PROJECT 10073 RECORD CARD

1. DATE
24 September 1962

2. LOCATION
Atlantic (New York-Lisbon)

3. DATE-TIME GROUP
Local _____
GMT 24/0424Z

4. TYPE OF OBSERVATION
☐ Ground-Visual ☐ Ground-Radar
☒ Air-Visual ☐ Air-Intercept Radar

5. PHOTOS
☐ Yes
☒ No

6. SOURCE
Civilian

7. LENGTH OF OBSERVATION
not rptd

8. NUMBER OF OBJECTS
one

9. COURSE
Westerly

10. BRIEF SUMMARY OF SIGHTING

Firey blue-white object size of football moving at great speed. Passed close to plane & lit up surrounding surface of a/c. Appeared fm low altitude & climbing. A/C flying 120 dgr magnetic. Object appeared at about 50 dgr tangent to Earth. Cloud cover below a/c. Obj was very bright & had tail emitting sparks. Witnessed by crew and passengers.

11. COMMENTS

Object appeared from below clouds. Thought to be missile; however, appearance including sparks trailing indicates that the object was a meteor. From distance illusion was coming from below the clouds. Object was heading toward the a/c. adding to this illusion. Case considered as a meteor sighting.

12. CONCLUSIONS

☐ Was Balloon
☐ Probably Balloon
☐ Possibly Balloon

☐ Was Aircraft
☐ Probably Aircraft
☐ Possibly Aircraft

☒ Was Astronomical Meteor
☐ Probably Astronomical
☐ Possibly Astronomical

☐ Other _____
☐ Insufficient Data for Evaluation
☐ Unknown

ATIC FORM 329 (REV 26 SEP 52)

REPORT OF UNIDENTIFIED FLYING OBJECT

Telephone Call: Received by Major R. J. Hauser
Time: 1615 Hours, 28 September 1962
From: Mr. [redacted]
Address: [redacted]
Dover, New Jersey

Resume of Conversation: Mr [redacted] is a TWA pilot and he and his brother also own the AMOCO Station at the above address. On the night of 24 September 1962 [redacted] was flying a TWA Boeing 707 from New York to Lisbon at an altitude of approximately 37,000 feet. At 0424 ZULU time, location which is pinpointed on a Doppler Chart in his possession, there suddenly appeared a firey object blue-white in color about the size of a football and moving at tremendous speed. It passed close to the plane and lit up the entire area surrounding the plane. Mr. [redacted] made a report of this incident upon landing at Lisbon; however, he wished to also report it to Picatinny Arsenal in event it may be of any value in relation to U. S. Army research. Mr. [redacted] indicated that this object could have been a missile item originating from Russia inasmuch as it appeared from that direction at low altitude and climbing at tremendous speed. He would be happy to discuss this further with Picatinny Arsenal personnel if interested.

In further discussion with arsenal personnel Mr. [redacted] indicated the following: He was flying a 120° magnetic heading. The object appeared about 50° with the tangent to the Earth. There was cloud cover below the plane at the time. The object appeared very bright with a tail emitting sparks. Other crew members witnessed the same phenomena. The blue line on the inclosed Doppler Chart (Chart TWA NA C/L-2) indicates his actual flight path; the position at which the object appeared is indicated by a blue circle inside a larger red circle.

1 Incl
1. Doppler Chart

HEADQUARTERS
1127TH USAF FIELD ACTIVITIES GROUP
FORT BELVOIR, VIRGINIA

REPLY TO
ATTN OF: AFCIN-1B2

9 NOV 1962

SUBJECT: Report of Unidentified Flying Object

TO: FTD
Wright-Patterson AFB Ohio

Forwarded in accordance with AFR 200-2.

FOR THE COMMANDER

James E Lazenby

JAMES E. LAZENBY
Colonel, USAF
AFCIN-1B

1 Atch
Ltr, SMUPA-VF-0063, US Army
Munitions Command, Dover, N.J.,
30 Oct 62, Subj: Rpt of UFOB

Copy to
AFSC w/o Dopplet Chart

U. S. ARMY MUNITIONS COMMAND
~~XXXXXXXXXXXX~~
PICATINNY ARSENAL
DOVER, NEW JERSEY

Mr Kosar/bh/71193

OCT 30 '62-2 COPIES

IN REPLY
REFER TO:
SMUPA-VF-0063

SUBJECT: Report of Unidentified Flying Object

TO: United States Air Force
Assistant Chief of Staff for Intelligence
Washington 25, D. C.

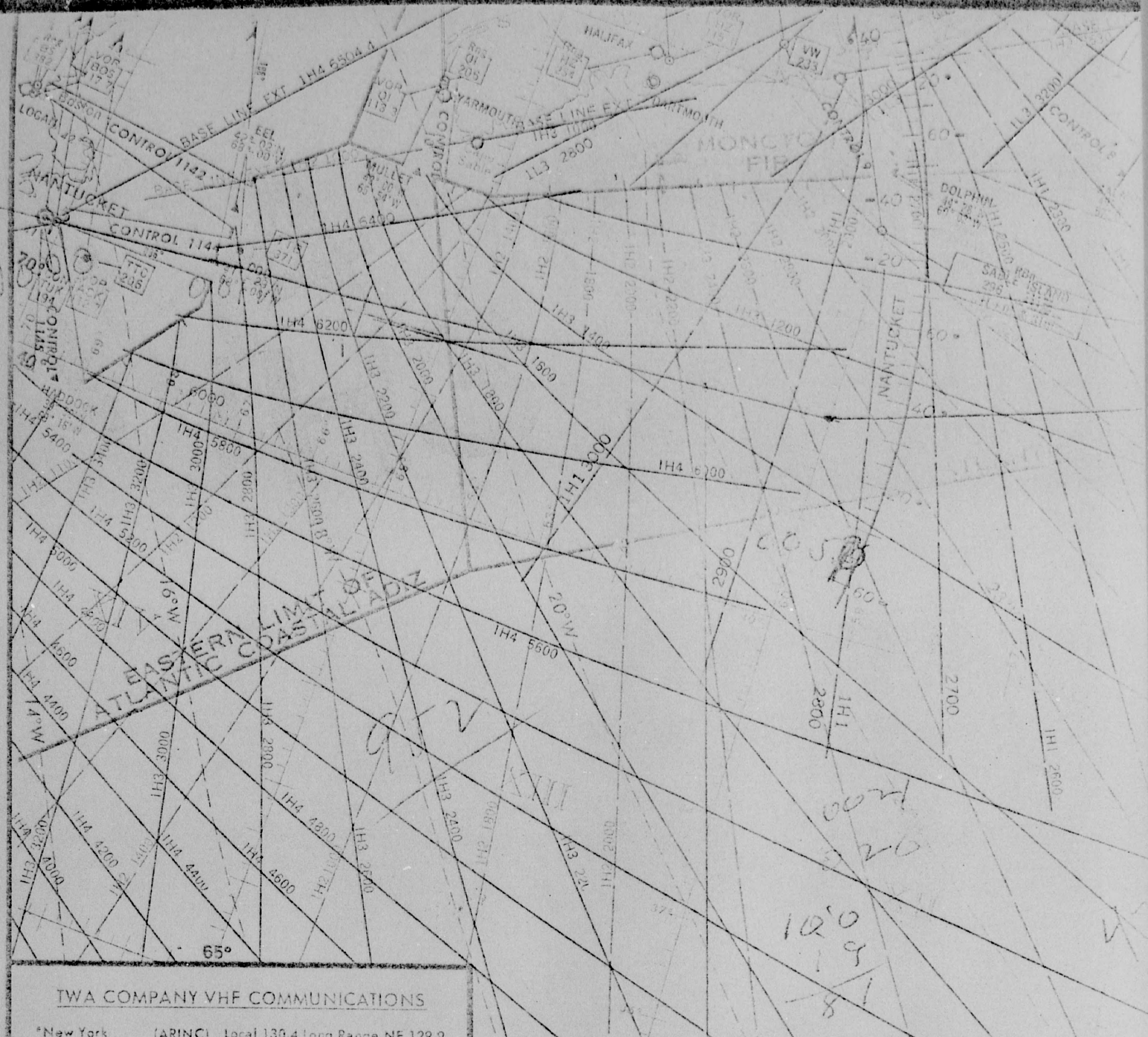
Inclosed is a report of an unidentified flying object as related to arsenal personnel by a Mr. [redacted] a TWA Boeing 707 pilot.

FOR THE COMMANDER:

John J Ramsden

JOHN J. RAMSDEN
Capt, Ord
Assistant

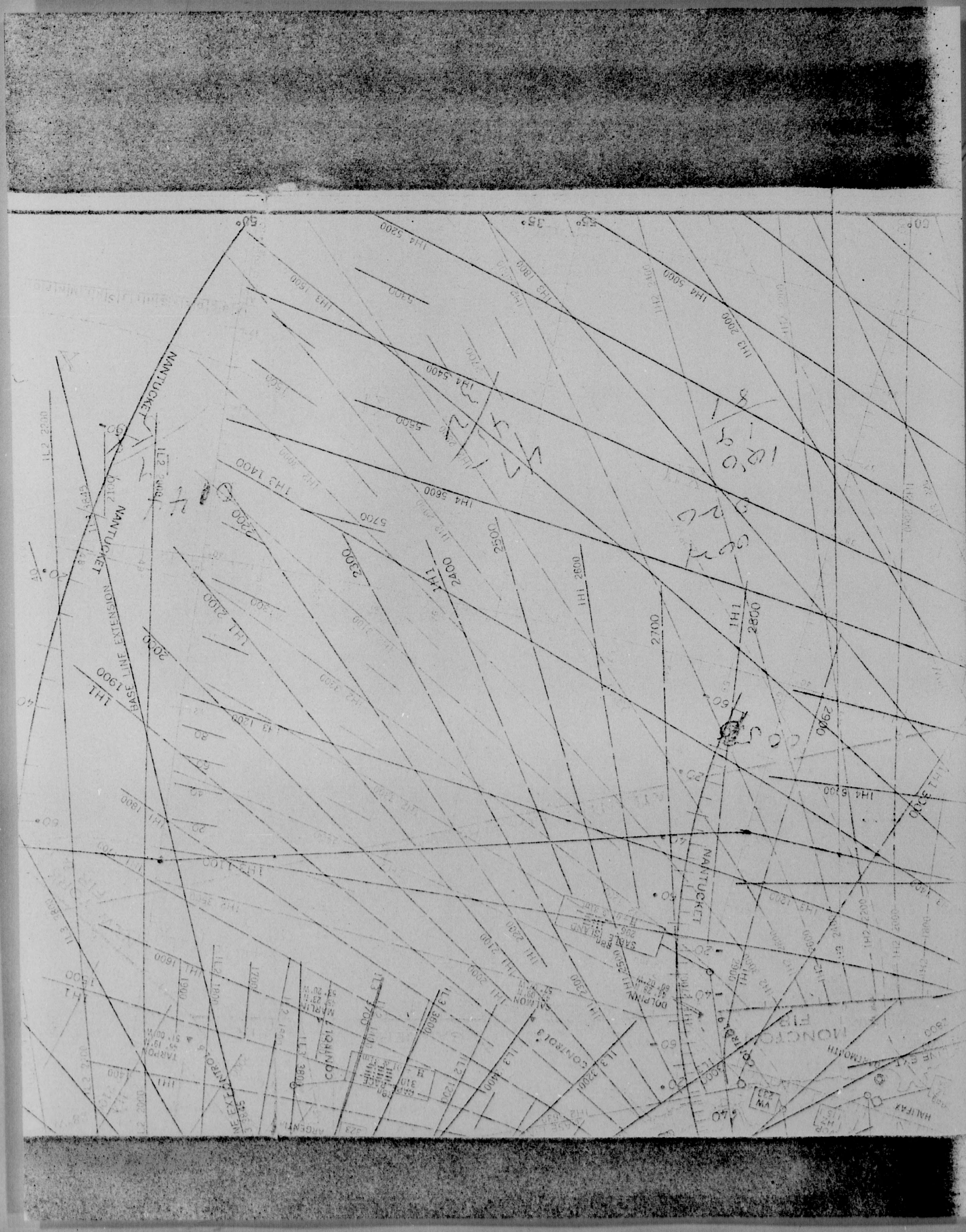
1 Incl
1. Rpt of UFO, w/Incl - Doppler Chart



