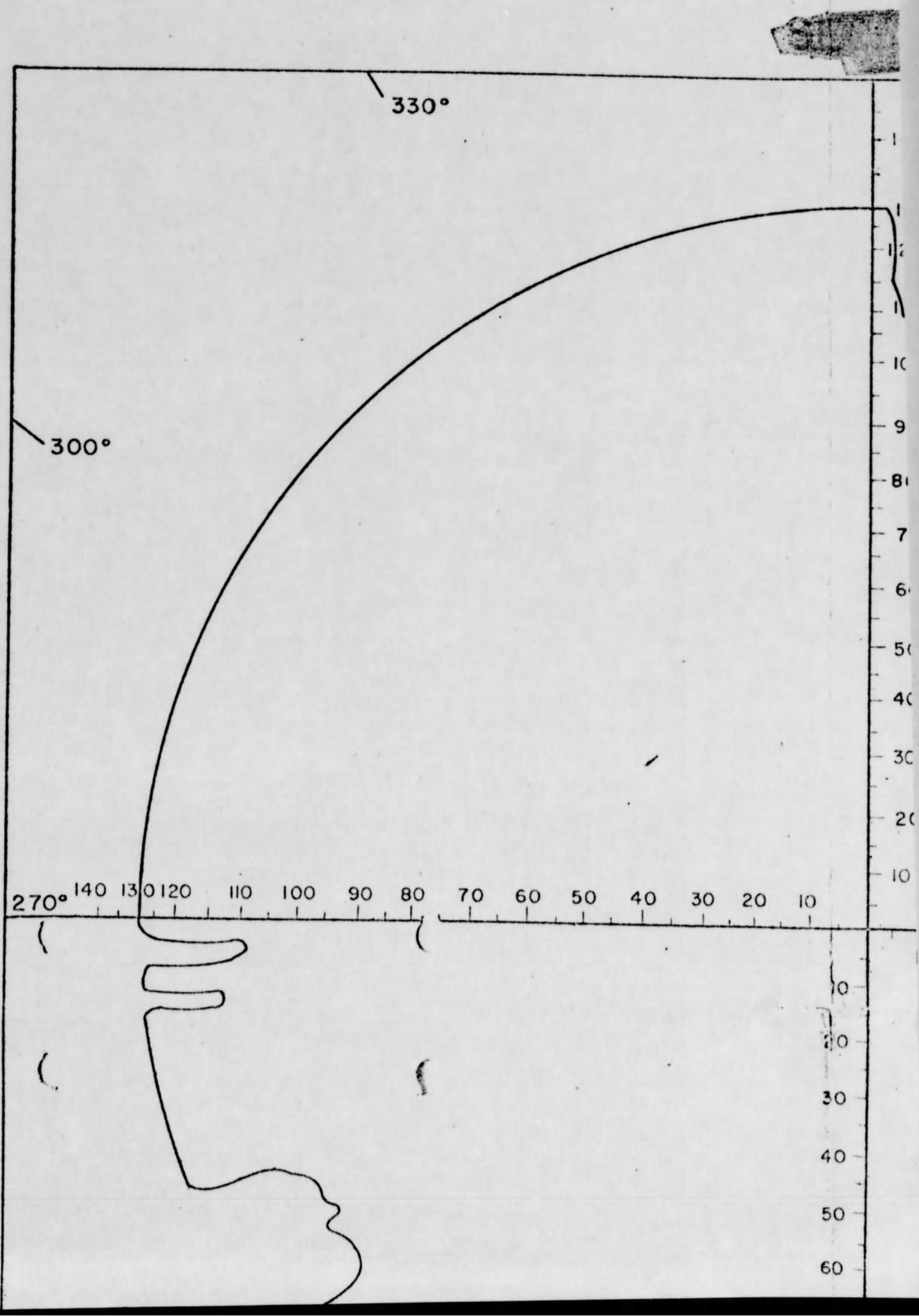
SCALE: 1:500,000



HORIZONTAL COVERAGE DIAGRAM

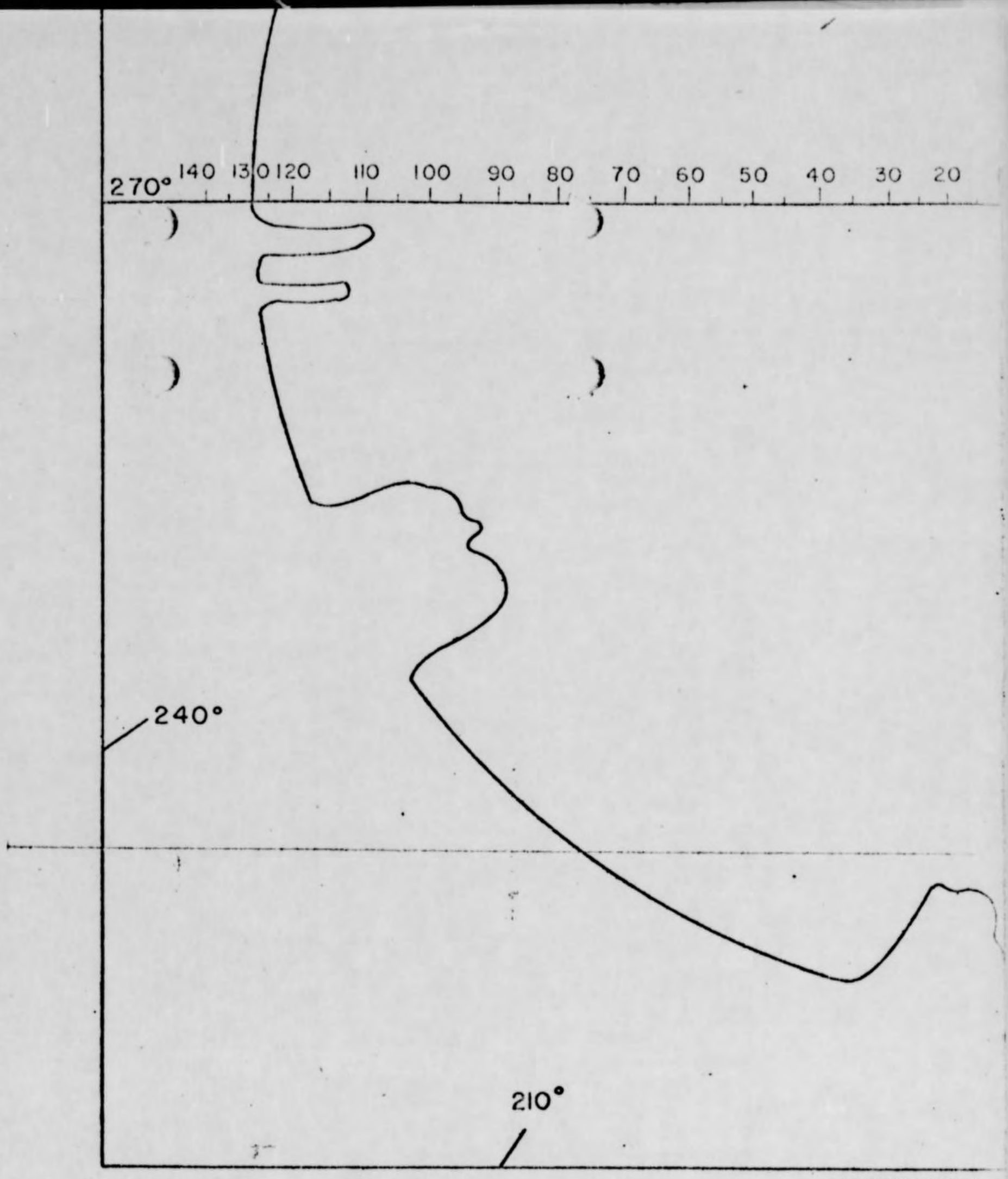
LEGEND

—~— MAX. SEARCH RANGE (CPS–1) –500 FEET


330°
300°
270°
140 130 120 110 100 90 80 70 60 50 40 30 20 10
10
20
30
40
50
60

UNCLASSIFIED

INCLOSURE #6
USAF 112 # IR-25-52

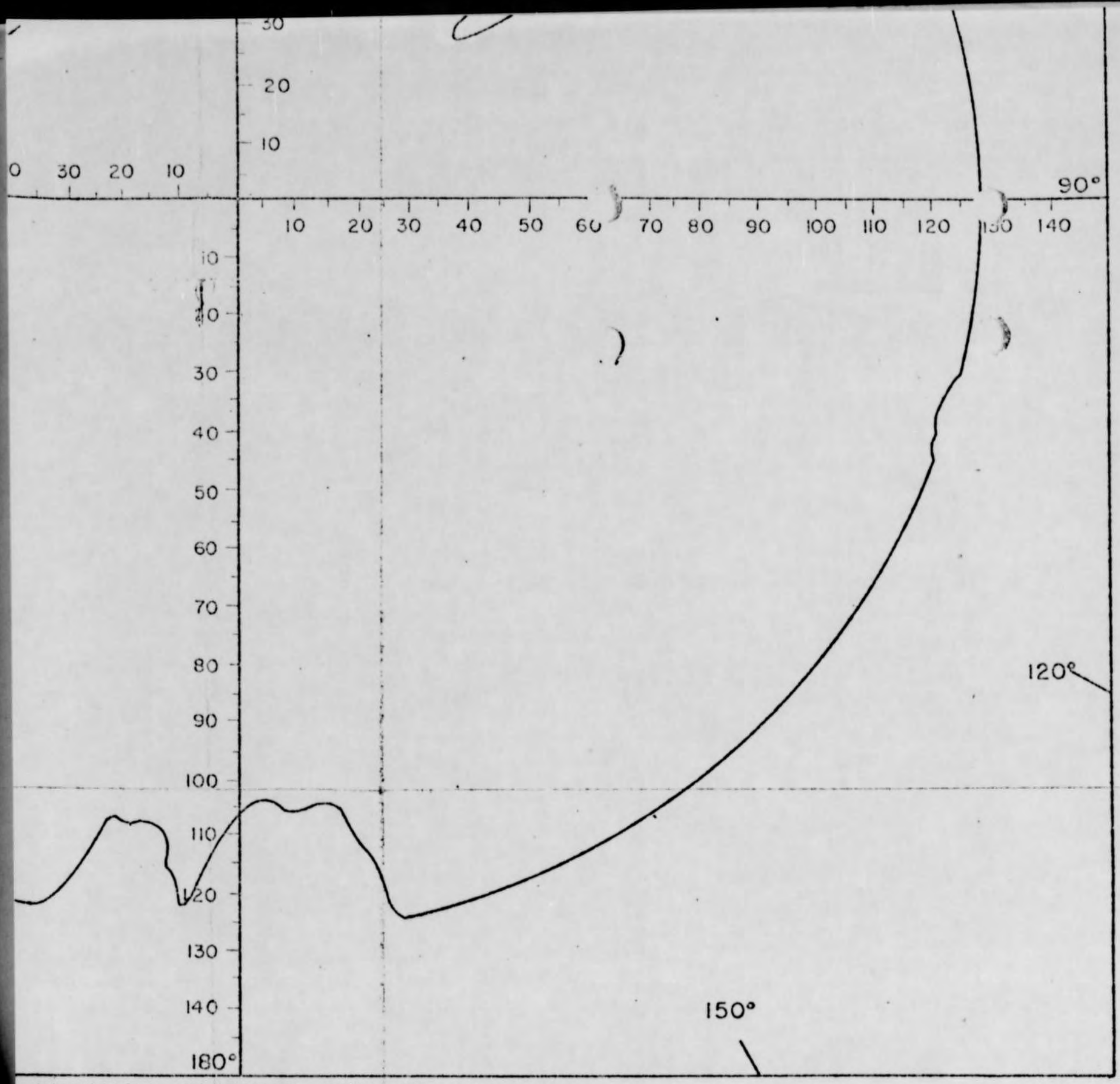


HORIZONTAL

LEGEND:

~~~~~ MAXIMUM SEARCH RANGE (CPS-1)- 4,000

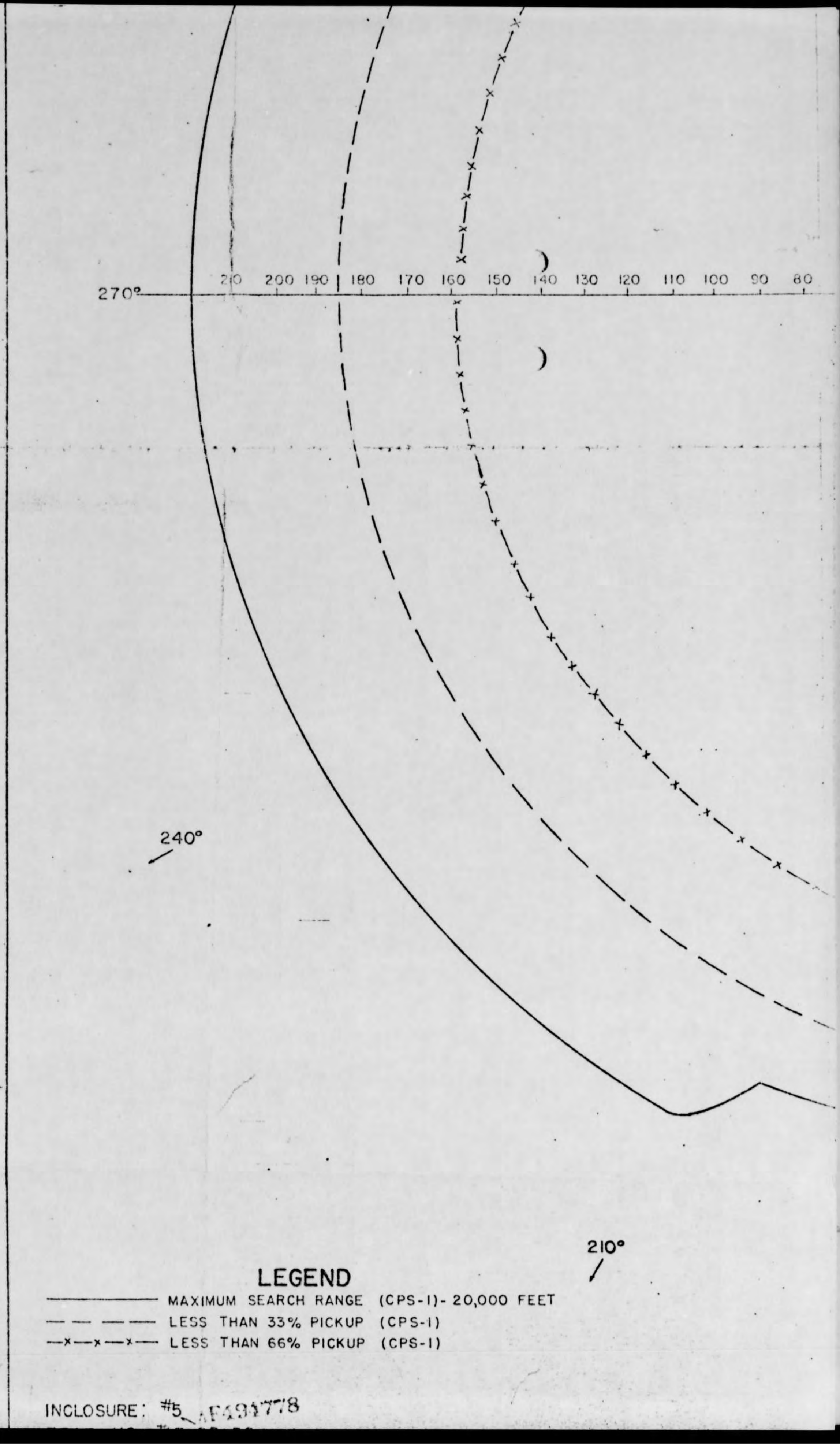
INCLOSURE 3 AF-1941778
FEAF 112 IR-25-52
~~~~~



