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## Technical Memorandum 80662

# Overseas Trip Report, CV 990 Underflight Mission

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**MARCH 1980**

National Aeronautics and  
Space Administration

**Goddard Space Flight Center**  
Greenbelt, Maryland 20771



TM 80662

OVERSEAS TRIP REPORT, CV 990

UNDERFLIGHT MISSION

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March 1980

GODDARD SPACE FLIGHT CENTER  
Greenbelt, Maryland

**OVERSEAS TRIP REPORT: OCTOBER/NOVEMBER CV-990 UNDERFLIGHT MISSION FOR  
THE NIMBUS-7 SCANNING MULTICHANNEL MICROWAVE RADIOMETER**

**Purpose**

The main objective of this mission was to gather "surface truth" information during underflights of the SMMR-7 over open oceans, sea ice, and continental ice sheets. On board the NASA CV-990 aircraft were the SMMR-7 Simulator, the Ocean Temperature Scanner, and an imaging scatterometer/altimeter operating at 14 GHz. Seventeen of the nineteen flights were devoted to this purpose. One of the two remaining flights was dedicated to an unrelated mission over frozen lakes near Barrow and the other to a demonstration of the CV-990 airborne laboratory to interested individuals from the Royal Norwegian Research Council, the University of Bergen, and the Christian Michelsen Institute, who in turn were providing comprehensive surface truth during the CV-990 flights over the Norwegian Sea.

**Bodo Operations**

Bodo, Norway served as the arrival and departure point for operations based in Norway. The two data flights were over the Norwegian Sea; one was devoted to mapping the ocean polar front south and west of Bear Island and the other to transecting several SMMR-7 footprints in a rectangular pattern parallel to the northern shoreline of Norway. In both cases, the CV-990 flight was coordinated with a Norwegian research vessel and a P-3 Orion aircraft which dropped ocean temperature sensing devices (AXBT's) at regular intervals within the CV-990 flight patterns. Data acquired by all parties during these flights will be exchanged, probably within the next 2 months.

The CV-990 was flown from Bodo to Bergen for the aforementioned demonstration of the SMMR-7 Simulator and the supporting instruments. Since it was the occasion of the Odd Dahl Symposium in Remote Sensing in honor of his 80th birthday (Odd Dahl was the navigator/pilot on the Maud Expedition), a large number of people visited the aircraft. Principal visitors to the aircraft were Mr. Dahl, the celebrant; Dr. Landmark of the Royal Norwegian Research Council; Dr. J. A.

Anderson, Director of the Christian Michelsen Institute (Bergen); Mr. A. Overgard, Station Manager of the Tromsø Spacecraft Telemetry receiving site; and Dr. O. M. Johannessen, principal investigator for the Norwegian Sea Experiment (NORSEX).

There were planning sessions for the coordinated flights and transects of the CV-990, Norwegian P-3 Orion aircraft, and the Norwegian research vessel in Bodo with Dr. Johannessen.

#### Greenland Operations

Thule served as the base for six flights devoted to obtaining correlative underflight data for the cryosphere parameters; e.g., sea ice concentration, surface temperature, and type, and Greenland ice sheet characteristics. Flights coordinated with Canadian surface truth measurements at Pond Inlet and the Beaufort Sea (off the McKenzie Delta) were carried out in collaboration with Dr. R. O. Ramseier of the Canadian Environment and Fisheries Department, Sondre-Storm fjord served as an intermediate stop-over for these flights, as did Gander, Newfoundland.

#### Other Operations

The remaining flights were based out of the U.S. air fields, i.e., Moffet Field, Andrews Air Force Base, McChord Air Force Base, Hilo International, and Fairbanks International. Two cryosphere parameter validation flights were flown out of Fairbanks; the remaining flights out of the other air fields were devoted to ocean/atmosphere parameter validation, e.g., sea surface temperature, near-surface winds, atmosphere water vapor, and cloud water.

All-in-all, the mission appeared to be highly successful in terms of excellent weather, high percentage of time for successful instrument operation, and minimum perturbations from the flight plans.

## CONTENTS

### SEA ICE

<u>Day</u>	<u>Location</u>	<u>Page</u>
298	Baffin Bay	12
299	Multi-year -- Northwest of Greenland	16
303	Ice Edge	26
310	Ice Edge	42
312	Pond Inlet	51
313	Ice Type -- Beaufort Sea	61
315	First Year Footprint	66
316	North of Pt. Barrow	71

### OCEAN/ATMOSPHERE

305	Polar Front	31
307	Sea Surface Temperature (SST) -- Near Surface Winds (NSW)	37
317	SST -- Fairbanks to Hilo Transit	77
320	SST/NSW -- Hilo to Seattle	81
321	NSW -- NOAA Coordination Flight	85
323	SST/NSW -- Seattle to Ames	89

### ICE SHEET

301	Northern Greenland	21
311	Southern Greenland	46

SMMR WINTER EXPERIMENT PROGRAM

SUMMARY OF FLIGHTS

AMES FLIGHT NO.	CV-990 TAKEOFF		CV-990 TOUCHDOWN		FLIGHT DURATION		GMT DAY
	L.T.	GMT	L.T.	GMT	H	M	
1	1256 Moffet	1956	1508 Moffet	2208	2	12	293 10/20
2	0804 Moffet	1504	1548 Andrews	1948	4	44	297 10/24
3A	0808 Andrews	1208	1143 Gander	1443	2	35	298 10/25
3B	1317 Gander	1617	1622 Thule	2022	4	05	298 10/25
4	1111 Thule	1511	1609 Thule	2009	4	58	299 10/26
5	0949 Thule	1349	1440 Thule	1840	4	51	301 10/28
6	1018 Thule	1418	1953 Bodo	1853	4	35	303 10/30
7	0847 Bodo	0747	1441 Bodo	1341	5	54	305 11/1
8A	0959 Bodo	0859	1154 Bergen	1054	1	55	306 11/2
8B	1507 Bergen	1407	1612 Bodo	1512	1	5	306 11/2
9	0821 Bodo	0721	1317 Bodo	1217	4	56	307 11/3
10	1008 Bodo	0908	1115 Sondstrom	1415	5	7	310 11/6
11	1028 Sondstrom	1328	1431 Thule	1831	5	3	311 11/7
12	1105 Thule	1505	1531 Thule	1931	4	26	312 11/8

**SMMR WINTER EXPERIMENT PROGRAM**

**SUMMARY OF FLIGHTS**

AMES FLIGHT NO.	CV-990 TAKEOFF		CV-990 TOUCHDOWN		FLIGHT DURATION		GMT DAY
	L.T.	GMT	L.T.	GMT	H	M	
13	1155 Thule	1555	1126 Fairbanks	2126	5	31	313 11/9
14	0934 Fairbanks	1934	1438 Fairbanks	0038	5	4	315 11/11
15	1004 Fairbanks	2004	1522 Fairbanks	0122	5	18	316 11/12
16	0951 Fairbanks	1951	1619 Hilo	0219	6	28	317 11/13
17	0949 Hilo	1949	1743 McChord	0143	5	54	320 11/16
18	1113 McChord	1913	1658 McChord	0058	5	45	321 11/17
19	1125 McChord	1925	1623 Moffet	0023	4	58	323 11/19
TOTAL					95	24	

## GROUND SURFACE TRUTH -- SMMR 1978 FLIGHTS

The following ground surface truth measurements were taken during the SMMR Winter Experiment Program flight.

- BODO**            A Norwegian surface vessel was taking sea temperature and wave height measurements. A Norwegian (P-3) airplane dropped AXBT's along flight lines.
- THULE**            Ice measurements were taken by an experiment team in POND INLET.
- FAIRBANKS**       Support was given by Canadian aircraft by visual, radar, IR and LASER observations.
- SEATTLE**         Flights were coordinated with a NOAA P-3 which dropped AXBT's. Supporting measurement were taken by the weather ship PAPA and surface buoys.

DAY No. 293

SMMR WINTER EXPERIMENT PROGRAM - 1

Date: 10/20/78

Take off from: Moffet Field, Cal.

Touchdown at: Moffet Field, Cal.

Flight Objectives:

Primary: Instrument checkout flight

Secondary: Ocean data

Weather: Clear

NIMBUS-7 Orbital Intercepts: NONE - Prelaunch

Flight Path Way Points	Lat.(N)	Long.(W)	Altitude (FT)	Time (GMT)	Location or Maneuver	Remarks
Takeoff	37.4	122.0	12	H 19	S.E. San Fran Bay	Heading 340°
WP-1	38.6	123.0	27400	20:11	Russian Rv.	Over Mtns.
WP-2	39.3	123.8	35000	20:19	Ft. Bragg, Cal.	Over Coast-line
WP-3	40.6	126.9	35000	20:41	Due West of Eureka, Cal.	Over Ocean
WP-4	43.7	126.9	35000	21:03	Due West of Eugene, Ore.	Over Ocean
WP-5	43.6	127.1	35000	21:05	Heading Southerly	Over Ocean
WP-6	40.5	124.4	33000	21:34	Heading SSE Over Cst	(Kings Peak)
WP-7	37.5	122.3	7300	22:02	End of Run	
LAND	37.4	127.0	12			

Day No. 293

SMMR WINTER EXPERIMENT PROGRAM - 1

Comments

No significant data were acquired.

DAY No. 297

SMR WINTER EXPERIMENT PROGRAM -2

Date: 10-24-78

Take Off From: Moffet Field, Cal.

Touchdown At: Andrews AFB, MD

Flight Objectives:

Primary: Traverse of Great Salt Lake and Lake Michigan for water calibration.

Secondary: Additional calibration of deserts and salt flats. Pick up NASA Scientific Team  
at Andrews AFB, MD.

Weather: Variable.

NIMBUS-7 Orbital Intercepts 5-7

Flight Path Way Points	Lat.(N)	Long.(W)	Altitude (Ft)	Time (GMT)	Remarks
Takeoff	37.4	122.1	100	15:04	Moffet Field
1	39.1	120.0	33,300	15:33	Lake Tahoe Heading 060°
2	40.2	117.8	33,200	15:49	Over Mt. Tobin, NV (9775')
3	40.8	115.6	33,300	16:03	Over Elko, NV heading 067°
4	41.4	113.0	33,300	16:18	NW Shore - Great Salt Lake
5	41.5	110.0	33,000	16:29	Utah, Wyoming State Line
6	41.8	105.6	33,000	17:00	Wheatland Res., Wyo.
7	42.6	96.4	37,000	17:49	Missouri Rv. at Sioux City, IA
8	43.0	88.0	37,000	18:32	Over Milwaukee, Wisc. (Lake Mich.)
9	42.5	86.3	37,000	18:41	East Shore Lake Michigan
10	39.6	80.0	35,300	19:20	Morgantown, W. VA area
11	39.0	77.6	15,100	19:33	Over Dulles
Touchdown	38.8	76.8	4	19:48	At Andrews

Comments

Instruments operated by skeleton crew.

DAY NO: 297

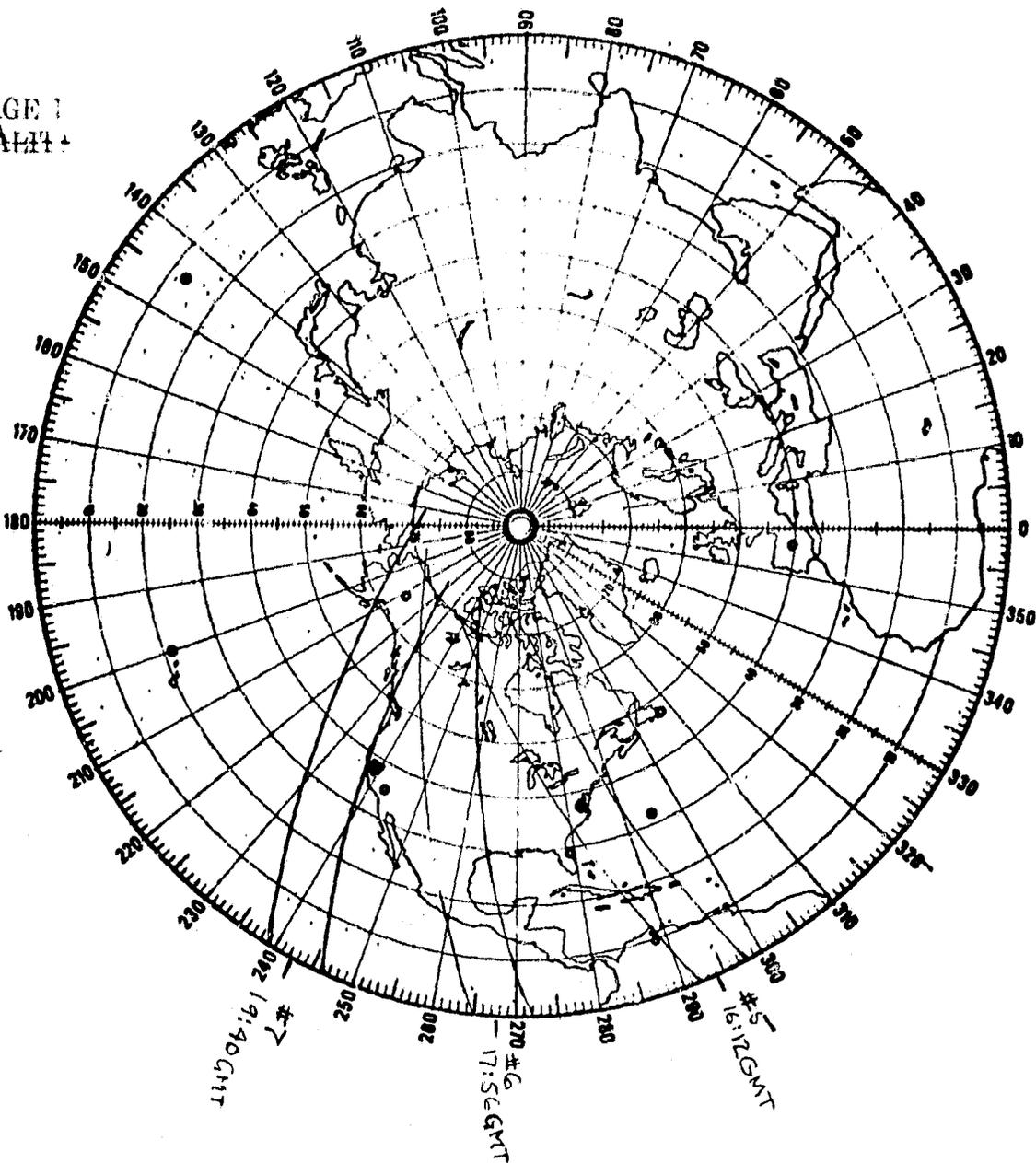
SMHR WINTER EXPERIMENT NO.-2

DATE: 10/24/78

Take off from: Moffett Field

Touchdown at: Andrews AFB

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DAY No. 298

SMMR WINTER EXPERIMENT PROGRAM - 3A

DATE: 10-25-78

Take Off From: Andrews AFB, MD

Touchdown At: Gander, Newfoundland

Flight Objectives:

Primary: Obtain passive microwave signatures for Sea Surface Temperatures (SST) and Near Surface Winds (NSW).

Secondary: Test team familiarization and instrument checkout.

Weather: Clear at start of trip, but partially cloudy most of trip.

NIMBUS-7 Orbital Intercepts 15-19

<u>Flight Path Way Points</u>	<u>Lat.(N)</u>	<u>Long.(W)</u>	<u>Time (GMT)</u>	<u>Altitude (Ft.)</u>	<u>Remarks</u>
Takeoff	38:48	76:51	12:08	84	Andrews Field, MD ESMR down
WP-1	39:14	75:52	12:18	18,500	Over Land
WP-2	39:49	75:00	12:25	27,200	Over Land
WP-3	40:38	73:40	12:36	33,000	Over Land
WP-4	41:38	72:24	12:47	33,000	Over Land
WP-5	41:57	71:51	12:50	33,000	Over Land
WP-6	43:26	69:28	13:08	33,000	Over Land
WP-7	45:24	65:52	13:33	33,000	Start Gulf of St. Lawrence ESMR on
WP-8	46:12	65:28	13:48	33,000	
WP-1	47:34	59:08	14:10	33,000	
Touchdown	48:55	54:38	14:43	150	Refueling stop at Gander, NF

SMMR WINTER EXPERIMENT PROGRAM - 3B

Take Off From: Gander, Newfound Land

Touchdown At: Thule

Flight Objectives:

**Primary:** Find the Baffin Bay Ice Edge; Obtain passive microwave signatures of the First Year Ice Forms

**Secondary:** Determine the Sea Surface Temperature Gradient (from warm southern waters to colder Arctic waters).

**Weather:** Partially cloudy most of trip. Once Ice Edge was reached, it was relatively clear. Extremely high winds encountered at Thule.

## NIMBUS-7 Orbital Intercepts 18-20

Flight Path Way Points	Lat.(N)	Long.(W)	Time (Z)	Altitude (Ft.)	Remarks
Takeoff	48:55	54:38	16:17	-	Gander, Newfoundland; cloud
WP-1	55:00	55:00	17:13	29,000	White water
WP-2	60:00	57:01	17:52	28,900	cloudy
WP-3	65:00	60:00	18:31	29,000	Icebergs ~1829; Ice edge 1840.
WP-4	68:30	61:30	18:57	29,000	Grey/grease ice, then open water. Main pack edge at 1903Z.
	73:33	64:32	19:36	27,600	Wingover
WP-5	74:00	64:53	19:40	20,000	Sea Ice run.
WP-6	74:55	66:59	19:51	9,800	
Touchdown	76:32	68:59	20:22	-	Thule; base for sea ice surface truth

Comments

First Portion (Andrew to Gander) - The trip was uneventful. Some minor problems were encountered with ESMR and with power sources early in the flight. These were soon resolved. Flight objectives were apparently achieved.

Second Portion (Gander to Thule) - The flight objectives were apparently achieved. There were no problems with the sensors and with the data collection systems. The ice edge was identified. Visibility was sufficient to identify icebergs and first year ice that was forming. Icebergs that were approximately 150 feet high were observed on approaching Thule. Because of high winds, the final approach into Thule was difficult.

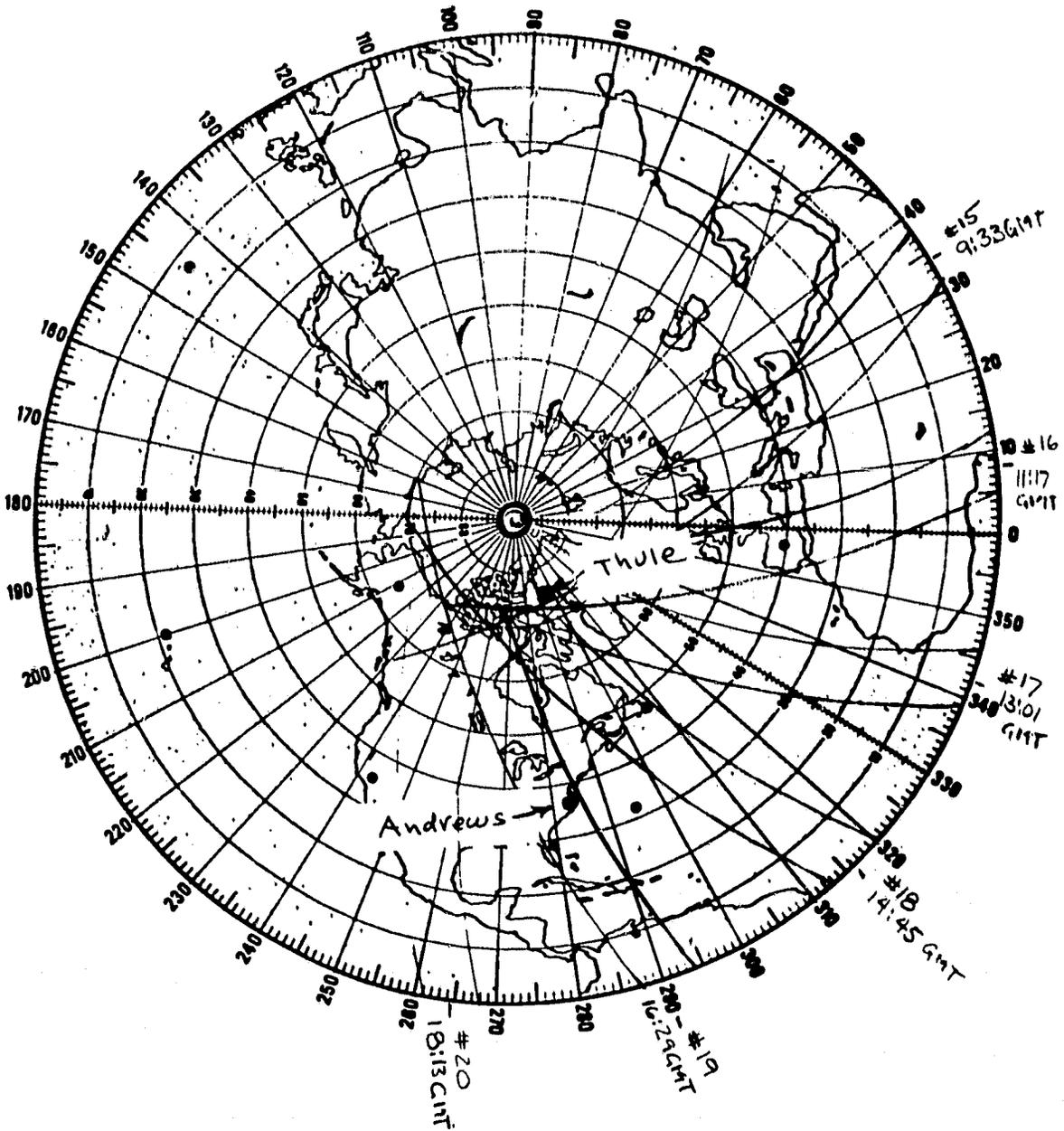
DAY NO: 298

SMHR WINTER EXPERIMENT NO. - 3A & 3B

DATE

Take off from: Andrews AFB, Md

Touchdown at: Thule



SMMR WINTER EXPERIMENT PROGRAM - 4

Take off from: Thule

Touchdown at: Thule

Flight Objectives:

- Primary:** Obtain Hi/Lo Footprint Signatures of multiyear sea ice near Queen Elizabeth Island; obtain multiyear sea ice and Ice Sheet Radiance Data.
- Secondary:** Perform wingover calibration of SMMR Simulator on homeward track.
- Weather:** In general, good visibility throughout flight. Occasional clouds and haze observed. Some photography early in the flight; otherwise, too dark. Thermal IR images available from OTS

## NIMBUS-7 Orbital Intercepts 30-33

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	76:32	68:43	15:06	77	Thule; No SMMR Simulator warmup
WP-1	77:50	73:28	15:29	28,000	Check point; SMMR at steady static temp ~1550Z
WP-2	81:12	110:00	16:22	28,000	Start pattern; 45° right bank
WP-3	83:52	90:55	16:52	27,900	
WP-4	83:40	120:12	17:17	27,900	
WP-5	80:08	122:56	17:44	28,200	
WP-6	81:11	110:17	18:03	500	Start low trace
	81:25	109:13	18:05	23,800	Wingover performed
WP-7	83:50	88:52	18:51	2,900	10K' SLAR run 1900Z' full 360° of 45° rt. bank
Touchdown	76:32	68:36	20:19	77	Thule

Comments

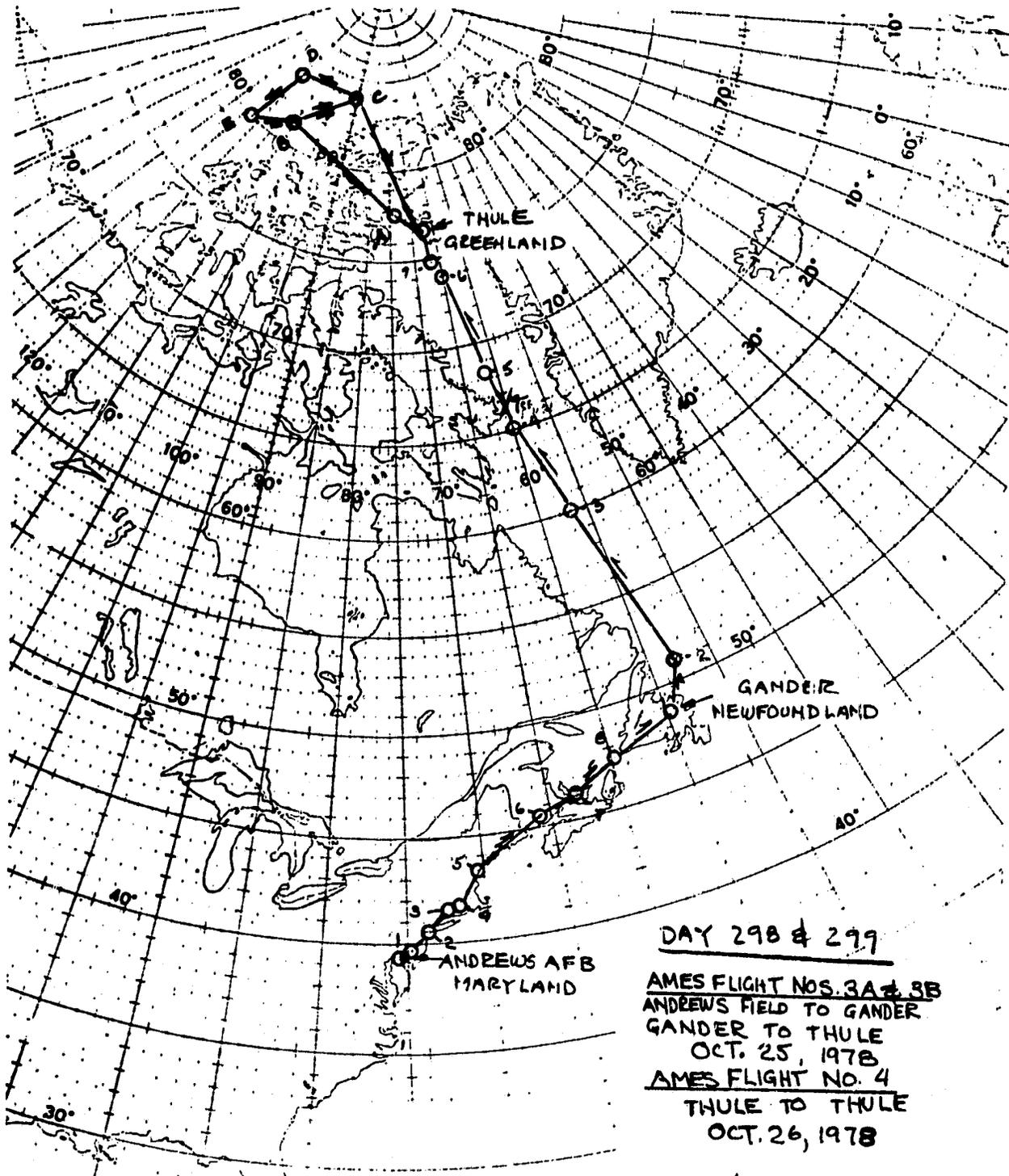
The flight objectives to measure the multiyear ice north of Ellesmere Island were successfully achieved. The team was able to have corresponding high/low level flights over the same geographical locations.

As observed on the low level flights, the ice appeared to be heavily compacted multiyear ice. During the flight, sun haze was noticed and, for the most part, it was too dark for photography. This darkness had only a slight impact on visual observations. Also, Thermal IR images available from OTS.

SEL systems appeared to be functioning properly.

Thule did not provide an adequate power cart for preflight warmup, as promised earlier, due to priority conflict (30 amp breaker).

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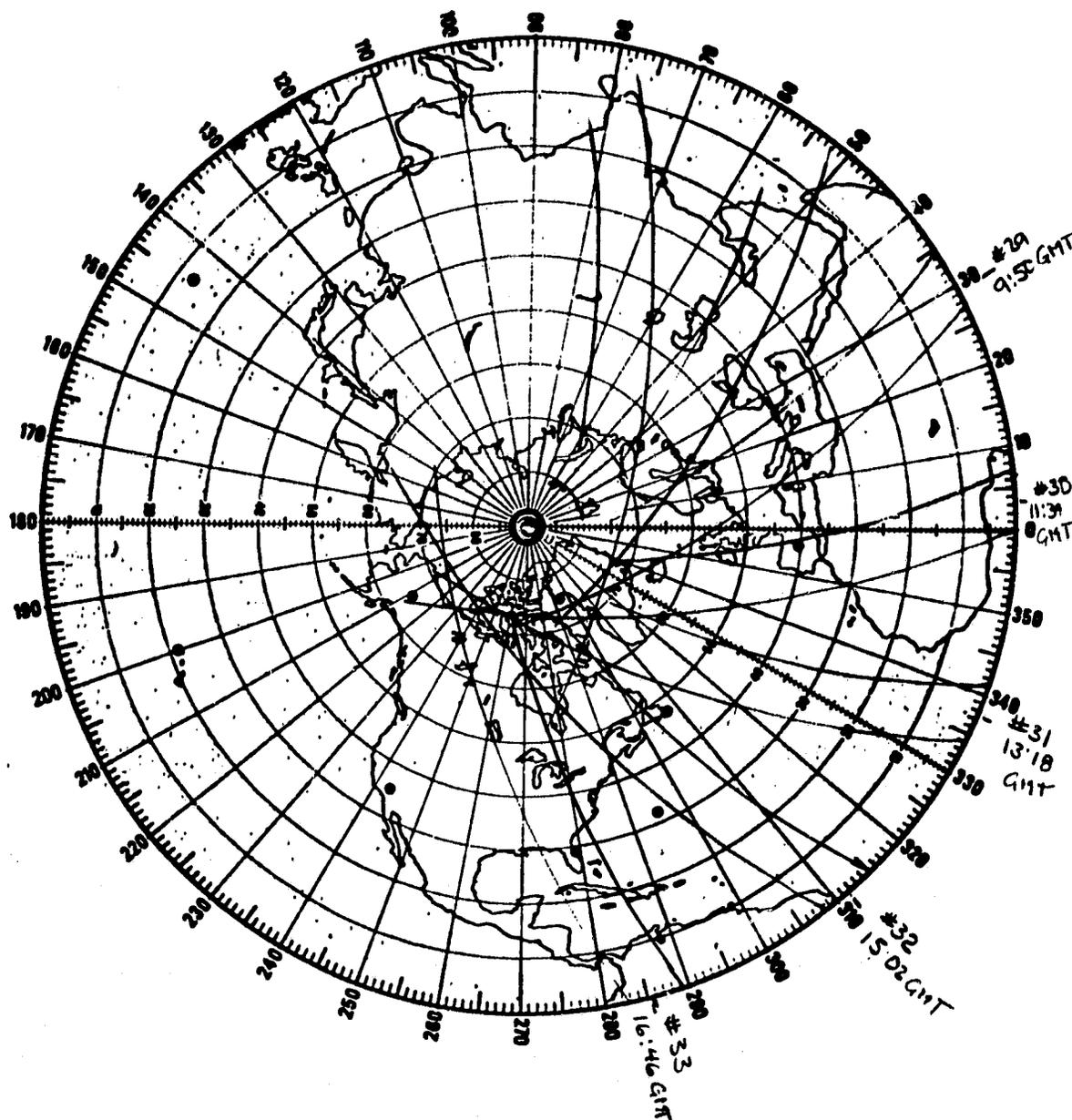
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SMHR WINTER EXPERIMENT NO.- 4

DATE: 10/26/78

Take off from: Thule

Touchdown at: Thule



SMMR WINTER EXPERIMENT PROGRAM - 5

DATE: 10-28-78

Take off from: Thule

Touchdown at: Thule

Flight Objectives:

**Primary:** Obtain remote sensing (passive microwave) signatures of different regions of Greenland Ice Sheet

**Secondary:** Obtain active microwave signatures of Firni; A form of snow covering Greenland Ice Sheet

**Weather:** Mostly partial, low level clouds. It was difficult, in visual observations, to distinguish between ice caps and these low level clouds.

## NIMBUS-7 Orbital Intercepts 58-62

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	76:32	68:32	13:49	77	
WP-1	78:07	67:13	14:07	32,094	
WP-2	77:19	66:35	14:17	33,182	
WP-3	77:12	60:53	14:23	33,236	Nominal 45° (35-40) rt. bank turn for full 360° over ice sheet
WP-4	77:03	56:17	14:35	33,017	Actual 45° rt bank around Site 2 (full 360°); turn sequence ~1449Z
WP-5	75:49	42:14	15:09	33,020	(200 left; 20°, E 450 rt.) 1510Z: 450 rt. turn over rough surface
WP-6	74:55	36:15	15:24	33,129	
WP-7	74:09	34:27	15:38	33,000	1535 45 rt. turn 1602 turn sequence
WP-8	79:58	37:26	16:29	33,200	
WP-1	80:26	60:07	17:02	33,000	

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
	80:10	61:07	17:05	28,000	Wingover performed
WP-2	80:05	61:05	17:06	23,600	
WP-3	76:22	60:56	17:47	8,400	Near shoreline; 1754: 100% open water
WP-4	76:10	60:57	17:50	7,700	
WP-5	76:04	71:41	18:25	7,500	1818: grease, grey ice 1818 500' run
Touchdown	76:32	68:32	18:48	77	

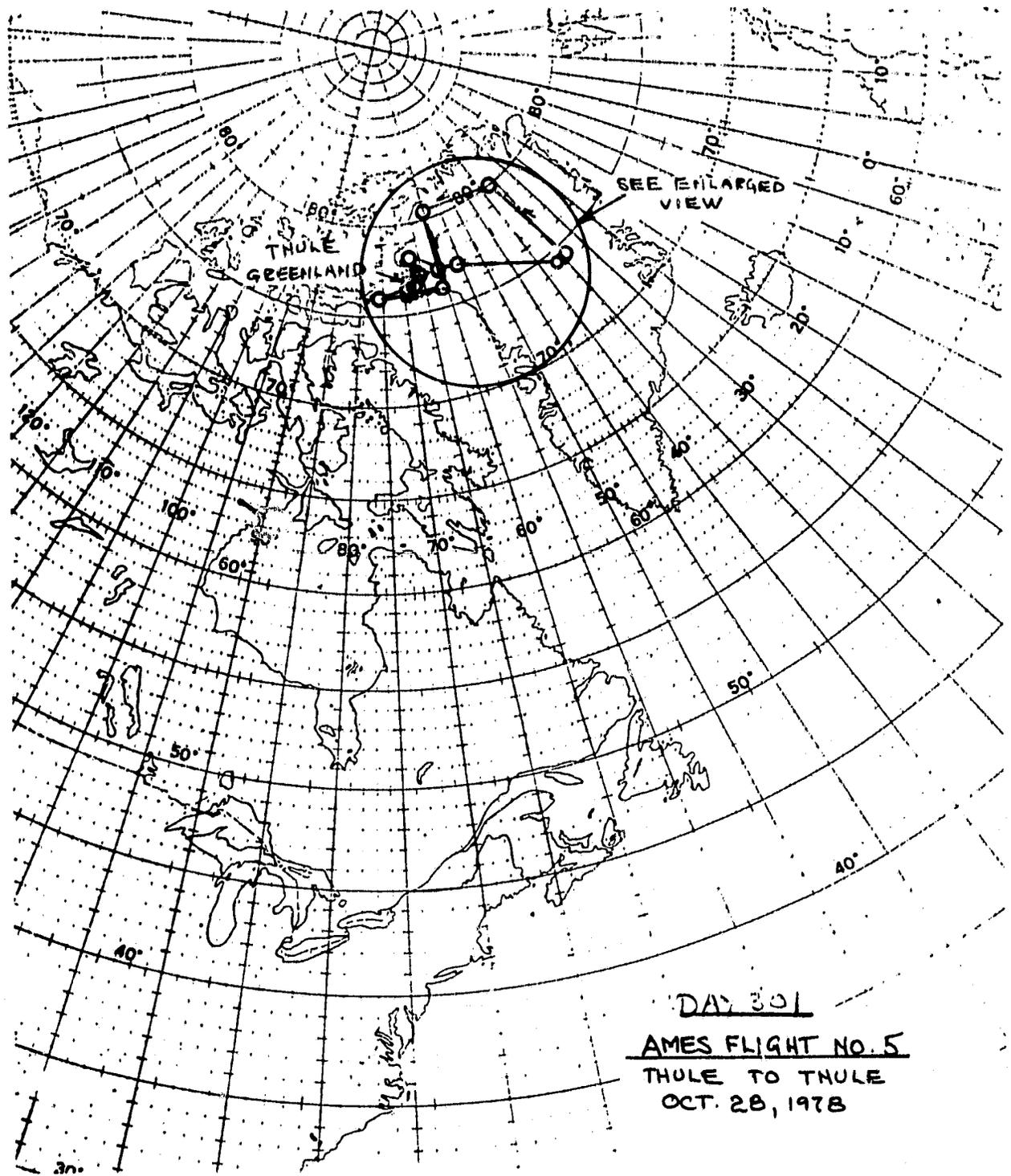
#### Comments

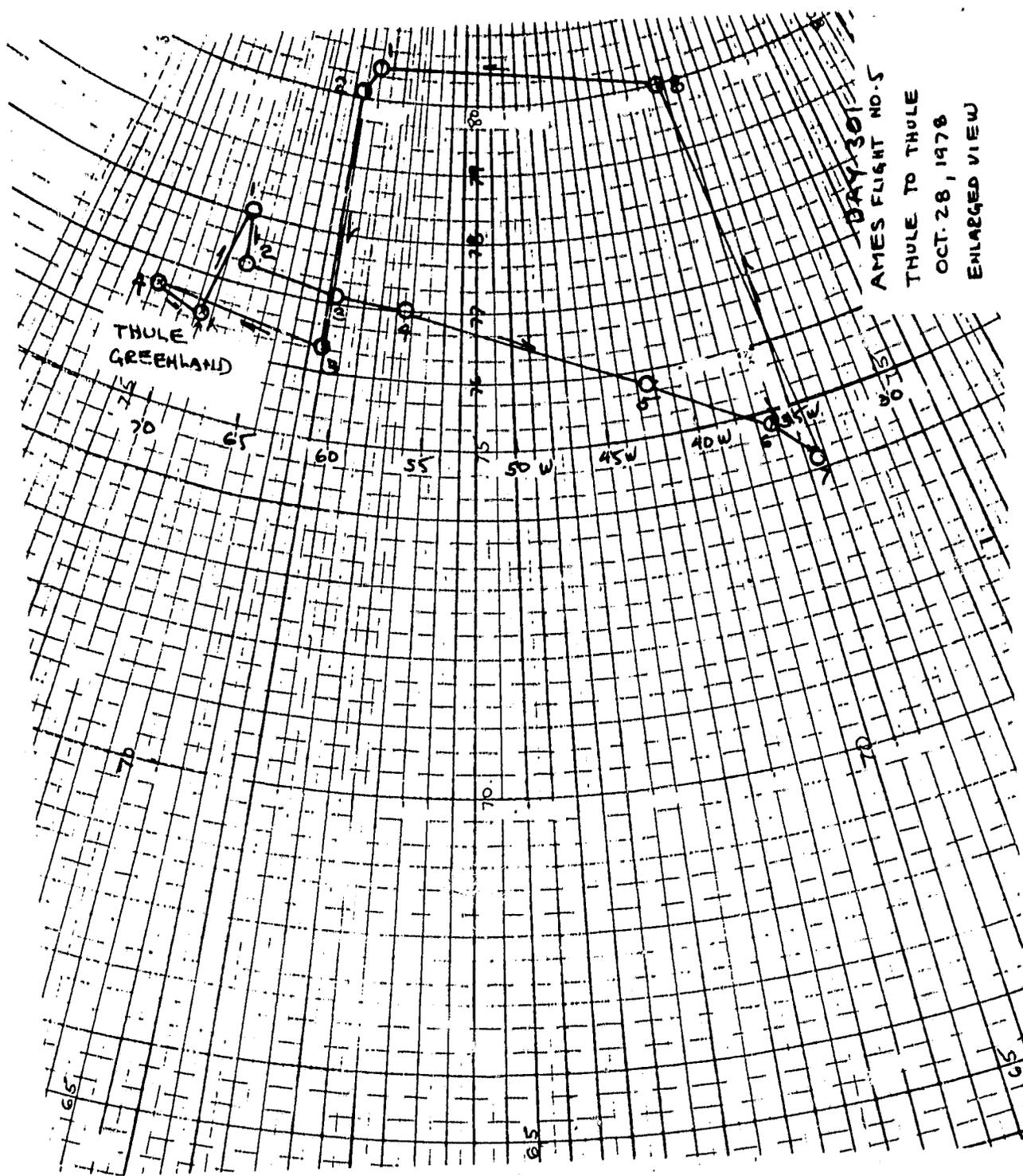
This flight was quickly planned to accommodate an unexplained loss of Liquid Nitrogen ( $LM_2$ ) in its storage container while at Thule. It was necessary to remain at Thule until the problem area could be identified and corrected since Thule had the only facility, in the northern latitudes, to manufacture  $LM_2$ .

The flight was without any major problem except that, on the return, it was discovered that the shutter of the Ocean Temperature Scanner was frozen shut throughout the flight. This was particularly unfortunate since a low level flight run was made over a large, uniform area of grey ice in Talbot Inlet.

A wingover was successfully performed over the Greenland Ice Sheet.