TWA COMPANY VHF COMMUNICATIONS

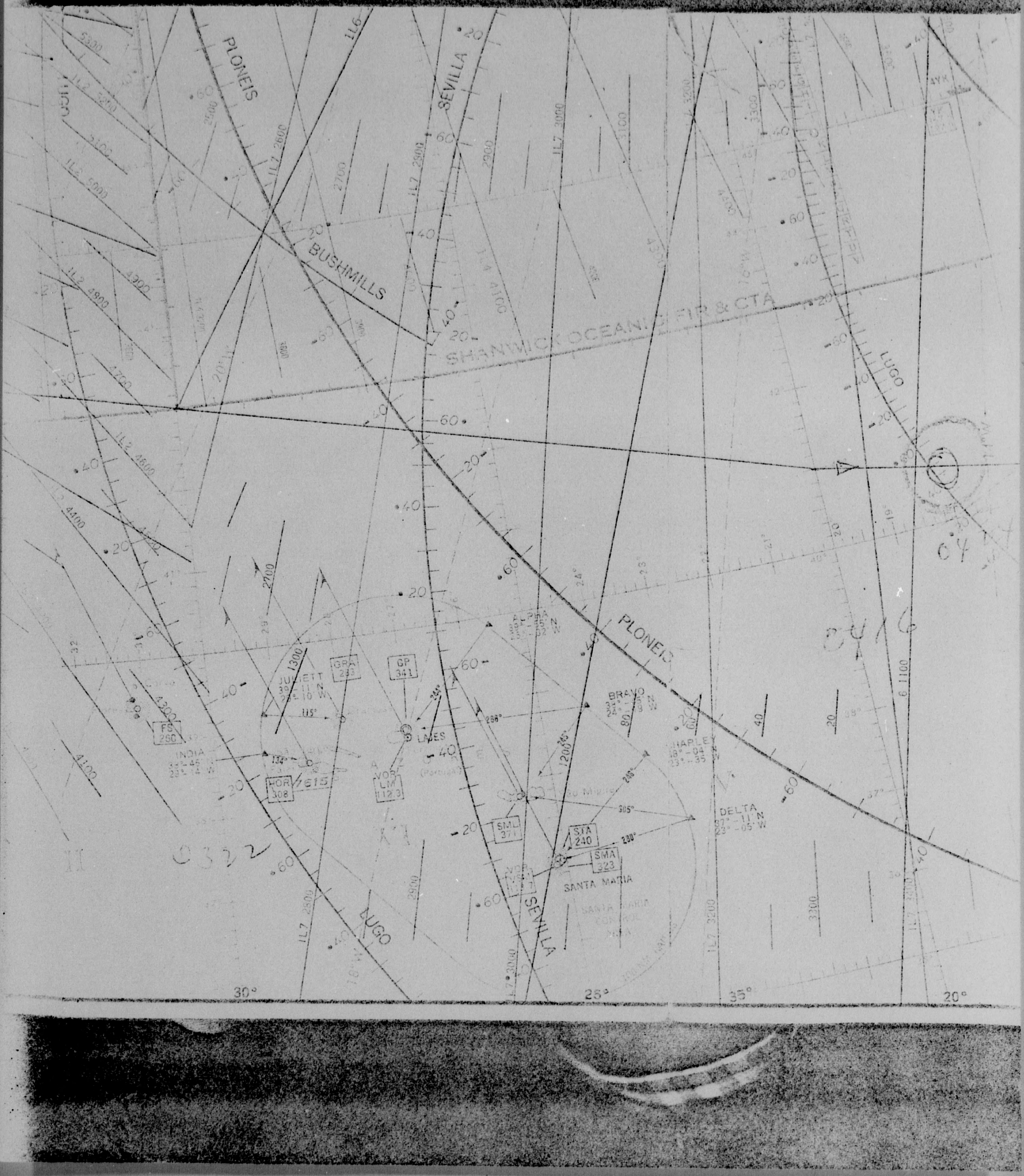
*New York	(ARINC)	Local 130.4 Long Range NE 129.9
Gander	*129.1	
Keflavik	*131.9	
*Lisbon	131.6	
*London	131.6	
*Paris	131.6	
*Shannon	%131.6	(Long Range Atlantic)

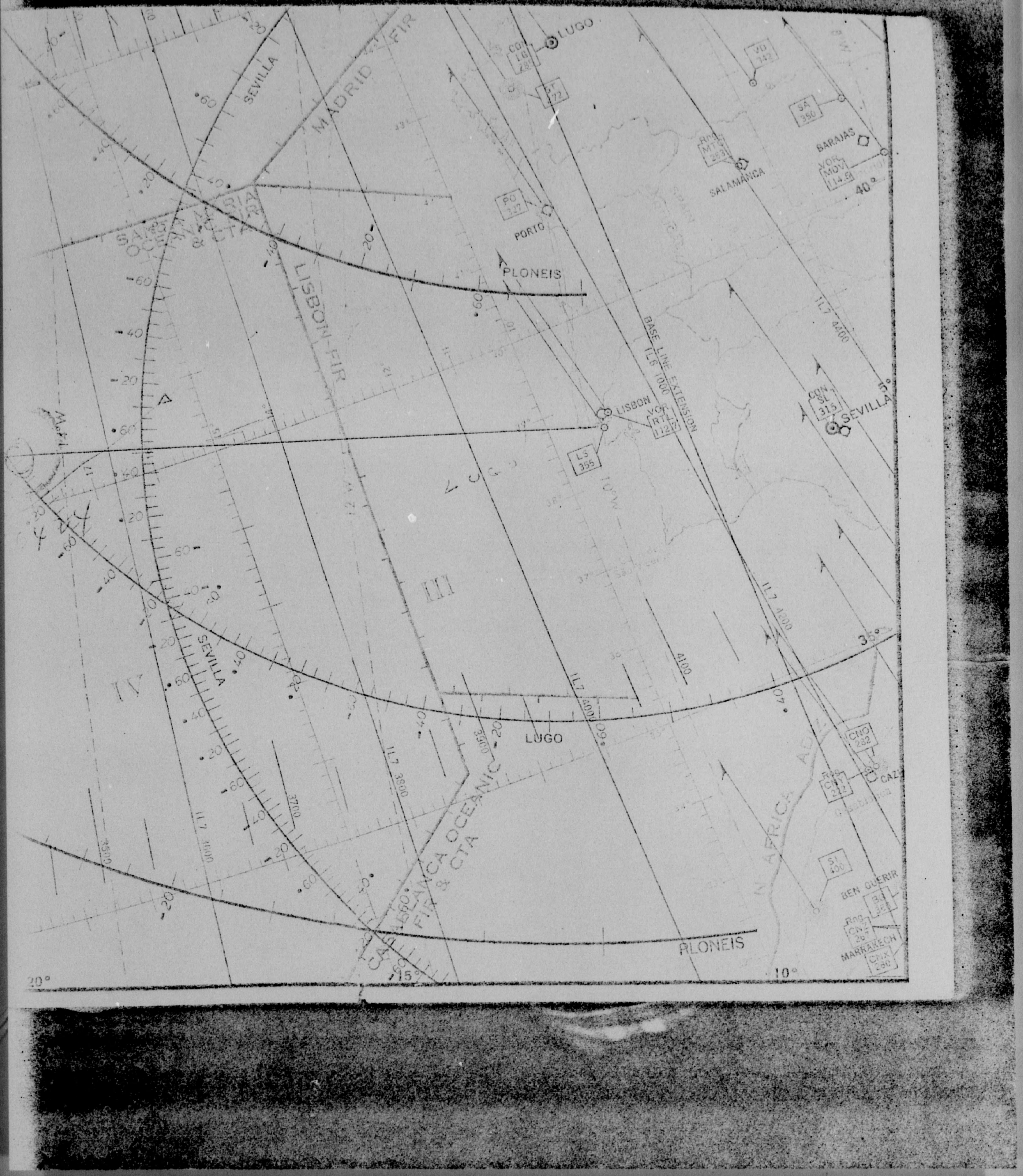
*Selcal Facilities Available
*Joint Airline Operation
%If 131.6 inoperative, use PAA frequency 131.4 when west of Shannon. Do not use 131.4 east or south of Shannon.


NANTUCKET
BASE LINE EXTENSION
NANTUCKET
IH1 1900
IH1 2100
IH1 2200
IH1 2400
IH1 2600
IH1 2800
IH1 3000
IH1 3200
IH1 3600
IH1 1800
IH1 2000
IH1 2300
IH1 1600
IH1 1500
IH1 1400
IH1 1200
IH1 1100
IH2 1800
IH2 2000
IH2 2100
IH2 2200
IH2 2400
IH2 2500
IH2 2600
IH2 2800
IH2 2900
IH2 3000
IH2 3200
IH2 3600
IH3 1500
IH3 1400
IH3 1800
IH3 2000
IH3 2100
IH3 2200
IH3 2400
IH3 2600
IH3 2800
IH3 3000
IH3 3200
IH3 3600
IH4 5200
IH4 5000
IH4 5400
IH4 5600
IH4 6200
IL2 3200
IL2 2900
IL2 2800
IL2 2700
IL2 2600
IL2 2400
IL2 2300
IL2 2100
IL2 2000
IL2 1900
IL2 1800
IL2 1600
IL2 1500
IL2 1400
IL2 1200
IL3 3600
IL3 3200
IL3 3000
IL3 2800
IL3 2600
IL3 2400
IL3 2200
IL3 2100
IL3 2000
IL3 1800
IL3 1600
IL3 1400
IL3 1200
5300
5500
5700
2500
2700
2900
2000
2200
1900
1800
1600
1500
1400
1200
1100
60°
50°
40°
30°
20°
10°
CONTROL 3
CONTROL 4
SABLE
NANTUCKET
MONCTON
HALIFAX
VW 233
H 310
CAPE RACE
TARPON
DOLPHIN
SALMON
MARLIN
ARGENTIA