HORIZONTAL COVERAGE DIAGRAM

00

SCALE: 1:500,000



LEGEND

——————— MAXIMUM SEARCH RANGE (CPS-1)- 20,000 FEET

— — — — LESS THAN 33% PICKUP (CPS-1)

—x—x—x— LESS THAN 66% PICKUP (CPS-1)

INCLOSURE: #5 AF494778

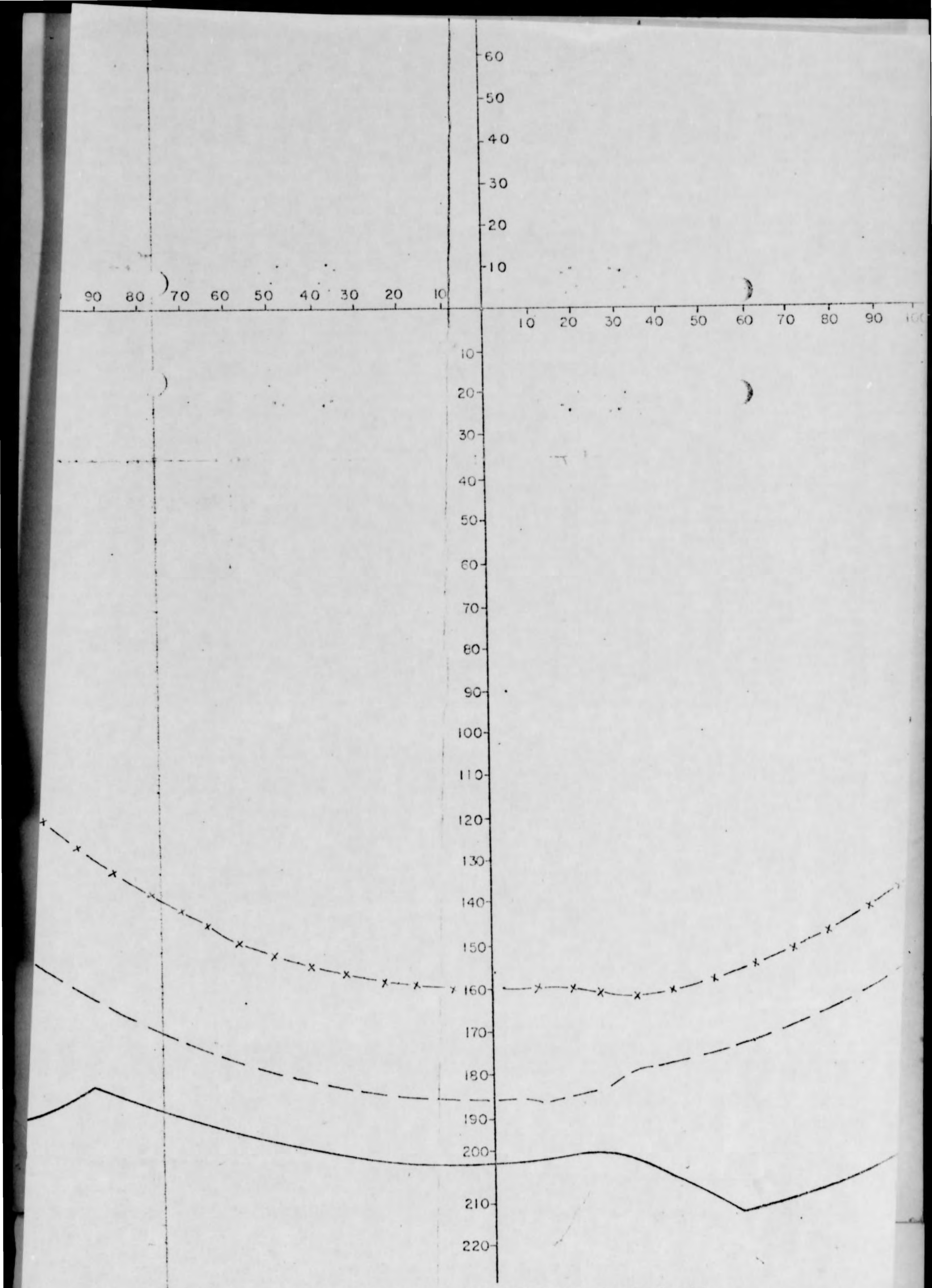
30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210

150°

AGE DIAGRAM

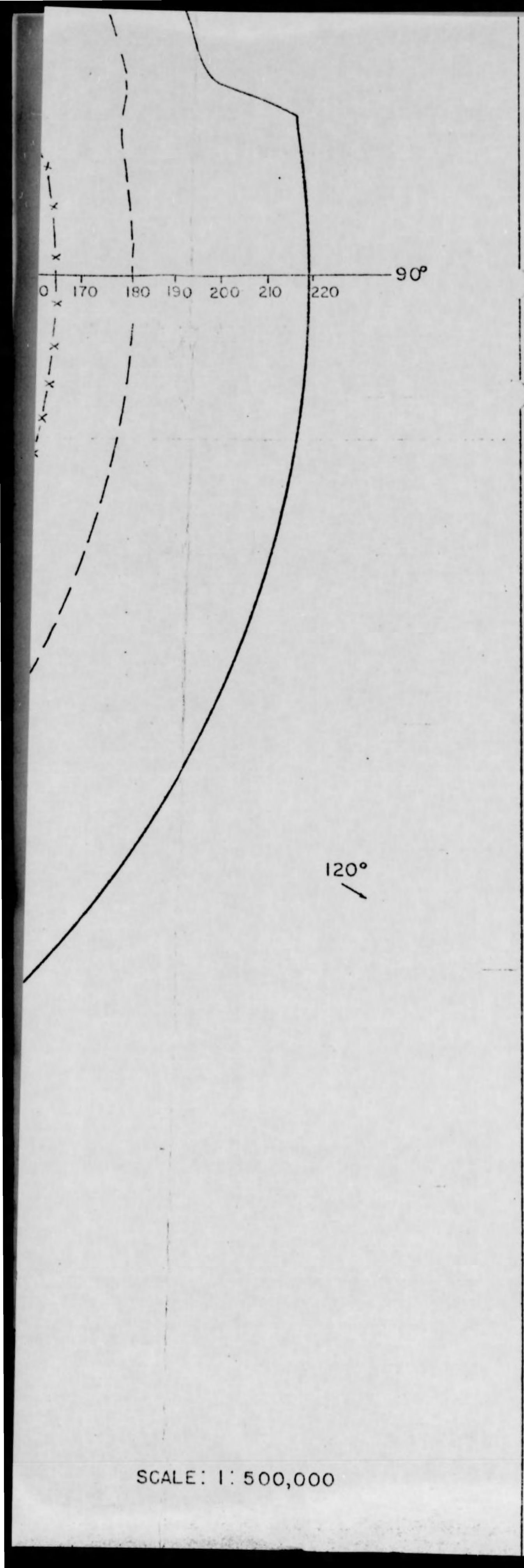
UNCLASSIFIED

SCALE: 1:5

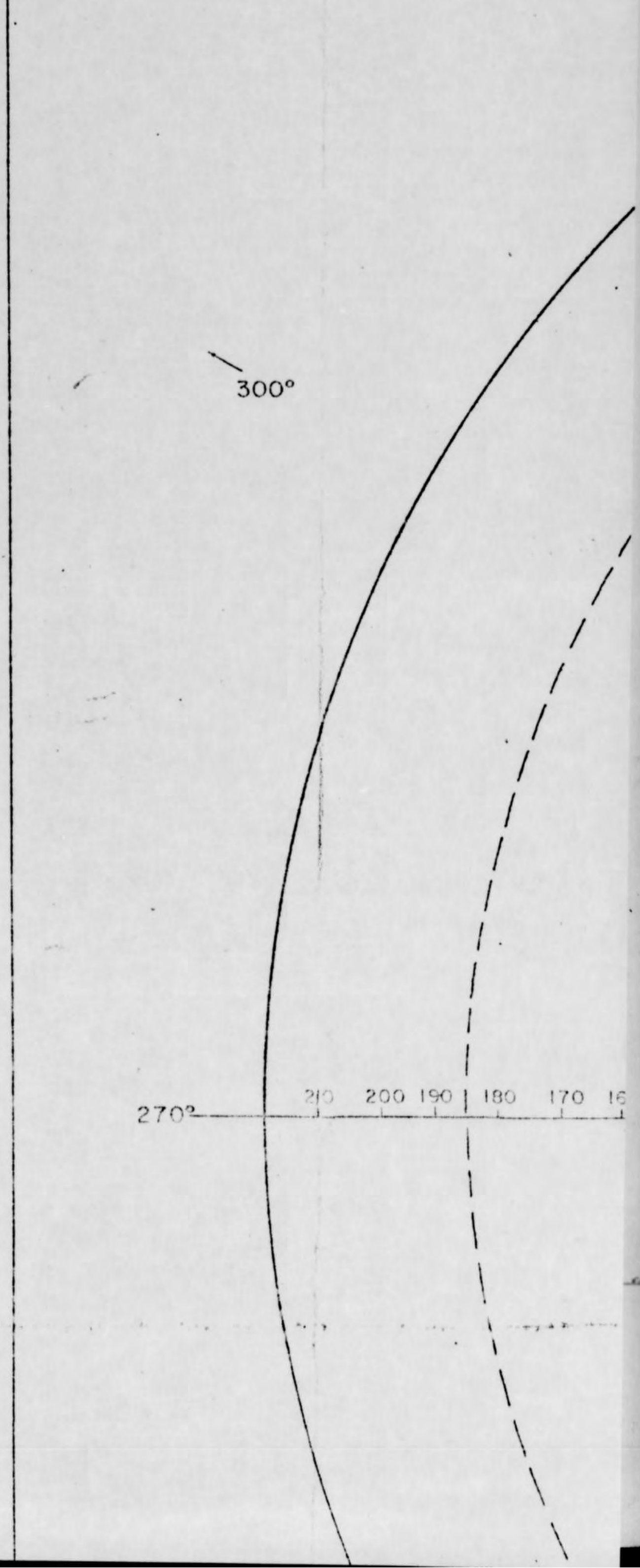


HORIZONTAL COVERAGE DIAGRAM

UNCLASSIFIED



SCALE: 1: 500,000


300°
270°
210
200
190
180
170

AF FORM 112—PART I
APPROVED 1 JUNE 1948

[redacted]
UNCLASSIFIED

Per [redacted]
CO FEAF APO 925
by Lt Col 5 Jul
Date Initials

COUNTRY		(LEAVE BLANK)
Japan	IR-25-52	4

AIR INTELLIGENCE INFORMATION REPORT

SUBJECT
FLYOBRPT

AREA REPORTED ON	FROM (Agency)
Okinawa	ATIL Office, D/I FEAF

DATE OF REPORT	DATE OF INFORMATION	EVALUATION
26 June 1952	3 October 1951	B-2

PREPARED BY (Officer)	SOURCE
Charles J. Malven, Captain, USAF (ATLO)	529th AC&W Group, APO 239

REFERENCES (Control number, directive, previous report, etc., as applicable)

SUMMARY: (Enter concise summary of report. Give significance in final one-sentence paragraph. List inclosures at lower left. Begin text of report on AF Form 112 -Part II)

1. This report contains all available information on the radar tracking of a high speed unidentified object from Site #51, 529th A. C. & W. Group, located a few miles north of Kadena Air Force Base, Okinawa.

2. This material was collected and evaluated by Mr. Wallace W. Bush, Classified Reconnaissance Branch, D/I FEAF.

APPROVED:

[redacted]
for CHARLES Y. BANFILL
Brigadier General, USAF
Deputy for Intelligence

[redacted]

8 Incls
1. Track of Radar Plot
2. Horizontal Coverage, 500 ft.
3. Horizontal Coverage, 4000 ft.
4. Horizontal Coverage, 10,000 ft.
5. Horizontal Coverage, 20,000 ft.
6. Horizontal Coverage, 30,000 ft.
7. Land Survey Profile
8. Lobe Diagram showing track of plot.

DISTRIBUTION BY ORIGINATOR

D/I USAF, Cy #1
ATIC, WPAFB, Attn: ATIAA-2C, Cy #2
D/I Alaskan Air Comd, Cy #3
g-2, Hq FEC, cys #4,5 & 6
IN-Rec, FEAF, Cy #7
IN-EVAL, FEAF, Cy#8
IN-REQ (ATLO), FEAF, Cy#9
File, Cy #10

UNCLASSIFIED

[redacted]

FEC Printing Plant

TS2-13258

AF FORM 112—PART II
APPROVED 1 JUNE 1948

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 1 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

1. Original report from site #51, 529th AC & W Gp, APO 239:

SUBJECT: Unidentified Aircraft Report * 8 October 1951

TO : Operations and Training Section
529th A.C. & W. Group
APO 239

1. UNIDENTIFIED AIRCRAFT DATA:

Initial Position of A/C 27°42' N 128°10' E
Time 1327 Z 2227 I LCL DATE 3 October 1951
ADCC Track Number 86 Heading West No. of A/C One (1)
Ground Speed See Remarks MPH Altitude Unknown
Maneuverability Extremely Maneuverable
Type of Aircraft Unknown
Aircraft Markings Unknown
Last Position of A/C 29°52' N 127°25' E
Time See Remarks Z ----- LCL DATE 3 October 1951

2. OBSERVER DATA:

Method of Sighting (Visual, Electronic, etc.) Electronic
No attempt made to sight object visually. No known visual sighting.
Location of Observer or Observing Equipment Observers and radar equipment were at the Okinawa GCI Station, Site #51 "A".

Site A 26°24' N 127°27' E Site B ____ N ____ E
Site C ____ N ____ E Site D ____ N ____ E
Site E ____ N ____ E ____ N ____ E

Name of observer See Remarks
Military Duty " "
Experience in Military Duty See Remarks
Reliability " "
Education " "
Years of Military Service ____ Age ____

3. INTERCEPTION DATA: No interception attempted.

Interceptor A/C: Type ____ Call Sign ____ No. of A/C ____
Scrambled at ____ Z Airborne at ____ Z
Interception at: Azimuth ____ Range ____ Time ____ Z
Altitude ____

4. HIGHER HEADQUARTERS NOTIFIED:

Individual	Time	Agencies	Time
Lt. Col. T. D. Bradley	1335 Z	Attempted to pass data to Itazuke	____ Z
Chief, Air Defense	____ Z	ADCC without success due to heavy	____ Z
20th Air Force	____ Z	CW interference.	____ Z
		Priority secret radio to Dir Intel, Recon, FEAF Oct 4 51 0135I.	

* Substitute Object for Aircraft in the title and paragraph 1.

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TS2-13258

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AF FORM 112—PART II
APPROVED 1 JUNE 1948

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 2 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

5. GROUND IDENTIFICATION ATTEMPTS: [redacted].

The following agencies were contacted in an attempt to secure identifying information: None

Results: _____

VHF and HF Contacts were attempted on the following frequencies:
None

Results: _____

6. RADAR AND RADIO DATA:

Condition of Radar Equipment Good condition and operation normal. See Remarks.

Frequency and intensity of radar pick-ups See Remarks

Radar interference and Jamming consisted of None

VHF AND HF Radio Interference consisted of None on VHF. Heavy CW (code) interference on 5650 kcs. at 1350Z 3 October 1951.