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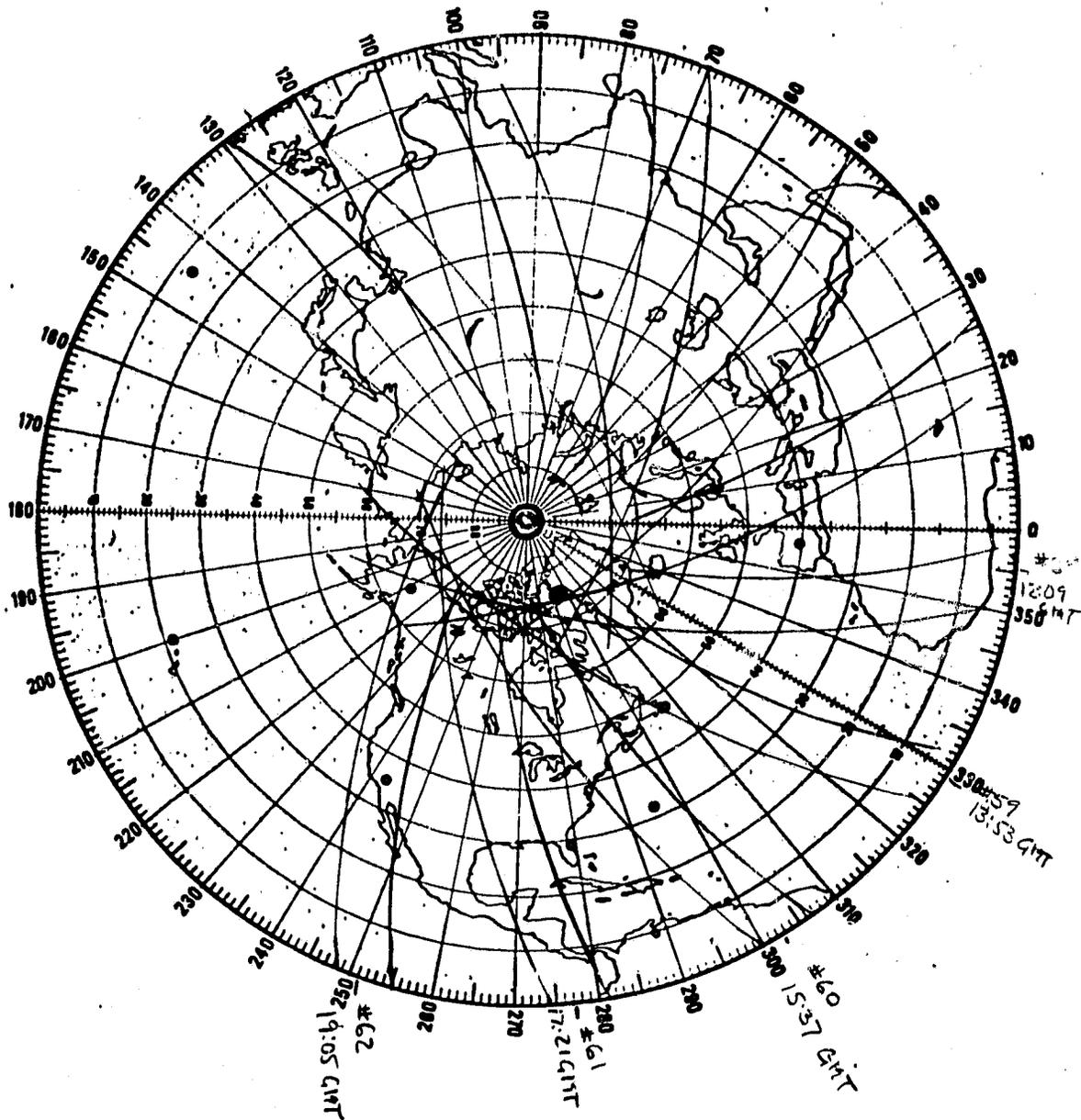




DAY NO: 301  
SMHR WINTER EXPERIMENT NO. -5  
DATE 10/28/78

Take off from: Thule

Touchdown at: Thule



SMMR WINTER EXPERIMENT PROGRAM - 6

Take off from: Thule

Touchdown: Bodo

Date: 10/30/78

Flight Objectives:

Primary: Obtain passive microwave signatures of sea Ice and ice Edge of East Greenland Sea.

Secondary: (a) Make sea surface temperature measurements of the Norwegian polar front; (b) continuation of remote sensing signature characteristics of ice sheets

Weather: A relatively clear, night time flight. Heavy clouds were observed as Norway was approached.

## NIMBUS-7 Orbital Intercepts 85-87

Flight Path Way Points	Lat.(N)	Long.	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	76:32	68:32 W	14:19	77	
WP-1	77:01	56:00 W	14:48	33,000	
WP-2	80:00	37:30 W	15:21	33,000	
WP-3	82:30	4:19 E	16:06	33,200	
WP-4	80:03	4:59 E	16:23	33,200	
WP-5	79:02	4:35 W	16:40	33,100	
WP-6	77:56	5:02 E	16:55	33,200	
WP-7	75:02	10:00 E	17:16	33,000	Transect ocean polar front
WP-8	75:00	20:00 E	17:35	33,000	
	72:09	20:07 E	17:55	22,800	Wingover performed
WP-1	71:40	19:46 E	18:00	20,200	
WP-2	71:27	18:50 E	18:03	20,000	Data Buoy - descend for NSW - comparison of A/C & Buoy data
WP-3	69:51	14:05 E	18:21	33,200	

<u>Flight Path Way Points</u>	<u>Lat.(N)</u>	<u>Long.</u>	<u>Time (GMT)</u>	<u>Altitude (Ft.)</u>	<u>Remarks</u>
Touchdown	67:13	14:11 E	18:53	13	

NSW - Near Surface Winds

Comments

All sensors performed satisfactorily on this flight.

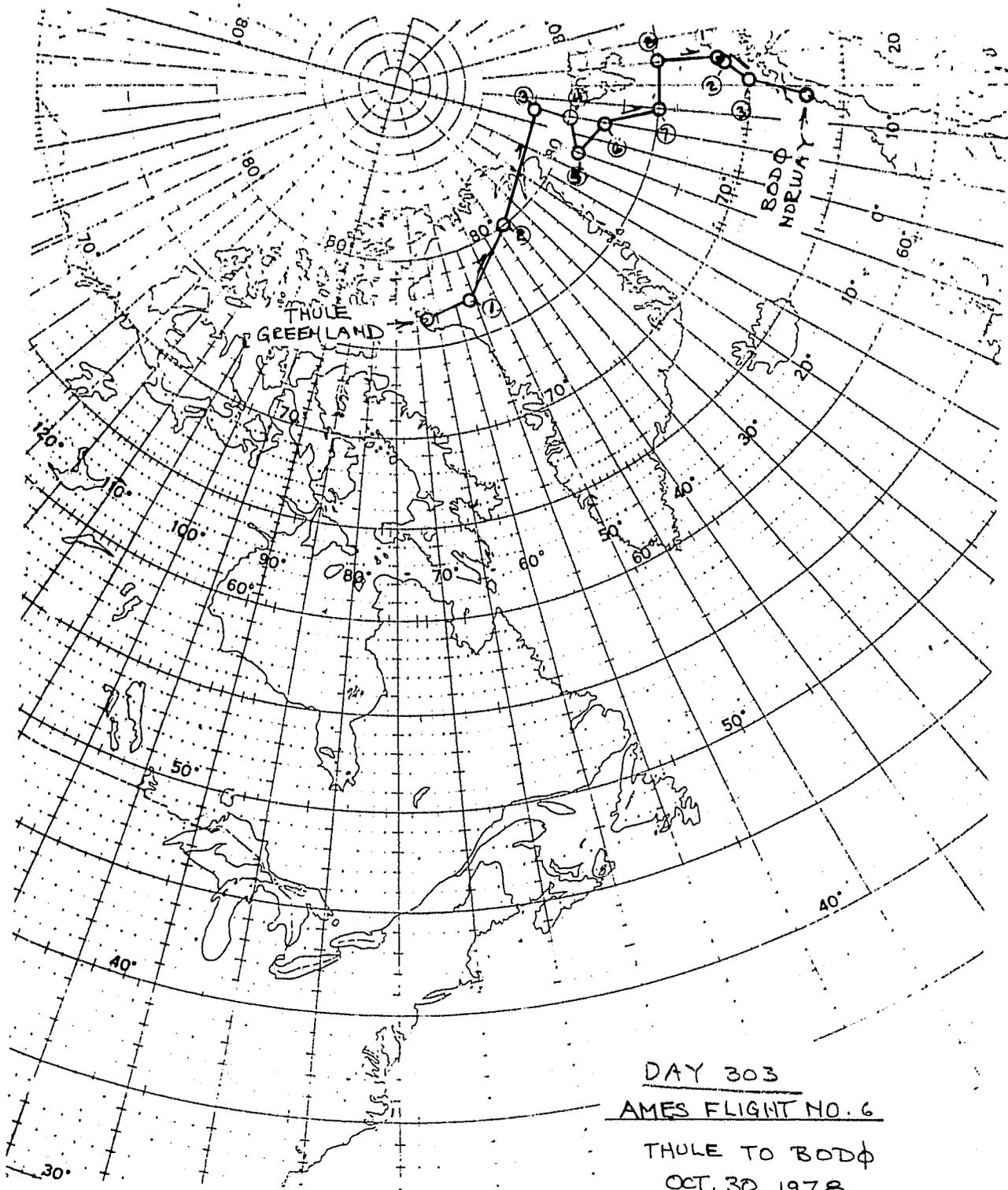
Sky conditions were clear while flying over the Greenland Ice Cap. However, the surface was difficult to see because of poor illumination. It was still possible to identify the village of NORD along the North Greenland coast.

Part of the flight was over East Greenland near to the ice edge. In this case, the ice edge was located further south than expected.

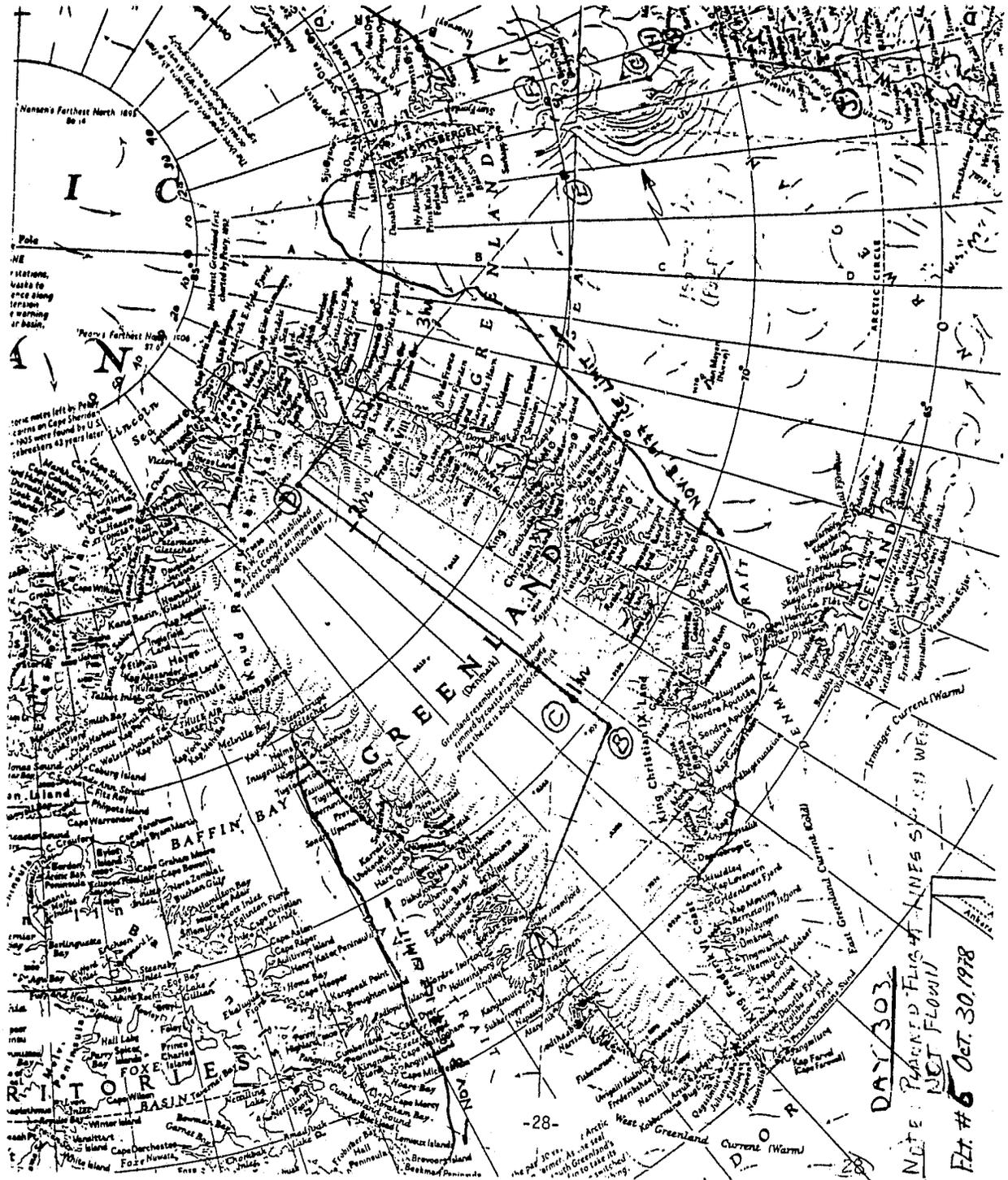
The polar front transect was carried out with no problems. The most interesting thing was to fly directly beneath the Northern Lights which provided a spectacular show of greens and golds.

A wingover was successfully completed.

Extreme care was exercised, in approaching Norway, to avoid entering Russian Air Space. The landing at Norway was at night and in the rain.



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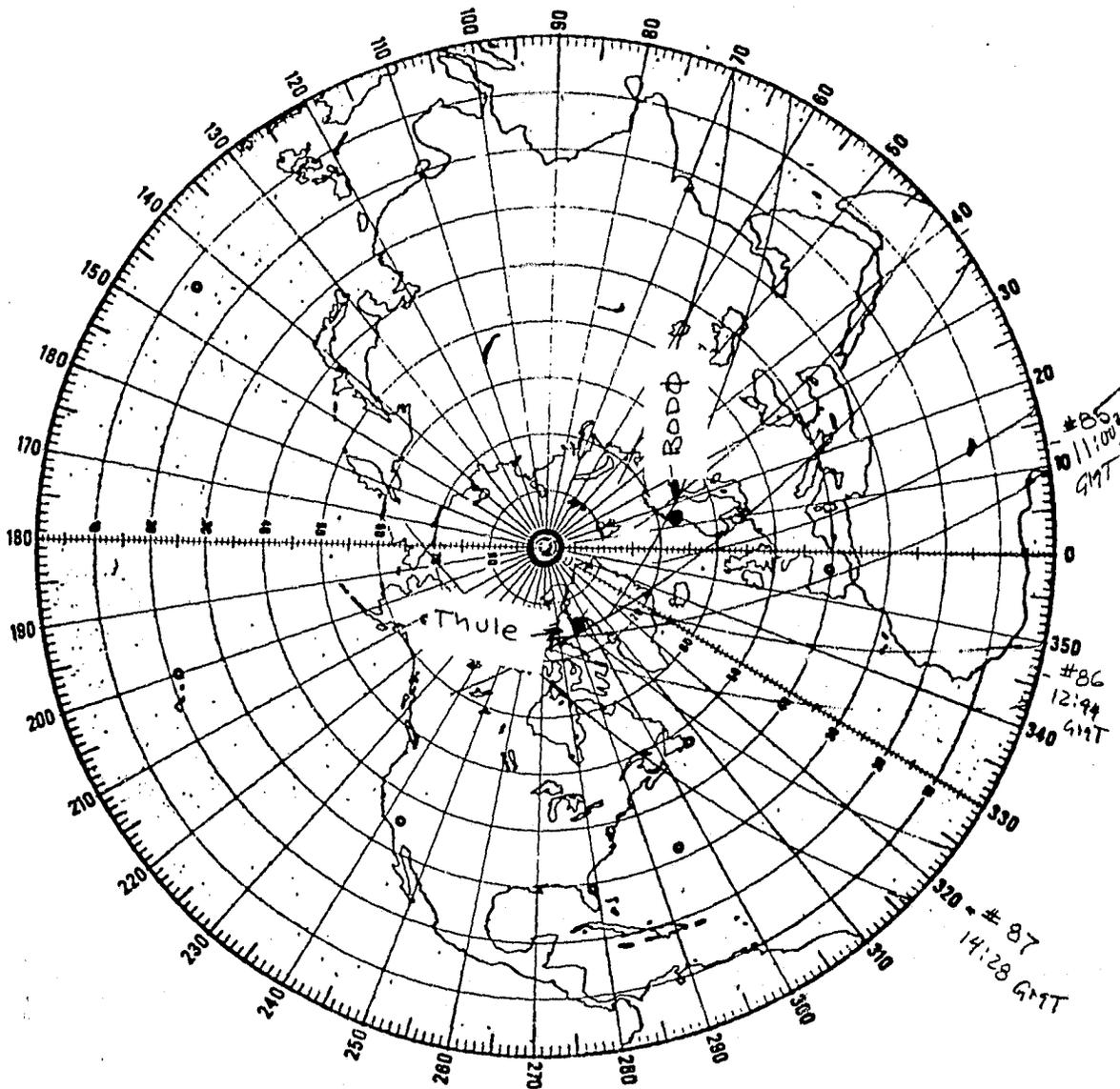
DAY NO. : 303

SMMR WINTER EXPERIMENT NO.-6

DATE : 10/30/78

Take off from: Thule

Touchdown at: Bodø



SMMR WINTER EXPERIMENT PROGRAM - 7

DATE: 11/1/78

Take off from: Bodo

Touchdown at: Bodo

Flight Objectives:**Primary:** Measure variations of sea surface temperature in the Norwegian Polar Front.**Secondary:** Obtain microwave emissivity measurements for the same region.**Weather:** Generally partially cloudy. However, the low level aircraft runs were performed in clear weather.**NIMBUS-7 Orbital Intercepts 110-112**

Flight Path Way Points	Lat.(N)	Long.(E)	Time (Z)	Altitude (Ft.)	Remarks
Takeoff	67:13	14:11E	07:47	13	
WP-1	71:35	19:17E	08:29	33,000	
WP-3	73:00	24:39E	08:46	33,300	
WP-4	74:55	20:38E	09:03	30,500	
WP-5	74:55	14:54E	09:15	33,000	
WP-6	74:49	15:00E	08:18	32,600	
WP-7	74:42	20:52E	09:30	33,100	
WP-8	72:52	24:15E	09:47	33,000	
WP-1	73:00	22:57E	09:52	33,200	
WP-2	74:27	19:27E	10:05	33,100	
WP-3	74:20	15:00E	10:20	33,000	
WP-4	74:18	19:47E	10:30	33,200	
WP-5	74:23	19:23E	10:29	33,000	
WP-6	73:00	22:35E	10:42	33,100	
WP-7	73:03	20:39E	10:48	33,000	

SMMR WINTER EXPERIMENT PROGRAM - 7

DAY No. 305

<u>Flight Path Way Points</u>	<u>Lat.(N)</u>	<u>Long.(E)</u>	<u>Time (Z)</u>	<u>Altitude (Ft.)</u>	<u>Remarks</u>
WP-8	73:52	18:55E	10:55	33,000	
WP-1	73:05	14:47E	11:08	33,100	
WP-2	73:37	15:00E	11:13	33,000	
WP-3	74:08	19:08E	11:23	33,000	
	73:04	19:14E	11:37	27,600	Wingover
WP-4	73:41	15:26E	11:14	4,600	1143Z: Start 500' RADAR run north
WP-5	74:00	19:00E	11:47	1,100	1150Z: Start 500' RADAR run south (with dips to 100')
WP-6	71:15	18:59E	12:26	100	
Touchdown	67:13	14:11E	13:44	13	

Comments

This flight was coordinated with a Norwegian P-3 aircraft and with two surface data collecting vessels.

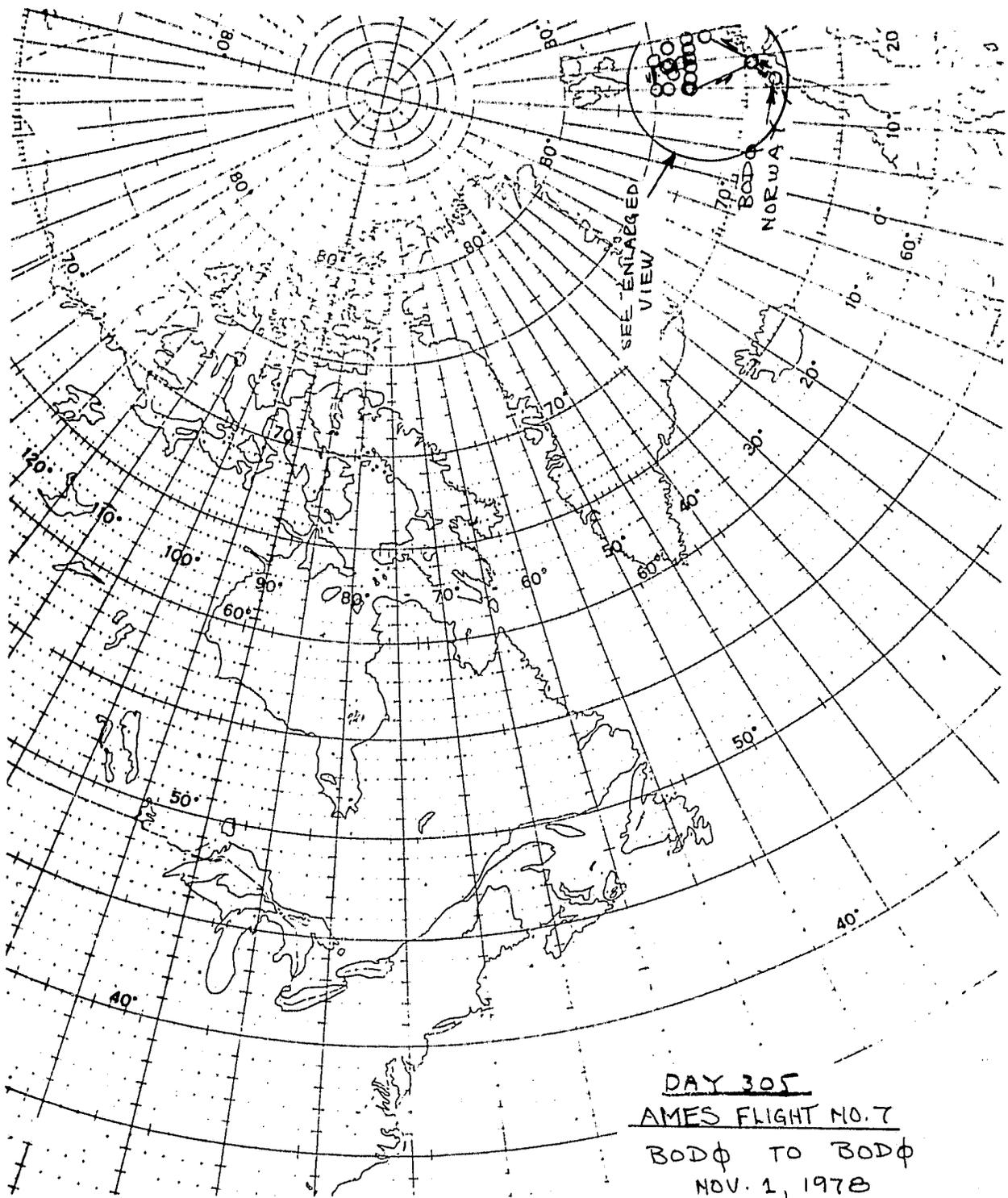
The flight was over the polar front in a complex flight path which centered about Bear Island in the Norwegian Sea.