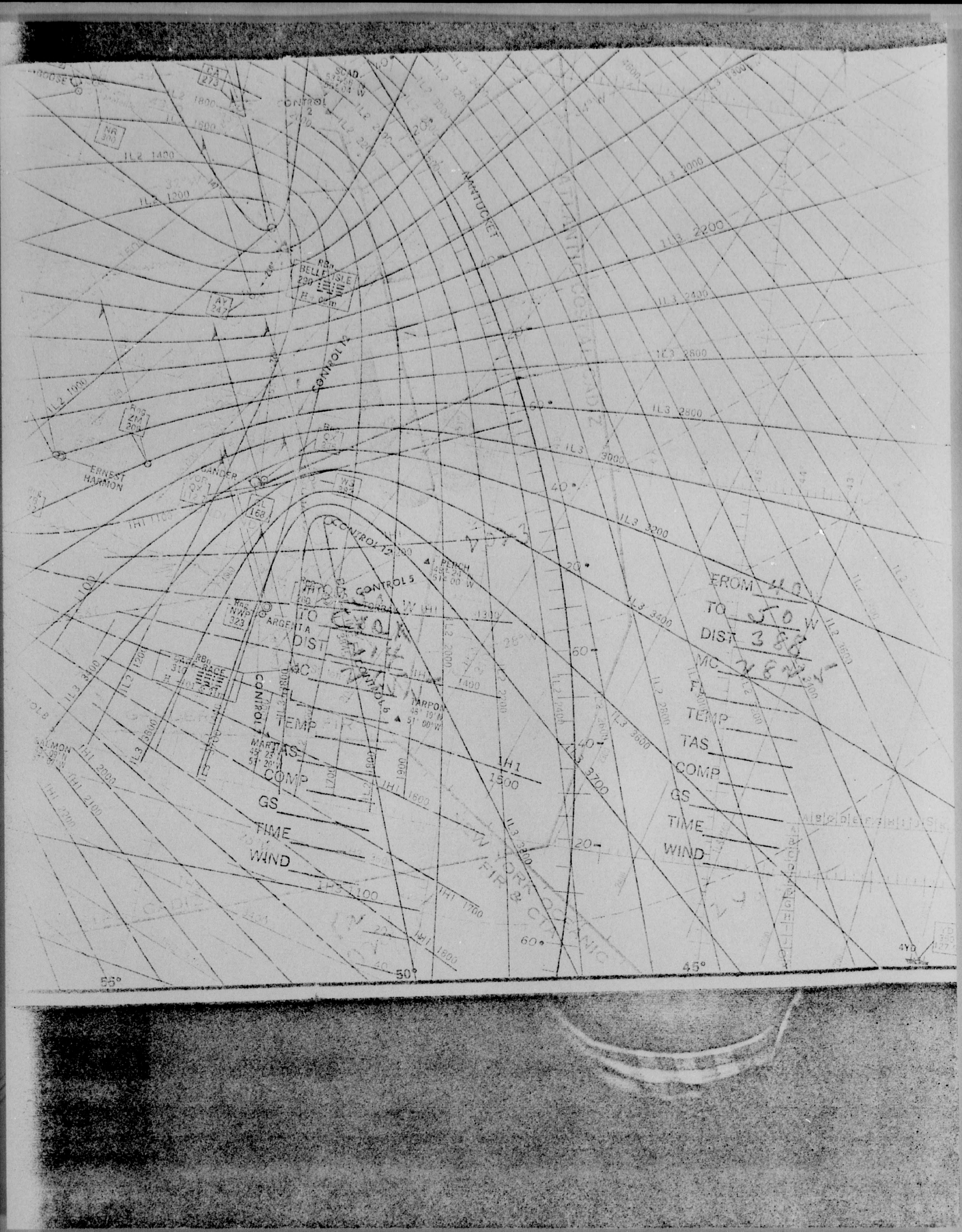
GANDER OCEANIC FIR & CTA

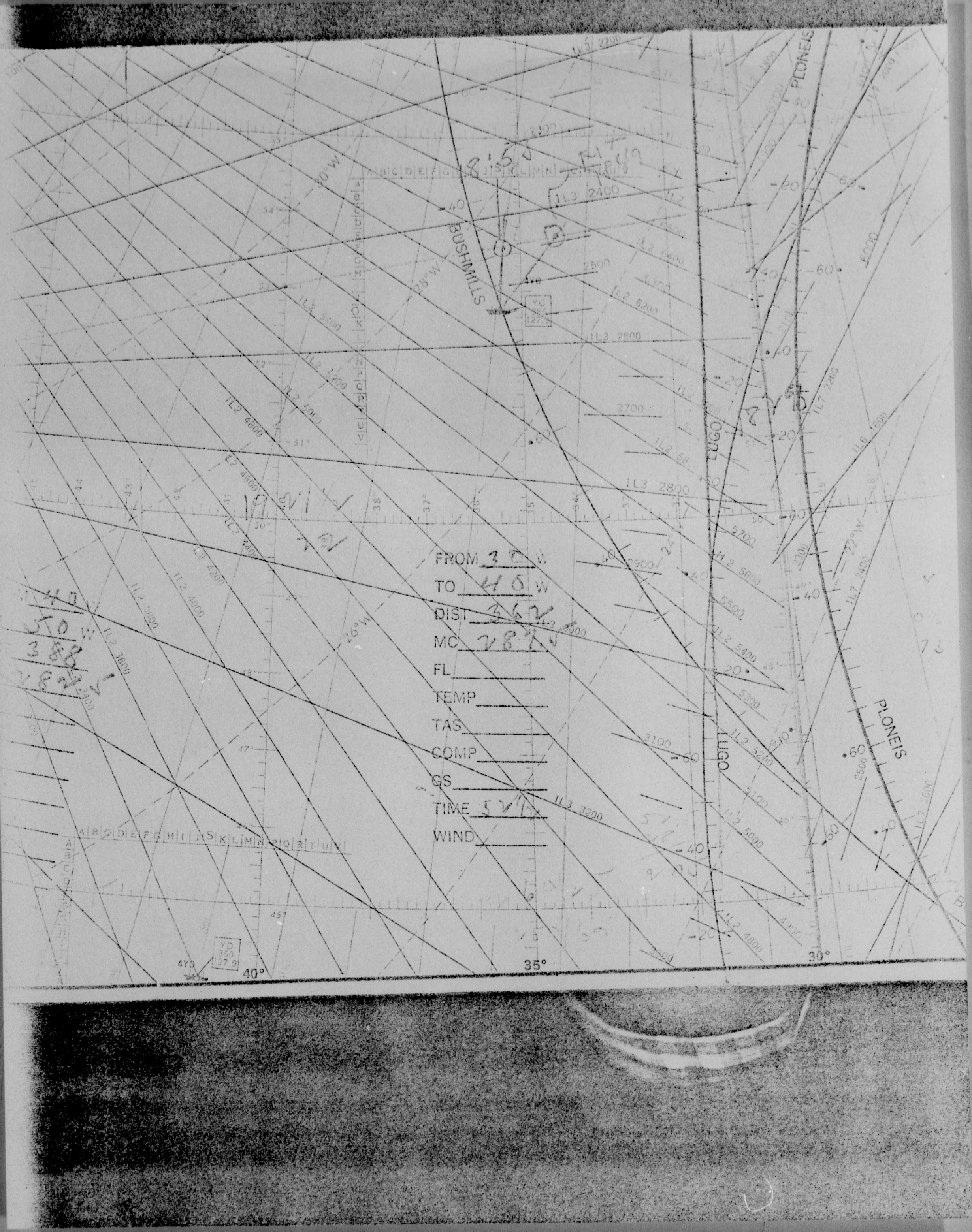
SANTA MARIA OCEANIC FIR & CTA

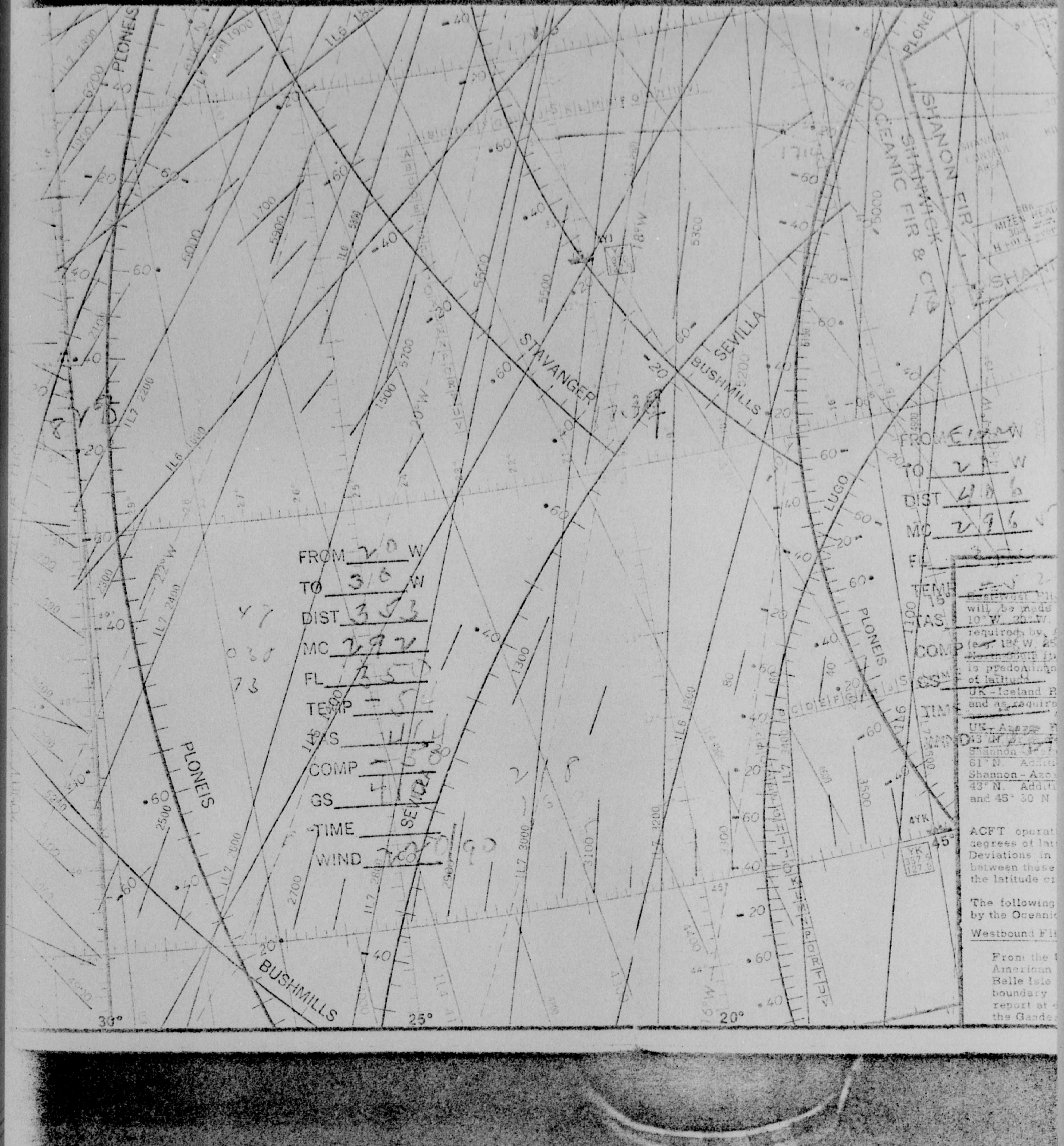

PLONEIS
SEVILLA
BUSHMILLS
SHANWICK OCEANIC FIR & CTA
LUGO
PLONEIS
SEVILLA
LUGO
JULIETT
38° 11' N
29° 10' W
ALPHA
39° 55' N
30° 32' W
BRAVO
33° 15' N
24° 18' W
CHARLIE
38° 04' N
23° 35' W
DELTA
37° 11' N
23° 05' W
INDIA
33° 45' N
29° 14' W
LAJES
SANTA MARIA
GRA 283
GP 341
FS 290
HOR 308
SMA 323
SJA 240
SML 371
115°
134°
286°
305°
280°
240°
120°
45°
20 Miles
30°
25°
35°
20°


MADRID FIR
SEVILLA
SAL OCEANIC & CTA FIR
LISBON FIR
CASABLANCA OCEANIC FIR & CTA
LUGO
PORTO
PLONEIS
LISBON
SALAMANCA
BARAJAS
SEVILLA
BASE LINE EXTENSION
ILZ 4400
ILZ 4200
ILZ 3900
ILZ 3600
ILZ 3500
CON LG 281
PT 272
VD 342
SA 350
RNG MTC 263
VOR MDV 114.5
PO 327
VOR RTL 112.7
LS 355
CON SL 315
CNO 282
RNG CNY 224
SI 400
BEN GUERIR
BG 356
RNG CNZ 267
MARRAKECH
CNX 280
N AFRICA ADIZ
40°
35°
30°
25°
20°
15°
10°
5°


NANTUCKET
CONTROL 114
NANTUCKET
CONTROL 8
CONTROL 10
BASE LINE EXT
YARMOUTH
HALIFAX
YARMOUTH BASE LINE EXT
MONCTON
ST JOHN
PRESQUE ISLE
BAGOTVILLE
MONTREAL INT'L
QUEBEC
SEPT ISLES
NANTUCKET
CANADA
UNITED STATES
BAMOOR (DOM)
HADDOCK
LOGAN
SABLE ISLAND
DOLPHIN
HALIFAX
MONCTON
ST JOHN
QUEBEC
NANTUCKET
SEPT ISLES
BAGOTVILLE


GOOSE
CA 273
NR 300
CONTROL 2
SOAD
IL2 1800
IL2 1600
IL2 1400
IL2 1200
IL2 1000
RBn BELLE ISLE 290
AY 247
NANTUCKET
IL3 2200
IL3 2600
IL3 2800
IL3 3000
IL3 3200
IL3 3400
IL3 3600
IL3 3700
60°
40°
20°
ERNEST HARMON
GANDER
Rng ZM 200
RBn GX
WJ 332
IL 168
IHI 1100
CONTROL 12
PERCH
CONTROL 5
ARGENTIA
Rng NWP 323
RBn RACE
IHI 1300
IHI 1400
IHI 1500
IHI 1600
IHI 1700
IHI 1800
IHI 1900
IHI 2000
IHI 2100
IHI 2200
TARPON
MARTAS
COMP
GS
TIME
WIND
TEMP
TAS
FROM 40
TO 50 W
DIST 388
MC 268
NEW YORK FIR & OCEANIC
55°
50°
45°


FROM
TO
DIST
MC
FL
TEMP
TAS
COMP
GS
TIME
WIND
BUSHMILLS
PLONEIS
LUGO
PLONEIS
IL3 2200
IL3 2400
IL2 5200
IL2 5000
IL2 4800
IL2 4600
IL2 4400
IL2 4200
IL2 4000
IL2 3800
IL2 3600
IL3 2600
IL3 2800
IL3 3000
IL3 3200
IL2 5400
IL2 5600
IL2 5800
IL2 6000
IL2 6200
IL3 2900
IL3 3100
IL2 5300
IL2 5100
IL2 4900
IL2 4700
IL7 2200
IL7 2400
IL7 2600
IL6 1600
YC 350 127.9
YD 350 127.9
4YD
20°W
23°W
22°W
30°
35°
40°


PLONEIS
SHANNON
SHANWICK OCEANIC FIR & CTA
STAVANGER
SEVILLA
BUSHMILLS
LUGO
SEKIDA
BUSHMILLS
FROM
TO
DIST
MC
FL
TEMP
TAS
COMP
GS
TIME
WIND
30°
25°
20°
45°



POSITION REPORTING PROCEDURE

1 SHANWICK OCA

East-West Flights: Unless other wise required position reports will be made every 10° of longitude from 10° W to 70° W, (e.g. 10° W, 20° W, 30° W, etc.) Additional compulsory reports may be required by ATC at intermediate 5° longitudinal lines to 65° W, (e.g. 15° W, 25° W, 35° W, etc.)

North-South Flights: Unless otherwise required ACFT whose track is predominantly in a N-S direction will report every 5° parallel of latitude.

UK-Iceland Route: Reporting will be at 10° W and latitude 61° N and as required by ATC for that portion of flight within UK domestic area.

UK-Azores Route: Reporting will be at 10° W, 15° W, and latitude 43° N or as required by ATC.

Shannon-Iceland Route: Designated reporting lines will be 56° N, 61° N. Additional reports may be requested by ATC for 58° 30' N.

Shannon-Azores Route: Designated reporting lines will be 48° N, 43° N. Additional reports may be requested by ATC for 50° 30' N and 45° 30' N.

2 GANDER OCA

ACFT operating within Gander OCA shall flight plan via whole degrees of latitude at each 10° of longitude (e.g. 60° W, 40° W, 30° W). Deviations in excess of 30 NM N or S of a great circle track between these points shall be specified in the flight plan by indicating the latitude crossing the intermediate 5° of longitude.

The following are specific position reporting procedures required by the Oceanic Control Centre:

Westbound Flights

From the United Kingdom and other European points to the North American continent, crossing the continental boundary south of Belle Isle shall report at 30° W, 40° W, 45° W and at the western boundary of the Gander Oceanic Control Area. The position report at 45° W shall contain an estimate for the point of crossing the Gander Oceanic Control Area western boundary.

From the Azores and North Africa to points in Newfoundland, shall report at the Gander/Santa Maria Oceanic Control Area Boundary, at 45° W and at the western boundary of the Gander Oceanic Control Area. The position report at 45° W shall include an estimate for the point of crossing the western boundary of the Gander Oceanic Control Area.

From points in Iceland to points in Newfoundland, shall report at the Iceland/Gander Oceanic Control Area Boundary and 45° W and at 50° W as well as at the western boundary of the Gander Oceanic Control Area.