Radar Status at the time of Unidentified's appearance:

GCI SITE "A" #51		GCI/EW SITE "B" #52		EW SITE "C" #53	
AN/CPS-1	Operative	SCR-270DA	Inoperative	SCR-270DA	Operative
AN/CPS-4	Operative	AN/TPS-1B	operative	AN/TPS-1B	Operative

EW SITE "D" #54		EW SITE "E" #55	
SCR-270DA	Operative	SCR-270DA	Operative
AN/TPS-1B	Standby	AN/TPS-1B	Inoperative
AN/TPS-10	Standby		

7. INDIVIDUAL RADAR PLOTS:

TIME Z	TRK NO.	RPTG SITE	TRK DIR	GRID BEAR	REF* DIS	NO. A/C	HGT	ID	FADES 1	2	3	MX	O/LD	REMARKS
1327:00	86	51	West	014	90	1	Unk	Unid						Initial Plot, High Beam
1327:15	"	"	"	004	90	1	"	"						" "
1327:30	"	"	"	352	90	"	"	"						" "
1327:45	"	"	"	339	95	"	"	"						" "
1328:00	"	"	NNW	339	112	"	"	"						" "
	"	"	"	340	132	"	"	"						" "
	"	"	North	355	200	"	"	"						I.P. Low Beam Low Recg
	"	"	"	355	210	"	"	"						" " " "
	"	"	"	355	225	"	"	"						" " " "
	"	"	"	355	247	"	"	"						Echo disappeared into the second transmitted pulse.

*From the GCI Station, Site "A" #51 26° 21' 55" N 127° 47' 49" E

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60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250

240°

210°

——— MAXIMUM SEARCH RANGE (CPS-1) - 30,000 FEET

AF FORM 112—PART II
APPROVED 1 JUNE 1948

[redacted] UNCLASSIFIED

AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 3 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

8. WEATHER IN UNIDENTIFIED'S AREA (Include Radar Reports):

No weather echos noted on radar scopes. Kadena Air Base Terminal weather conditions at 1300Z 3 October 1951 were as follows:
3/10 Alto-cumulus with bases at 10,000 feet, 1/10 strata-cumulus with bases at 2,000 feet. Visability 15 miles, temperature 73° F, dew point 68° F.

REMARKS: Very few clouds to the north.

Winds Aloft: 1500Z, 3 October 1951, Kadena Air Base.

Altitude	Wind From	Speed (Knots)
Surface	60°	11
5,000	70°	6
10,000	310°	5
15,000	220°	25
20,000	250°	25
25,000	270°	35
30,000	270°	39
35,000	270°	46
40,000	Unknown	Unknown

9. REMARKS:

a. On 3 October 1951 at 1327Z a radar operator at the Okinawa Ground Control Intercept Station, Site #51 "A" (26° 24' 55" N, 127° 47' 49" E) detected an unidentified echo on the plan position indicator (PPI) scope, high beam of the AN/CPS-1 Search Radar.

b. Sgt [redacted], AF 12 244 829, Sr AC&W Operator, AFSC 27350, first detected this object on a bearing of 014 degrees, 90 statute miles from the GCI Station. He states that the radar blip was easily seen but not brilliant, and that had it been brilliant it would have appeared approximately three (3) times larger than the normal echo returned by a B-29 type aircraft. Sgt [redacted] states that the blip was sausage shaped and straight and that its length was twice its width. He estimated its width to have been two (2) miles and its length four (4) miles. The longwise axis of the blip was always at a 90 degree angle to the direction of movement. This object changed its direction of movement on the PPI scope, but the actual turn was not observed because the change in heading occured between successive sweeps of the antenna, i.e. within 15 seconds. No noticeable change in the rate of movement, size or shape of the radar echo was noted by this operator at any time during the sighting. However, he states that the last echo from the object (when at 340 degrees, 152 statute miles from the GCI Station) was the brightest of the six echos he saw.

c. The PPI high beam scope was operating on a range from zero to 120 statute miles when the object was first detected. The trace brilliance was adjusted at a barely discernable level, the signal brilliance at an intensity where the noise level was just detectable, and the focus sharp.

d. There were no precipitation echos on this scope at the time of the sighting and no other echos were seen in conjunction with or simultaneously with this object. No other targets were seen on this scope by this operator during his tour of duty at this position.

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16—55870-1 ☆ U. S. GOVERNMENT PRINTING OFFICE

AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 4 OF 11 PAGES
ATILO, D/I FEAF	IR-25-52	

e. After this object disappeared from the high beam scope, Private [redacted], Apprentice AC&W Operator, AFSC 27330, detected an echo on a bearing of 355 degrees, 200 miles from the GCI Station on the low beam long range scope of the AN/CPS-1. He saw this echo four times and states that it was brighter than the average echo and that it was two and one half (2 1/2) to three (3) times larger than a B-29 blip. It was solid, well defined and sausage shaped and estimated by this radar operator to be two and one half (2 1/2) to three (3) miles wide and six (6) to eight (8) miles long. The longitudinal axis of this echo was always ninety (90) degrees to the direction of movement. No change in the size, shape, brightness or rate and direction of movement of this echo was noted by Pvt. Gonzales. The last echo was fully as large and bright as the previous three. No other radar echos were seen in connection with this unidentified echo. The last sighting of this object was at a bearing of 355 degrees, 247 statute miles from the GCI Station. At this point it disappeared into the second transmitted pulse.

f. The PPI low beam long range scope was operating on a range from 110 to 230 statute miles when the object appeared on it. The settings of the remaining scope controls were essentially the same as for the high beam scope. No interference, weather echos or sea clutter was seen on this scope, and operation of the radar appeared normal to the operator. Routine air traffic had been previously tracked.

g. The object's ground speed is estimated at 4800 miles per hour during the first minute of detection. The validity of this estimate is based on the operator's statement that he initially saw five consecutive radar echos and that he wrote their range and azimuth positions on the face of his scope in grease pencil. No written record of the time of detection of consecutive plots was made. The high beam scope operator states that he did not see any radar echos between 112 and 152 miles although the area was swept by the radar beam. However, he believes this lack of detection may have been due to his readjustment of the range of his scope at this time. He does not recall how much time elapsed or how many sweeps of the antenna occured between the detections at 112 and 152 miles. The low beam scope operator saw three consecutive echos at 200, 210 and 225 miles on a bearing of 355 degrees. He did not see any echos between 225 and 247 miles although the radar beam swept this area at least once. This operator also readjusted the range of his scope while the object was within this range.

h. In addition to the two radar operators, Sgt. [redacted], AF [redacted], Sr Radar Mechanic (Ground Equipment) AFSC 30251, also saw the radar echo of this unidentified object. He was looking at the same scopes as the above operators and he concurs in their remarks. He states that about the time this object was detected permanent echos began to increase in brightness, particularly the island of Yoron Jima (height 308 feet, bearing 42 degrees, 54 statute miles from the GCI Station) which was seen on the low beam short range scope. This condition continued and a short time after the unidentified object disappeared from the scopes part of the island of Okino Erabu Shima (height 807 feet, bearing 37 degrees, 83 statute miles from the GCI Station) was seen on low beam. The unidentified object's echo was never detected on the low beam short range scope. During the evening and prior to the unidentified's appearance, the two scopes on which it was seen had been checked by Sgt. [redacted] and the azimuth reading of the scopes syncronized and oriented to true north.

AF FORM 112—PART II
APPROVED 1 JUNE 1948

[redacted] UNCLASSIFIED

AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 3 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

8. WEATHER IN UNIDENTIFIED'S AREA (Include Radar Reports):

No weather echos noted on radar scopes. Kadena Air Base Terminal weather conditions at 1300Z 3 October 1951 were as follows:
3/10 Alto-cumulus with bases at 10,000 feet, 1/10 strata-cumulus with bases at 2,000 feet. Visability 15 miles, temperature 73° F, dew point 65° F.

REMARKS: Very few clouds to the north.

Winds Aloft: 1500Z, 3 October 1951, Kadena Air Base.

Altitude	Wind From	Speed (Knots)
Surface	60°	11
5,000	70°	6
10,000	310°	5
15,000	220°	25
20,000	250°	25
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35,000	270°	46
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9. REMARKS:

a. On 3 October 1951 at 1327Z a radar operator at the Okinawa Ground Control Intercept Station, Site #51 "A" (26° 24' 55" N, 127° 47' 49" E) detected an unidentified echo on the plan position indicator (PPI) scope, high beam of the AN/CPS-1 Search Radar.

b. Sgt [redacted], AF 12 244 829, Sr AC&W Operator, AFSC 27350, first detected this object on a bearing of 014 degrees, 90 statute miles from the GCI Station. He states that the radar blip was easily seen but not brilliant, and that had it been brilliant it would have appeared approximately three (3) times larger than the normal echo returned by a B-29 type aircraft. Sgt. Watson states that the blip was sausage shaped and straight and that its length was twice its width. He estimated its width to have been two (2) miles and its length four (4) miles. The longwise axis of the blip was always at a 90 degree angle to the direction of movement. This object changed its direction of movement on the PPI scope, but the actual turn was not observed because the change in heading occured between successive sweeps of the antenna, i.e. within 15 seconds. No noticeable change in the rate of movement, size or shape of the radar echo was noted by this operator at any time during the sighting. However, he states that the last echo from the object (when at 340 degrees, 152 statute miles from the GCI Station) was the brightest of the six echos he saw.

c. The PPI high beam scope was operating on a range from zero to 120 statute miles when the object was first detected. The trace brilliance was adjusted at a barely discernable level, the signal brilliance at an intensity where the noise level was just detectable, and the focus sharp.

d. There were no precipitation echos on this scope at the time of the sighting and no other echos were seen in conjunction with or simultaneously with this object. No other targets were seen on this scope by this operator during his tour of duty at this position.

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 5 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

i. Prior to 1327Z two surface vessels were detected on a bearing of 100 to 120 degrees at 55 statute miles from the GCI station. Sea clutter was also discernable to a range of 35 miles and 360 degrees around the station on low beam.

j. During the period from 0600Z to 1400Z the AN/CPS-1's maximum detection range of an inbound aircraft was 150 statute miles. This was on a bearing of 055 degrees and the aircraft was a B-29 at 9,000 feet. The maximum range to which an outbound aircraft was carried during this period was 165 miles on a bearing of 096 degrees. This aircraft was a C-54 at 9,000 feet.

k. The operating frequencies of this AN/CPS-1 at the time of the sighting were 2860 megacycles on "high beam" and 2700 megacycles on "low beam". The pulse repetition frequency was 350, the pulse width was one (1) microsecond, and the antenna rate was four (4) revolutions per minute. This radar does not have a freely tiltable antenna. Height of the antenna above sea level is 750 feet.

l. No photographs were taken of this radar echo. However, the plots and the track as shown on the diagram have been concurred in by the radar operators.

m. Sgt. [redacted] has had one (1) year and five (5) months experience as a radar operator, sixteen (16) months of which consist of experience on the AN/CPS-1. He has been in the service three (3) years and four (4) months and has graduated from the FEAF Air Defense School (radar operator). His civilian education consists of three (3) years of high school. He is 21 years of age and is considered extremely reliable in his specialty.

n. Pvt. [redacted] has had three (3) years and nine (9) months experience as a radar operator, thirty-two (32) months of which consist of experience with the AN/CPS-1. He has been in the service four (4) years, and has attended a radar operators school at Shiroi, Japan. He has completed one (1) year of high school and is 22 years of age. He is considered reliable in his specialty.

o. Sgt. [redacted] has had one (1) year and ten (10) months experience as a radar mechanic on ground equipment. He is a graduate of the radar repairman's course at Keesler Air Force Base, Mississippi. He has been in the service three (3) years and one (1) month. He is 21 years old, is a high school graduate and is considered to be extremely reliable in his specialty.

/s/ [redacted]
Captain USAF
Senior Controller, ADCC

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AF FORM 112—PART II
APPROVED 1 JUNE 1948

[redacted] UNCLASSIFIED

AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 3 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

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30,000	270°	39
35,000	270°	46
40,000	Unknown	Unknown

9. REMARKS:

a. On 3 October 1951 at 1327Z a radar operator at the Okinawa Ground Control Intercept Station, Site #51 "A" (26° 24' 55" N, 127° 47' 49" E) detected an unidentified echo on the plan position indicator (PPI) scope, high beam of the AN/CPS-1 Search Radar.

b. Sgt Melv[redacted] AC&W Operator, AFSC 27350, first detected this object on a bearing of 014 degrees, 90 statute miles from the GCI Station. He states that the radar blip was easily seen but not brilliant, and that had it been brilliant it would have appeared approximately three (3) times larger than the normal echo returned by a B-29 type aircraft. Sgt [redacted] states that the blip was sausage shaped and straight and that its length was twice its width. He estimated its width to have been two (2) miles and its length four (4) miles. The longwise axis of the blip was always at a 90 degree angle to the direction of movement. This object changed its direction of movement on the PPI scope, but the actual turn was not observed because the change in heading occured between successive sweeps of the antenna, i.e. within 15 seconds. No noticeable change in the rate of movement, size or shape of the radar echo was noted by this operator at any time during the sighting. However, he states that the last echo from the object (when at 340 degrees, 152 statute miles from the GCI Station) was the brightest of the six echos he saw.

c. The PPI high beam scope was operating on a range from zero to 120 statute miles when the object was first detected. The trace brilliance was adjusted at a barely discernable level, the signal brilliance at an intensity where the noise level was just detectable, and the focus sharp.

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16—55870-1 ☆ U. S. GOVERNMENT PRINTING OFFICE

AF FORM 112—PART II
APPROVED 1 JUNE 1948

[redacted] UNCLASSIFIED

AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 6 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

2. Preliminary analysis by Mr. Bush to Headquarters, 20th Air Force:

I. SUBJECT: Unidentified Object tracked and reported by site #51.

II. PURPOSE: Analysis of the facts submitted in the original report and the remarks obtained from all personnel concerned during debriefing at Kadena, Okinawa.

III. ANALYSIS: The known basic facts concerning the intercept of the unidentified object and the analysis of these facts are as follows:

1. Object was intercepted by AN/CPS-1 radar at site #51 of the Japanese air defense net which is located at 2624N/12727E, a few miles North of Kadena, Okinawa on a 750 foot mountain.

2. The object was tracked on the high beam of the CPS-1 radar for a distance of 23° at 90 miles angular range, and an additional 12° while extending the range to 95 miles. At this point the object took a heading, as viewed by the radar operator, of 340° and increased range to 152 miles and disappeared from the high beam. A total of six plots were obtained on the high beam representing seven rotations of the antenna. The antenna rotation rate was 4 RPM. The distance traveled was approximately 63 miles in 1 1/2 minutes or 2520 miles per hour. The distance traveled was calculated thus by, (90 miles) (Tan 35°) = 63 miles or .7 miles per second. The object was picked up on the low beam at 200 miles and tracked 50 miles during five sweeps of the antenna. A rate calculated for the 50 miles in one minute is 3088 miles per hour. This calculation of the speed of the object is probably close to being the actual velocity.

3. The antenna sweep rate: The antenna was timed and established to be rotating at 15 seconds per revolution.

4. All of the electronic characteristics are known of the intercepting radar: The frequency was 2700 MC for the low beam and 2860 MC for the high beam. The pulse width was 1 MS and the PRF 350.

5. The blip displayed on the face of the "plan 12" was unusually large and consistently uniform as intercepted by both the high and low beams. The shape of the blip at all times was 90° to the line of movement, thus establishing the width, as to line of motion, as being much greater than the depth of the object. This condition was stable regardless of line of attack from the radar.

HIGH BEAM:

The high beam operator states the scope presentation showed a blip which would indicate the object as being possibly three times greater than a B-29. Thus the radiating surface must be approximately 9 times the radiating surface of a B-29 aircraft. It is accepted in this report that the object was changing elevation and range as well as bearing in reference to the radar location, thus placing the unidentified object at several angles from the radar.