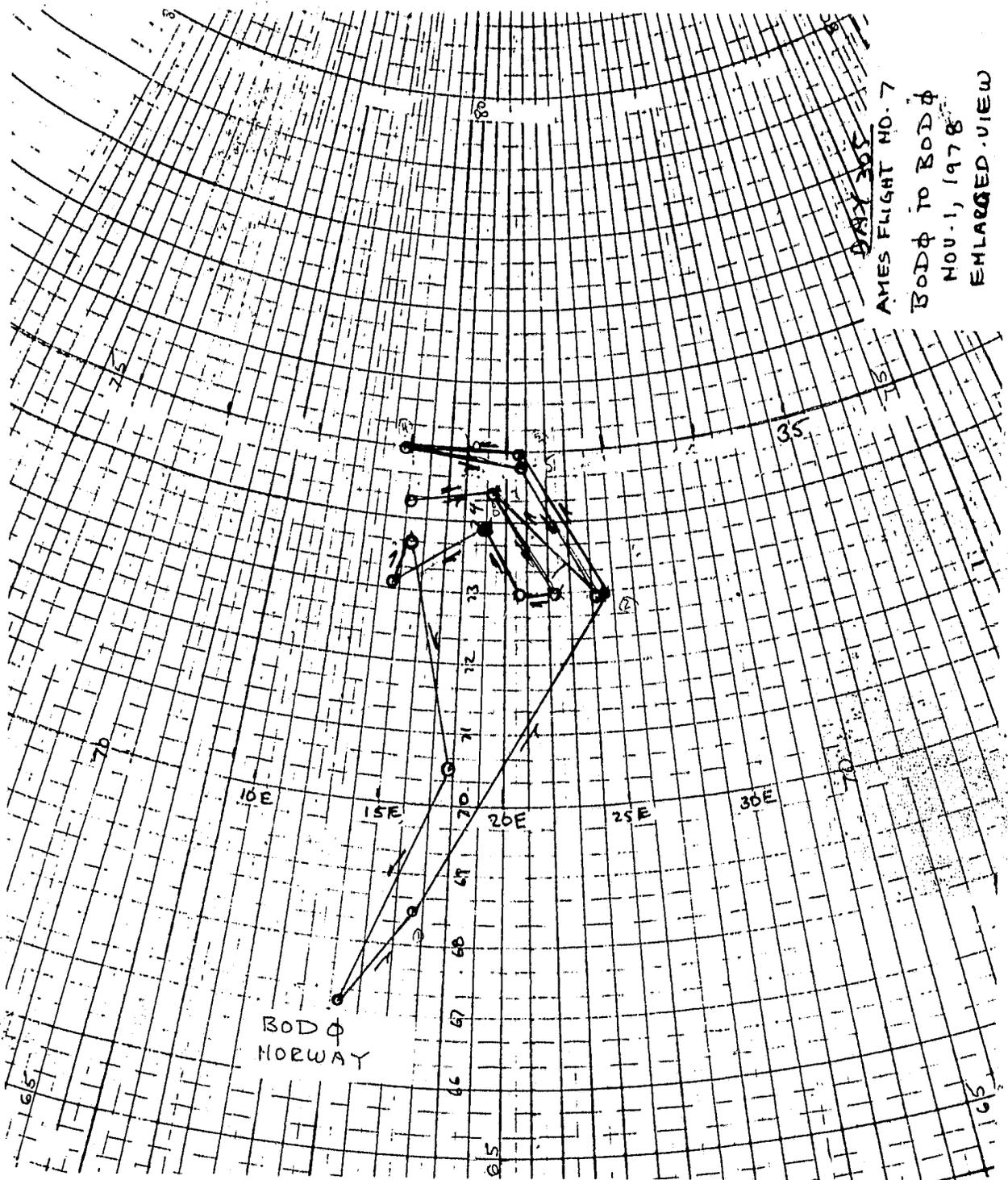
All sensors and data collecting systems were in good working order. There was constant radio communication with cooperating research vessels and with the aircraft.

The low level runs, at times only 100 feet above sea level, passed directly over the surface research vessels. The P-3 accompanied the CV-990 on the low level run flying in tandem (on the left side) and dropping Airborne Expendable Bathythermographs (AXBT's).

Occasional precipitation was encountered along the latter part of the low level run. Surface winds were recorded at 13 to 20 knots from the west.

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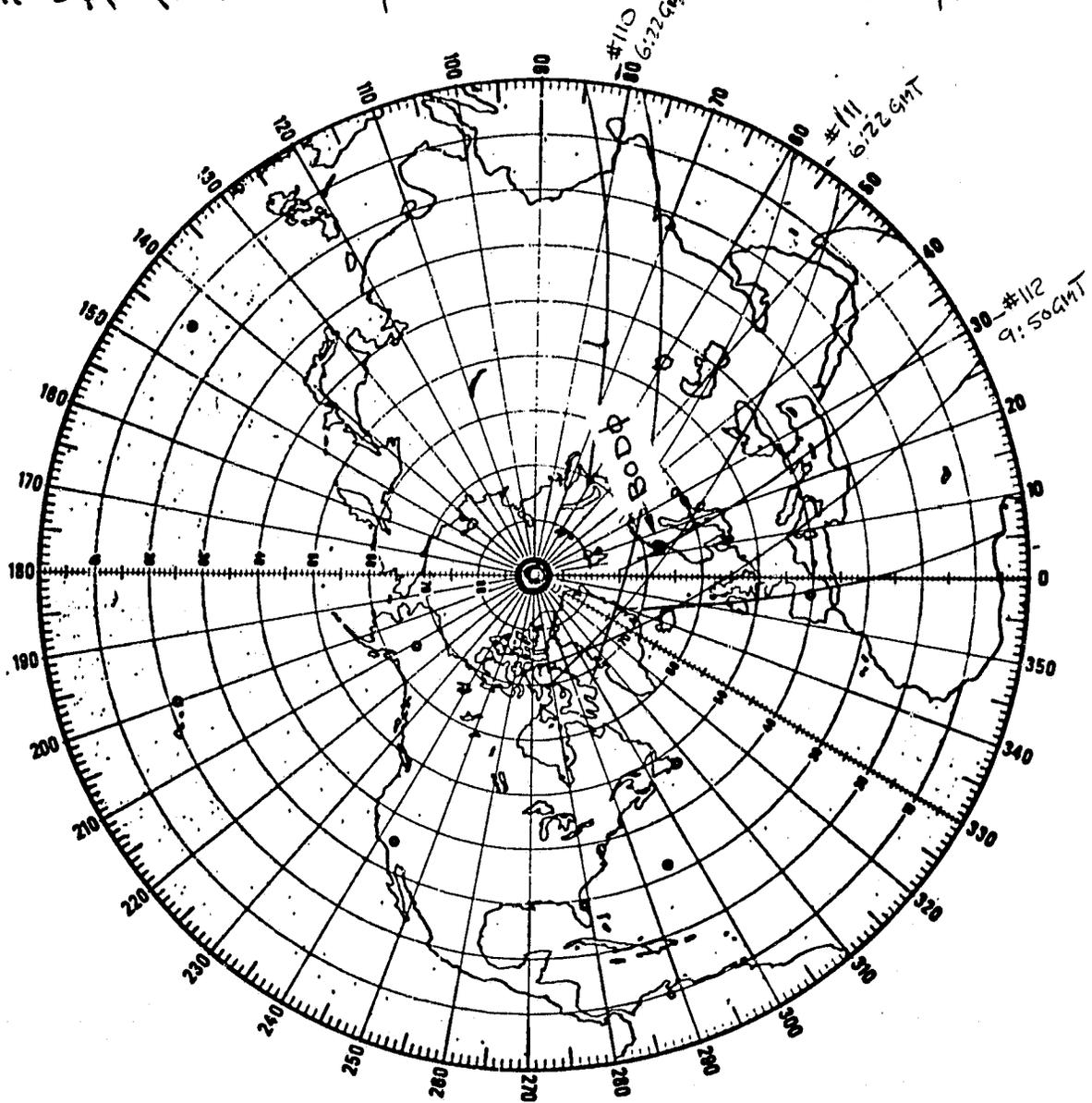
DAY 305  
 AMES FLIGHT NO. 7  
 BOD φ TO BOD φ  
 NOV. 1, 1978  
 ENLARGED VIEW

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DAY NO.: 305  
SMMR WINTER EXPERIMENT NO.-7  
DATE: 11/1/78

Take off from: Bodø

Touchdown at: Bodø



DAY No. 306

SMMR WINTER EXPERIMENT PROGRAM - 8

DATE: 11/2/78

Take off from: Bodo

Touchdown at: Bergen

Take off from: Bergen

Touchdown at: Bodo

Flight Objectives:

**Primary:** PR operation. Display of airborne laboratory and remote sensing equipment to Norwegian government officials and staff from University of Bergen and Christian Michelsens Institute

**Secondary:**

**Weather:** Rainy

**NIMBUS-7 Orbital Intercepts - NONE**

Flight Path (way points)

<u>Number</u>	<u>Lat.(N)</u>	<u>Long.(E)</u>	<u>Time (GMT)</u>	<u>Altitude (Ft.)</u>	<u>Remarks</u>
Takeoff	67:17	14:25	08:59	13	
Touchdown (Bergen)	60:17	5:13	10:54	50	
Takeoff (Bergen)	60:17	5:13	14:07	50	
Touchdown (Bodo)	67:17	14:25	15:12	13	

Comments

This flight was to bring the SMMR simulator and the supporting instruments to Bergen on the occasion of the Odd Dahl Symposium in Remote Sensing.

There was no instrument activity on this flight because of potential problems of appearing to violate Norway's military security.

DAY No. 307

DATE: 11/3/78

SMMR WINTER EXPERIMENT PROGRAM - 9

Take off from: Bodo

Touchdown at: Bodo

Flight Objectives:

**Primary:** Measure variations in sea surface temperature for regions southwest of the Norwegian Polar Front.

**Secondary:** Obtain information on the passive microwave characteristics of high seas for the same region.

**Weather:** Flight almost all overcast except for a few openings. Mainly strato-cumulus and cumulus clouds. The flight passed between two fronts; the eastern front was of gale force causing heavy seas (33 ft. waves).

**NIMBUS-7 Orbital Intercepts 138-140**

**Flight Path (way points)**

Flight Plan Way Points	Lat.(N)	Long.(E)	Time GMT	Altitude (Ft.)	Remark
Takeoff	67:13	14:11	07:28	0	OTS inoperative for entire flight
WP-1	68:28	16:38	07:38	30,700	
WP-2	69:42	19:00	07:50	33,000	
WP-3	71:40	20:50	08:08	33,000	
WP-4	68:25	5:00	08:59	33,100	
WP-5	69:48	4:45	09:10	33,100	
WP-6	72:58	20:37	09:53	33,100	1013Z: Start 500' run winds: 47KTS! Spiral descent
WP-7	71:40	20:49	10:03		
	71:40	20:49	10:21	1,300	Wingover
WP-8	71:29	18:39	10:20	3,500	
Touchdown	67:13	14:11	12:17	13	

Comments

Clouds were encountered throughout the high level run.

This flight was also coordinated with the Norwegian P-3 aircraft and with the two surface research vessels.

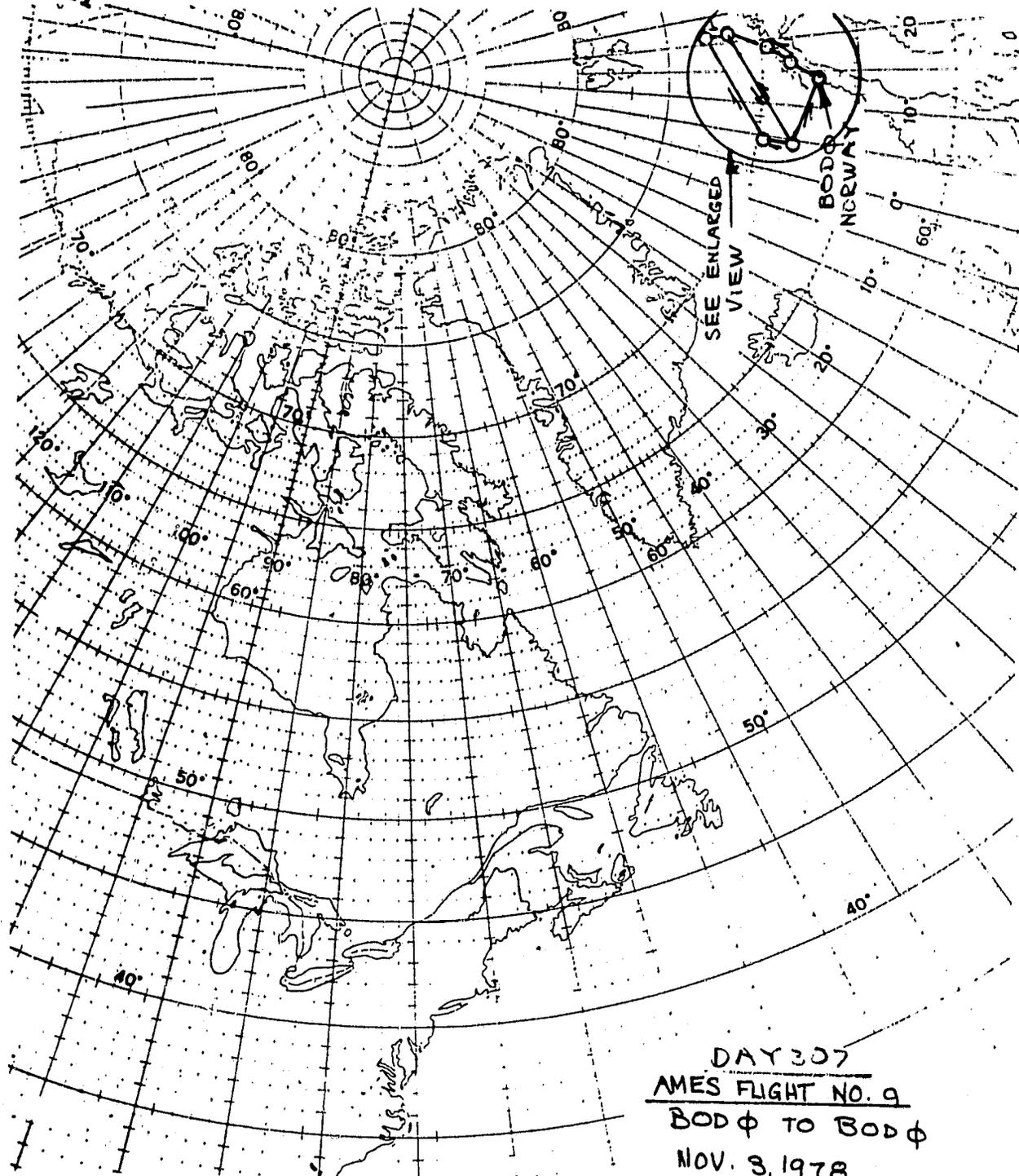
All sensors were in good order except the Ocean Temperature Scanner which was inoperative (power failure).

At the start of the flight, a descending spiral was performed (from 30,000 to 500 feet) to determine the profile of atmospheric conditions between these two altitudes.

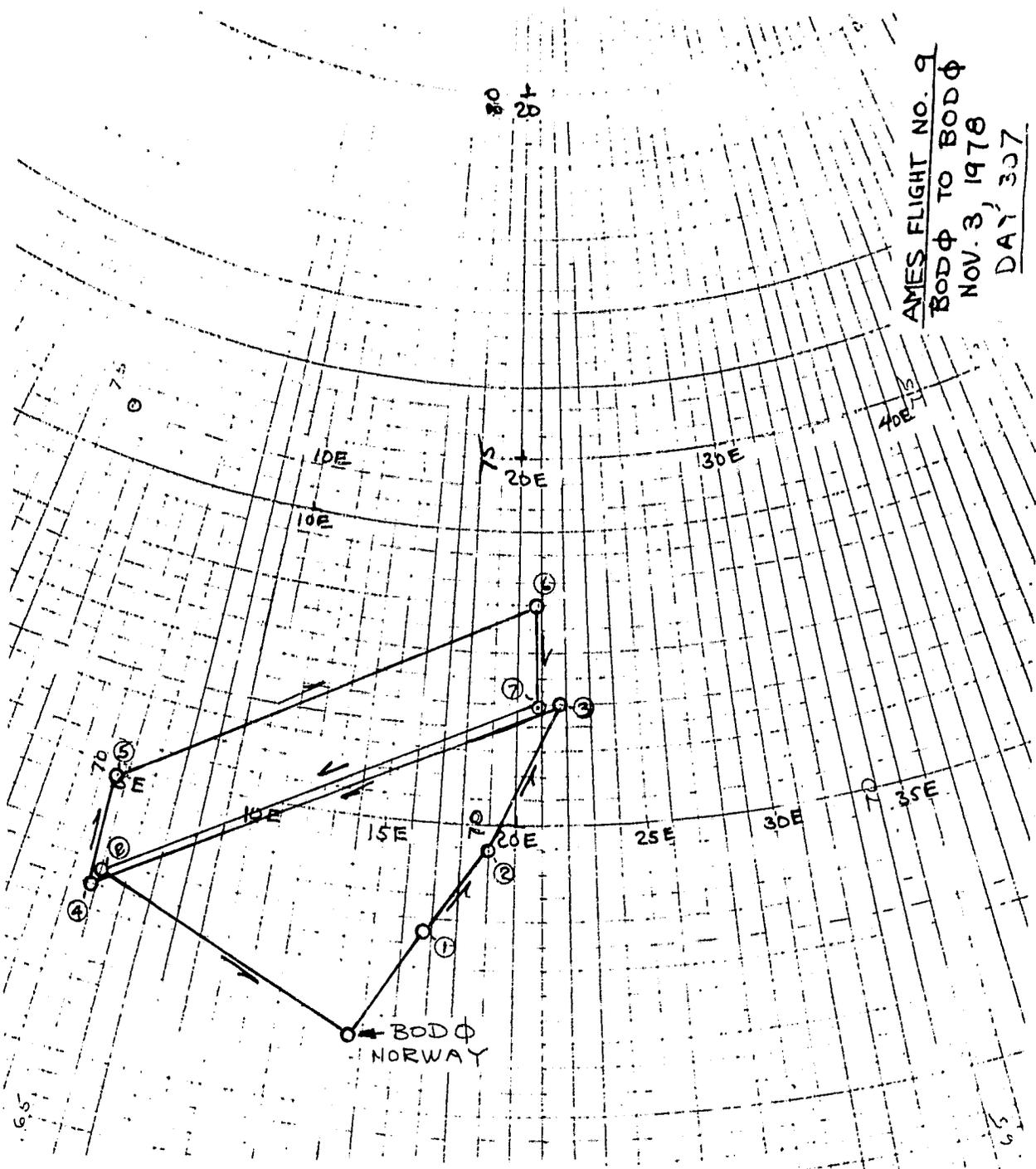
Gale force winds (47 to 50 knots) were encountered towards the start of the low level run at 500 feet. Foam patches in the high seas were connected indicating extremely turbulent conditions.

The duration of the low level run was 20 minutes. Towards the end, the seas subsided to near calm conditions.

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AMES FLIGHT NO. 9  
BODΦ TO BODΦ  
NOV. 3, 1978  
DAY 307

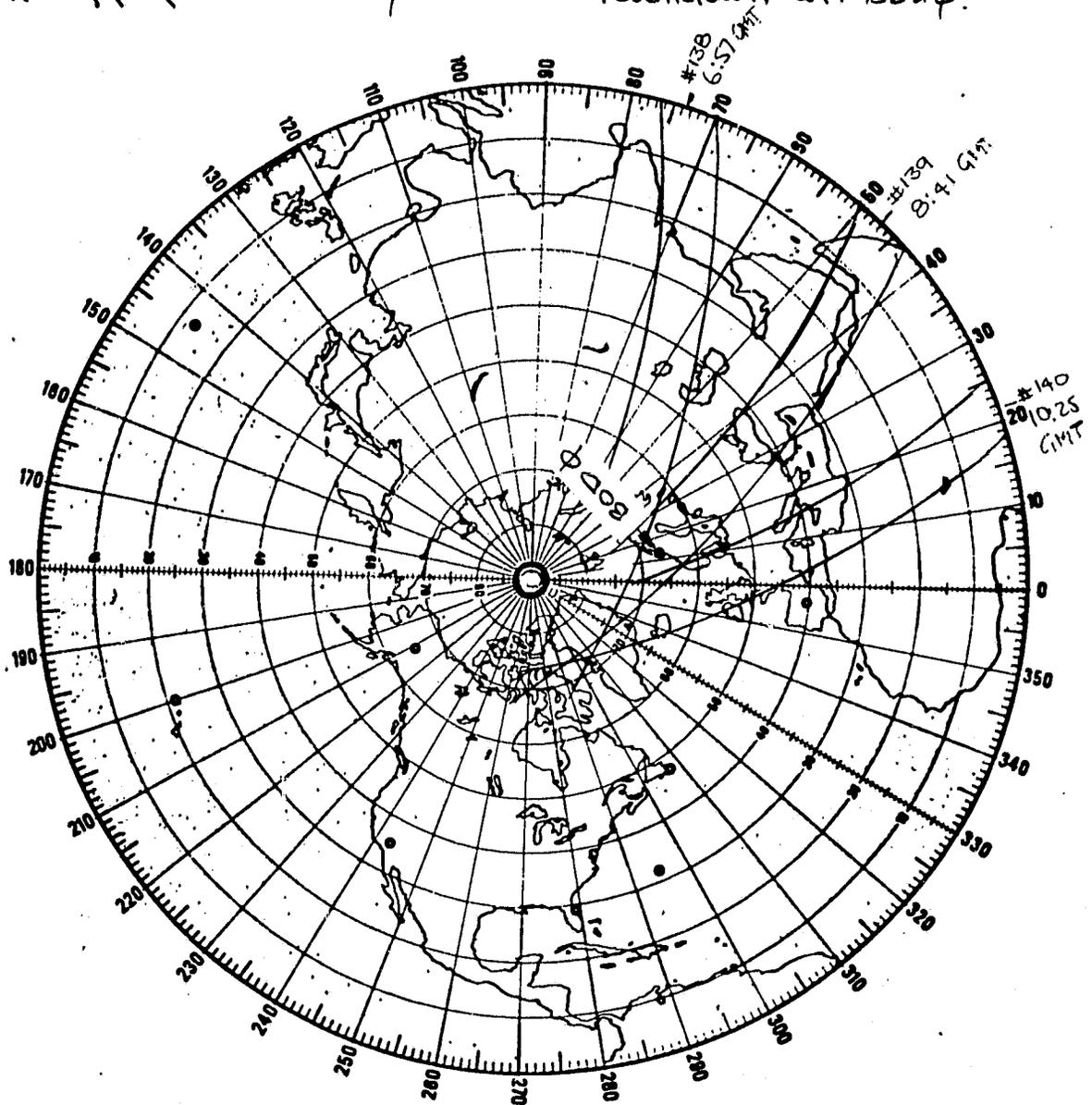


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DAY NO: 307  
SMHR WINTER EXPERIMENT NO.-9  
DATE: 11/3/78

Take off from: Bodø

Touchdown at: Bodø.