Eastbound Flights

From the North American continent operating south of Belle Isle and crossing the Gander Oceanic Control Area to points in the United Kingdom or the European continent, shall report at the western boundary of the Gander Oceanic Control Area and at 40° W and 30° W.

From Newfoundland to points in the Azores and North Africa shall report at the western boundary of the Gander Oceanic Control Area and at 45° W as well as at the Gander/Santa Maria Oceanic Control Area Boundary.

From or over Newfoundland to points in Iceland, shall report at the western boundary of the Gander Oceanic Control Areas 50° W and at 45° W as well as the Gander/Iceland Oceanic Control Area Boundary.

FLIGHT PLANS:

IFR flight plan must be filed prior to take off when flight penetrates or operates within Iceland Military ADIZ. In the event flight plan cannot be adhered to, transmit corrected information immediately to appropriate facility. If, in the interest of safety, it becomes necessary to deviate from current flight plan, such deviation must be reported immediately to military flight service (USAF) and/or appropriate Icelandic authority. Flight plans will not be submitted nor changed in flight to provide initial entry into ADIZ except in an emergency.

POSITION REPORTS:

IFR flights outside air traffic control areas will report to appropriate facility prior to entering or operating in ADIZ, giving time, position and altitude at last reporting point along flight path to penetration, and ETA over next reporting point; or, if this is impracticable, estimated time, position and altitude of penetration of ADIZ not earlier than 30 MIN nor later than 15 MIN prior to penetration.

Position reports must be transmitted at least once an hour within ADIZ, or as otherwise required, using established reporting points when practicable.

ALLOWABLE TOLERANCES FOR ADHERENCE TO ADIZ FLIGHT PLAN OR TRAFFIC CLEARANCE:

Time: Plus or minus 5 MIN from ETA over reporting point or point of penetration.

Distance: 20 NM from centerline of proposed route if entering or operating in ADIZ.

Altitude Deviation: None, unless amended air traffic clearance is obtained, or, if operating where no ATC clearance is required, prior notice is given to appropriate facility. In latter case, normal descent may be commenced within reasonable distance of point of intended landing.

FLIGHT PLANS:

IFR flight plan must be filed prior to take off when flight penetrates or operates within Iceland Military ADIZ.
In the event flight plan cannot be adhered to, transmit corrected information immediately to appropriate facility.
If, in the interest of safety, it becomes necessary to deviate from current flight plan, such deviation must be reported immediately to military flight service (USAF) and/or appropriate Icelandic authority. Flight plans will not be submitted nor changed in flight to provide initial entry into ADIZ except in an emergency.

POSITION REPORTS:

IFR flights outside air traffic control areas will report to appropriate facility prior to entering or operating in ADIZ, giving time, position and altitude at last reporting point along flight path to penetration, and ETA over next reporting point; or, if this is impracticable, estimated time, position and altitude of penetration of ADIZ not earlier than 30 MIN nor later than 15 MIN prior to penetration.

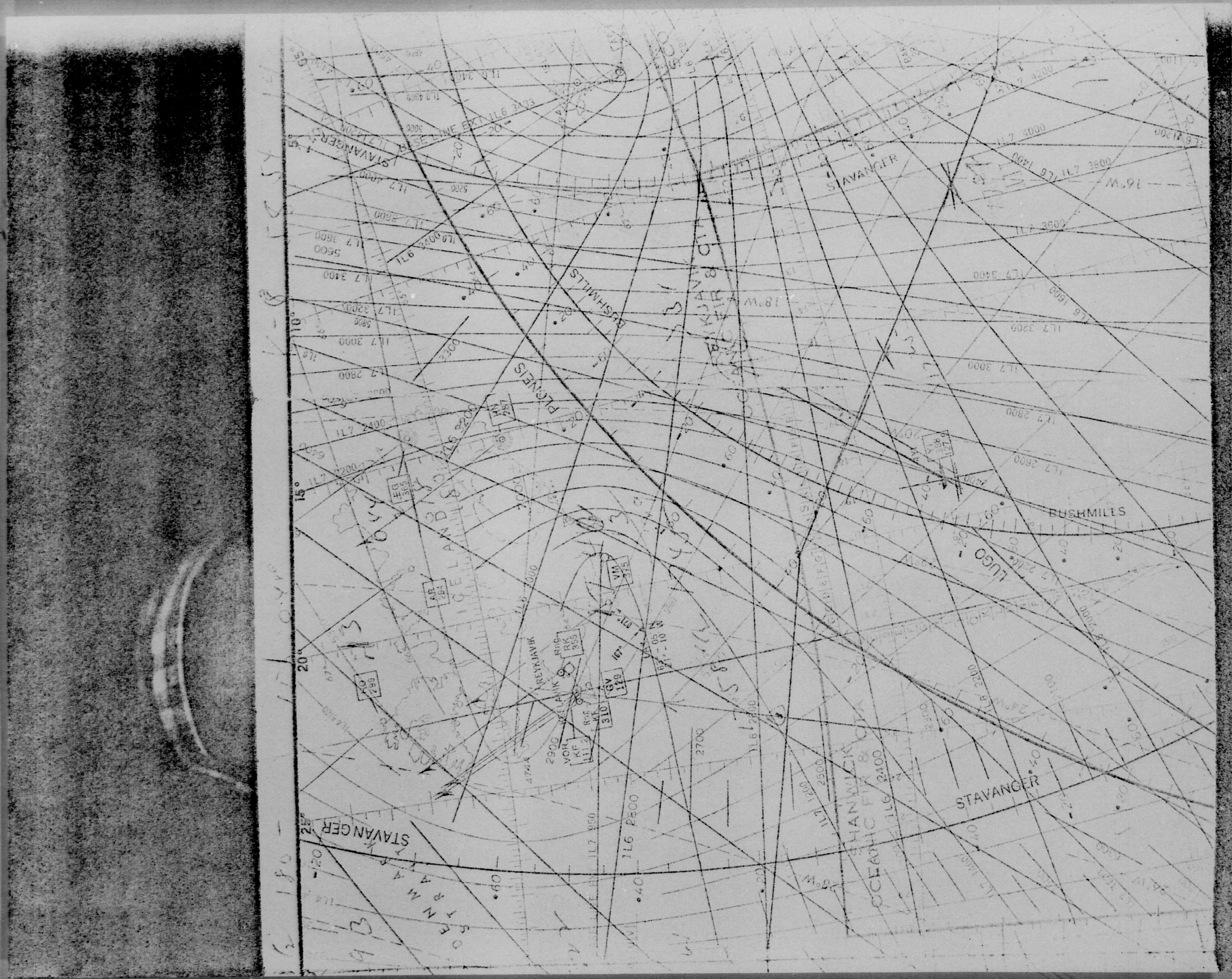
Position reports must be transmitted at least once an hour within ADIZ, or as otherwise required, using established reporting points when practicable.

ALLOWABLE TOLERANCES FOR ADHERENCE TO ADIZ FLIGHT PLAN OR TRAFFIC CLEARANCE

Time: Plus or minus 5 MIN from ETA over reporting point or point of penetration.

Distance: 20 NM from centerline of proposed route if entering or operating in ADIZ.

Altitude Deviation: None, unless amended air traffic clearance is obtained, or, if operating where no ATC clearance is required, prior notice is given to appropriate facility. In latter case, normal descent may be commenced within reasonable distance of point of intended landing.


STAVANGER
BUSHMILLS
PLOMES
REYKJAVIK
STAVANGER
STAVANGER
OCEANIC FIR
STAVANGER

SONDRESTROM

EMERG. : 121.5 243.0
APPROACH: 363.8 236.6 127.88 126.2 127.9
TOWER: 236.6 126.2 127.88 275.8 3023.5 R

R = Receive

GREENLAND

MINIMUM CRUISING LEVELS OVER GREENLAND:

FL 120 South of 61° 00' N
FL 140 South of 65° 00' N and North of 61° 00' N
FL 180 North of 65° 00' N

ICE CAP

NAIS ARSSUAK (BW1)