The radar high beam has a beam width of .8° at the half-power point; thus at 90 miles, a single target such as a B-29 aircraft, would display a blip of approximately 1.26 miles (.8°) wide and the 1 MS pulse should display a blip approximately 300 yards long. Considering the bloom of the CR tube due to the strength of the signal return and a factor of human error as the cause of the 2 mile length of the scope presentation, the 4 mile blip width can only be explained as being caused by a wide target formed by possibly several objects flying in a wide formation. The angles of such a formation to the radar might indicate somewhat less of a return should the target be losing latitude and increasing range at a proportional rate sufficient to maintain a fairly constant angular range from the radar site.

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At the same time the object was losing altitude and increasing range to the radar site, it was also moving in bearing to the West at an apparent horizontal speed of 2520 miles per hour. In other words, a formation, flat in plane, would not necessarily remain in a flat plane while maneuvering a turn, decreasing altitude and increasing range from a spot perpendicular to the line of flight. The display as recorded from the low beam section of the radar equipment bears out the suggested maneuvering of the unidentified object tracked on the high beam by retaining the nature of its flight as remaining wider in shape 90° to line of flight and the registered speed of flight of 3000 miles. As will be pointed out later, the object was probably losing altitude during the period of time plotted by the low beam. The reported square turn of as high a "G" rate as suggested in the original report, is not an abrupt turn at all, but a gradual maneuver distributing the pressure of such a turn over a wide area and decreasing the severity of the "G" strain to a probable 2 or 3 "G" figure.

6. The calibration chart from the recent site calibration indicates the high lobe as being very steep and not extending pass 80 miles from the site location. The calibration report does not show how this type of a lobe was determined. This writer takes issue with this lobe pattern because it is not in accord with a normal lobe pattern as the AN/CPS-1 design enables solid coverage from 2 1/2° to 25° with an "0" tilt. A calculated lobe pattern as shown in the calibration report for site #51 would permit an object to be tracked by the high beam a maximum of 80 miles only, which is also evidenced to be in error by subject report inasmuch as the unidentified object was tracked 152 miles on the high beam.

The lobe pattern (Inclosure #8) is shown extending from 3 1/2° to 25°. This setting is based on two things. (1) The antenna has four washers under the rest which is equal to an elevation of 2° from the -1/2° position which is the lowest setting. (2) The antenna is mounted on the top of a mountain 750 feet above sea level, however, the top of the area has a slow break-off; thus a tempered use of the formula 1.4 2H would tend to effect the beam and lower it possibly 1/2°. By use of this reasoning, the calculated beam pattern was placed at plus 3 1/2° . All of this has been considered to establish a reasonably accurate point where the unidentified object left the high beam. The points in space where the object passed between the high beam and the low beam can fairly accurately be calculated and they are as follows: The object left the high beam at an angular range of 152 miles, that is at a point 129 miles ground range from the radar site and at an altitude of 49,000 feet. The entry of the low beam was made at a point 194 miles ground range from the site and at an altitude of 45,000 feet. The result of these two findings are: (1) Proof the object was decreasing altitude at a rate of 3,000 feet a minute, considering a speed of 3,000 miles an hours. (2) The object descended 4,000 feet in 64 1/2 miles, which is a little less than the normal slow rate of descent.

7. Other radars operating in the area did not intercept the object. Radar sites #52 and #55 both are closer to the path of the object than site #51, but neither had a target at or near 1327 Z 3 Oct 51. The Bogie passed over site #55 at approximately the same time the initial plot was obtained by site #51.

Radar site #54 located Southwest of site #51 also failed to intercept the high speed object.

8. A search was made among the indigenous personnel in an attempt to find someone who had seen anything whatsoever that could help identify the object. No one was located who had seen anything unusual.

9. The supplementary report by Mr. Antinne of FEAF mentions the possibility that the Bogie was equipped with beacon equipment which was triggered by the CPS-1 and fed back through the system causing the unusual brilliant display of the long range blips.

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 8 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

It is difficult to justify this assumption. The Rosebud equipment at the location is not tied into the two "Plan 12" Oscilloscopes used for the reported plotting. The time element necessary to display a triggered signal from the object on the display equipment is not sufficient and the possibility of selecting the exact frequencies of the CPS-1 for the two (2) beams is most unlikely.

10. Heavy CW Interference

The CW frequency utilized on the CW net from Kadena to Itazuke was not usable due to excessive CW interference. Interference from an unknown source is frequently experienced on this net, but I was unable to determine what hours the interference occurs with the greatest amplitude or whether this was a deliberate attempt to block the reporting net of 1327Z 3 Oct 51 in support of the unidentified object.

11. The apparent shift of the target in bearing between the high and low beams is not a true picture. A check the next day found the coordination between the two beams to be off several degrees.

3. Letter of transmittal - 1st Indorsement by Headquarters, 20th Air Force:

319.1 (9 Oct 51) OPN AD 1st Ind

HEADQUARTERS, TWENTIETH AIR FORCE, APO 239

TO: Commanding General, Far East Air Forces, APO 925

1. Subject report has been delayed in this headquarters pending completion of an analysis which attempts to support theories that the unidentified object was the track of a natural object, rather than an aircraft or missile. This analysis was undertaken in the interest of forwarding a complete report for review by your headquarters.

2. Information is offered that the analysis, referenced above, requires special calibration of the radar equipment upon which the object was sighted and is not completed at this time. Every effort will be made to expedite this calibration and a complete report of the findings and conclusions forwarded to your headquarters in the immediate future.

FOR THE COMMANDING GENERAL:

1 Incl:
n/c

/s/ [redacted]
[redacted], JAGSON
Lt Col, USAF
Adjutant General

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[redacted] Security

16—55570-1 ☆ U. S. GOVERNMENT PRINTING OFFICE

AF FORM 112—PART II
APPROVED 1 JUNE 1948

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 9 OF 11 PAGES
ATIL Office, D/I FEAF	UNCLASSIFIED IR-25-52	

4. Study report - prepared by Mr. Anton, Philco Technical Representative:

SUBJECT: Unidentified Radar Target

1. The undersigned does not agree with the theory outlined in paragraph one of the 1st indorsement, i.e., that a natural object caused the track recorded at Site #51 for the following reasons:

a. The almost constant velocity of the object, as described by the radar operators, and as indicated from inspection of the graphic plot in the inclosure.

b. The shift of target motion from 265 degrees to 355 degrees, an approximately 90 degree change of heading, within a 15 second period.

c. The shift of signal aspect with a change of target direction.

d. The lack of target fluctuation.

e. Although the target was closer to two other sites, it was detected by neither site.

2. While it is entirely possible for a natural object to maintain a state of constant velocity, as indicated in paragraph 1.a. above, it is not considered at all probable that an object subject to natural forces only would satisfy the conditions outlined in both paragraphs 1.a. and 1.b., that is, maintenance of a constant high velocity coupled with a rapid change of direction. The only forces of magnitude affecting the velocity and heading of a natural object would be:

a. Initial momentum.

b. Air resistance.

c. Gravity.

It is not seen how a radical shift of heading could be caused by interaction of the above forces, since (a) and (b) are diametrically opposed, and (c) would not affect the heading, but only the pitch of a free falling object.

3. In view of the above, it must be concluded that the target in question was not of natural origin and was not controlled entirely by natural forces. There are several points in the initial report which offer rather strong substantiation of this theory. An elaboration of these points follows:

a. The change of target aspect with target heading as indicated in paragraph 1.c. above. This phenomenon is not in agreement with normal characteristics of a radar echo. The geometric aspect of a radar echo is a primary function of the vertical and horizontal beam widths of the radar set, and, for a given target, is nominally independent of target heading. Normally, a change of target heading will result in a change of radar echo size, but not in a change of echo aspect. A change of echo aspect with target heading, therefore, would be indicative of the presence of a directional or semi-directional echo source. Such a source would normally be one of two forms; (a) a series of tuned stubs carried by the object, cut to such a physical length and spaced such that upon proper excitation re-radiation of the exciting wave would take place in a predetermined direction, or (b) generation of the radiation within the missile proper. A large

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number of studies by various research organizations, including Watson Labs and the Hughes Aircraft Company, tend to discredit the probability of proposition (a), so the theory outlined in (b), of the signal originating within the missile, would seem the more valid of the two. Since there was no apparent change in echo intensity, or detectable fluctuation in echo size, which would be the case for an echo returned from a very high speed object, due to the well established frequency shift or "Doppler Effect", it becomes increasingly apparent that the most probable source of target signal was not due to a radar echo return but was emmitted from the target itself. Assuming that the target carried a self-contained, directional or semi-directional signal source, which, in view of the above, is not beyond the verge of logic, it then must naturally follow that in all probability the target was a man-made missile, possibly guided, and equipped with some form of a radio or radar beacon of the transponder type. That the signal was emitted from a transponder type beacon is further borne out by the fact that the target signal appeared at a definite range and a definite azimuth, and did not cause "rabbits" to appear on the radar scope, as would have been true in the case of a free-running or random triggered signal source.

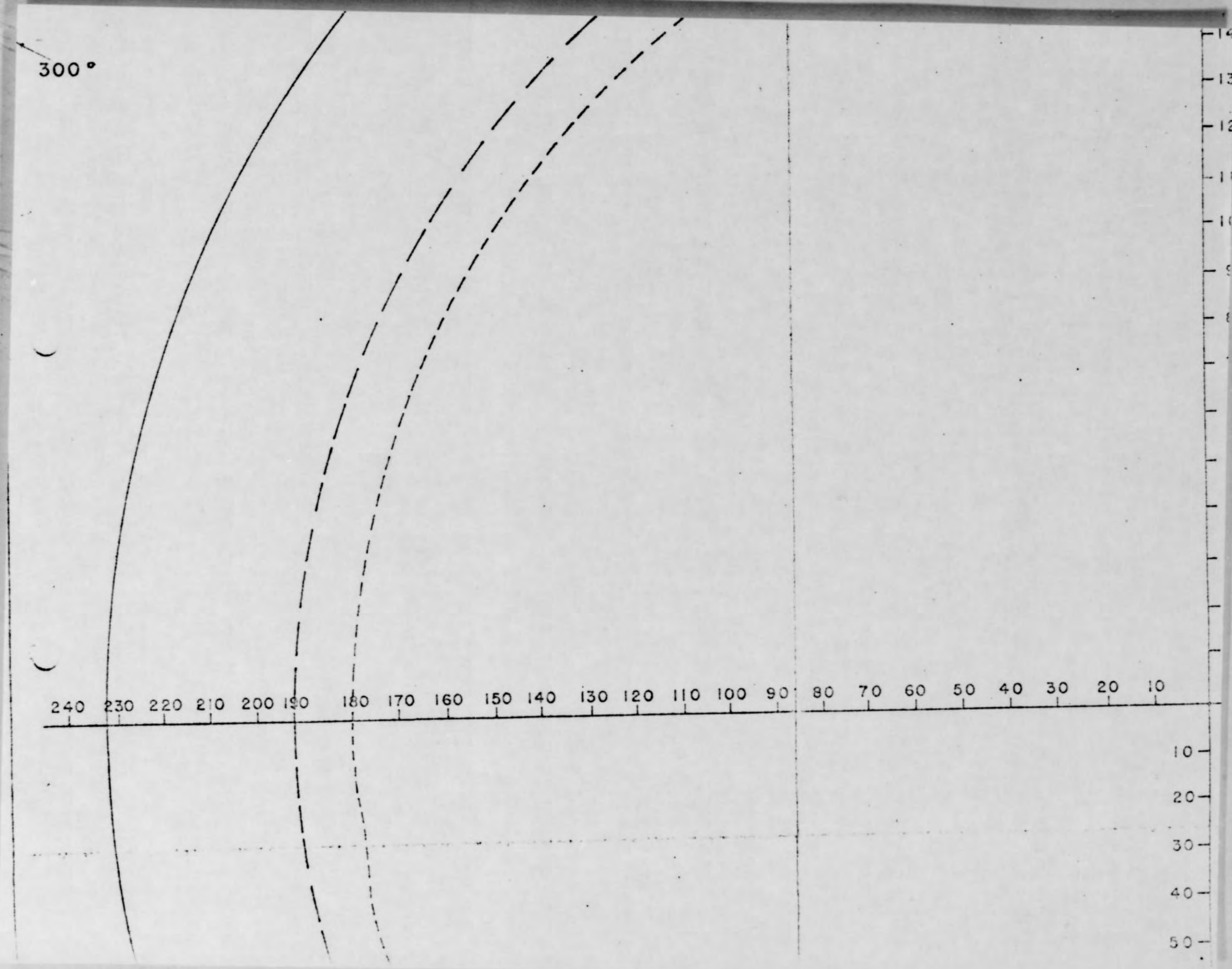
b. With the above in mind, the reason for failure of the other two radar sites to detect the missile is readily seen. Site #51 uses the AN/CPS-1 radar equipment, which operates in the "S" band, while Sites #52 and #55, which were both physically closer to the missile, but did not detect it, operate in the "L" and/or "P" bands. If the missile radiated energy in the "S" band, the radiated signal would, of course, not be detectable by equipments in either the "L" or "P" bands.

4. A further point of consideration is the fact that the AN/CPS-4 height finder equipment at Site #51 did not detect the target, although this radar set also operates in the "S" band. There are three probable reasons for this. (a) The equipment was not operating or was not operating properly. (b) The frequency of the AN/CPS-4 and the target signal were substantially different, or (c) the missile was at such an altitude as to be out of the range of the equipment. In the case where the AN/CPS-4 was operating, it is felt that a combination of (b) and (c) would be the most likely cause of failure to detect the target. Item (c) is further substantiated by the fact that at comparitively close ranges the target was detected by only the AN/CPS-1 high beam and at longer ranges by only the low beam.

5. Another item requiring evaluation is the frequency dispersion of the AN/CPS-1 high and low beam transmitters. The report gives these frequencies as 2660 megacycles and 2700 megacycles respectively, or, a frequency dispersion of 160 megacycles. With such a wide difference in operating frequencies existing between the AN/CPS-1 high and low beams, it becomes apparent that either the missile transmitted a frequency modulated signal of extreme deviation, or, possible, that the high and low beam scopes were being fed a signal from a single narrow frequency source. The latter case is considered possible since the AN/CPS-1 radar at Site #51 is presently equipped with a "Rosebud" beacon receiver, MX-533/CPS-1, which, by direction of Headquarters FEAF, is tuned to a frequency of 2907 megacycles, the standard "S" band radar beacon frequency, in use by the USAF and other American military agencies.

6. A recapitulation of the above data definitely points to the possibility of the unidentified object reported by Site #51 as being a manufactured missile, possibly guided, and carrying a radar beacon transponder operating in the "S" band region.

7. While it is understood that the above assumptions, though based on the facts given, are merely assumptions, it is felt that the possibilities outlined


300°
240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
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AF FORM 112—PART II
APPROVED 1 JUNE 1948

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AIR INTELLIGENCE INFORMATION REPORT

FROM (Agency)	REPORT NO.	PAGE 11 OF 11 PAGES
ATIL Office, D/I FEAF	IR-25-52	

are great enough to warrant further study of the report in much greater detail than has been the case in this report.