DAY No. 310

DATE: 11/6/78

SMMR WINTER EXPERIMENT PROGRAM - 10

Take off from: Bodo

Touchdown at: Sondstrom

Flight Objectives:

Primary: Obtain additional information on the passive microwave characteristics of the East Greenland Sea and the ice edge.

Secondary: Obtain additional information on the Greenland Ice Sheet.

Weather: Flight was clear after the East Greenland Sea was reached.

NIMBUS-7 Orbital Intercepts 180-184

Flight Plan Way Points	Lat.(N)	Long.	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	67:13	14:11E	09:08	3	
WP-1	68:28	16:41E	09:25	27,300	
WP-2	69:49	18:52E	09:39	30,400	
WP-3	71:34	19:04E	09:53	31,300	
WP-4	72:26	19:54E	10:00	31,200	
		17:24E	10:23		
WP-5	73:04	17:33E	10:05	31,200	
WP-6	74:59	17:24E	10:23	31,400	
WP-7	75:01	16:54E	11:05	31,000	
WP-8	76:22	0:31E	11:06	30,800	
WP-1	76:58	9:56	11:26	30,800	
WP-2	72:30	15:21	12:07	31,200	
WP-3	72:04	28:00	12:40	33,100	
WP-4	71:47	29:08	12:44	33,000	
WP-5	71:23	33:19	12:57	33,000	

Flight Plan Way Points	Lat.(N)	Long.	Time (GMT)	Altitude (Ft.)	Remarks
WP-6	71:06	37:29	13:08	33,000	
WP-7	70:54	40:36	13:17	33,000	
WP-8	70:16	44:36	13:30	35,600	
WP-1	69:47	47:27	13:39	37,000	
WP-2	69:20	48:02	13:43	37,000	
WP-3	69:11	50:04	13:49	37,000	
WP-4	69:05	51:50	13:52	37,000	
Touchdown	67:01	50:43	14:15	50	

### Comments

All sensors and data collection systems appeared to function satisfactorily.

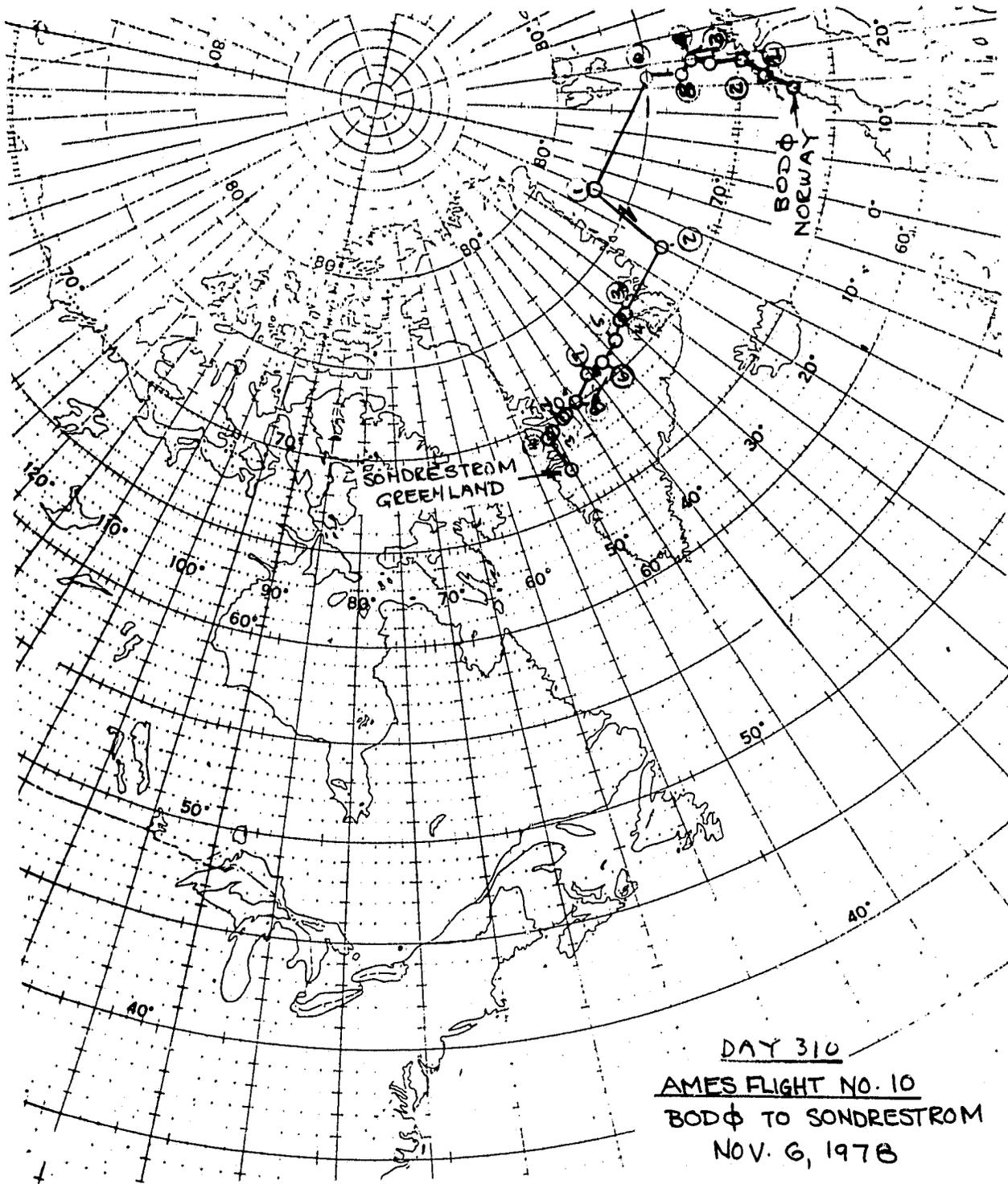
The first portion of the flight was cloudy and featured the last transect over the Norwegian Polar Front.

As the Greenland Sea was approached, there was a decrease in cloud cover and different ice forms could be visually identified. There were spectacular views of the mountains along the east shore of Greenland.

A transect was made across the Greenland Ice Sheet. Numerous visual observations were made of different sastrugi ice patterns.

The touchdown in Sondstrom Fjord was made without difficulty.

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DAY 310

AMES FLIGHT NO. 10

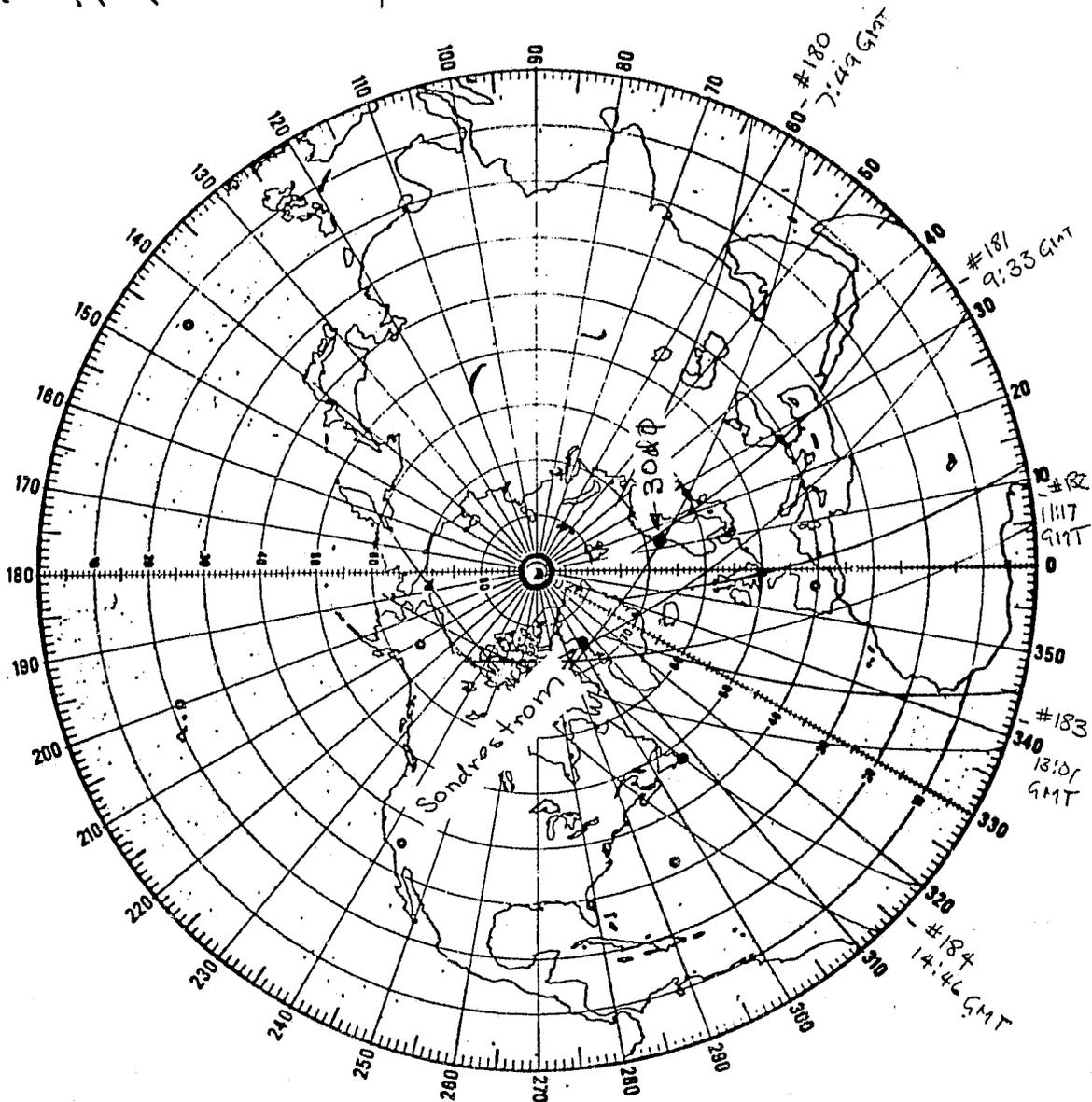
BODØ TO SONDRESTROM

NOV. 6, 1978

DAY NO. 310  
SMHR WINTER EXPERIMENT NO.-10  
DATE 11/6/1978

Take off from: Bodø

Touchdown at: Sandnessrom



DAY No. 311

DATE: 11/7/78

SMMR WINTER EXPERIMENT PROGRAM - 11

Take off from: Sondestrom

Touchdown at: Thule

Flight Objectives:

Primary: Continue to collect data on the Southern Greenland Ice Sheet.

Secondary: Fly over radar stations Dye Nos. 1, 2 and 3 to coordinate collection of surface truth information.

Weather:

NIMBUS-7 Orbital Intercepts 196-199

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	67:01	50:43	13:28	0	
WP-1	66:54	49:54	13:37	15,100	
WP-2	66:28	46:19	13:50	15,100	Dye No. 2
WP-3	66:10	43:43	14:08	15,100	
WP-4	65:06	40:34	14:26	13,500	Open water: 30° rt bank turn
WP-5	65:03	41:43	14:32	21,000	
WP-6	65:08	43:56	14:39	29,100	Dye No. 1
WP-7	65:02	50:00	15:00	29,100	
WP-8	64:47	49:51	15:03	29,100	
WP-1	63:25	43:59	15:25	29,200	
WP-2	63:03	44:51	15:34	29,000	
WP-3	65:12	43:47	15:51	29,000	Dye No. 3
WP-4	70:55	40:38	16:34	31,000	

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
WP-5	72:17	37:57	16:54	31,000	
WP-6	77:00	45:00	17:32	31,100	
WP-7	76:55	56:01	17:55	31,000	
	77:07	62:29	18:06	31,000	Wingover
WP-8	77:11	64:45	18:11	10,700	
Touchdown	76:32	68:37	18:31	77	Approach over shorefast ice

### Comments

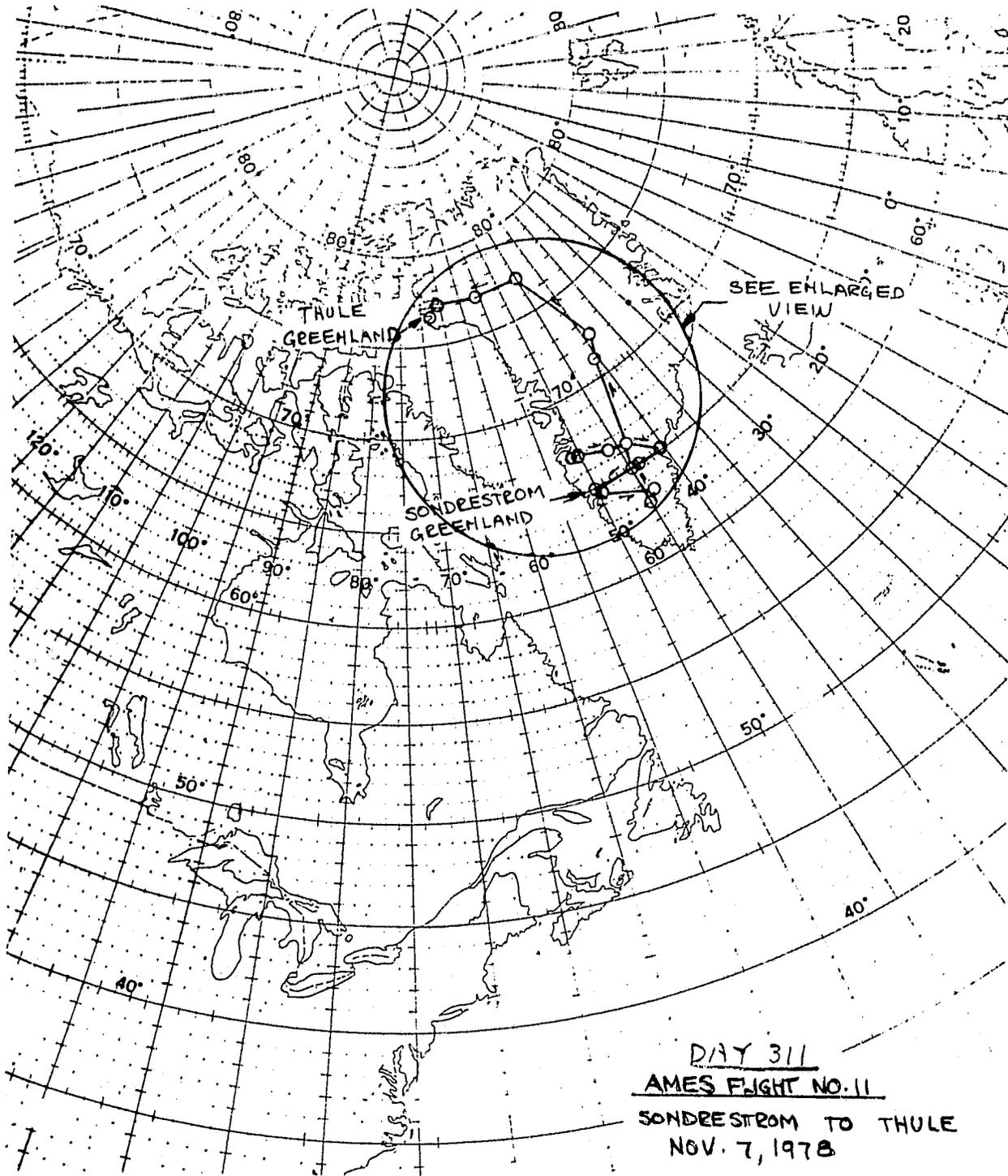
The take-off time was delayed because of a snowstorm.

Once airborne, a number of transects of the South Greenland Ice Sheet was made. Radar stations (page 1, 2 and 3) were overflowed.

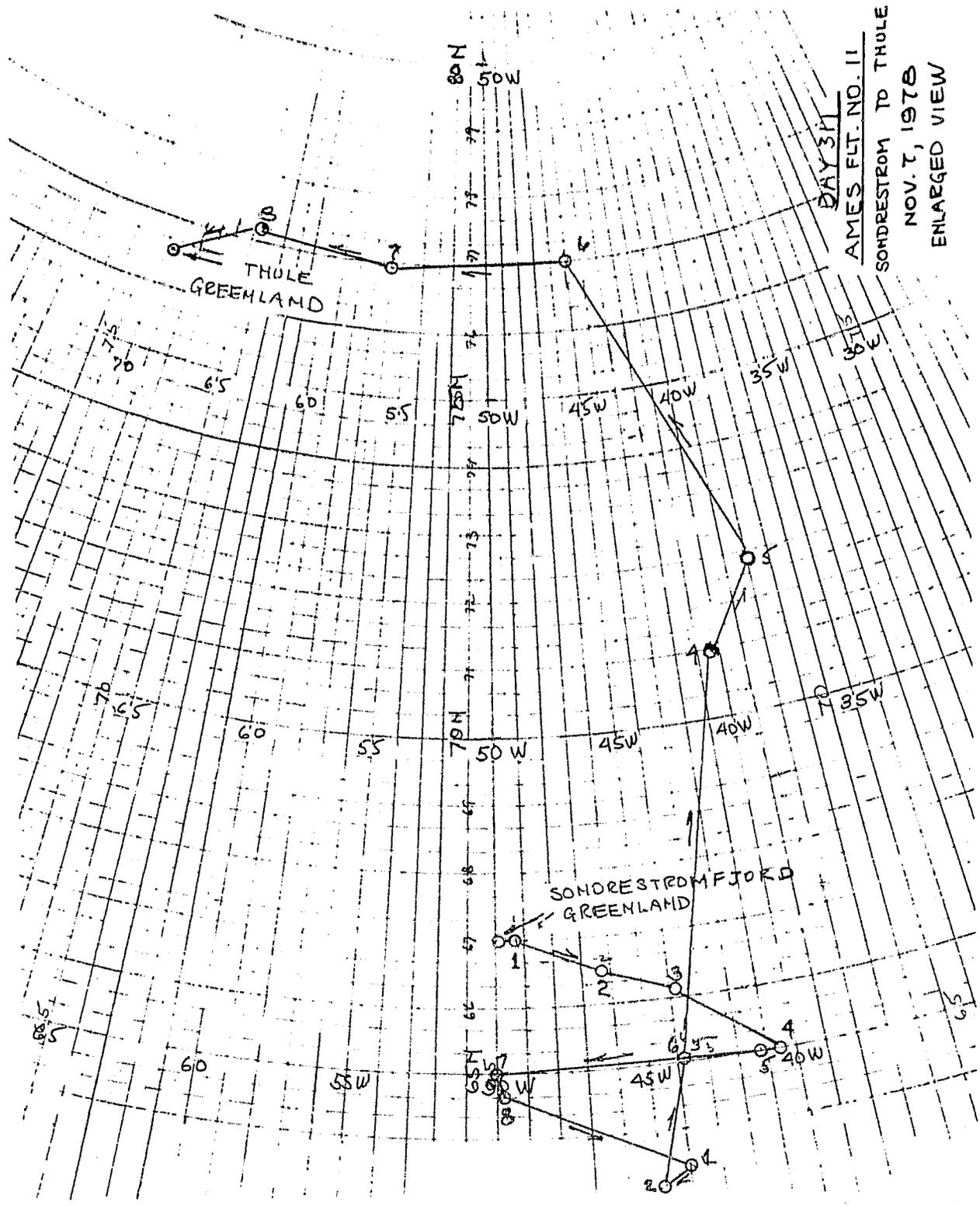
Upon approaching Thule, a frontal system was encountered. However, this did not affect the visual observations of the Greenland Ice Sheet.

A wingover was carried out during this flight. The landing at Thule was without difficulty.

It should be mentioned that dark, wave-like phenomena were observed near the ice sheet surface at a number of points. It is believed that this is caused by atmospheric effects. These phenomena were subsequently absorbed by imagery. There is interest in further study of this phenomena.