DENMARK STRAIT

BUSHMILLS

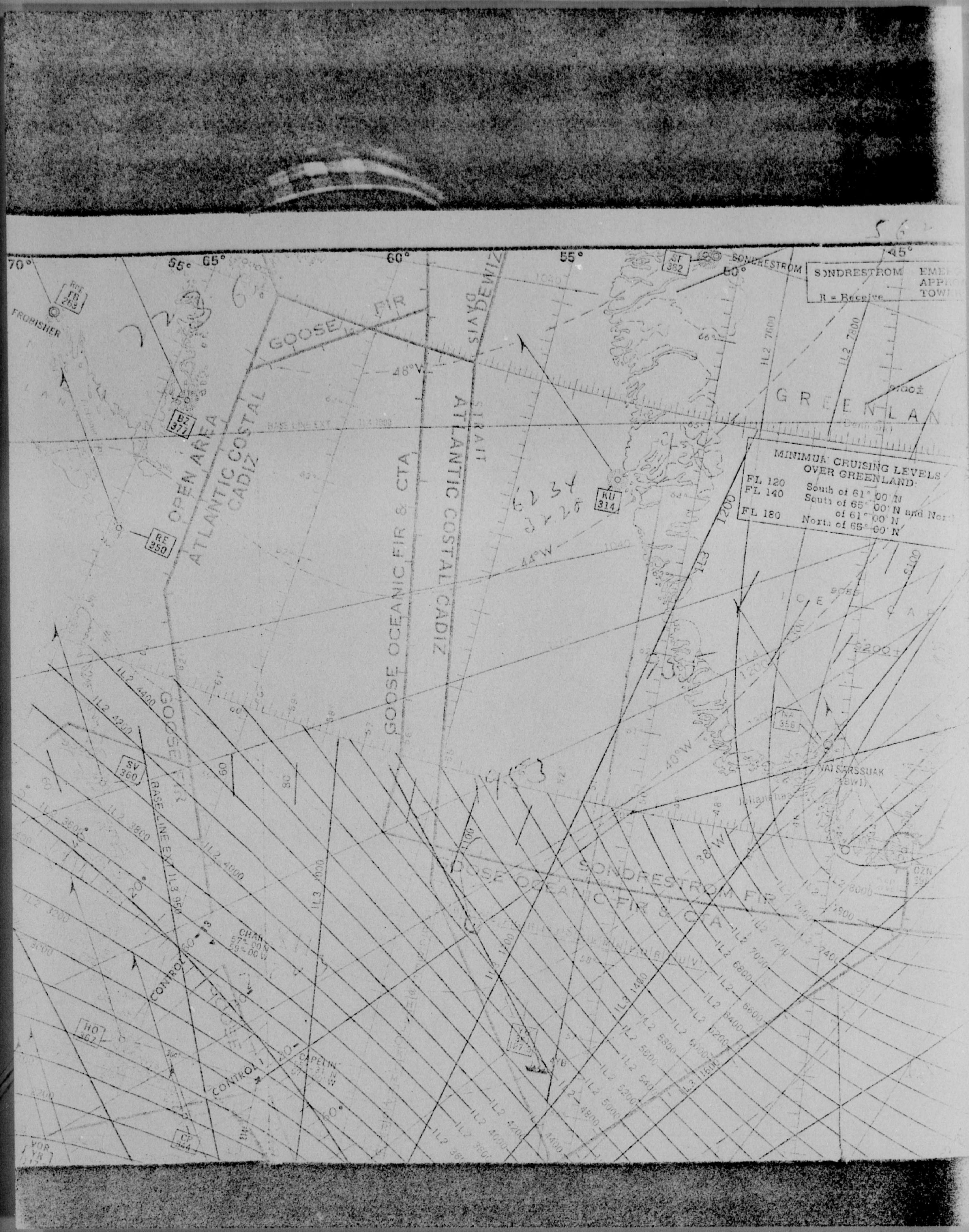
STAVANGER

SHANWICK OCEANIC FIR & CTA

REYKJAVIK OCEANIC FIR & CTA

GANDER OCEANIC FIR & CTA

FIR


70°
65°
60°
55°
50°
45°
FROBISHER
RDF FB 269
BZ 371
RE 350
OPEN AREA
ATLANTIC COSTAL CADIZ
GOOSE FIR
GOOSE OCEANIC FIR & CTA
DAVIS STRAIT
ATLANTIC COSTAL CADIZ
SONDRESTROM
SONDRESTROM FIR
SONDRESTROM EMERG APPROACH TOWER
R = Receive
ST 382
KU 314
INA 358
SV 360
HO 367
CP 364
VOR YR
MINIMUM CRUISING LEVELS OVER GREENLAND
FL 120 South of 61° 00' N
FL 140 South of 65° 00' N and North of 61° 00' N
FL 180 North of 65° 00' N
GREENLAND
ICE CAP
NATSARSSUAK (BW1)
CHAR 57° 00 N 59° 00 W
CONTROL
BASE LINE EXT
1040
1060
1080
1100
1120
1140
1160
1180
1200
1220
1240
1260
1280
1300
1320
1340
1360
1380
1400
1420
1440
1460
1480
1500
1520
1540
1560
1580
1600
1620
1640
1660
1680
1700
1720
1740
1760
1780
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
2020
2040
2060
2080
2100
2120
2140
2160
2180
2200
2220
2240
2260
2280
2300
2320
2340
2360
2380
2400
2420
2440
2460
2480
2500
2520
2540
2560
2580
2600
2620
2640
2660
2680
2700
2720
2740
2760
2780
2800
2820
2840
2860
2880
2900
2920
2940
2960
2980
3000
3020
3040
3060
3080
3100
3120
3140
3160
3180
3200
3220
3240
3260
3280
3300
3320
3340
3360
3380
3400
3420
3440
3460
3480
3500
3520
3540
3560
3580
3600
3620
3640
3660
3680
3700
3720
3740
3760
3780
3800
3820
3840
3860
3880
3900
3920
3940
3960
3980
4000
4020
4040
4060
4080
4100
4120
4140
4160
4180
4200
4220
4240
4260
4280
4300
4320
4340
4360
4380
4400
4420
4440
4460
4480
4500
4520
4540
4560
4580
4600
4620
4640
4660
4680
4700
4720
4740
4760
4780
4800
4820
4840
4860
4880
4900
4920
4940
4960
4980
5000
5020
5040
5060
5080
5100
5120
5140
5160
5180
5200
5220
5240
5260
5280
5300
5320
5340
5360
5380
5400
5420
5440
5460
5480
5500
5520
5540
5560
5580
5600
5620
5640
5660
5680
5700
5720
5740
5760
5780
5800
5820
5840
5860
5880
5900
5920
5940
5960
5980
6000
6020
6040
6060
6080
6100
6120
6140
6160
6180
6200
6220
6240
6260
6280
6300
6320
6340
6360
6380
6400
6420
6440
6460
6480
6500
6520
6540
6560
6580
6600
6620
6640
6660
6680
6700
6720
6740
6760
6780
6800
6820
6840
6860
6880
6900
6920
6940
6960
6980
7000
7020
7040
7060
7080
7100
7120
7140
7160
7180
7200
7220
7240
7260
7280
7300
7320
7340
7360
7380
7400
7420
7440
7460
7480
7500
7520
7540
7560
7580
7600
7620
7640
7660
7680
7700
7720
7740
7760
7780
7800
7820
7840
7860
7880
7900
7920
7940
7960
7980
8000
8020
8040
8060
8080
8100
8120
8140
8160
8180
8200
8220
8240
8260
8280
8300
8320
8340
8360
8380
8400
8420
8440
8460
8480
8500
8520
8540
8560
8580
8600
8620
8640
8660
8680
8700
8720
8740
8760
8780
8800
8820
8840
8860
8880
8900
8920
8940
8960
8980
9000
9020
9040
9060
9080
9100
9120
9140
9160
9180
9200
9220
9240
9260
9280
9300
9320
9340
9360
9380
9400
9420
9440
9460
9480
9500
9520
9540
9560
9580
9600
9620
9640
9660
9680
9700
9720
9740
9760
9780
9800
9820
9840
9860
9880
9900
9920
9940
9960
9980
10000
10020
10040
10060
10080
10100
10120
10140
10160
10180
10200
10220
10240
10260
10280
10300
10320
10340
10360
10380
10400
10420
10440
10460
10480
10500
10520
10540
10560
10580
10600
10620
10640
10660
10680
10700
10720
10740
10760
10780
10800
10820
10840
10860
10880
10900
10920
10940
10960
10980
11000
11020
11040
11060
11080
11100
11120
11140
11160
11180
11200
11220
11240
11260
11280
11300
11320
11340
11360
11380
11400
11420
11440
11460
11480
11500
11520
11540
11560
11580
11600
11620
11640
11660
11680
11700
11720
11740
11760
11780
11800
11820
11840
11860
11880
11900
11920
11940
11960
11980
12000
12020
12040
12060
12080
12100
12120
12140
12160
12180
12200
12220
12240
12260
12280
12300
12320
12340
12360
12380
12400
12420
12440
12460
12480
12500
12520
12540
12560
12580
12600
12620
12640
12660
12680
12700
12720
12740
12760
12780
12800
12820
12840
12860
12880
12900
12920
12940
12960
12980
13000
13020
13040
13060
13080
13100
13120
13140
13160
13180
13200
13220
13240
13260
13280
13300
13320
13340
13360
13380
13400
13420
13440
13460
13480
13500
13520
13540
13560
13580
13600
13620
13640
13660
13680
13700
13720
13740
13760
13780
13800
13820
13840
13860
13880
13900
13920
13940
13960
13980
14000
14020
14040
14060
14080
14100
14120
14140
14160
14180
14200
14220
14240
14260
14280
14300
14320
14340
14360
14380
14400
14420
14440
14460
14480
14500
14520
14540
14560
14580
14600
14620
14640
14660
14680
14700
14720
14740
14760
14780
14800
14820
14840
14860
14880
14900
14920
14940
14960
14980
15000
15020
15040
15060
15080
15100
15120
15140
15160
15180
15200
15220
15240
15260
15280
15300
15320
15340
15360
15380
15400
15420
15440
15460
15480
15500
15520
15540
15560
15580
15600
15620
15640
15660
15680
15700
15720
15740
15760
15780
15800
15820
15840
15860
15880
15900
15920
15940
15960
15980
16000
16020
16040
16060
16080
16100
16120
16140
16160
16180
16200
16220
16240
16260
16280
16300
16320
16340
16360
16380
16400
16420
16440
16460
16480
16500
16520
16540
16560
16580
16600
16620
16640
16660
16680
16700
16720
16740
16760
16780
16800
16820
16840
16860
16880
16900
16920
16940
16960
16980
17000
17020
17040
17060
17080
17100
17120
17140
17160
17180
17200
17220
17240
17260
17280
17300
17320
17340
17360
17380
17400
17420
17440
17460
17480
17500
17520
17540
17560
17580
17600
17620
17640
17660
17680
17700
17720
17740
17760
17780
17800
17820
17840
17860
17880
17900
17920
17940
17960
17980
18000
18020
18040
18060
18080
18100
18120
18140
18160
18180
18200
18220
18240
18260
18280
18300
18320
18340
18360
18380
18400
18420
18440
18460
18480
18500
18520
18540
18560
18580
18600
18620
18640
18660
18680
18700
18720
18740
18760
18780
18800
18820
18840
18860
18880
18900
18920
18940
18960
18980
19000
19020
19040
19060
19080
19100
19120
19140
19160
19180
19200
19220
19240
19260
19280
19300
19320
19340
19360
19380
19400
19420
19440
19460
19480
19500
19520
19540
19560
19580
19600
19620
19640
19660
19680
19700
19720
19740
19760
19780
19800
19820
19840
19860
19880
19900
19920
19940
19960
19980
20000
20020
20040
20060
20080
20100
20120
20140
20160
20180
20200
20220
20240
20260
20280
20300
20320
20340
20360
20380
20400
20420
20440
20460
20480
20500
20520
20540
20560
20580
20600
20620
20640
20660
20680
20700
20720
20740
20760
20780
20800
20820
20840
20860
20880
20900
20920
20940
20960
20980
21000
21020
21040
21060
21080
21100
21120
21140
21160
21180
21200
21220
21240
21260
21280
21300
21320
21340
21360
21380
21400
21420
21440
21460
21480
21500
21520
21540
21560
21580
21600
21620
21640
21660
21680
21700
21720
21740
21760
21780
21800
21820
21840
21860
21880
21900
21920
21940
21960
21980
22000
22020
22040
22060
22080
22100
22120
22140
22160
22180
22200
22220
22240
22260
22280
22300
22320
22340
22360
22380
22400
22420
22440
22460
22480
22500
22520
22540
22560
22580
22600
22620
22640
22660
22680
22700
22720
22740
22760
22780
22800
22820
22840
22860
22880
22900
22920
22940
22960
22980
23000
23020
23040
23060
23080
23100
23120
23140
23160
23180
23200
23220
23240
23260
23280
23300
23320
23340
23360
23380
23400
23420
23440
23460
23480
23500
23520
23540
23560
23580
23600
23620
23640
23660
23680
23700
23720
23740
23760
23780
23800
23820
23840
23860
23880
23900
23920
23940
23960
23980
24000
24020
24040
24060
24080
24100
24120
24140
24160
24180
24200
24220
24240
24260
24280
24300
24320
24340
24360
24380
24400
24420
24440
24460
24480
24500
24520
24540
24560
24580
24600
24620
24640
24660
24680
24700
24720
24740
24760
24780
24800
24820
24840
24860
24880
24900
24920
24940
24960
24980
25000
25020
25040
25060
25080
25100
25120
25140
25160
25180
25200
25220
25240
25260
25280
25300
25320
25340
25360
25380
25400
25420
25440
25460
25480
25500
25520
25540
25560
25580
25600
25620
25640
25660
25680
25700
25720
25740
25760
25780
25800
25820
25840
25860
25880
25900
25920
25940
25960
25980
26000
26020
26040
26060
26080
26100
26120
26140
26160
26180
26200
26220
26240
26260
26280
26300
26320
26340
26360
26380
26400
26420
26440
26460
26480
26500
26520
26540
26560
26580
26600
26620
26640
26660
26680
26700
26720
26740
26760
26780
26800
26820
26840
26860
26880
26900
26920
26940
26960
26980
27000
27020
27040
27060
27080
27100
27120
27140
27160
27180
27200
27220
27240
27260
27280
27300
27320
27340
27360
27380
27400
27420
27440
27460
27480
27500
27520
27540
27560
27580
27600
27620
27640
27660
27680
27700
27720
27740
27760
27780
27800
27820
27840
27860
27880
27900
27920
27940
27960
27980
28000
28020
28040
28060
28080
28100
28120
28140
28160
28180
28200
28220
28240
28260
28280
28300
28320
28340
28360
28380
28400
28420
28440
28460
28480
28500
28520
28540
28560
28580
28600
28620
28640
28660
28680
28700
28720
28740
28760
28780
28800
28820
28840
28860
28880
28900
28920
28940
28960
28980
29000
29020
29040
29060
29080
29100
29120
29140
29160
29180
29200
29220
29240
29260
29280
29300
29320
29340
29360
29380
29400
29420
29440
29460
29480
29500
29520
29540
29560
29580
29600
29620
29640
29660
29680
29700
29720
29740
29760
29780
29800
29820
29840
29860
29880
29900
29920
29940
29960
29980
30000
30020
30040
30060
30080
30100
30120
30140
30160
30180
30200
30220
30240
30260
30280
30300
30320
30340
30360
30380
30400
30420
30440
30460
30480
30500
30520
30540
30560
30580
30600
30620
30640
30660
30680
30700
30720
30740
30760
30780
30800
30820
30840
30860
30880
30900
30920
30940
30960
30980
31000
31020
31040
31060
31080
31100
31120
31140
31160
31180
31200
31220
31240
31260
31280
31300
31320
31340
31360
31380
31400
31420
31440
31460
31480
31500
31520
31540
31560
31580
31600
31620
31640
31660
31680
31700
31720
31740
31760
31780
31800
31820
31840
31860
31880
31900
31920
31940
31960
31980
32000
32020
32040
32060
32080
32100
32120
32140
32160
32180
32200
32220
32240
32260
32280
32300
32320
32340
32360
32380
32400
32420
32440
32460
32480
32500
32520
32540
32560
32580
32600
32620
32640
32660
32680
32700
32720
32740
32760
32780
32800
32820
32840
32860
32880
32900
32920
32940
32960
32980
33000
33020
33040
33060
33080
33100
33120
33140
33160
33180
33200
33220
33240
33260
33280
33300
33320
33340
33360
33380
33400
33420
33440
33460
33480
33500
33520
33540
33560
33580
33600
33620
33640
33660
33680
33700
33720
33740
33760
33780
33800
33820
33840
33860
33880
33900
33920
33940
33960
33980
34000
34020
34040
34060
34080
34100
34120
34140
34160
34180
34200
34220
34240
34260
34280
34300
34320
34340
34360
34380
34400
34420
34440
34460
34480
34500
34520
34540
34560
34580
34600
34620
34640
34660
34680
34700
34720
34740
34760
34780
34800
34820
34840
34860
34880
34900
34920
34940
34960
34980
35000
35020
35040
35060
35080
35100
35120
35140
35160
35180
35200
35220
35240
35260
35280
35300
35320
35340
35360
35380
35400
35420
35440
35460
35480
35500
35520
35540
35560
35580
35600
35620
35640
35660
35680
35700
35720
35740
35760
35780
35800
35820
35840
35860
35880
35900
35920
35940
35960
35980
36000
36020
36040
36060
36080
36100
36120
36140
36160
36180
36200
36220
36240
36260
36280
36300
36320
36340
36360
36380
36400
36420
36440
36460
36480
36500
36520
36540
36560
36580
36600
36620
36640
36660
36680
36700
36720
36740
36760
36780
36800
36820
36840
36860
36880
36900
36920
36940
36960
36980
37000
37020
37040
37060
37080
37100
37120
37140
37160
37180
37200
37220
37240
37260
37280
37300
37320
37340
37360
37380
37400
37420
37440
37460
37480
37500
37520
37540
37560
37580
37600
37620
37640
37660
37680
37700
37720
37740
37760
37780
37800
37820
37840
37860
37880
37900
37920
37940
37960
37980
38000
38020
38040
38060
38080
38100
38120
38140
38160
38180
38200
38220
38240
38260
38280
38300
38320
38340
38360
38380
38400
38420
38440
38460
38480
38500
38520
38540
38560
38580
38600
38620
38640
38660
38680
38700
38720
38740
38760
38780
38800
38820
38840
38860
38880
38900
38920
38940
38960
38980
39000
39020
39040
39060
39080
39100
39120
39140
39160
39180
39200
39220
39240
39260
39280
39300
39320
39340
39360
39380
39400
39420
39440
39460
39480
39500
39520
39540
39560
39580
39600
39620
39640
39660
39680
39700
39720
39740
39760
39780
39800
39820
39840
39860
39880
39900
39920
39940
39960
39980
40000
40020
40040
40060
40080
40100
40120
40140
40160
40180
40200
40220
40240
40260
40280
40300
40320
40340
40360
40380
40400
40420
40440
40460
40480
40500
40520
40540
40560
40580
40600
40620
40640
40660
40680
40700
40720
40740
40760
40780
40800
40820
40840
40860
40880
40900
40920
40940
40960
40980
41000
41020
41040
41060
41080
41100
41120
41140
41160
41180
41200
41220
41240
41260
41280
41300
41320
41340
41360
41380
41400
41420
41440
41460
41480
41500
41520
41540
41560
41580
41600
41620
41640
41660
41680
41700
41720
41740
41760
41780
41800
41820
41840
41860
41880
41900
41920
41940
41960
41980
42000
42020
42040
42060
42080
42100
42120
42140
42160
42180
42200
42220
42240
42260
42280
42300
42320
42340
42360
42380
42400
42420
42440
42460
42480
42500
42520
42540
42560
42580
42600
42620
42640
42660
42680
42700
42720
42740
42760
42780
42800
42820
42840
42860
42880
42900
42920
42940
42960
42980
43000
43020
43040
43060
43080
43100
43120
43140
43160
43180
43200
43220
43240
43260
43280
43300
43320
43340
43360
43380
43400
43420
43440
43460
43480
43500
43520
43540
43560
43580
43600
43620
43640
43660
43680
43700
43720
43740
43760
43780
43800
43820
43840
43860
43880
43900
43920
43940
43960
43980
44000
44020
44040
44060
44080
44100
44120
44140
44160
44180
44200
44220
44240
44260
44280
44300
44320
44340
44360
44380
44400
44420
44440
44460
44480
44500
44520
44540
44560
44580
44600
44620
44640
44660
44680
44700
44720
44740
44760
44780
44800
44820
44840
44860
44880
44900
44920
44940
44960
44980
45000
45020
45040
45060
45080
45100
45120
45140
45160
45180
45200
45220
45240
45260
45280
45300
45320
45340
45360
45380
45400
45420
45440
45460
45480
45500
45520
45540
45560
45580
45600
45620
45640
45660
45680
45700
45720
45740
45760
45780
45800
45820
45840
45860
45880
45900
45920
45940
45960
45980
46000
46020
46040
46060
46080
46100
46120
46140
46160
46180
46200
46220
46240
46260
46280
46300
46320
46340
46360
46380
46400
46420
46440
46460
46480
46500
46520
46540
46560
46580
46600
46620
46640
46660
46680
46700
46720
46740
46760
46780
46800
46820
46840
46860
46880
46900
46920
46940
46960
46980
47000
47020
47040
47060
47080
47100
47120
47140
47160
47180
47200
47220
47240
47260
47280
47300
47320
47340
47360
47380
47400
47420
47440
47460
47480
47500
47520
47540
47560
47580
47600
47620
47640
47660
47680
47700
47720
47740
47760
47780
47800
47820
47840
47860
47880
47900
47920
47940
47960
47980
48000
48020
48040
48060
48080
48100
48120
48140
48160
48180
48200
48220
48240
48260
48280
48300
48320
48340
48360
48380
48400
48420
48440
48460
48480
48500
48520
48540
48560
48580
48600
48620
48640
48660
48680
48700
48720
48740
48760
48780
48800
48820
48840
48860
48880
48900
48920
48940
48960
48980
49000
49020
49040
49060
49080
49100
49120
49140
49160
49180
49200
49220
49240
49260
49280
49300
49320
49340
49360
49380
49400
49420
49440
49460
49480
49500
49520
49540
49560
49580
49600
49620
49640
49660
49680
49700
49720
49740
49760
49780
49800
49820
49840
49860
49880
49900
49920
49940
49960
49980
50000
50020
50040
50060
50080
50100
50120
50140