/s/Frank C. Anton
FRANK C. ANTON
Philco Tech Rep
Electronics Division
OP-COMM

COMMENTS BY PREPARING OFFICER:

Request that any significant findings of evaluation of this report be forwarded to this Headquarters, Attention: IN-REC.

for George S. Ramos
CHARLES J. HALVEN
Captain, USAF
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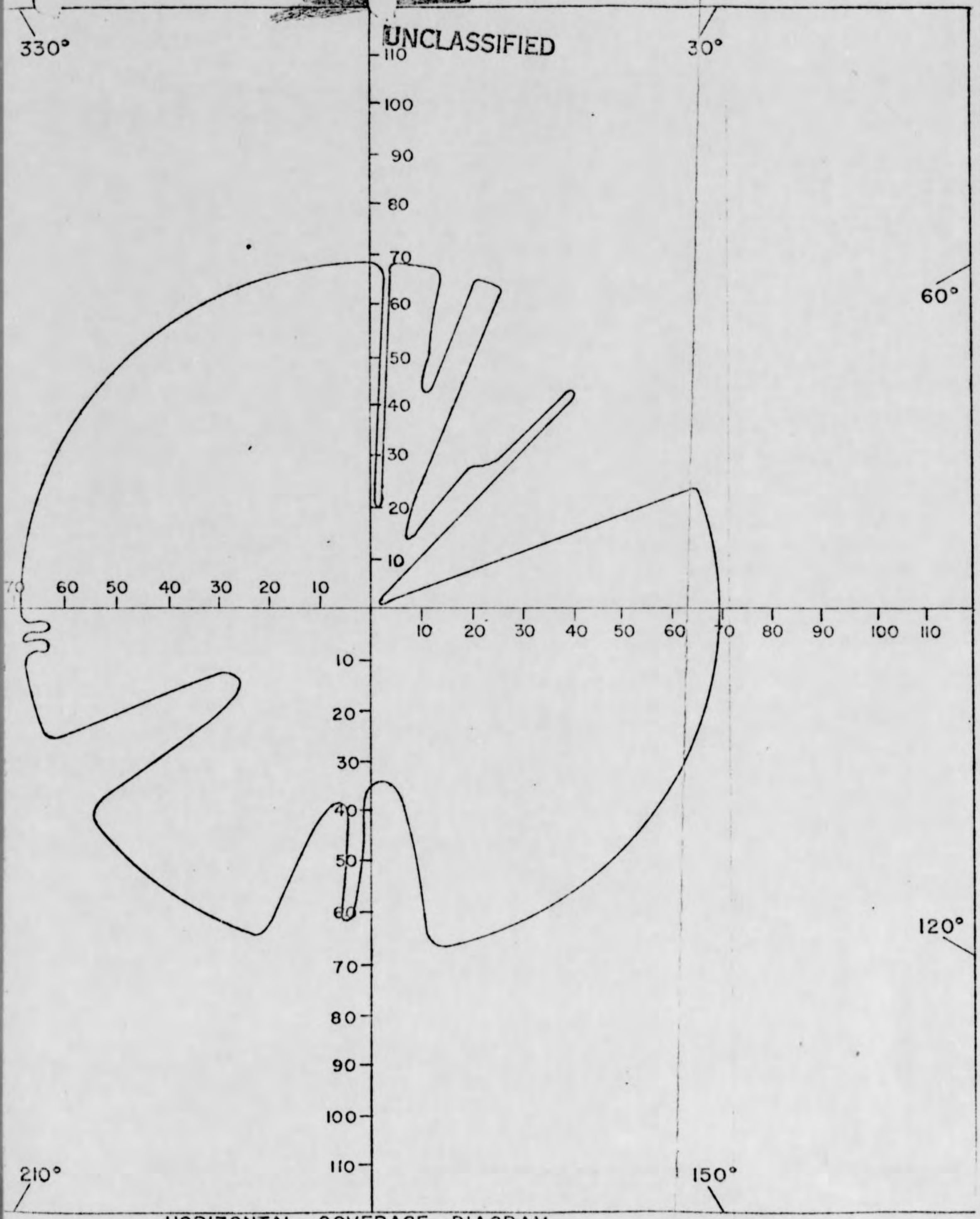

HORIZONTAL COVERAGE DIAGRAM

ANGE (CPS-1) - 500 FEET UNCLASSIFIED

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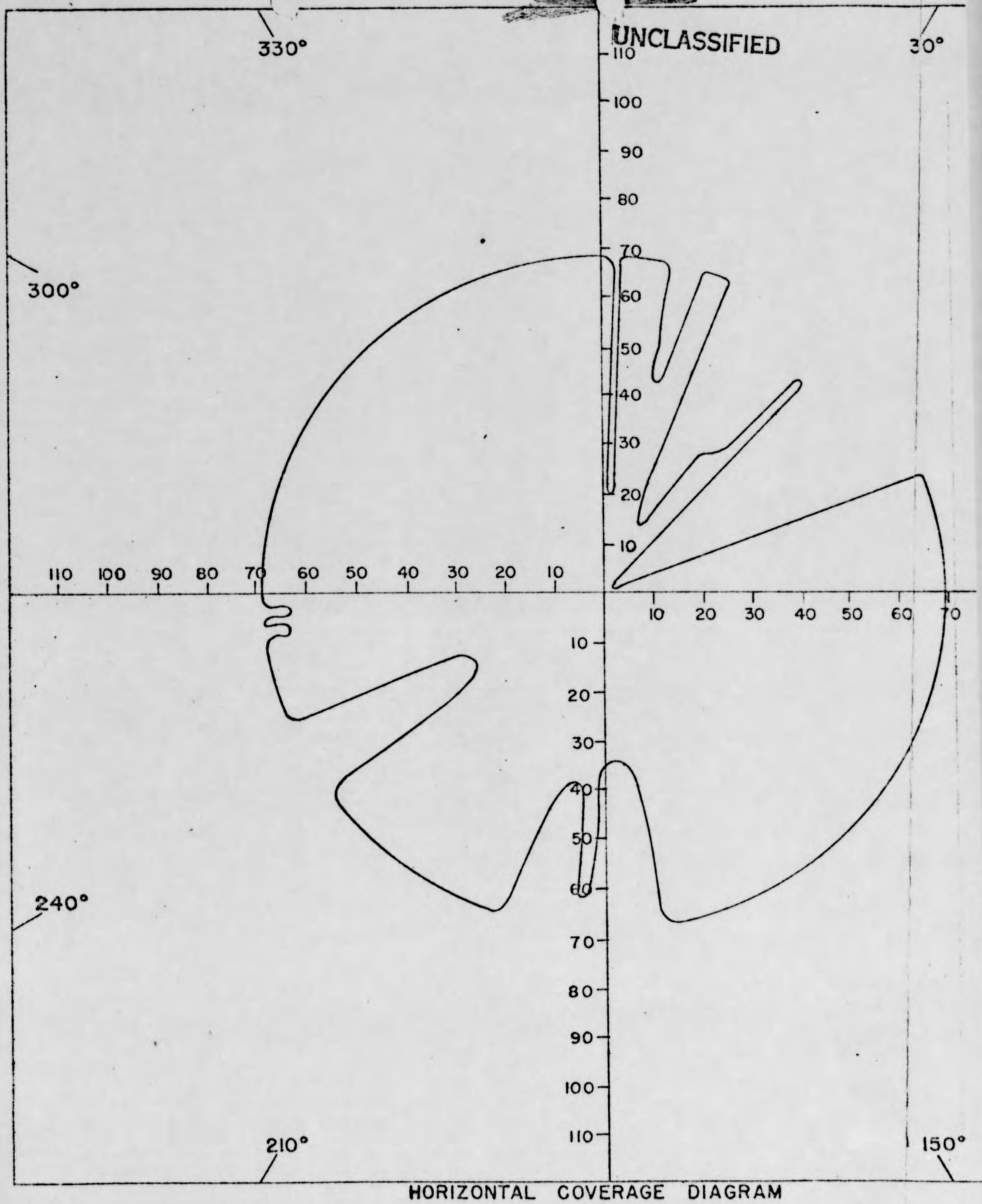

HORIZONTAL COVERAGE DIAGRAM

LEGEND

—~— MAX. SEARCH RANGE (CPS-1) -500 FEET

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INCLOSURE #2

FEAF 112 #R-25-52

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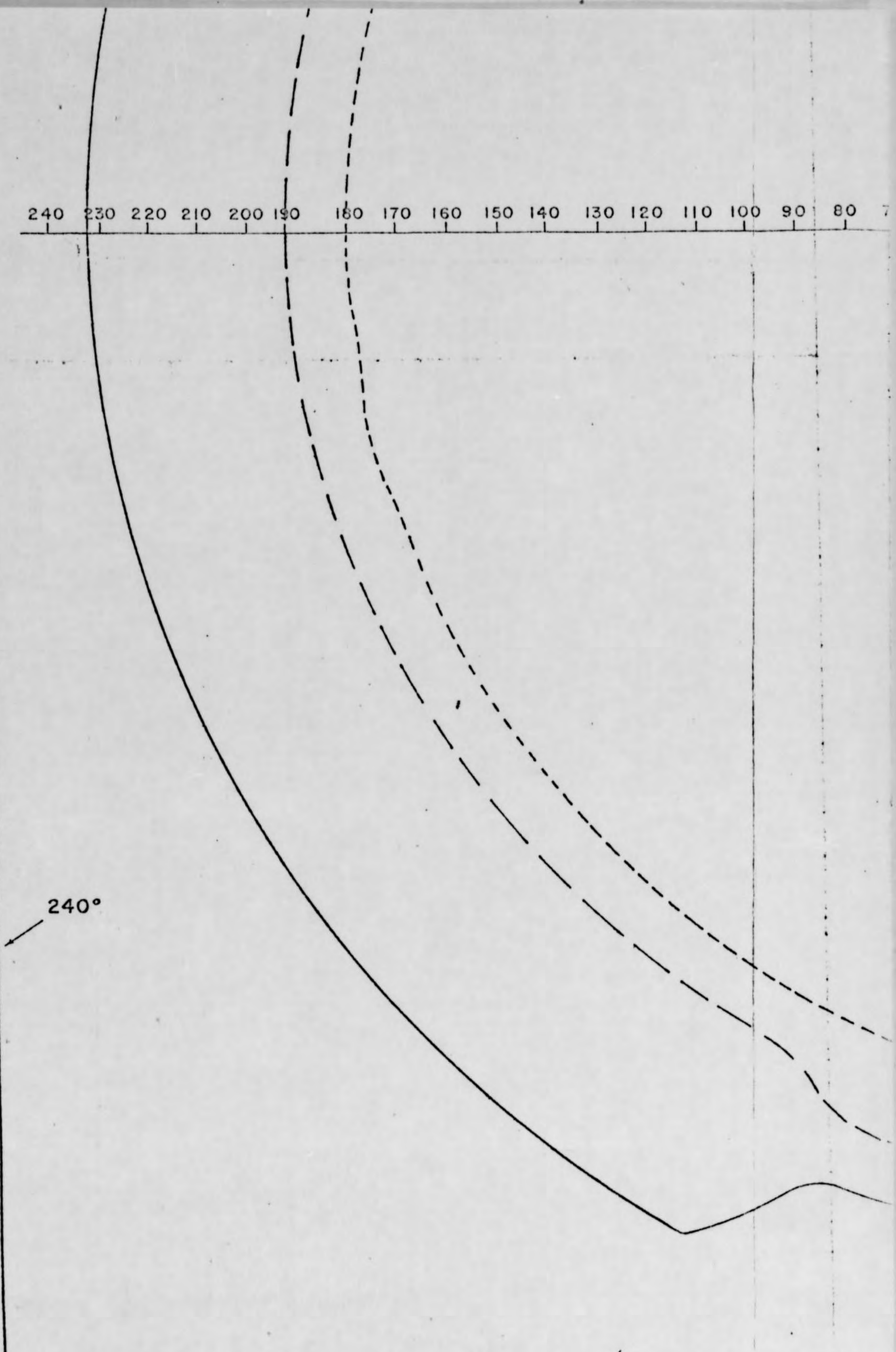


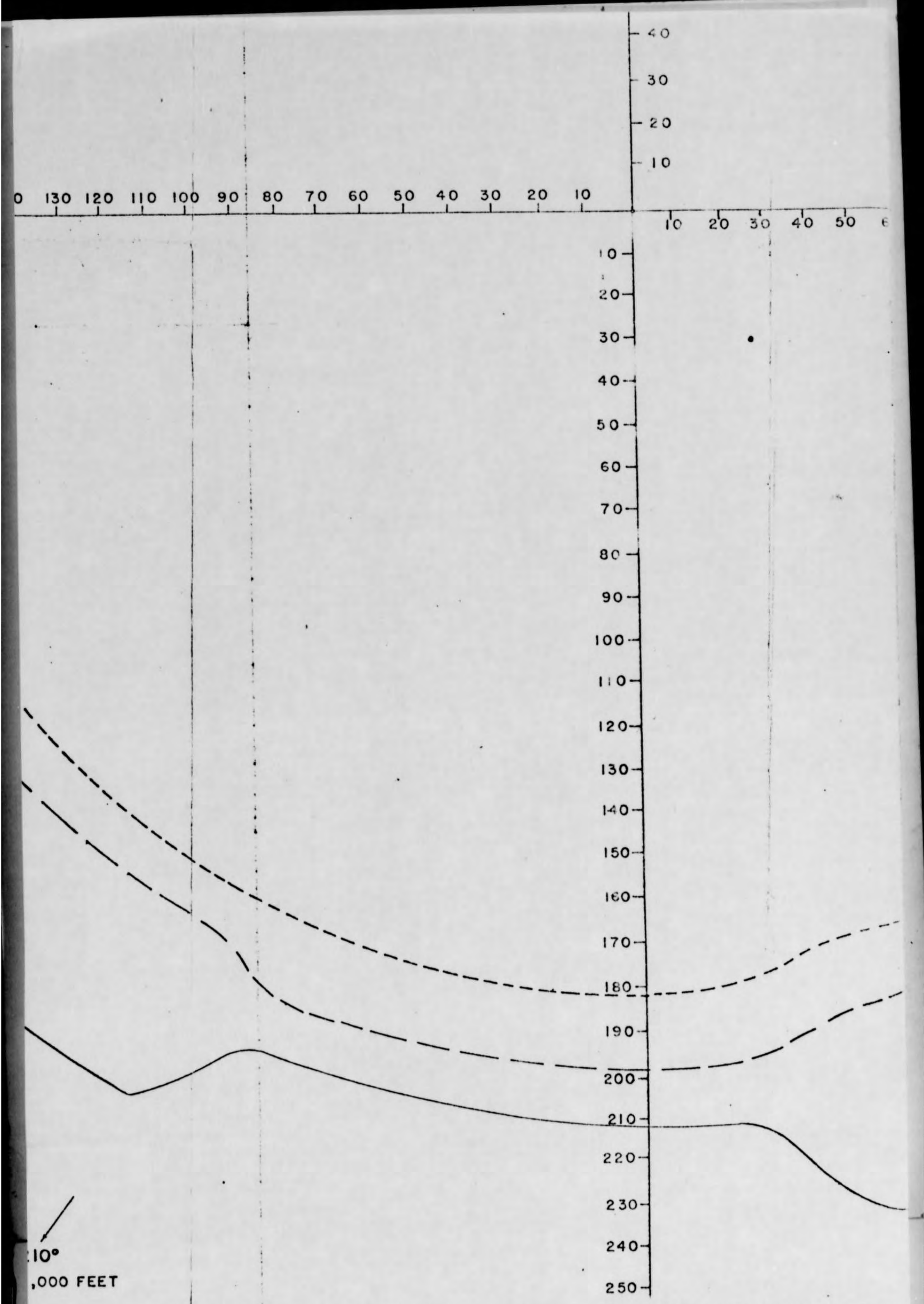
——— MAXIMUM SEARCH RANGE (CPS-1) - 30,000 FEET

— — — LESS THAN 33% PICKUP (CPS-1)