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DAY 31  
 AMES FLT. NO. 11  
 SONDRSTROM TO THULE  
 NOV. 7, 1978  
 ENLARGED VIEW

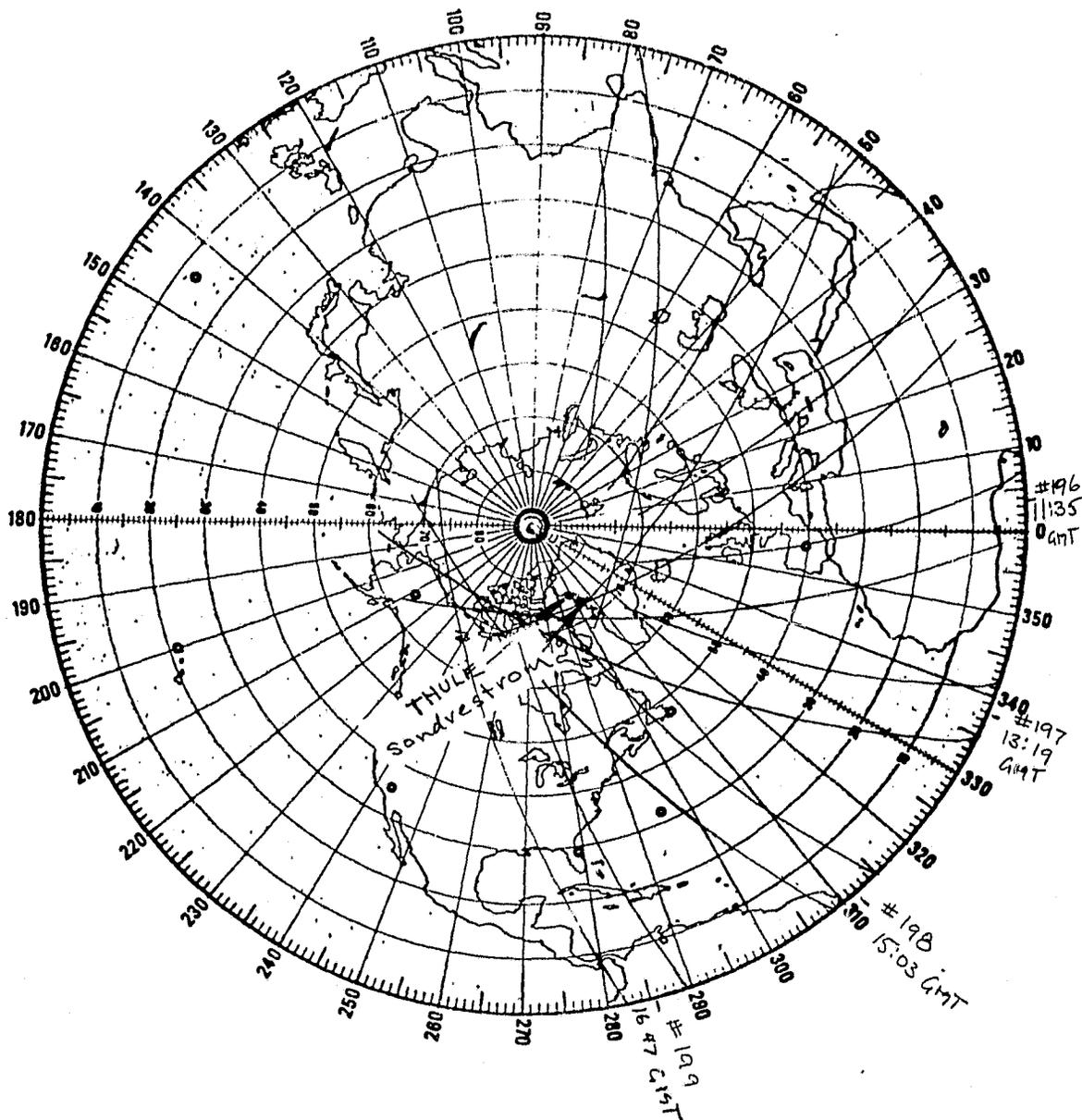
DAY NO. : 311

SMHR WINTER EXPERIMENT NO.-11

DATE 11/7/1978

Take off from: Sondrestrom

Touchdown at: Thule



DAY No. 312

DATE: 11/8/78

SMMR WINTER EXPERIMENT PROGRAM - 12

Take off from: Thule

Touchdown at: Thule

Flight Objectives:

**Primary:** Overfly Surface Truth Field Experiment at Pond Inlet (conducted by Herman Steltner, Point Inlet School Principal).

**Secondary:** Obtain passive microwave measurements of first year sea ice in Baffin Bay.

**Weather:** First portion of the trip was cloudy. It became clear at Pond Inlet. The clouds increased as Thule was approached.

NIMBUS-7 Orbital Intercepts 211-215

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	76:32	68:32	15:05	77	
WP-1	75:15	60:18	15:19	14,100	Leaving Shoreline
WP-2	74:00	67:58	15:30	25,900	
WP-3	72:35	58:04	15:56	26,000	
WP-4	72:30	64:55	16:14	25,900	
	72:51	71:38	16:31	22,100	Wingover
WP-5	72:40	74:20	16:39	10,400	
WP-6	72:47	77:25	16:49	10,600	
WP-7	72:29	79:01	16:54	10,400	
WP-8	72:36	79:01	16:57	10,200	
WP-1	72:50	78:05	17:01	10,200	
WP-2	72:49	74:47	17:11	7,500	
WP-3	72:45	75:21	17:15	600	

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
WP-4	72:47	77:47	17:26	500	Start Rosette patterns over Pond Inlet. Patterns ending at WP-4
WP-4	72:47	77:43	18:08	500	Restart of Way Point track
WP-5	72:45	75:00	18:19	3,900	
WP-6	75:00	74:00	18:40	26,000	
WP-7	77:01	72:47	18:58	25,600	Low-level approach to north water
WP-8	77:30	67:00	18:59	500	
Touchdown	76:32	68:32	19:31	77	

#### Comments

Sky conditions during the first part of the trip and along Melville Bay were partly cloudy.

After crossing the ice edge in Baffin Bay, the aircraft started toward Pond Inlet.

A wingover was performed. During the wingover, a "glitch" in the power system resulted in a shut down of ADDAS. This glitch also caused a power failure in ESMR. The problem appeared to be caused by a faulty power converter. The ESMR system was made operational by using a different power converter.

The approach to Pond Inlet was made in clear weather. A number of changes were made in altitude to accommodate imaging radar collection requirements.

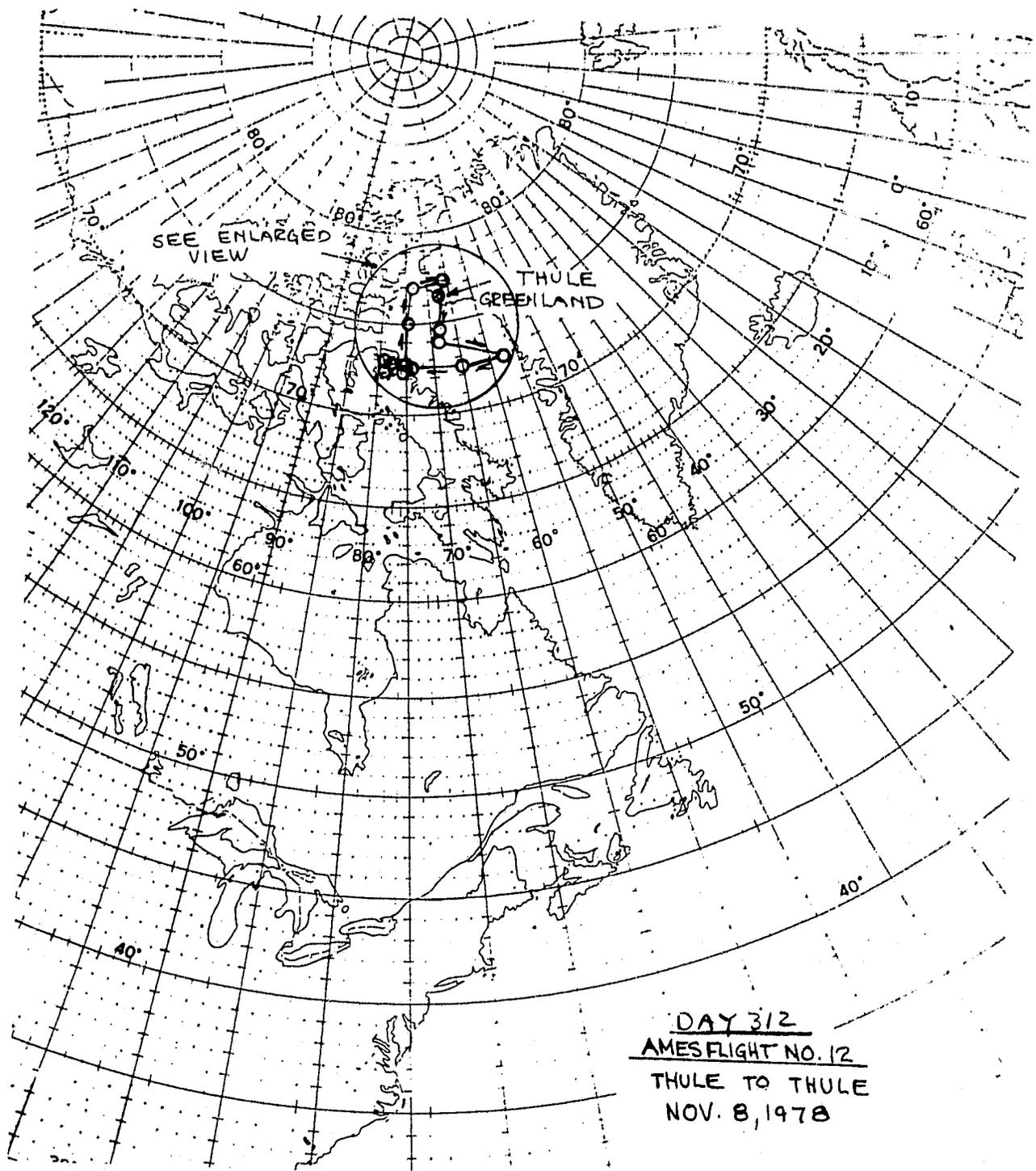
The surface truth area in Pond Inlet was clearly marked by black markers on the sea ice and by smoke bombs. A number of low level transect runs were made over surface truth stations.

Both smooth and rough surface frost ice were observed. Snowmobile tracks as well as seal holes could be clearly identified.

Comments (Cont'd)

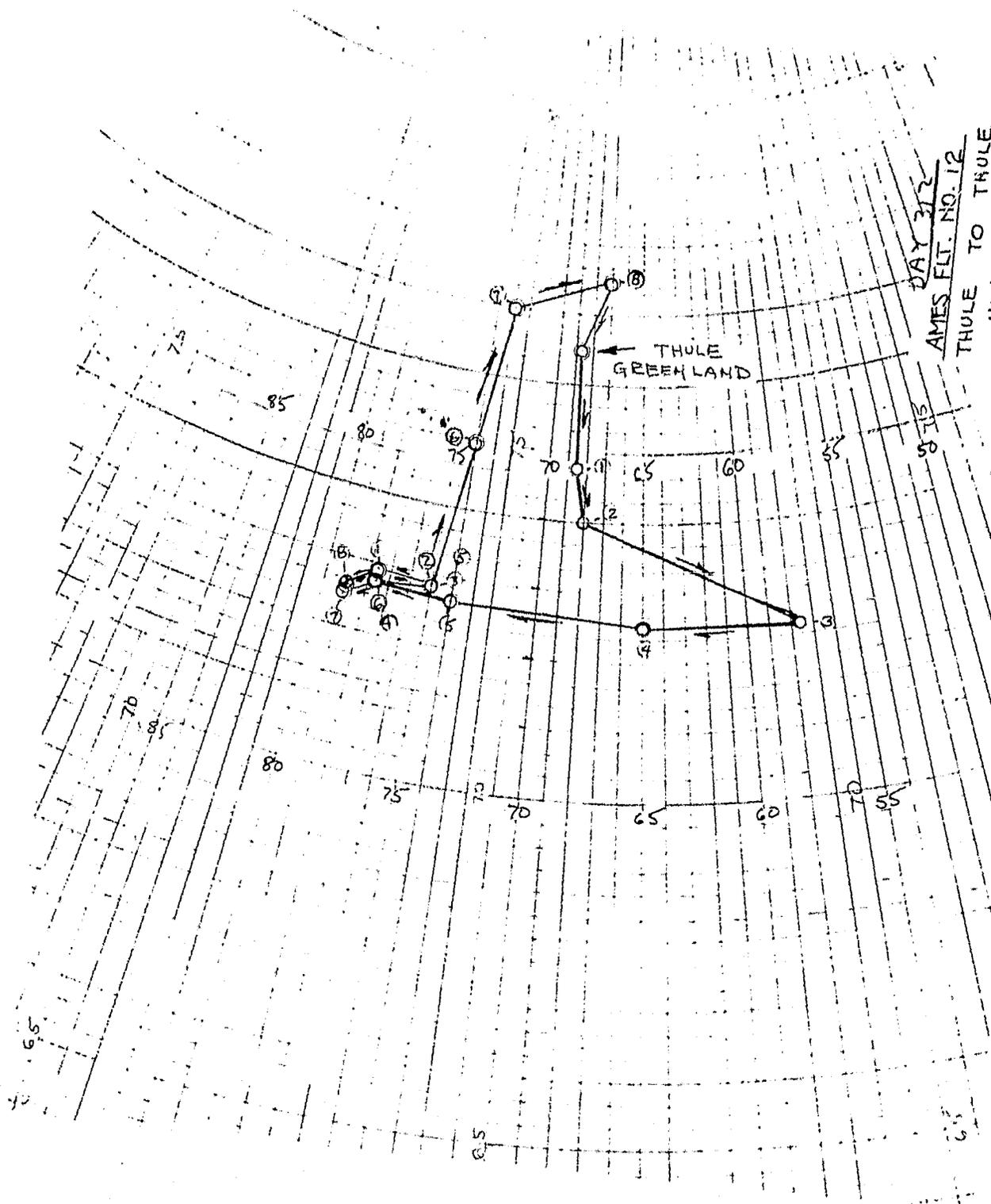
The CV-990 was heartily welcomed by the Pond Inlet community including school children.

The return to Thule was routine.



DAY 312  
AMES FLIGHT NO. 12  
THULE TO THULE  
NOV. 8, 1978

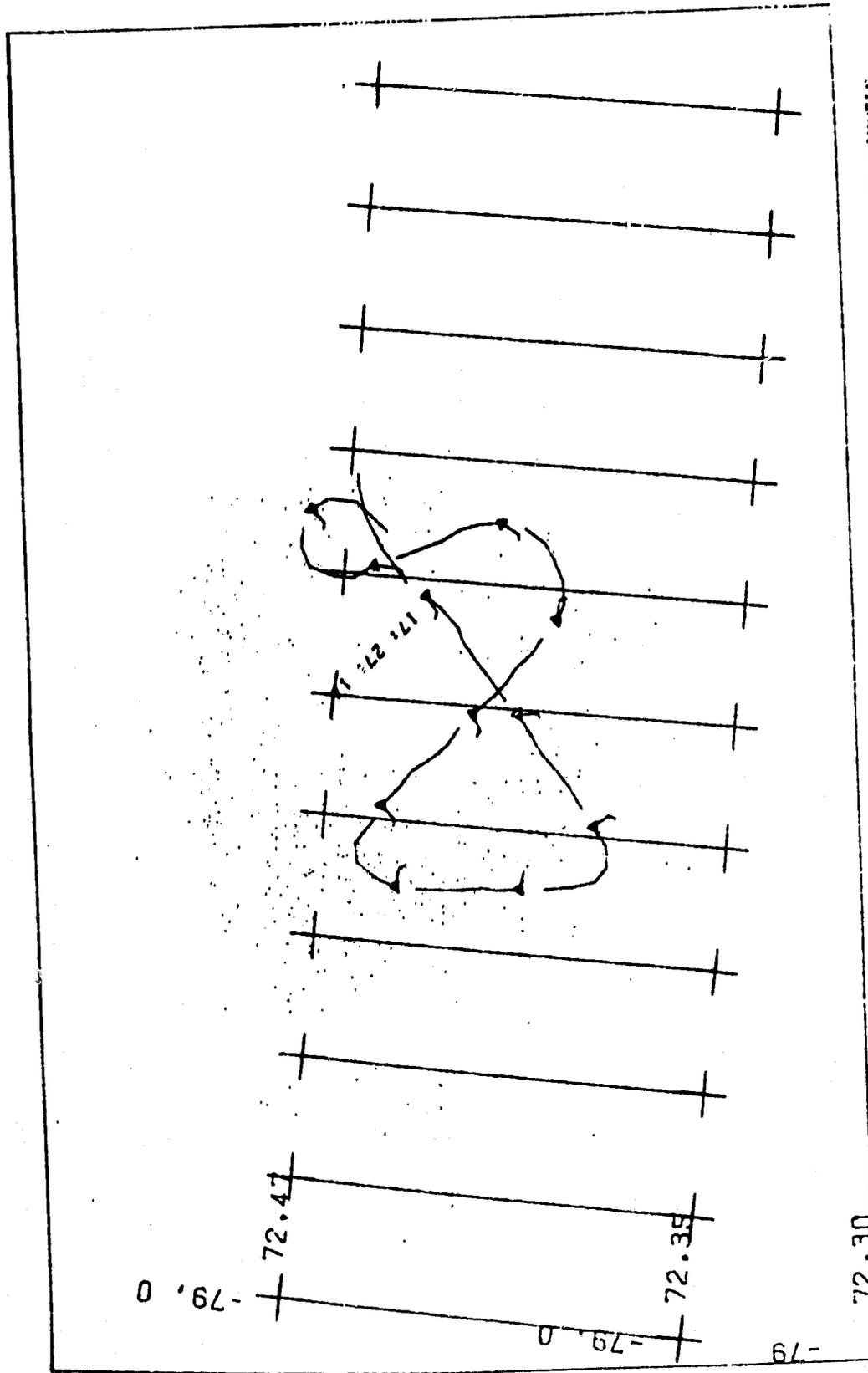
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DAY 312  
 AMES FLT. NO. 12  
 THULE TO THULE  
 NOV. 8, 1978  
 ENLARGED VIEW

PME PROCESSING- END TIME REACHED.

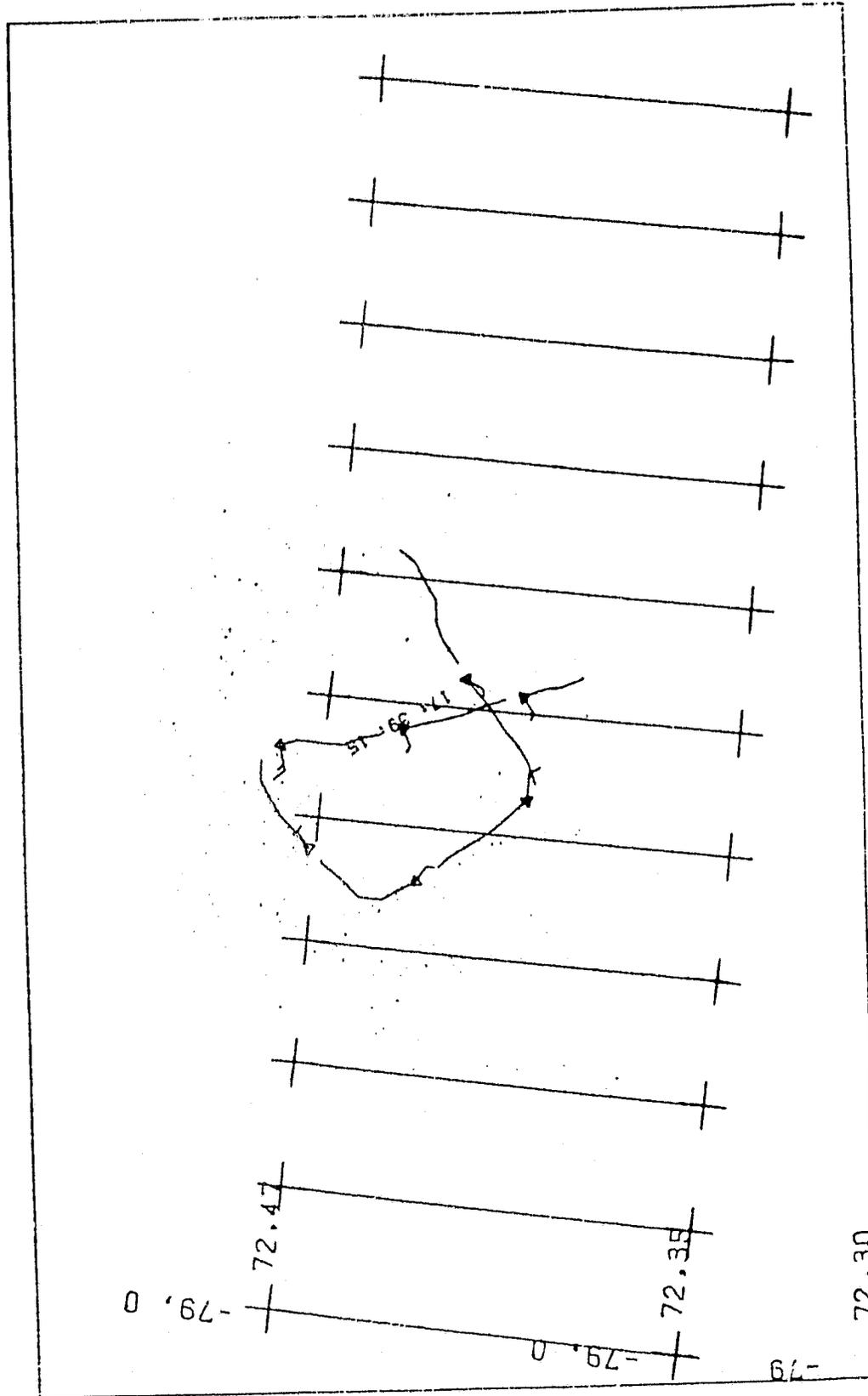
SECTION 8.