50160
50180
50200
50220
50240
50260
50280
50300
50320
50340
50360
50380
50400
50420
50440
50460
50480
50500
50520
50540
50560
50580
50600
50620
50640
50660
50680
50700
50720
50740
50760
50780
50800
50820
50840
50860
50880
50900
50920
50940
50960
50980
51000
51020
51040
51060
51080
51100
51120
51140
51160
51180
51200
51220
51240
51260
51280
51300
51320
51340
51360
51380
51400
51420
51440
51460
51480
51500
51520
51540
51560
51580
51600
51620
51640
51660
51680
51700
51720
51740
51760
51780
51800
51820
51840
51860
51880
51900
51920
51940
51960
51980
52000
52020
52040
52060
52080
52100
52120
52140
52160
52180
52200
52220
52240
52260
52280
52300
52320
52340
52360
52380
52400
52420
52440
52460
52480
52500
52520
52540
52560
52580
52600
52620
52640
52660
52680
52700
52720
52740
52760
52780
52800
52820
52840
52860
52880
52900
52920
52940
52960
52980
53000
53020
53040
53060
53080
53100
53120
53140
53160
53180
53200
53220
53240
53260
53280
53300
53320
53340
53360
53380
53400
53420
53440
53460
53480
53500
53520
53540
53560
53580
53600
53620
53640
53660
53680
53700
53720
53740
53760
53780
53800
53820
53840
53860
53880
53900
53920
53940
53960
53980
54000
54020
54040
54060
54080
54100
54120
54140
54160
54180
54200
54220
54240
54260
54280
54300
54320
54340
54360
54380
54400
54420
54440
54460
54480
54500
54520
54540
54560
54580
54600
54620
54640
54660
54680
54700
54720
54740
54760
54780
54800
54820
54840
54860
54880
54900
54920
54940
54960
54980
55000
55020
55040
55060
55080
55100
55120
55140
55160
55180
55200
55220
55240
55260
55280
55300
55320
55340
55360
55380
55400
55420
55440
55460
55480
55500
55520
55540
55560
55580
55600
55620
55640
55660
55680
55700
55720
55740
55760
55780
55800
55820
55840
55860
55880
55900
55920
55940
55960
55980
56000
56020
56040
56060
56080
56100
56120
56140
56160
56180
56200
56220
56240
56260
56280
56300
56320
56340
56360
56380
56400
56420
56440
56460
56480
56500
56520
56540
56560
56580
56600
56620
56640
56660
56680
56700
56720
56740
56760
56780
56800
56820
56840
56860
56880
56900
56920
56940
56960
56980
57000
57020
57040
57060
57080
57100
57120
57140
57160
57180
57200
57220
57240
57260
57280
57300
57320
57340
57360
57380
57400
57420
57440
57460
57480
57500
57520
57540
57560
57580
57600
57620
57640
57660
57680
57700
57720
57740
57760
57780
57800
57820
57840
57860
57880
57900
57920
57940
57960
57980
58000
58020
58040
58060
58080
58100
58120
58140
58160
58180
58200
58220
58240
58260
58280
58300
58320
58340
58360
58380
58400
58420
58440
58460
58480
58500
58520
58540
58560
58580
58600
58620
58640
58660
58680
58700
58720
58740
58760
58780
58800
58820
58840
58860
58880
58900
58920
58940
58960
58980
59000
59020
59040
59060
59080
59100
59120
59140
59160
59180
59200
59220
59240
59260
59280
59300
59320
59340
59360
59380
59400
59420
59440
59460
59480
59500
59520
59540
59560
59580
59600
59620
59640
59660
59680
59700
59720
59740
59760
59780
59800
59820
59840
59860
59880
59900
59920
59940
59960
59980
60000
60020
60040
60060
60080
60100
60120
60140
60160
60180
60200
60220
60240
60260
60280
60300
60320
60340
60360
60380
60400
60420
60440
60460
60480
60500
60520
60540
60560
60580
60600
60620
60640
60660
60680
60700
60720
60740
60760
60780
60800
60820
60840
60860
60880
60900
60920
60940
60960
60980
61000
61020
61040
61060
61080
61100
61120
61140
61160
61180
61200
61220
61240
61260
61280
61300
61320
61340
61360
61380
61400
61420
61440
61460
61480
61500
61520
61540
61560
61580
61600
61620
61640
61660
61680
61700
61720
61740
61760
61780
61800
61820
61840
61860
61880
61900
61920
61940
61960
61980
62000
62020
62040
62060
62080
62100
62120
62140
62160
62180
62200
62220
62240
62260
62280
62300
62320
62340
62360
62380
62400
62420
62440
62460
62480
62500
62520
62540
62560
62580
62600
62620
62640
62660
62680
62700
62720
62740
62760
62780
62800
62820
62840
62860
62880
62900
62920
62940
62960
62980
63000
63020
63040
63060
63080
63100
63120
63140
63160
63180
63200
63220
63240
63260
63280
63300
63320
63340
63360
63380
63400
63420
63440
63460
63480
63500
63520
63540
63560
63580
63600
63620
63640
63660
63680
63700
63720
63740
63760
63780
63800
63820
63840
63860
63880
63900
63920
63940
63960
63980
64000
64020
64040
64060
64080
64100
64120
64140
64160
64180
64200
64220
64240
64260
64280
64300
64320
64340
64360
64380
64400
64420
64440
64460
64480
64500
64520
64540
64560
64580
64600
64620
64640
64660
64680
64700
64720
64740
64760
64780
64800
64820
64840
64860
64880
64900
64920
64940
64960
64980
65000
65020
65040
65060
65080
65100
65120
65140
65160
65180
65200
65220
65240
65260
65280
65300
65320
65340
65360
65380
65400
65420
65440
65460
65480
65500
65520
65540
65560
65580
65600
65620
65640
65660
65680
65700
65720
65740
65760
65780
65800
65820
65840
65860
65880
65900
65920
65940
65960
65980
66000
66020
66040
66060
66080
66100
66120
66140
66160
66180
66200
66220
66240
66260
66280
66300
66320
66340
66360
66380
66400
66420
66440
66460
66480
66500
66520
66540
66560
66580
66600
66620
66640
66660
66680
66700
66720
66740
66760
66780
66800
66820
66840
66860
66880
66900
66920
66940
66960
66980
67000
67020
67040
67060
67080
67100
67120
67140
67160
67180
67200
67220
67240
67260
67280
67300
67320
67340
67360
67380
67400
67420
67440
67460
67480
67500
67520
67540
67560
67580
67600
67620
67640
67660
67680
67700
67720
67740
67760
67780
67800
67820
67840
67860
67880
67900
67920
67940
67960
67980
68000
68020
68040
68060
68080
68100
68120
68140
68160
68180
68200
68220
68240
68260
68280
68300
68320
68340
68360
68380
68400
68420
68440
68460
68480
68500
68520
68540
68560
68580
68600
68620
68640
68660
68680
68700
68720
68740
68760
68780
68800
68820
68840
68860
68880
68900
68920
68940
68960
68980
69000
69020
69040
69060
69080
69100
69120
69140
69160
69180
69200
69220
69240
69260
69280
69300
69320
69340
69360
69380
69400
69420
69440
69460
69480
69500
69520
69540
69560
69580
69600
69620
69640
69660
69680
69700
69720
69740
69760
69780
69800
69820
69840
69860
69880
69900
69920
69940
69960
69980
70000
70020
70040
70060
70080
70100
70120
70140
70160
70180
70200
70220
70240
70260
70280
70300
70320
70340
70360
70380
70400
70420
70440
70460
70480
70500
70520
70540
70560
70580
70600
70620
70640
70660
70680
70700
70720
70740
70760
70780
70800
70820
70840
70860
70880
70900
70920
70940
70960
70980
71000
71020
71040
71060
71080
71100
71120
71140
71160
71180
71200
71220
71240
71260
71280
71300
71320
71340
71360
71380
71400
71420
71440
71460
71480
71500
71520
71540
71560
71580
71600
71620
71640
71660
71680
71700
71720
71740
71760
71780
71800
71820
71840
71860
71880
71900
71920
71940
71960
71980
72000
72020
72040
72060
72080
72100
72120
72140
72160
72180
72200
72220
72240
72260
72280
72300
72320
72340
72360
72380
72400
72420
72440
72460
72480
72500
72520
72540
72560
72580
72600
72620
72640
72660
72680
72700
72720
72740
72760
72780
72800
72820
72840
72860
72880
72900
72920
72940
72960
72980
73000
73020
73040
73060
73080
73100
73120
73140
73160
73180
73200
73220
73240
73260
73280
73300
73320
73340
73360
73380
73400
73420
73440
73460
73480
73500
73520
73540
73560
73580
73600
73620
73640
73660
73680
73700
73720
73740
73760
73780
73800
73820
73840
73860
73880
73900
73920
73940
73960
73980
74000
74020
74040
74060
74080
74100
74120
74140
74160
74180
74200
74220
74240
74260
74280
74300
74320
74340
74360
74380
74400
74420
74440
74460
74480
74500
74520
74540
74560
74580
74600
74620
74640
74660
74680
74700
74720
74740
74760
74780
74800
74820
74840
74860
74880
74900
74920
74940
74960
74980
75000
75020
75040
75060
75080
75100
75120
75140
75160
75180
75200
75220
75240
75260
75280
75300
75320
75340
75360
75380
75400
75420
75440
75460
75480
75500
75520
75540
75560
75580
75600
75620
75640
75660
75680
75700
75720
75740
75760
75780
75800
75820
75840
75860
75880
75900
75920
75940
75960
75980
76000
76020
76040
76060
76080
76100
76120
76140
76160
76180
76200
76220
76240
76260
76280
76300
76320
76340
76360
76380
76400
76420
76440
76460
76480
76500
76520
76540
76560
76580
76600
76620
76640
76660
76680
76700
76720
76740
76760
76780
76800
76820
76840
76860
76880
76900
76920
76940
76960
76980
77000
77020
77040
77060
77080
77100
77120
77140
77160
77180
77200
77220
77240
77260
77280
77300
77320
77340
77360
77380
77400
77420
77440
77460
77480
77500
77520
77540
77560
77580
77600
77620
77640
77660
77680
77700
77720
77740
77760
77780
77800
77820
77840
77860
77880
77900
77920
77940
77960
77980
78000
78020
78040
78060
78080
78100
78120
78140
78160
78180
78200
78220
78240
78260
78280
78300
78320
78340
78360
78380
78400
78420
78440
78460
78480
78500
78520
78540
78560
78580
78600
78620
78640
78660
78680
78700
78720
78740
78760
78780
78800
78820
78840
78860
78880
78900
78920
78940
78960
78980
79000
79020
79040
79060
79080
79100
79120
79140
79160
79180
79200
79220
79240
79260
79280
79300
79320
79340
79360
79380
79400
79420
79440
79460
79480
79500
79520
79540
79560
79580
79600
79620
79640
79660
79680
79700
79720
79740
79760
79780
79800
79820
79840
79860
79880
79900
79920
79940
79960
79980
80000
80020
80040
80060
80080
80100
80120
80140
80160
80180
80200
80220
80240
80260
80280
80300
80320
80340
80360
80380
80400
80420
80440
80460
80480
80500
80520
80540
80560
80580
80600
80620
80640
80660
80680
80700
80720
80740
80760
80780
80800
80820
80840
80860
80880
80900
80920
80940
80960
80980
81000
81020
81040
81060
81080
81100
81120
81140
81160
81180
81200
81220
81240
81260
81280
81300
81320
81340
81360
81380
81400
81420
81440
81460
81480
81500
81520
81540
81560
81580
81600
81620
81640
81660
81680
81700
81720
81740
81760
81780
81800
81820
81840
81860
81880
81900
81920
81940
81960
81980
82000
82020
82040
82060
82080
82100
82120
82140
82160
82180
82200
82220
82240
82260
82280
82300
82320
82340
82360
82380
82400
82420
82440
82460
82480
82500
82520
82540
82560
82580
82600
82620
82640
82660
82680
82700
82720
82740
82760
82780
82800
82820
82840
82860
82880
82900
82920
82940
82960
82980
83000
83020
83040
83060
83080
83100
83120
83140
83160
83180
83200
83220
83240
83260
83280
83300
83320
83340
83360
83380
83400
83420
83440
83460
83480
83500
83520
83540
83560
83580
83600
83620
83640
83660
83680
83700
83720
83740
83760
83780
83800
83820
83840
83860
83880
83900
83920
83940
83960
83980
84000
84020
84040
84060
84080
84100
84120
84140
84160
84180
84200
84220
84240
84260
84280
84300
84320
84340
84360
84380
84400
84420
84440
84460
84480
84500
84520
84540
84560
84580
84600
84620
84640
84660
84680
84700
84720
84740
84760
84780
84800
84820
84840
84860
84880
84900
84920
84940
84960
84980
85000
85020
85040
85060
85080
85100
85120
85140
85160
85180
85200
85220
85240
85260
85280
85300
85320
85340
85360
85380
85400
85420
85440
85460
85480
85500
85520
85540
85560
85580
85600
85620
85640
85660
85680
85700
85720
85740
85760
85780
85800
85820
85840
85860
85880
85900
85920
85940
85960
85980
86000
86020
86040
86060
86080
86100
86120
86140
86160
86180
86200
86220
86240
86260
86280
86300
86320
86340
86360
86380
86400
86420
86440
86460
86480
86500
86520
86540
86560
86580
86600
86620
86640
86660
86680
86700
86720
86740
86760
86780
86800
86820
86840
86860
86880
86900
86920
86940
86960
86980
87000
87020
87040
87060
87080
87100
87120
87140
87160
87180
87200
87220
87240
87260
87280
87300
87320
87340
87360
87380
87400
87420
87440
87460
87480
87500
87520
87540
87560
87580
87600
87620
87640
87660
87680
87700
87720
87740
87760
87780
87800
87820
87840
87860
87880
87900
87920
87940
87960
87980
88000
88020
88040
88060
88080
88100
88120
88140
88160
88180
88200
88220
88240
88260
88280
88300
88320
88340
88360
88380
88400
88420
88440
88460
88480
88500
88520
88540
88560
88580
88600
88620
88640
88660
88680
88700
88720
88740
88760
88780
88800
88820
88840
88860
88880
88900
88920
88940
88960
88980
89000
89020
89040
89060
89080
89100
89120
89140
89160
89180
89200
89220
89240
89260
89280
89300
89320
89340
89360
89380
89400
89420
89440
89460
89480
89500
89520
89540
89560
89580
89600
89620
89640
89660
89680
89700
89720
89740
89760
89780
89800
89820
89840
89860
89880
89900
89920
89940
89960
89980
90000
90020
90040
90060
90080
90100
90120
90140
90160
90180
90200
90220
90240
90260
90280
90300
90320
90340
90360
90380
90400
90420
90440
90460
90480
90500
90520
90540
90560
90580
90600
90620
90640
90660
90680
90700
90720
90740
90760
90780
90800
90820
90840
90860
90880
90900
90920
90940
90960
90980
91000
91020
91040
91060
91080
91100
91120
91140
91160
91180
91200
91220
91240
91260
91280
91300
91320
91340
91360
91380
91400
91420
91440
91460
91480
91500
91520
91540
91560
91580
91600
91620
91640
91660
91680
91700
91720
91740
91760
91780
91800
91820
91840
91860
91880
91900
91920
91940
91960
91980
92000
92020
92040
92060
92080
92100
92120
92140
92160
92180
92200
92220
92240
92260
92280
92300
92320
92340
92360
92380
92400
92420
92440
92460
92480
92500
92520
92540
92560
92580
92600
92620
92640
92660
92680
92700
92720
92740
92760
92780
92800
92820
92840
92860
92880
92900
92920
92940
92960
92980
93000
93020
93040
93060
93080
93100
93120
93140
93160
93180
93200
93220
93240
93260
93280
93300
93320
93340
93360
93380
93400
93420
93440
93460
93480
93500
93520
93540
93560
93580
93600
93620
93640
93660
93680
93700
93720
93740
93760
93780
93800
93820
93840
93860
93880
93900
93920
93940
93960
93980
94000
94020
94040
94060
94080
94100
94120
94140
94160
94180
94200
94220
94240
94260
94280
94300
94320
94340
94360
94380
94400
94420
94440
94460
94480
94500
94520
94540
94560
94580
94600
94620
94640
94660
94680
94700
94720
94740
94760
94780
94800
94820
94840
94860
94880
94900
94920
94940
94960
94980
95000
95020
95040
95060
95080
95100
95120
95140
95160
95180
95200
95220
95240
95260
95280
95300
95320
95340
95360
95380
95400
95420
95440
95460
95480
95500
95520
95540
95560
95580
95600
95620
95640
95660
95680
95700
95720
95740
95760
95780
95800
95820
95840
95860
95880
95900
95920
95940
95960
95980
96000
96020
96040
96060
96080
96100
96120
96140
96160
96180
96200
96220
96240
96260
96280
96300
96320
96340
96360
96380
96400
96420
96440
96460
96480
96500
96520
96540
96560
96580
96600
96620
96640
96660
96680
96700
96720
96740
96760
96780
96800
96820
96840
96860
96880
96900
96920
96940
96960
96980
97000
97020
97040
97060
97080
97100
97120
97140
97160
97180
97200
97220
97240
97260
97280
97300
97320
97340
97360
97380
97400
97420
97440
97460
97480
97500
97520
97540
97560
97580
97600
97620
97640
97660
97680
97700
97720
97740
97760
97780
97800
97820
97840
97860
97880
97900
97920
97940
97960
97980
98000
98020
98040
98060
98080
98100
98120
98140
98160
98180
98200
98220
98240
98260
98280
98300
98320
98340
98360
98380
98400
98420
98440
98460
98480
98500
98520
98540
98560
98580
98600
98620
98640
98660
98680
98700
98720
98740
98760
98780
98800
98820
98840
98860
98880
98900
98920
98940
98960
98980
99000
99020
99040
99060
99080
99100
99120
99140
99160
99180
99200
99220
99240
99260
99280
99300
99320
99340
99360
99380
99400
99420
99440
99460
99480
99500
99520
99540
99560
99580
99600
99620
99640
99660
99680
99700
99720
99740
99760
99780
99800
99820
99840
99860
99880
99900
99920
99940
99960
99980
100000