- - - - - LESS THAN 66% PICKUP (CPS-1)

INCLOSURE #6

USAF 112 # IR-25-52



HORIZONTAL COVERAGE DIAGRAM

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150°

SCALE : 1:500,000

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60°

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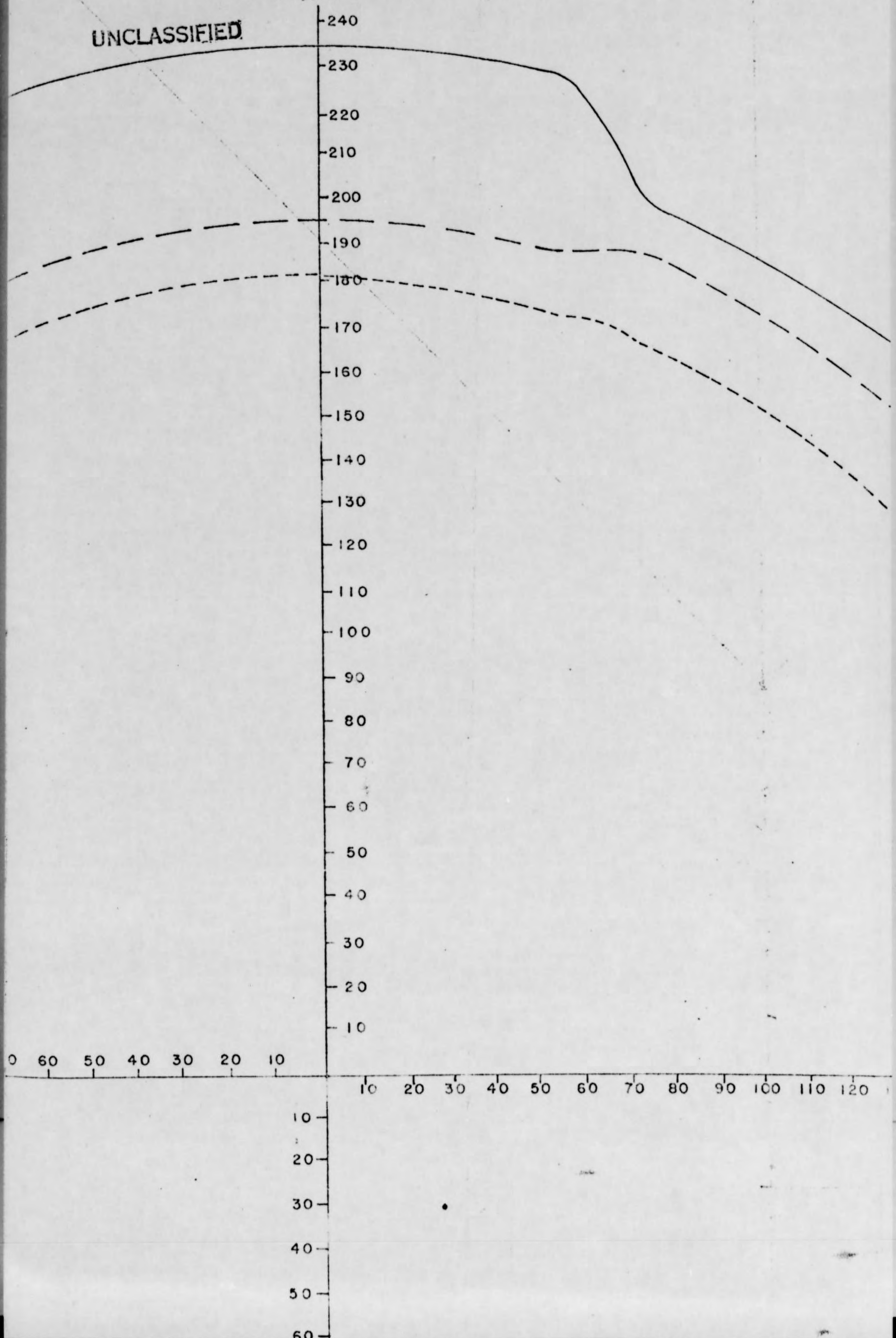

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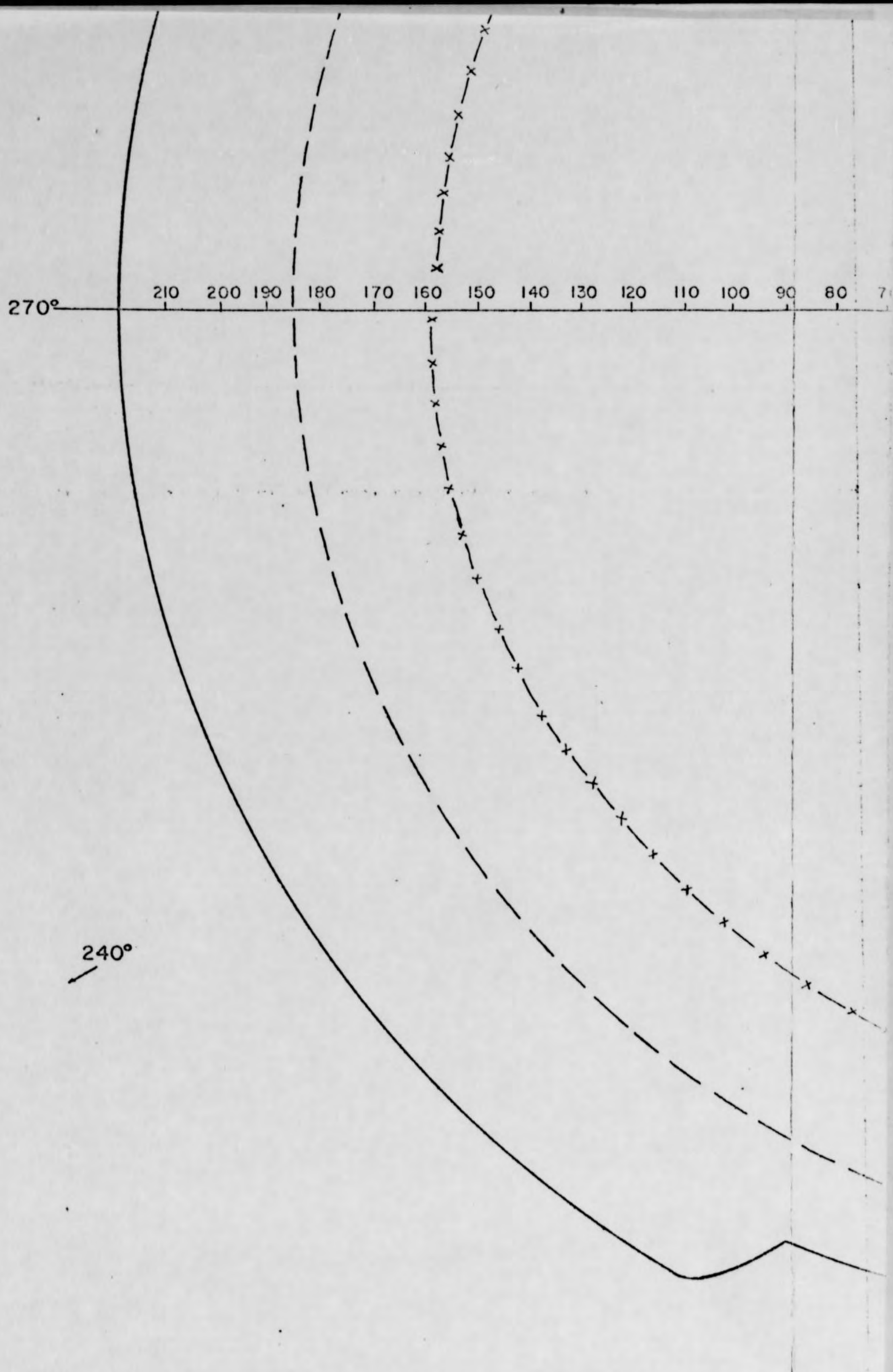


LEGEND

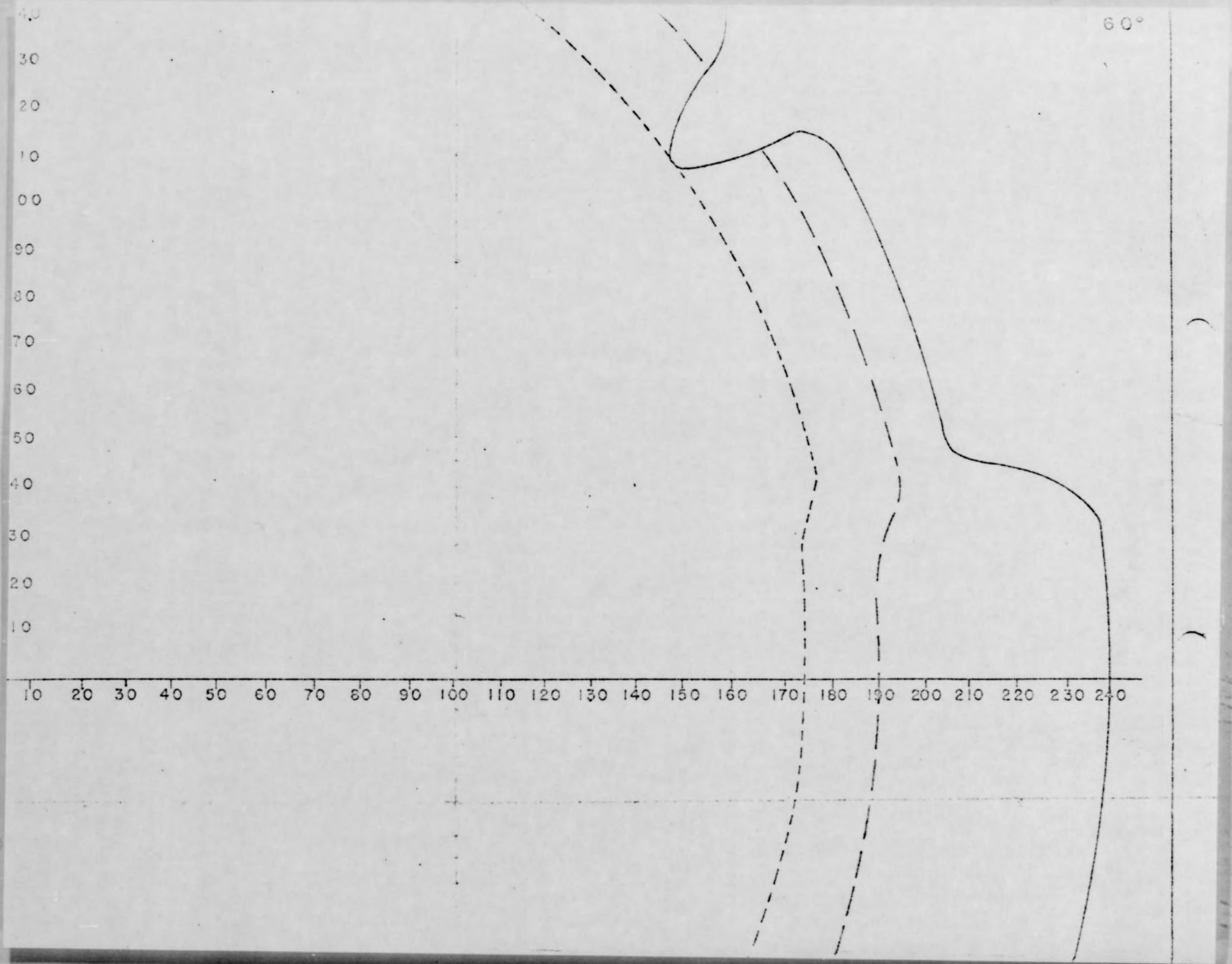
——————— MAXIMUM SEARCH RANGE (CPS-1)- 20,000 FEET

— — — — LESS THAN 33% PICKUP (CPS-1)

—x—x—x— LESS THAN 66% PICKUP (CPS-1)

INCLOSURE: #5

FEAF 112 #1R-25-52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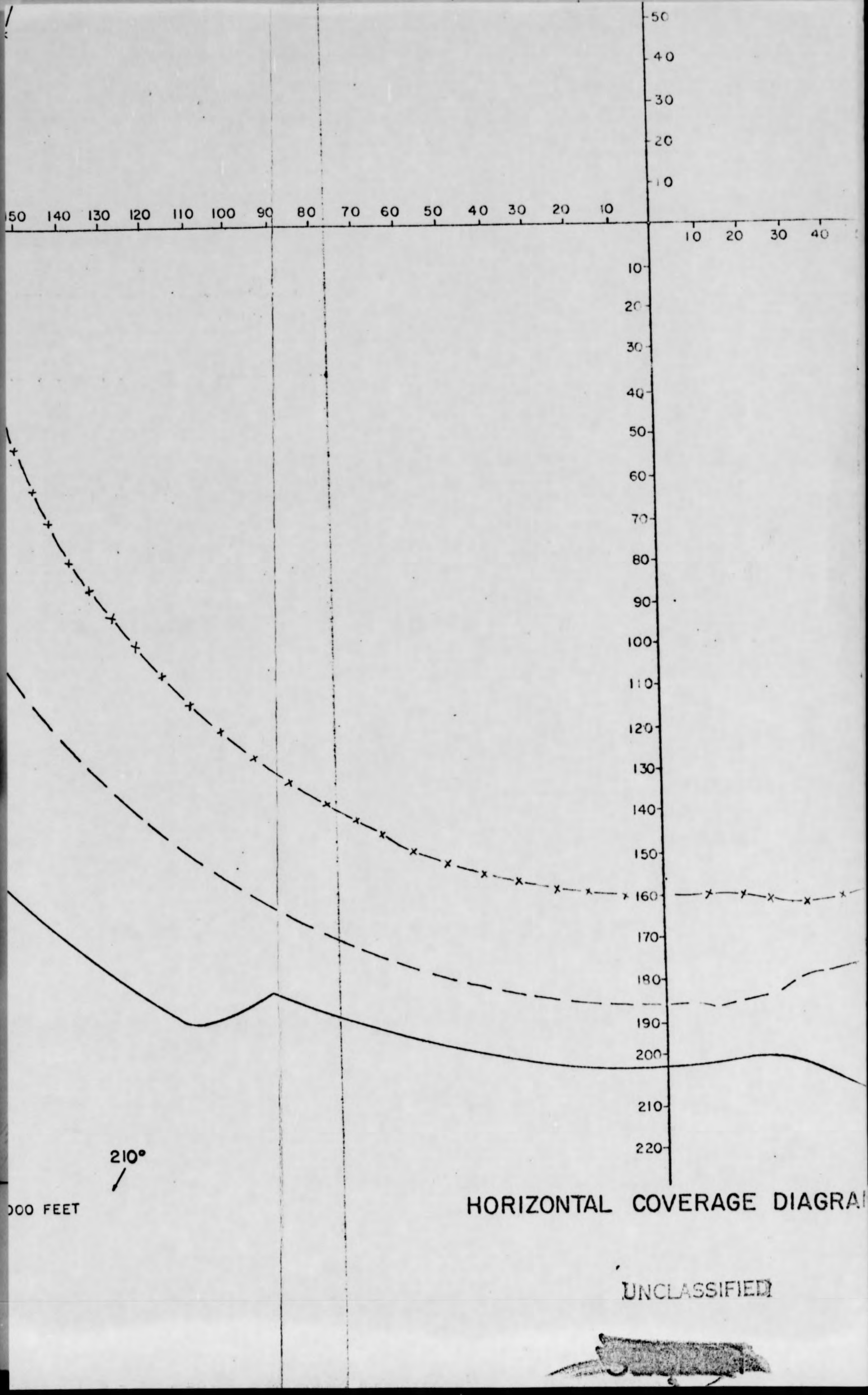