FLIGHT 012 NIMBUS-0 '78 POND INLET RUN 1 POND INLET RUN 1 1.00 MINUTES  
17:26: 0 TO 17:38: 0 UT. SCALE=1:2.0E+05 TIME TICS EVERY 1.00 MINUTES  
OVERLAY FOR SPECIAL ROTATED BY

DONE PROCESSING. END TIME REACHED.

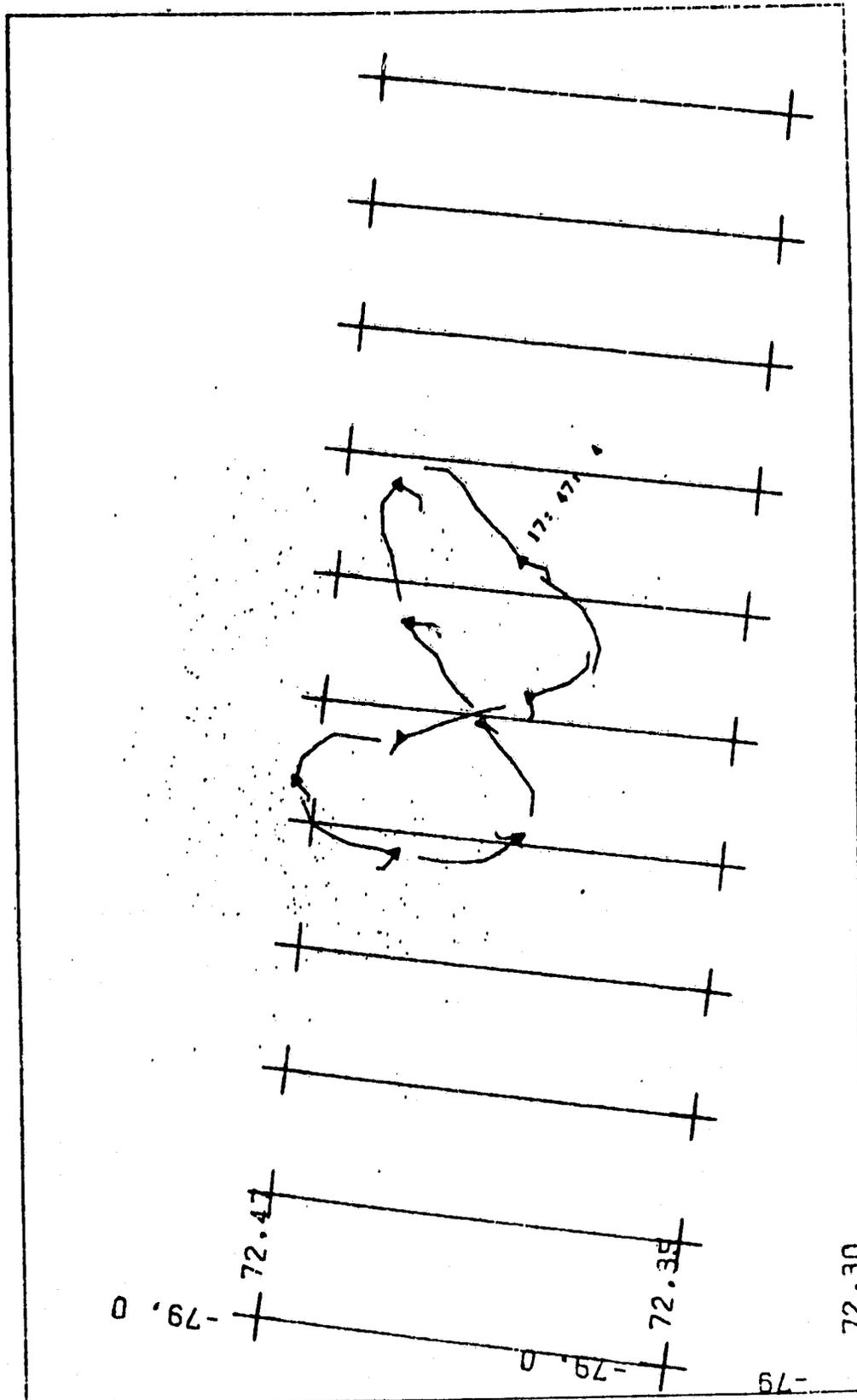
ACTION 8 .



FLIGHT 012 NIMBUS-0 '78 POND INLET RUN 2  
OVERLAY FOR SPECIAL ROTATED BY 17:38: 0 TO 17:46: 0 UT. SCALE=1:2.0E+05 TIME TICS EVERY 1.00 MINUTES

DOME PROCESSING-END TIME REACHED.

ACTION 8 -



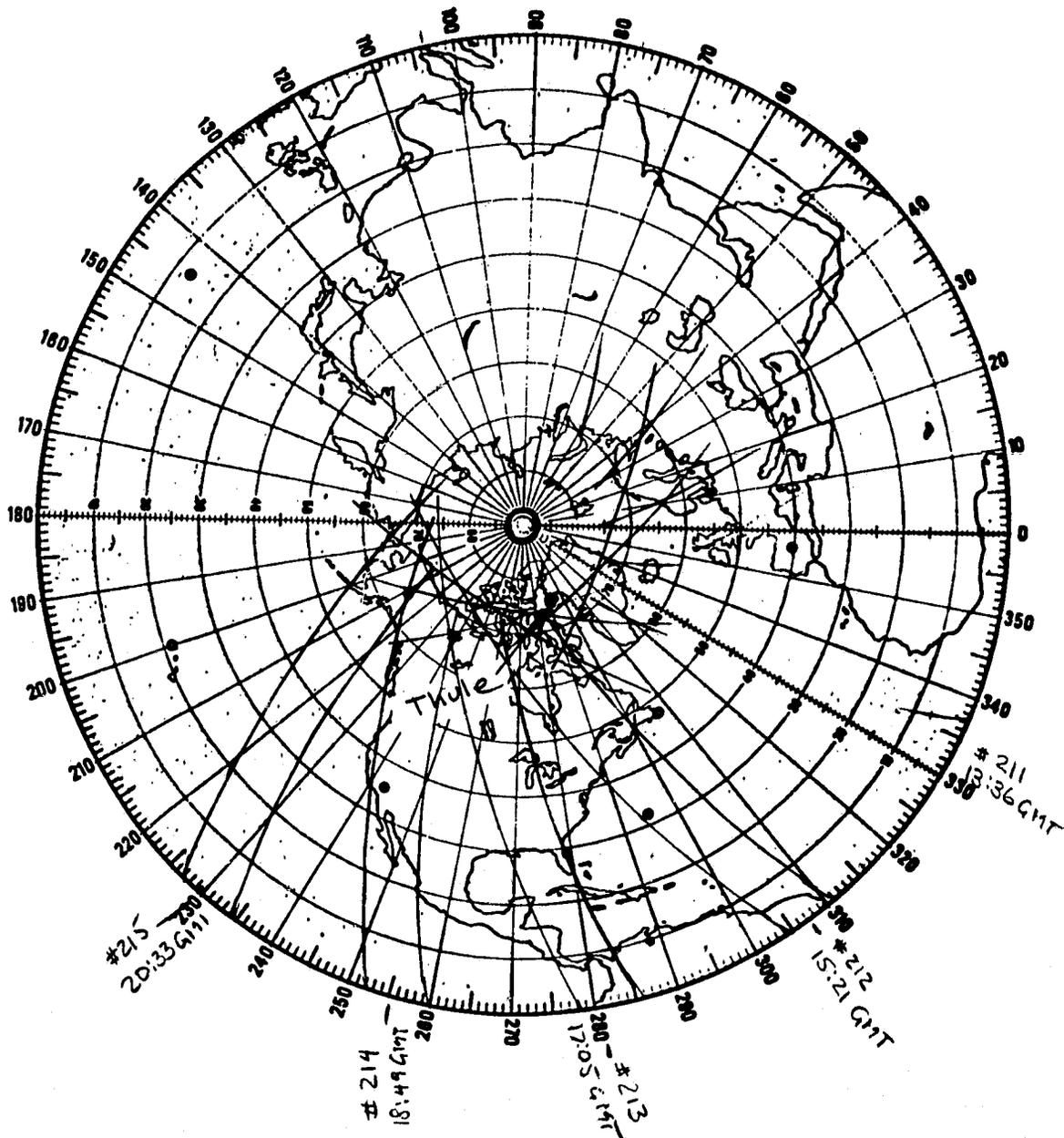
FLIGHT #12 NIMBUS-0 '78 POND INLET RUN 3  
ROTATED BY 17:46: 0 TO 17:56: 0 UT. SCALE=1:2.0E-05 TIME TICS EVERY 1.00 MINUTES



DAY NO. 312  
SMMR WINTER EXPERIMENT NO. -12  
DATE 11/0/70

Take off from: Thule

Touchdown at: Thule.



DAY No. 313

DATE 11/9/78

SMMR WINTER EXPERIMENT PROGRAM -- 13

Take off from: Thule

Touchdown at Fairbanks

Flight Objectives:

**Primary:** Obtain passive microwave data on first year and multi-year forms found in the Arctic Ocean and in the Beaufort Sea.

**Secondary:** Obtain active microwave data for similar types of ice forms in the same regions.

**Weather:** Take-off was in dusk. As the aircraft proceeded northward, the darkness increased. It was clear over the Beaufort Sea; cloudy and overcast over Alaska.

NIMBUS-7 Orbital Intercepts 225-230

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	76:32	68:43	15:55	77	
WP-1	77:42	74:55	16:14	32,300	North water/Fritz Mueller Date
WP-2	82:40	58:05	16:58	33,100	Very Old Multi-year Ice
WP-3	84:29	69:53	17:15	31,500	Multi-year Ice
WP-4	83:12	110:01	17:50	31,400	
WP-5	80:00	129:59	18:24	31,700	MY/FY Ice Mixtures
WP-6	75:00	130:00	19:00	28,800	
WP-7	71:30	130:00	19:27	3,500	Mostly FY Sample; SMMR Cal Point
WP-8	71:29	142:35	20:21	3,200	High/low passes for atmos- pheric correction
WP-1	66:35	145:16	21:05		
	66:13	145:49	21:08	33,600	Wingover
Touchdown	64:47	147:51	21:26	132	

Comments

The flight started through the Kennedy Channel into the Lincoln Sea region. Along the Kennedy Channel, large concentrations of multiyear ice were observed. On reaching the Lincoln Sea, it was dark until, proceeding southward, Prince Patrick Island in the Beaufort Sea was reached. There, sky conditions were clear enabling good visual observations.

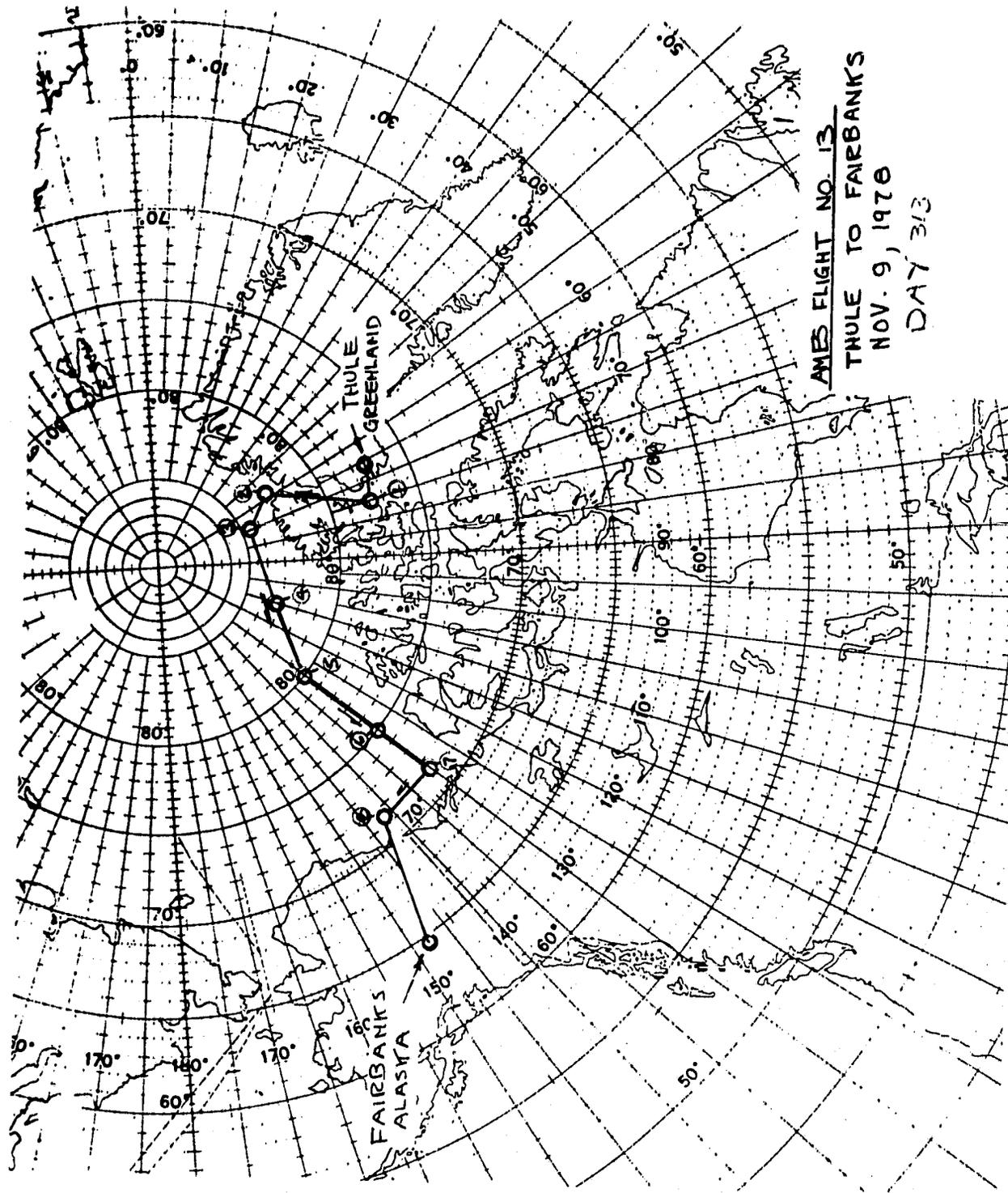
The low-level run consisted of varying the flight altitudes (from 500 ft to 1500 ft). The 1500 foot altitude runs were used to collect imaging radar data; the 500 ft run was used to collect SMMR simulator and ESMR data.

The major ice types identified were medium to large multiyear floes cemented together by first year frozen ice.

Large refrozen melt ponds could be identified since practically no snow cover was present. The refrozen melt ponds were a beautiful turquoise blue which is characteristic of multiyear ice.

As the aircraft approached the Alaskan coast, there was an increase in cloud cover. The surface was, therefore, totally obscured during the remainder of the flight into Fairbanks.

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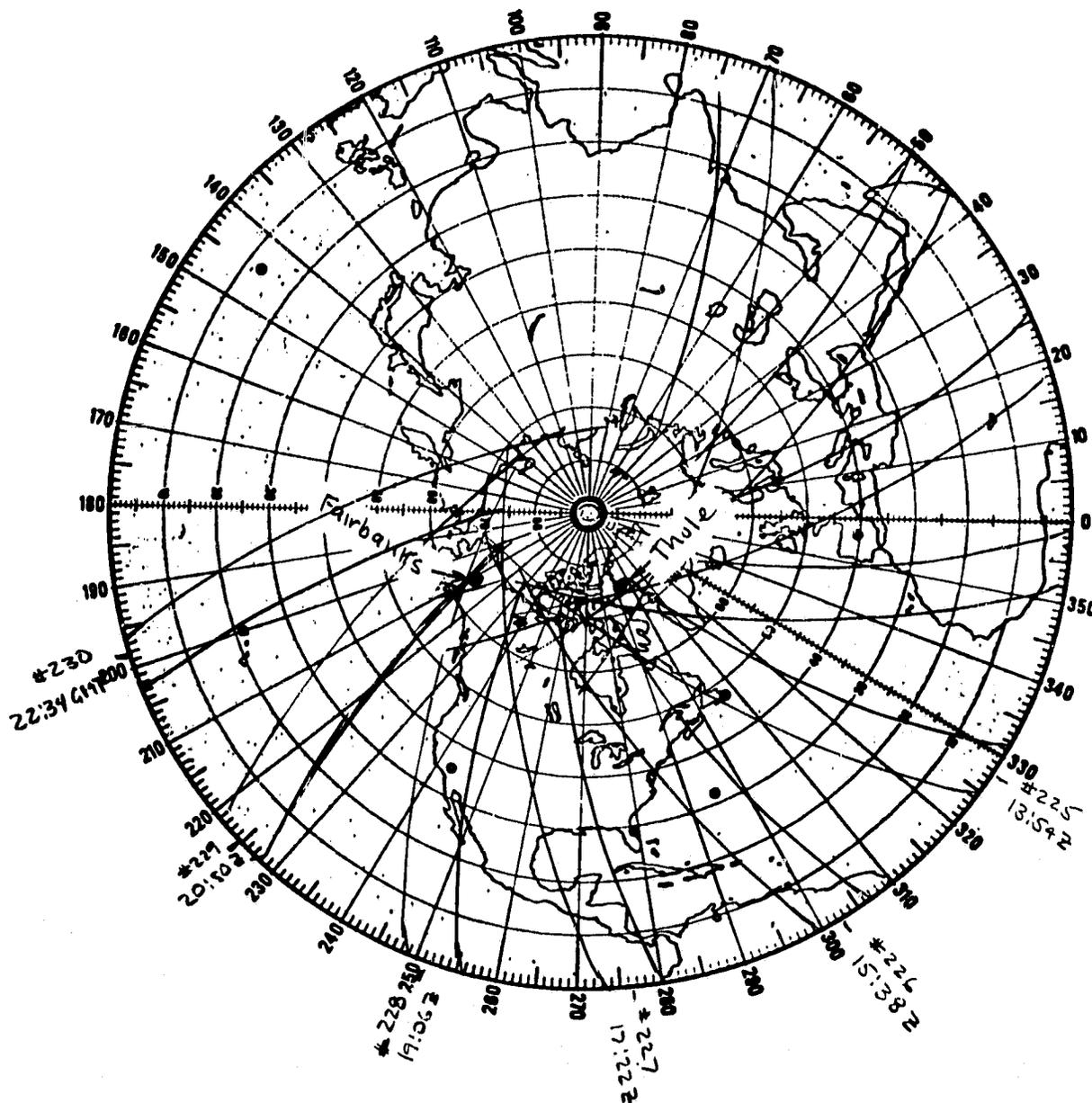


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DAY NO. 313  
SMHR WINTER EXPERIMENT NO.-13  
DATE 11/9/70

Take off from: Thule

Touchdown at: Fairbanks



DAY No. 315

DATE: 11/11/79

SMMR WINTER EXPERIMENT PROGRAM - 14

Take off from: Fairbanks

Touchdown at: Fairbanks

Flight Objectives:

**Primary:** Collect passive microwave information on first year ice in MacKenzie Bay based on high and low level observations.

**Secondary:** Perform similar experimental activities for multiyear ice.

**Weather:** Mostly partially cloudy. However, the low data run in the Beaufort Sea was, for the most part, clear.

**NIMBUS-7 Orbital Intercepts 255-259**

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	68:48	147:51	19:34	32	
WP-1	71:05	144:00	20:33	32,900	
WP-2	70:49	135:01	20:53	32,800	
WP-3	71:58	131:32	21:05	32,700	
WP-4	74:24	139:11	21:31	32,600	
WP-5	74:19	138:32	21:47	1,600	
WP-6	72:03	131:16	22:24	1,400	
WP-7	70:45	134:36	22:49	1,500	
WP-8	71:01	143:59	23:34	3,300	
	70:22	143:34	23:41	26,700	Wingover
Touchdown	64:47	147:51	00:37	32	

Comments

The flight from Fairbanks toward Priedeaux Bay (Baxter Islands) was in a cloud covered sky. The high altitude flight over Beaufort Sea was in relatively clear weather.