0424 Zulu

800 21 Aug

TRANS WORLD AIRLINES
NORTH ATLANTIC C/L CHARTS

TWA ← NA C/L-2

© 1960 JEPPESEN & CO.
8025 E. 40th AVE DENVER, COLO. USA
All rights reserved

→ TWA NA C/L-1

REVISION DATA

CHART NA C/L-1 FEB 13-62 Loran rates I-L-0 and I-L-4 added. Cork, Ireland, VOR added. Facility frequencies and identifiers revised as applicable.

CHART NA C/L-2 FEB 13-62 Loran rates I-L-0 and I-L-4 added. Cork, Ireland, VOR added. Facility frequencies and identifiers revised as applicable.

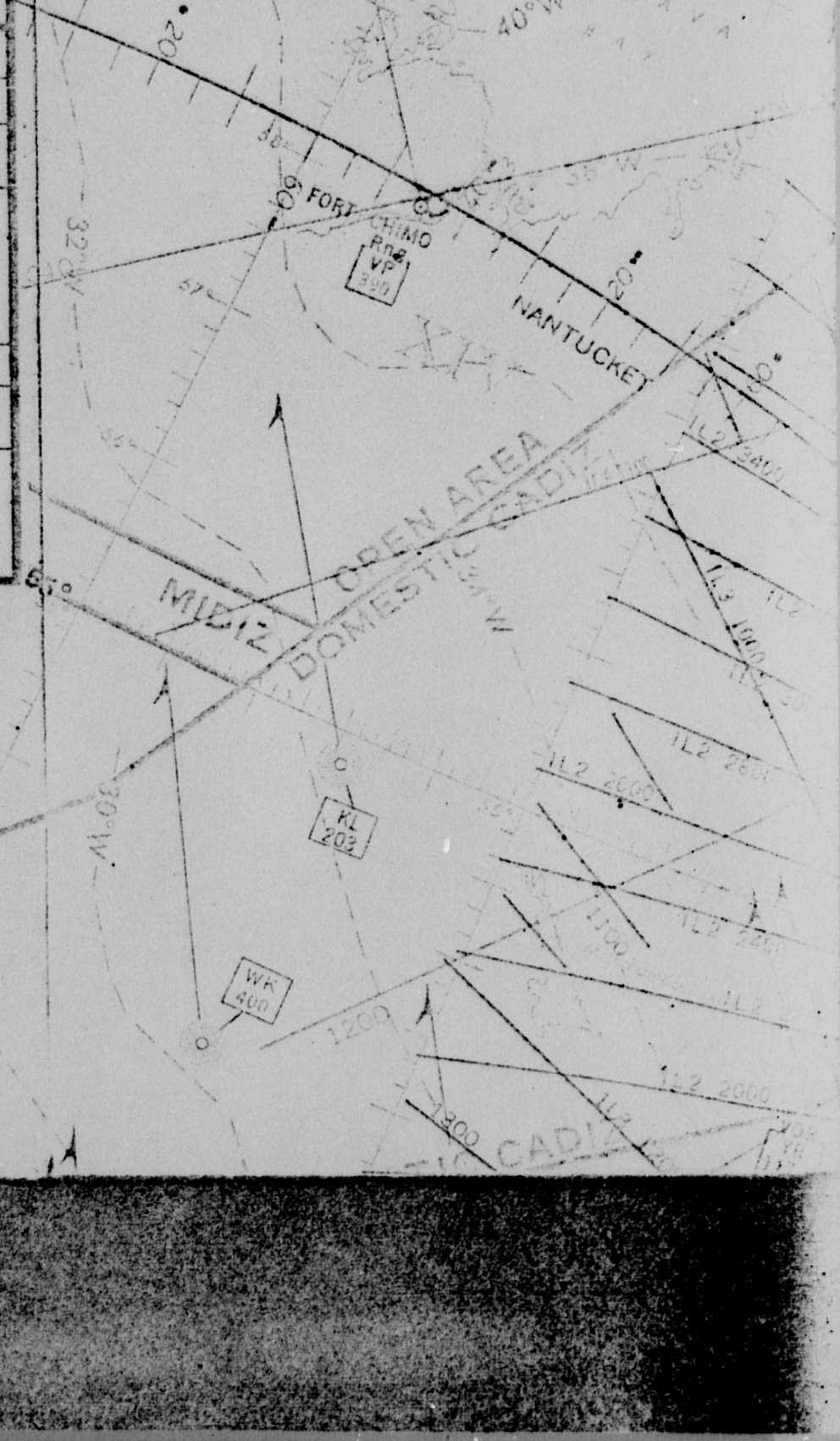
CANADIAN RADAR ASSISTANCE

1. Contact Canadian Radar Advisory on 122.2
2. If normal Air Defense commitments preclude Advisory Service, radar will transmit "unable" with no further explanation
3. Radar Advisory will provide:

   a) Track and ground speed checks
   b) position of aircraft by GEOREF unless otherwise requested
   c) vectors to designated points
   d) position of heavy cloud
   e) flight following to aircraft in distress

VOLMET BROADCASTS - 3001, 5559, 8828.5, 13264.5 Kcs.