210°

000 FEET

HORIZONTAL COVERAGE DIAGRA

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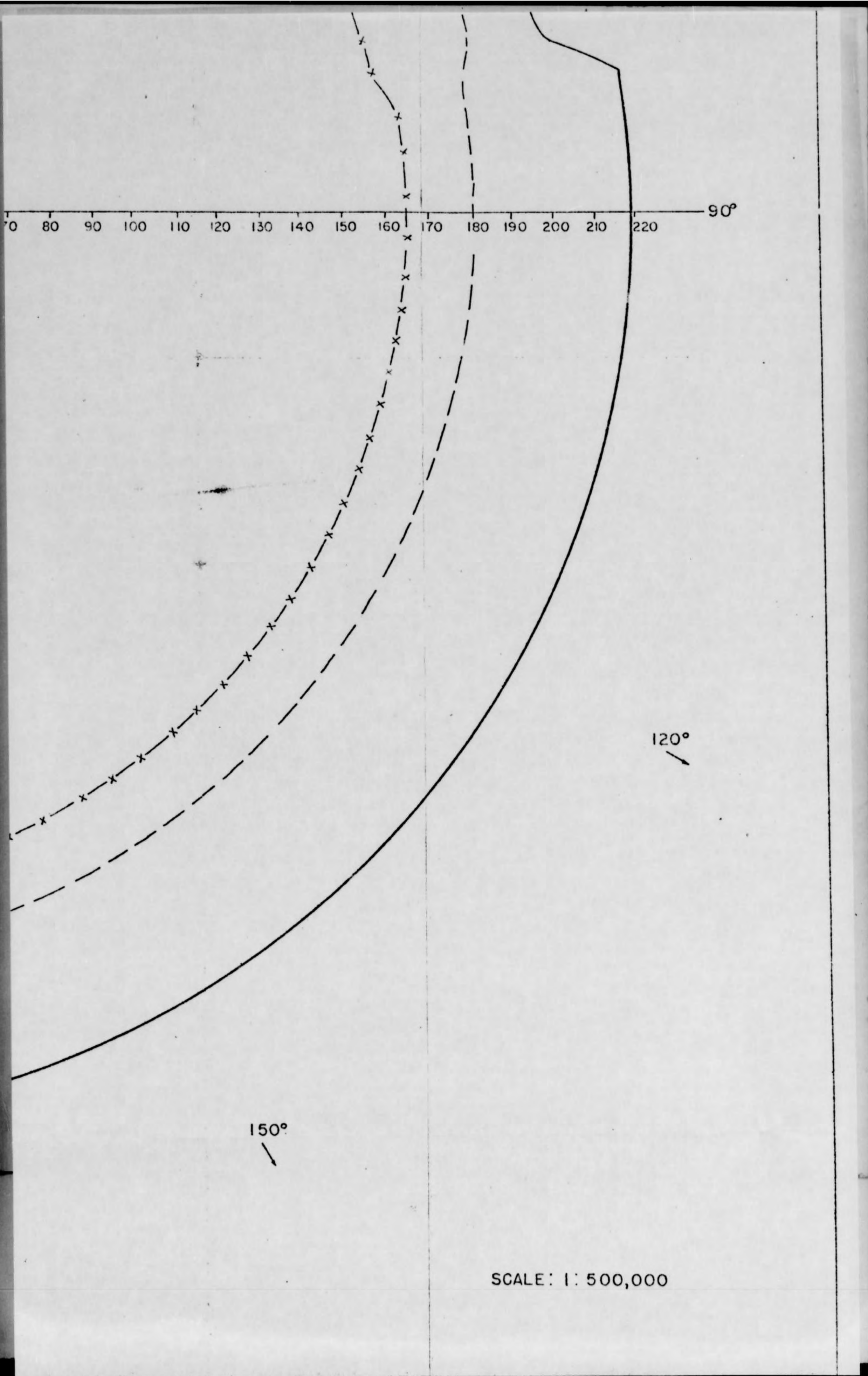

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30°

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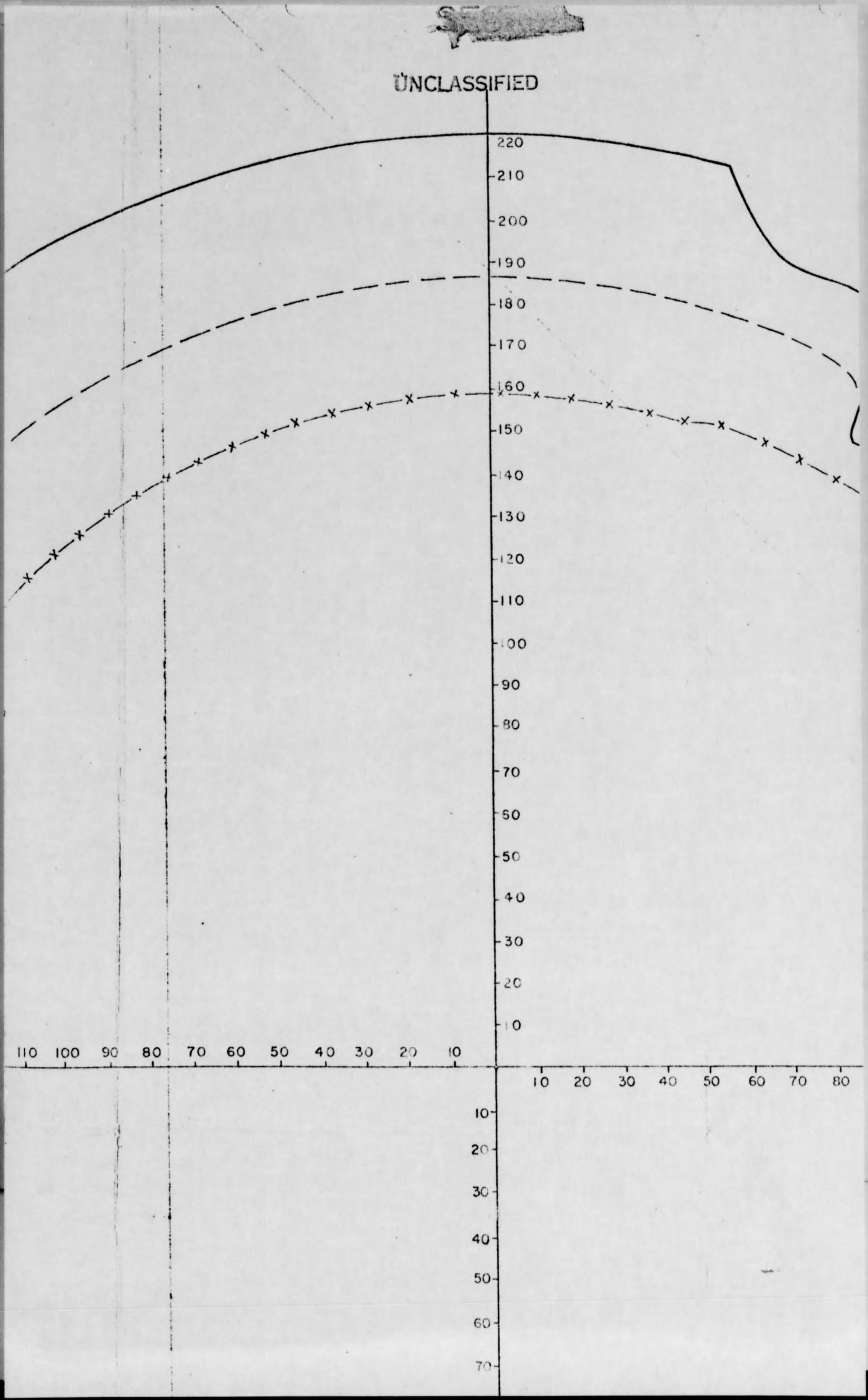

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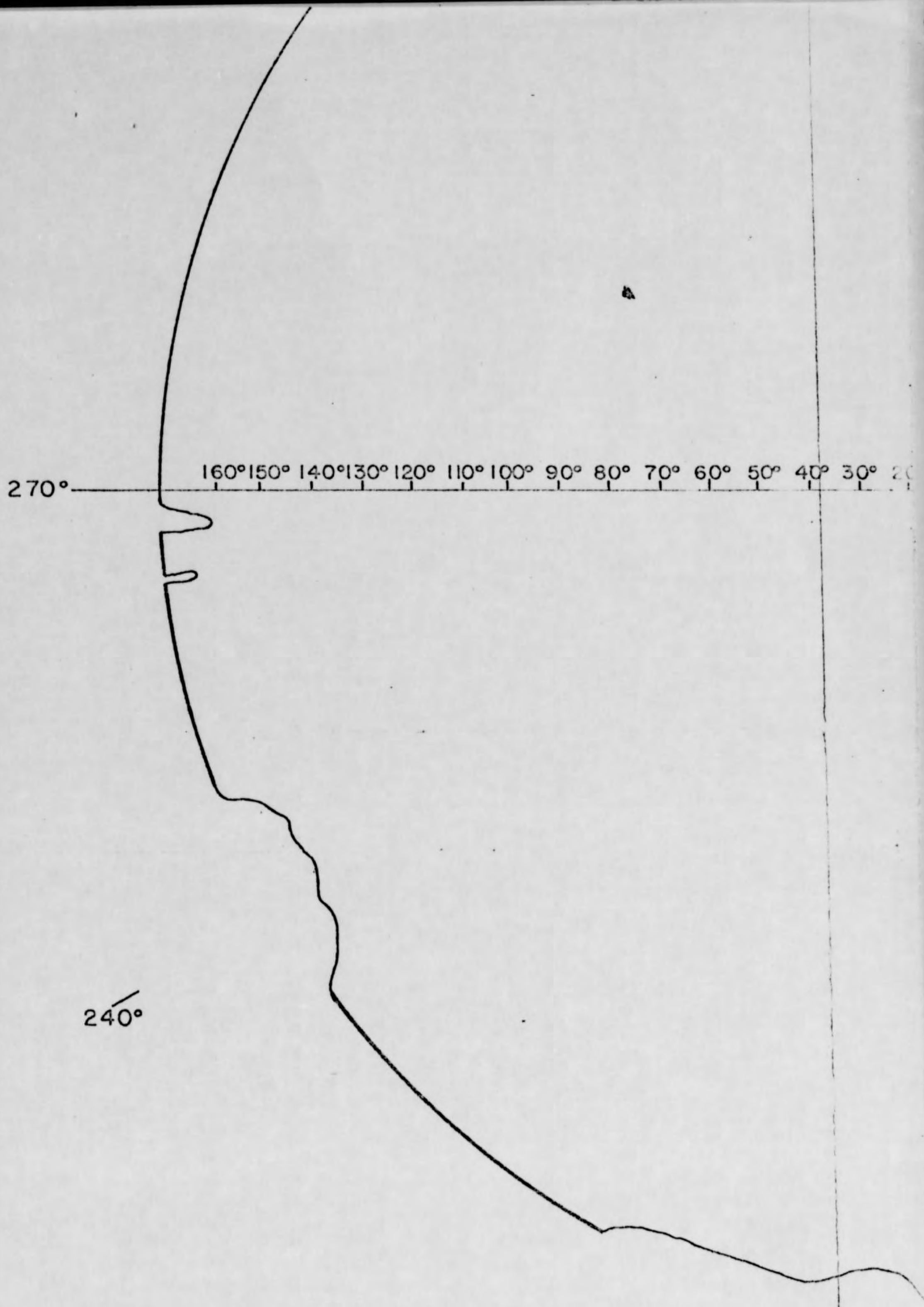
330°

300°

270°

210 200 190 180 170 160 150 140 130 120 110 100 90 80 70



LEGEND

——— MAXIMUM SEARCH RANGE (CPS-1) — 10,000 FEET HORIZONTAL

INCLOSURE #4

FEAF 112 # IR-25-52

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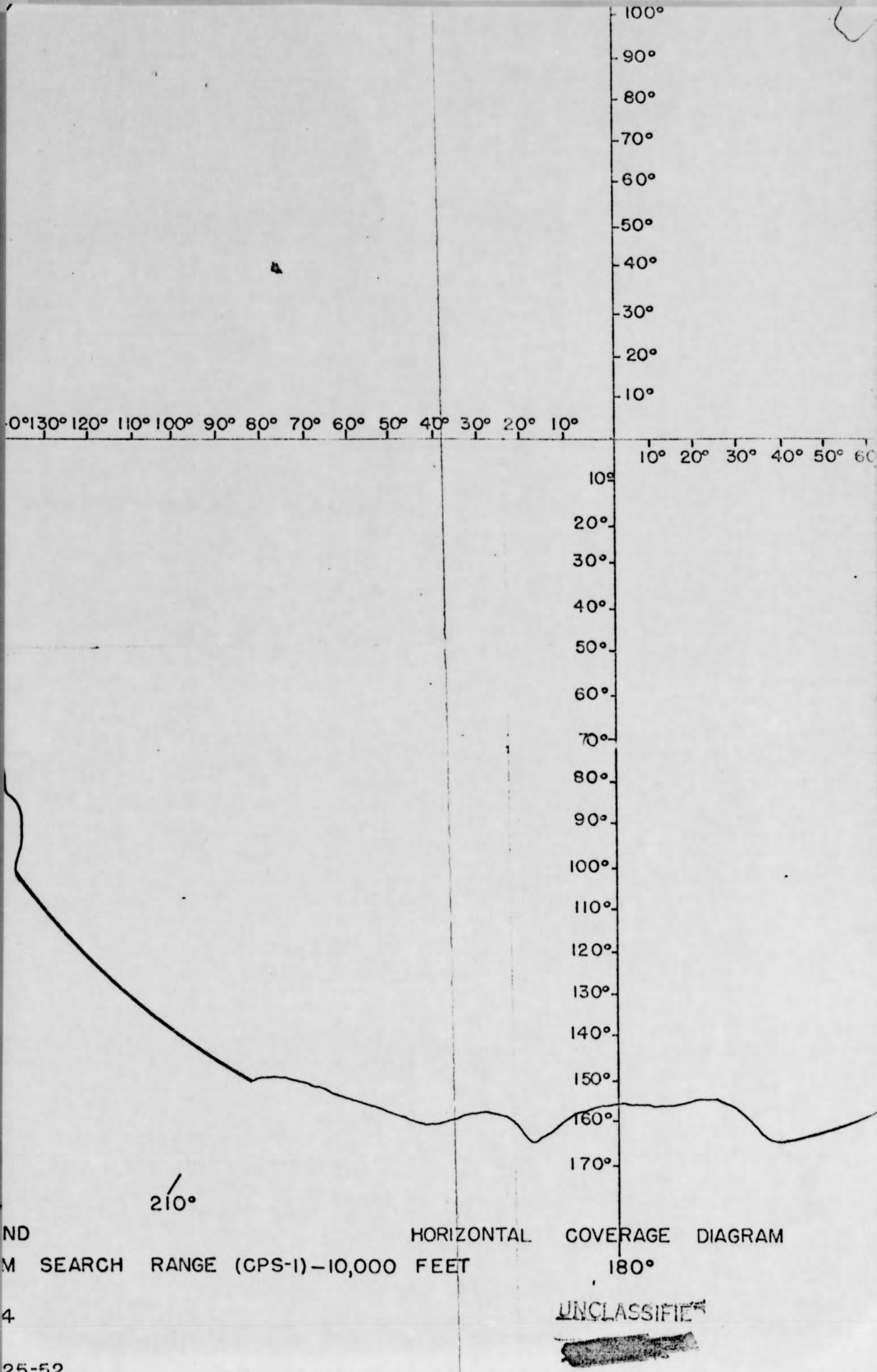

ND HORIZONTAL COVERAGE DIAGRAM

M SEARCH RANGE (CPS-1)—10,000 FEET

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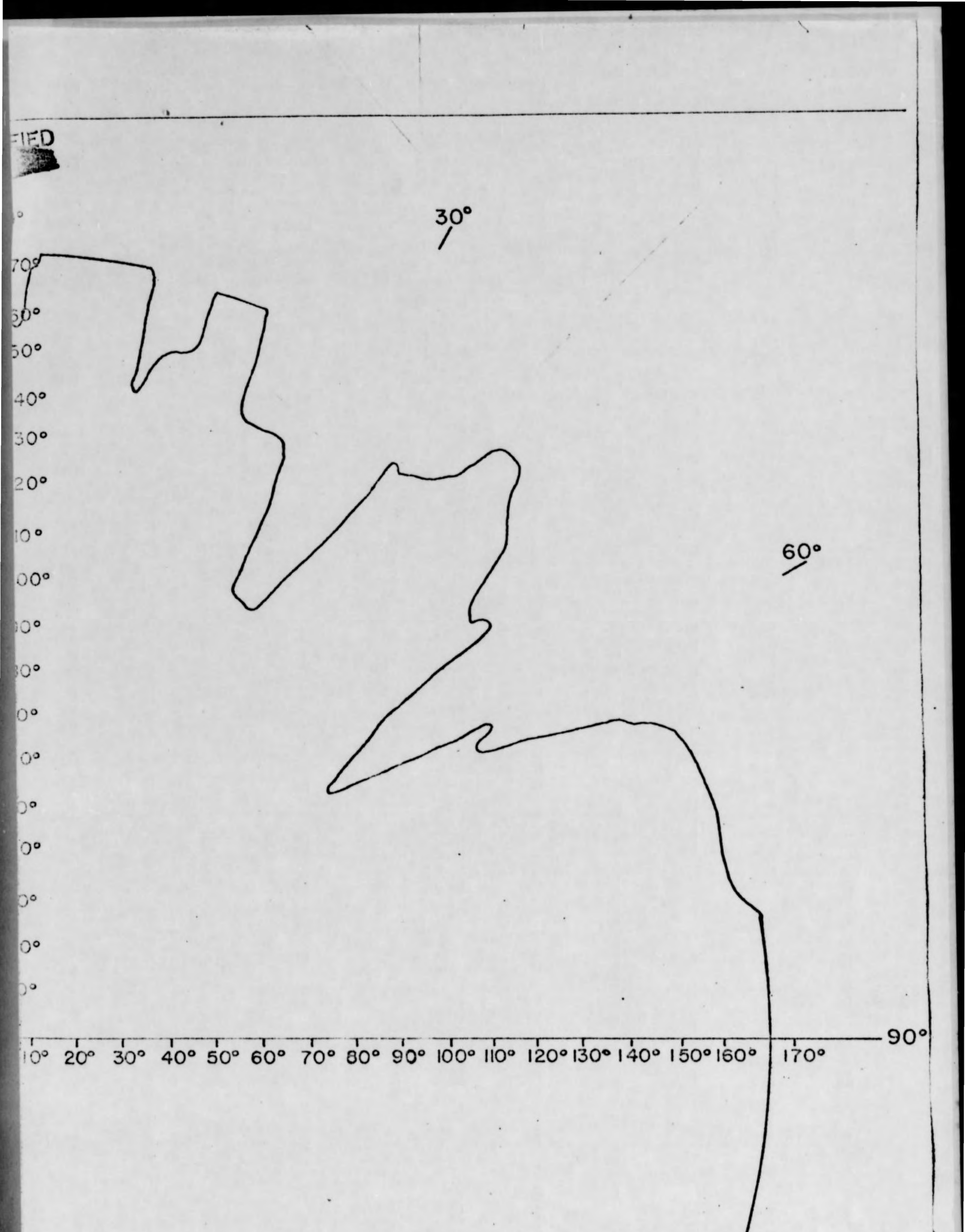
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AGE DIAGRAM

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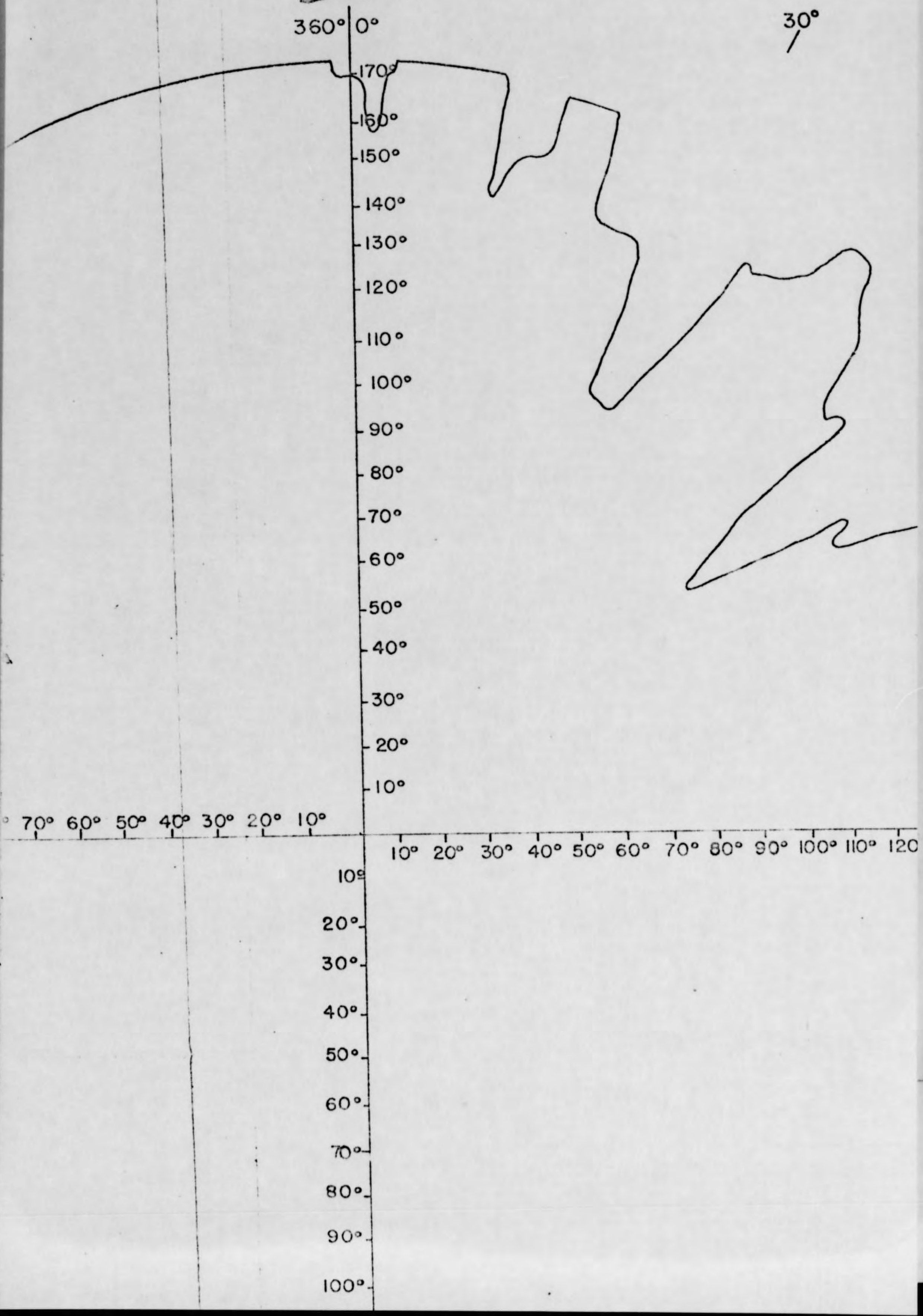
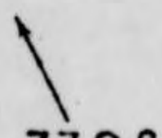
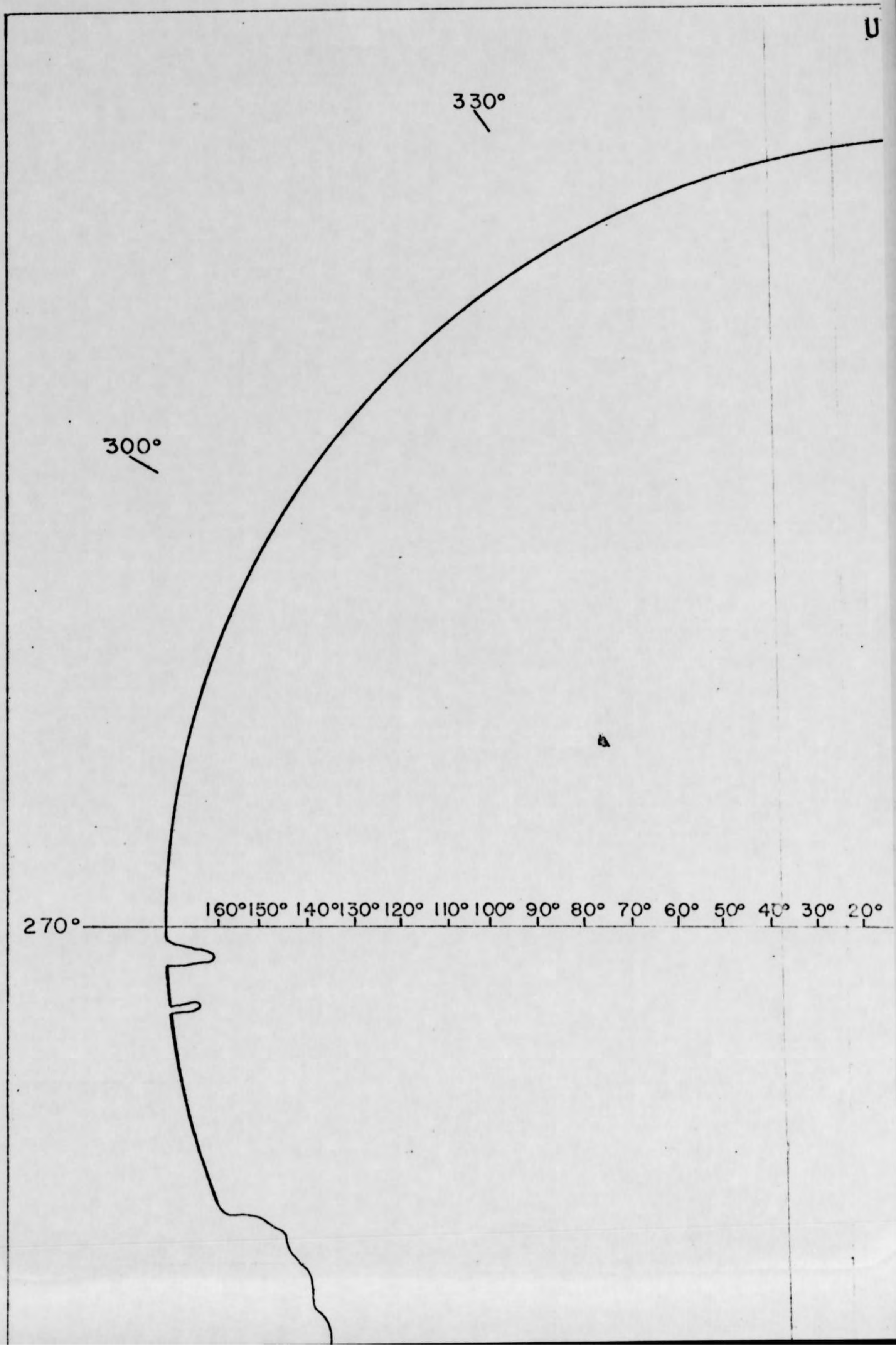
SCALE 1:500,000



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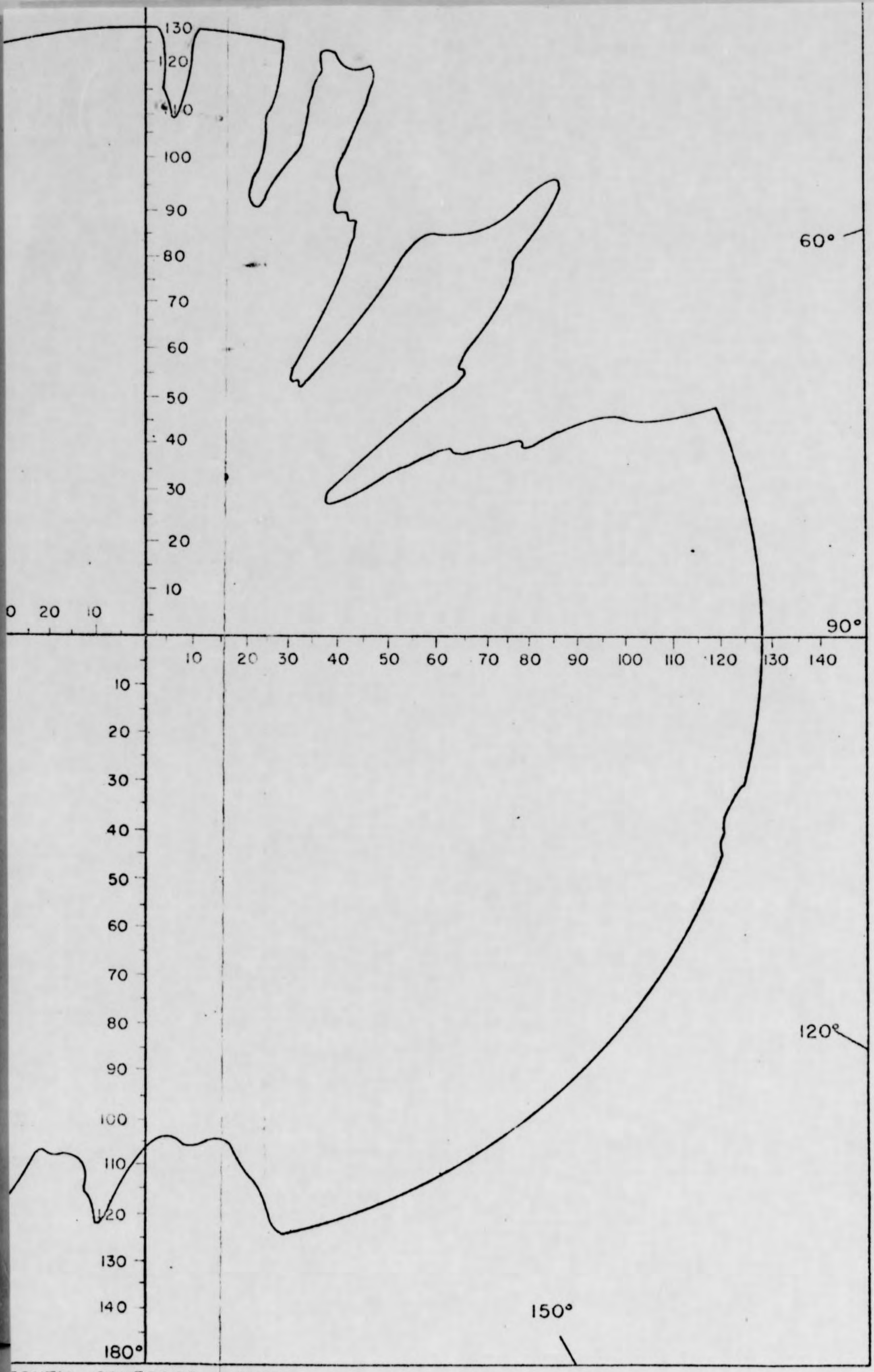

ZONTAL COVERAGE DIAGRAM

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