00-05	05-10	10-15	15-20	20-25	25-30
NEW YORK OVERSEAS RADIO	GANDER	GANDER	SHANNON AERADIO	SHANNON AERADIO	PARIS RADIO FRENCH LANGUAGE
NEW YORK INTERNATIONAL BOSTON WASHINGTON	GANDER GOOSE STEPHENVILLE	MONCTON SYDNEY MONTREAL	SHANNON PRESTWICK LONDON/LONDON	AMSTERDAM/ SCHIPHOL BRUXELLES/ NATIONAL DUBLIN	PARIS/ORLY LYON TOURS
30-35	35-40	40-45	45-50	50-55	55-60
NEW YORK OVERSEAS RADIO	GANDER	GANDER	SHANNON AERADIO	SHANNON AERADIO	PARIS RADIO
NEW YORK INTERNATIONAL BOSTON WASHINGTON	GANDER GOOSE STEPHENVILLE	MONCTON SYDNEY MONTREAL	SHANNON PRESTWICK LONDON/LONDON	AMSTERDAM/ SCHIPHOL BRUXELLES/ NATIONAL	PARIS/ORLY FRANKFURT MAIN GENEVE

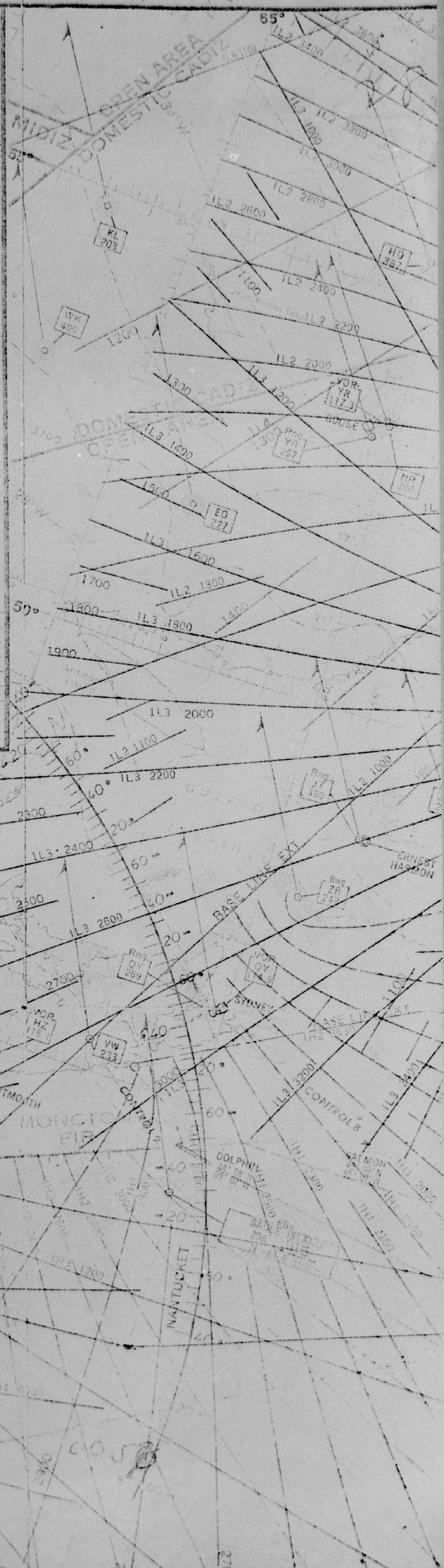


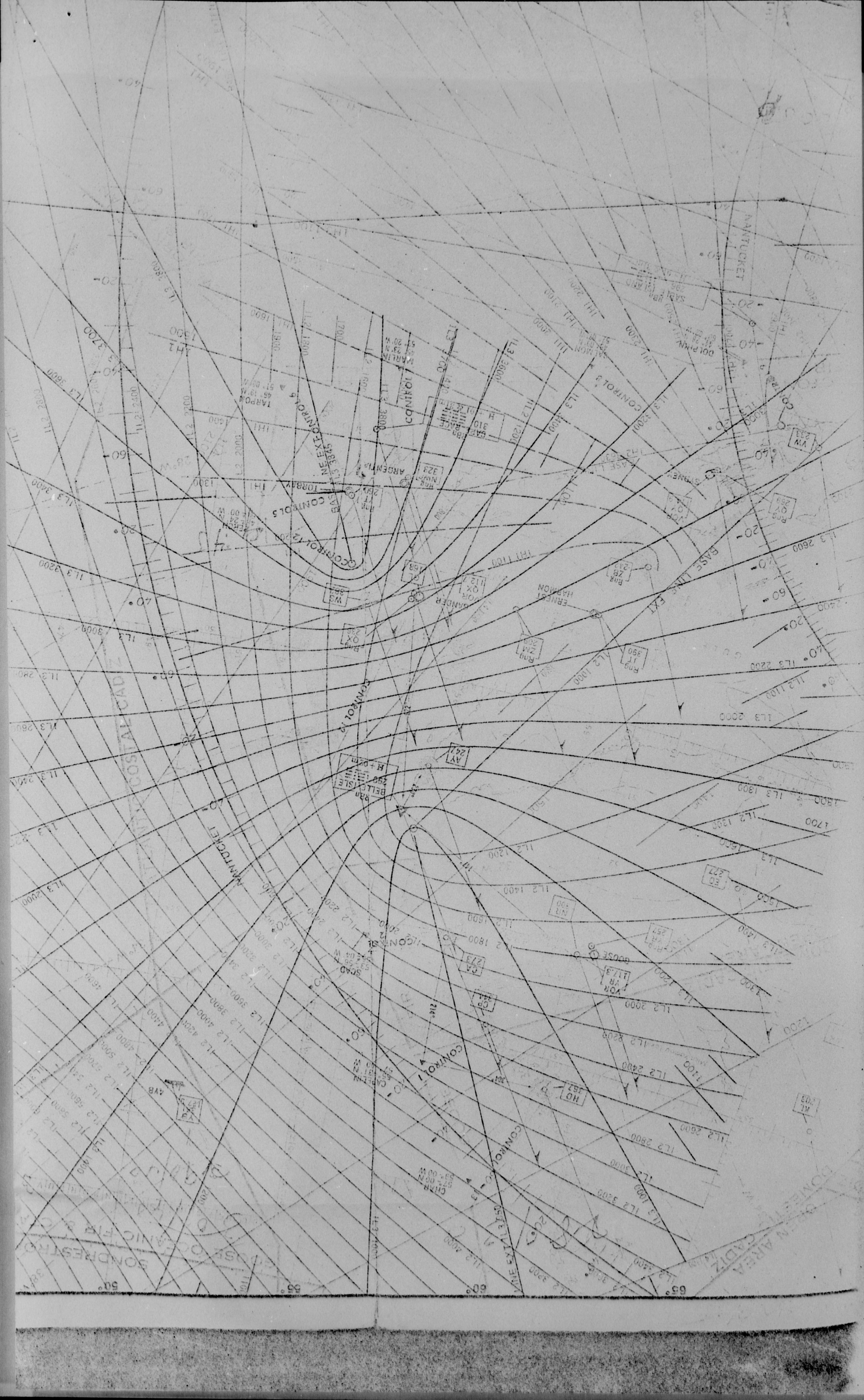
ENROUTE COMMUNICATIONS
NORTH ATLANTIC

STATION	VHF	HF											
		OUTER CIRCLE						INNER CIRCLE					
		FAM A SOUTHERN ROUTES				FAM D NORTHERN ROUTES				FAM B acft registered in states West of 30°W		FAM C acft registered in states East of 30°W	
		2851	5611.5	8947.5	13354.5 17966.5	2868	5626.5	8913.5	13324.5 17966.5	2887	5671.5 8988 13284.5 17966.5	2945	5641.5 8852 13284.5 17966.5
Amsterdam	121.1 123.7												
Bermuda/Kindley	126.9	x	x	x									
Sodo	126.7					x	x	x					
Churchill	126.9					x	x	x	x				
Copenhagen	120.3 120.9					x	x	x	x				
Frobisher	126.9					x	x	x					
Gander	126.9W 127.1E 119.7 (5) 133.9 (6)	x	x	x	x	x	x	x	x	x	x x x	x	x x x
Goose	126.9 120.4 (5) 133.1 (6)					x	x	x		x	x x		
Knob Lake	126.2												
Lisbon	118.5	x	x	x	x								
Moncton	126.9 132.2 (6)					x	x	x					
Montreal	126.9 132.35 (6)					x	x	x					
Mont Joli	126.9					x	x	x					
New York	130.4 (Local) 129.9 (North)	x	x	x	x x	x	x	x	x x	x	x x x x	x	x x x x
Nord	127.9					x	x	x					
Oslo	126.7					x	x						
Paris	119.3 125.1 126.1 127.9 (4)		x	x		x	x						
Prestwick Oceanic		x	x	x	x	x	x	x	x	x	x x x x	x	x x x x
Prince Christian	127.9					x	x	x		x		x	
Reykjavik	127.9					x	x	x	x	x	x x x x	x	x x x x
Santa Maria	127.9	x	x	x	x x					x	x x x	x	x x x x
Shannon	127.6 120.9	x	x	x	x	x	x	x		x	x x x x	x	x x x x
Sondrestrom	127.9					x	x	x					
Stavanger	124.7 126.7 127.9					x	x	x					
Sydney	126.9												
Thule (Dundas)	121.5 127.9					x	x	x					
OSV Alpha	121.5 (2) 127.9 (1)					N	D	R	R				
OSV Bravo	121.5 (2) 127.9 (3)					R	x	R	R				
OSV Charlie	121.5 (2) 127.9 (3)					R	x	R	R				
OSV Delta	121.5 (2) 127.9 (3)	R	x	R	R								
OSV Echo	121.5 (2) 127.9 (3)	R	x	R	R								
OSV India	121.5 (2) 127.9 (1)					N	D	R	R				
OSV Juliett	121.5 (2) 127.9 (1)					N	D	R	R				
OSV Kilo	121.5 (2) 127.9 (1)	R	x	R	R								

NOTES:
1 On request only on UK vessels
2 International VHF emergency
3 Primary VHF air/ship
4 See Aviation Chart GND COM for additional frequencies
5 Extended Range
6 High Level

R = On Request D = Day
N = Night x = H24




NANTUCKET
CONTROL 5
CONTROL 2
CONTROL 1
NE EXTENSION
BASE LINE EXT
ENTRANCE
ENTRANCE
ENTRANCE

DRESTRONA FIR

FIR & CTA

REYKJAVIK OCEANIC FIR & CTA

GANDER OCEANIC FIR & CTA

SANTA MARIA OCEANIC FIR & CTA

OZN 303

YC 395 127.5

YD 350 127.9

4YC

4YD

BUSHMILLS

PLONEIS

50° 45° 40° 35° 30°

32°W 30°W 28°W 26°W

IL2 3000 IL2 3200 IL2 3400 IL2 3600 IL2 3800 IL2 4000 IL2 4200 IL2 4400 IL2 4600 IL2 4800 IL2 5000 IL2 5200 IL2 5400 IL2 5600 IL2 5800 IL2 6000 IL2 6200 IL2 6400 IL2 6600 IL2 6800 IL2 7000 IL2 7200 IL2 7400 IL2 7600 IL2 7800

IL3 1800 IL3 2000 IL3 2200 IL3 2400 IL3 2600 IL3 2800 IL3 3000 IL3 3200 IL3 3400 IL3 3600

SHANNON FIR
SHANWICK
OCEANIC FIR & CTA

PLONEIS

LUGO

SEVILLA

BUSHMILLS

STAVANGER

CHART TWA NA C/L-2

SHANNON FIR

LONDON FIR

PARIS FIR

MADRID FIR

SEVILLA

SANTA MARIA OCEANIC & CTA

LISBON FIR

SHANNON OCEANIC TCA

BUSHMILLS

DUBLIN

SHANNON

SOUTH SHANNON

ROUNDISLAND

MIZEN HEAD

LUGO

MANCHESTER

LONDON

HURN

PLONEIS

SOUTH PLONEIS

SCHIPHOL

NATIONAL

LE BOURGET ORLY

MERIGNAC

SEVILLA

BILBAO

SALAMANCA

PORTO

LISBON

BARAJAS

Belfast

Birmingham

Bordeaux

Boulogne

Amsterdam

Manchester

Limerick

Kilkee

Ballycastle

GREAT BRITAIN

IRELAND

SPAIN

PORTUGAL

BASE LINE EXTENSION FLO 1100

ILS/MLS CHANNEL

ILS/MLS CHANNEL

ILS/MLS CHANNEL