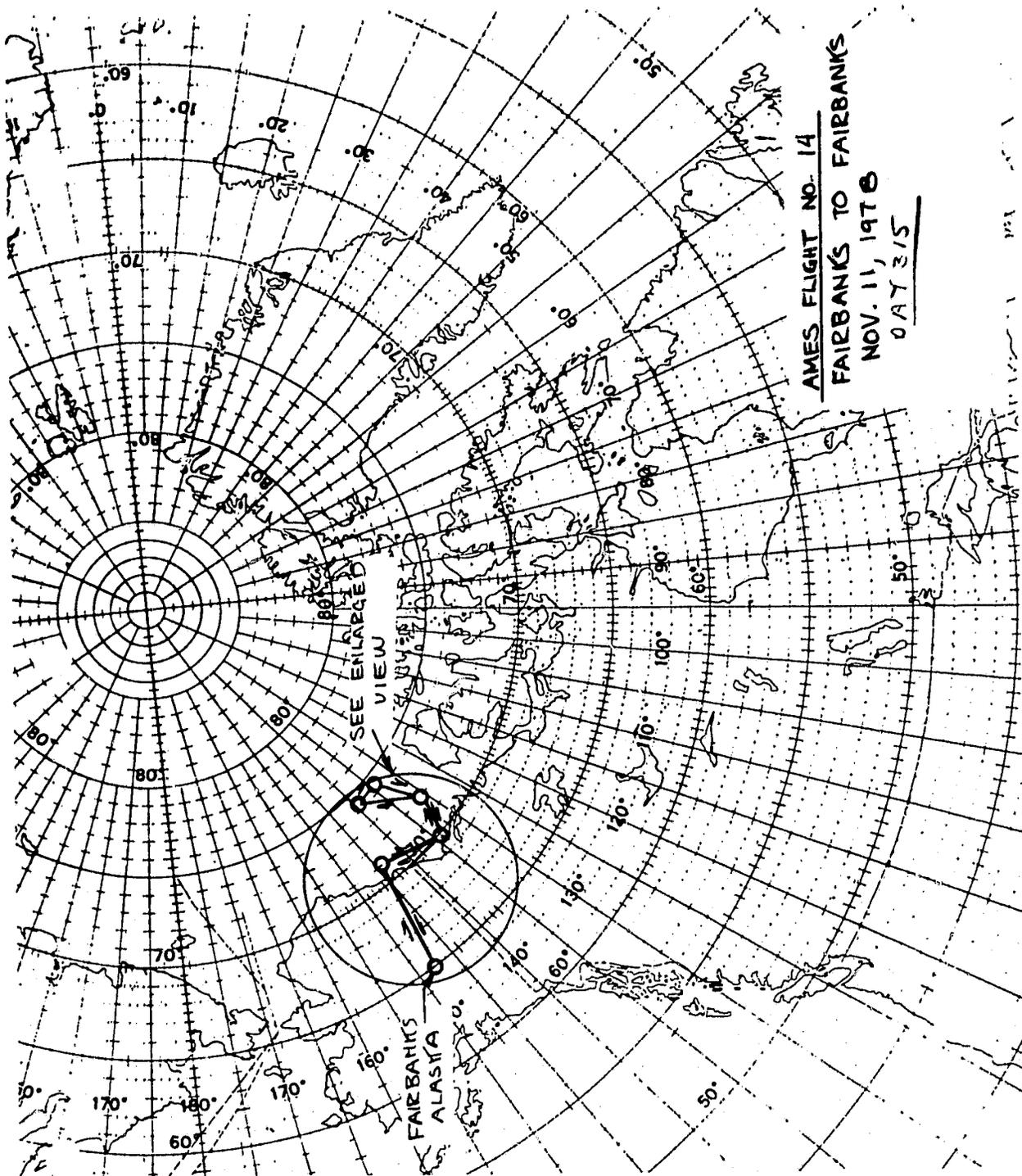
Several difficulties were encountered with certain instruments on this flight:

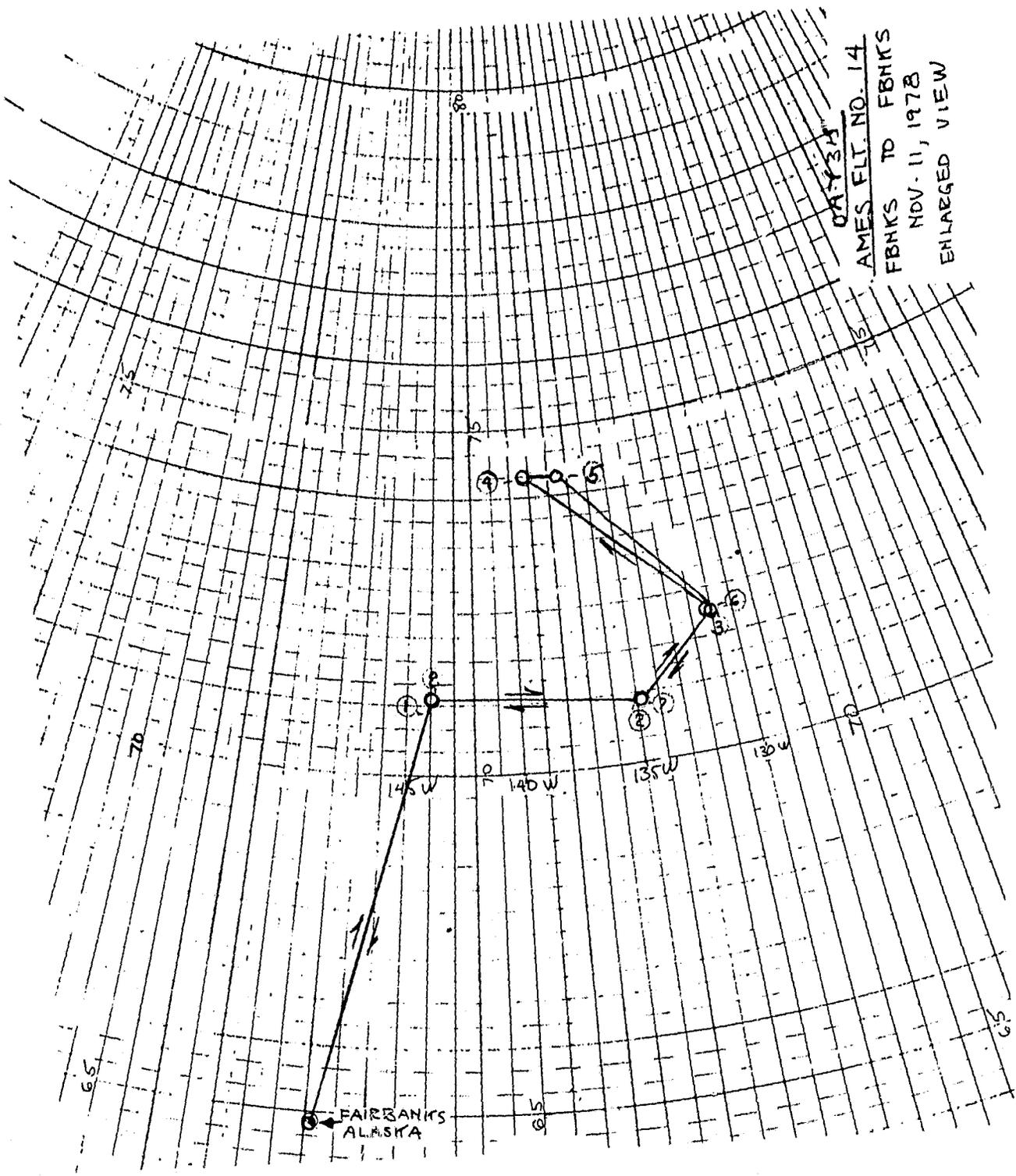
- (a) The KS87 camera was not recording frame number for a while.
- (b) The operator for the radar experiment sensor was ill. It is not certain if good data was obtained.

A wingover was carried out as well as a spiral descent for the purpose of collecting thermal and water vapor data through the atmosphere.

Low level runs at an altitude of 1500 ft. were, for the most part clear. A variety of different ice types were identified as well as ice concentration ranging from multiyear ice to open water. This flight was coordinated with a Canadian ice breaker to collect surface truth. Coordination was also achieved with a Canadian Airborne Ice Patrol operating out of Northern Canada.

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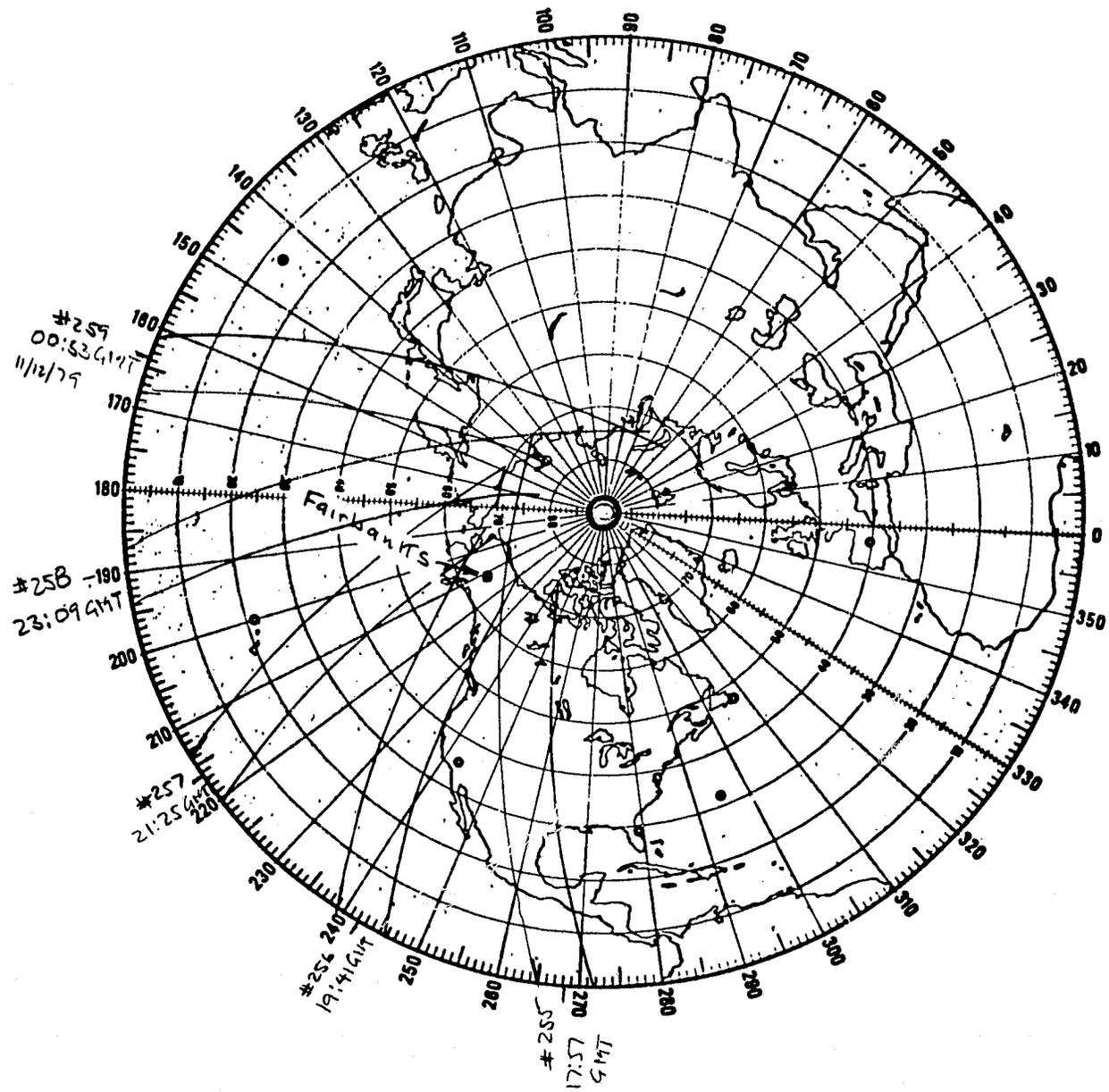


AMES FLT. NO. 14  
 FBKKS TO FBKKS  
 NOV. 11, 1978  
 ENLARGED VIEW

DAY NO. 315  
SMMR WINTER EXPERIMENT NO-14  
DATE 11/11/78

Take off from: Fairbanks

Touchdown at: Fairbanks



DAY No. 316

DATE: 11/12/78

SMMR WINTER EXPERIMENT PROGRAM - 15

Take off from: Fairbanks

Touchdown at: Fairbanks

Flight Objectives:

**Primary:** Collect multi-frequency (passive, visual, active) data on the Alaska Pipeline and selected tundra lakes south of Pt. Barrow.

**Secondary:** a) Collect active micro wave remote sensing data near shore ice processes along the west coast of Alaska; and b) Observe the changes in sea ice characteristics along a profile from Pt. Barrow directly north to 76° north latitude.

**Weather:** First portion of the flight was cloudy. In the low level runs, over the lakes, there were clouds above (white-out conditions). North of Pt. Barrow, weather cleared. Became cloudy on the return to Alaska.

NIMBUS-7 Orbital Intercepts 269-272

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	64:47	147:51	20:04	0	
WP-1	65:49	149:40	20:19	28,000	
WP-2	66:04	150:12	20:22	30,300	
WP-3	66:32	150:33	20:25	33,000	
WP-4	67:27	149:58	20:33	33,000	
WP-5	68:35	149:20	20:42	33,000	
WP-6	68:50	148:53	20:44	33,000	
WP-7	70:00	148:28	20:52	33,000	
WP-8	70:20	146:52	20:57	20,000	
WP-1	70:37	150:23	21:17	5,400	
WP-2	71:15	156:10	21:46	5,200	

SMMR WINTER EXPERIMENT PROGRAM – 15

DAY No. 316

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Run 0-1	71:09	156:12	21:54	1,500	Runs over tundra lakes south of Pt. Barrow
Run 0-2	71:00	156:02	21:57	1,500	
Run 0-3	71:07	156:09	22:11	1,500	
Run 0-4	71:06	156:10	22:16	1,400	
Run 0-5	71:18	156:21	22:31	1,500	
WP-5	72:30	156:02	22:39	1,900	
WP-6	73:30	156:02	22:52	10,800	
WP-7	70:32	148:06	00:05	10,500	
WP-8	70:08	145:41	00:14	10,500	
WP-1	69:52	146:26	00:18	23,000	
WP-2	68:47	148:29	00:30	29,100	
WP-3	68:35	149:16	00:33	28,900	
WP-4	67:27	149:58	00:43	29,000	
WP-5	66:32	150:31	00:51	28,900	
WP-6	66:04	150:11	00:55	28,900	
	65:47	149:38	00:58	28,200	Wingover
Touchdown	64:47	147:51	01:22	32	

Comments

The flight initially proceeded along the Alaskan Pipeline at an altitude of 30,000 ft. Cloud cover was, in most cases, 10/10. The pipeline was momentarily sighted in a few locations; sightings lasted no more than several seconds. This resulted in a poor data set for one of the primary flight objectives.

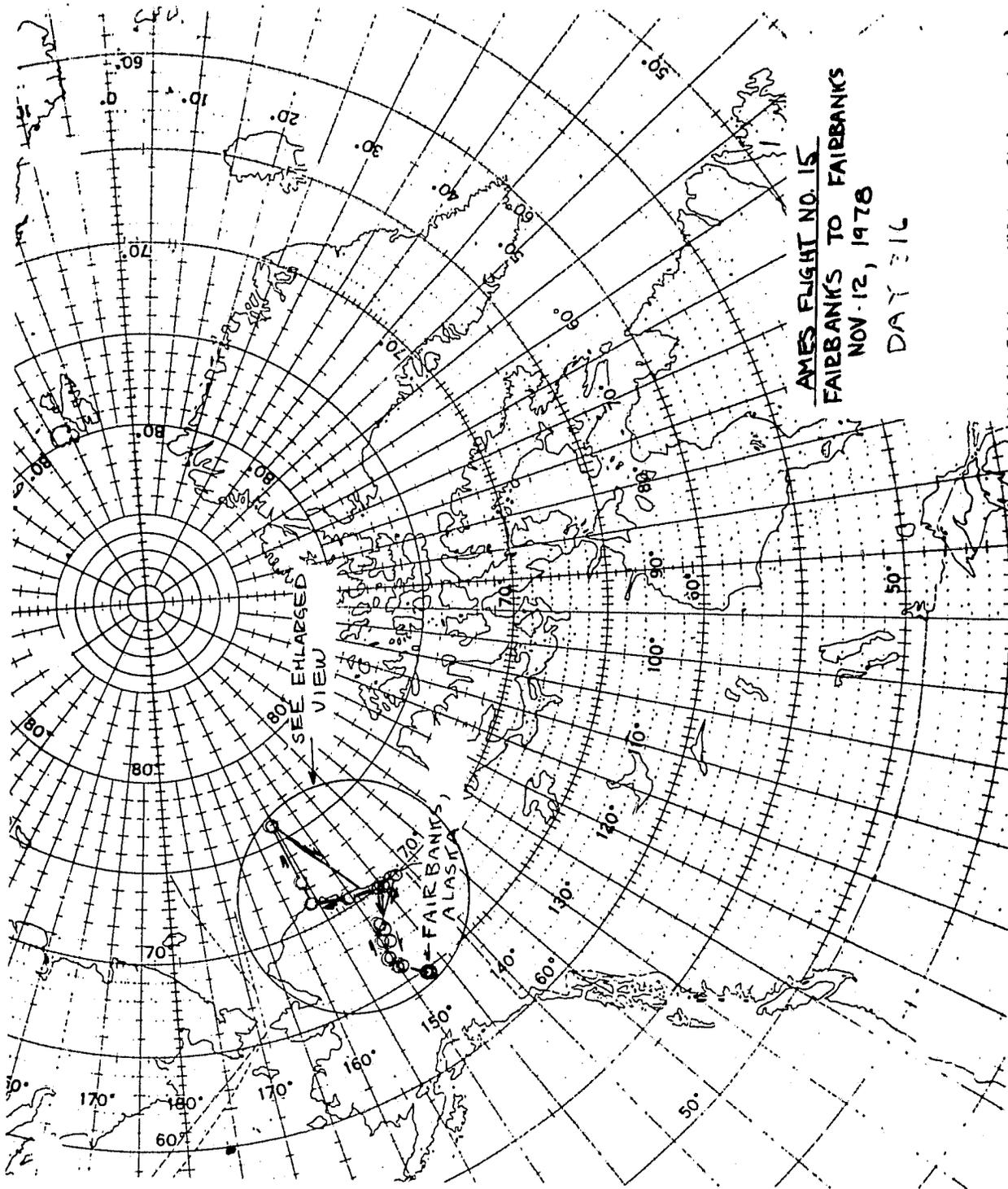
Comments (Cont'd)

After observing the Alaskan pipeline terminal in Prudeaux Bay, the plane then proceeded towards Pt. Barrow. This shoreline transect was to collect information on the near coastal ice process. Because of clouds, visual observations were minimal.

At Pt. Barrow, the plane proceeded at a low level (1500 ft) towards two frozen tundra lakes. Surface truth observations were being carried out at these lakes at the time of the crossing. Because of nearly "white-out" conditions, however, the target lakes were not visually located.

After making the best possible attempt to collect data over these lakes, the flight proceeded northward at 500 ft elevation to 76 degrees north latitude. Visual observations included the coastal shear zone near Pt. Barrow. Increasingly larger multiyear flows and pressure ridges were encountered. One multiyear flow was 10km in length.

The return flight was at high altitude, again passing over the pipeline. However, cloudy conditions still prevented visual observations. The KS87 camera still lacked frame and time indications.



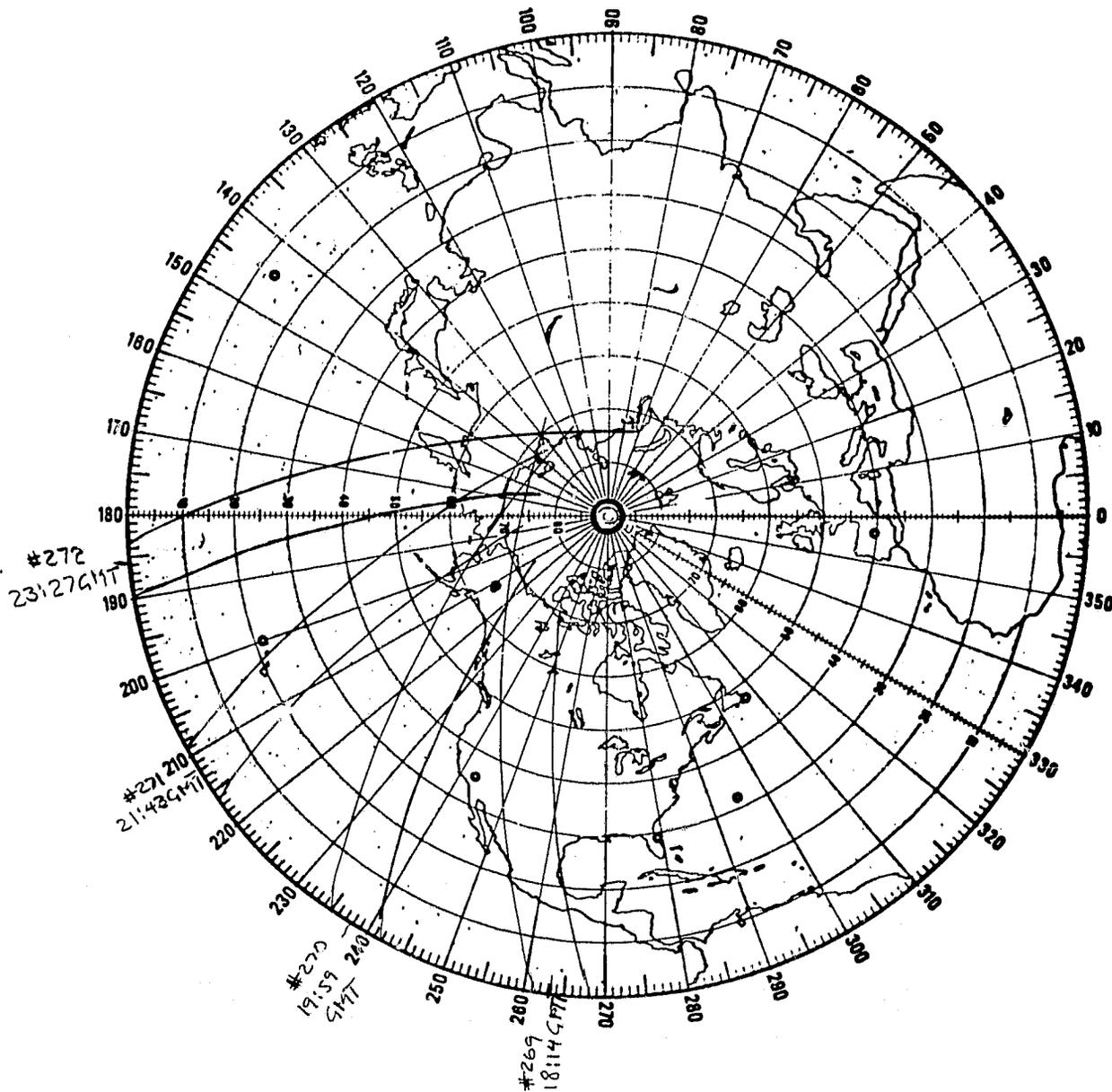
AMES FLIGHT NO. 15  
FAIRBANKS TO FAIRBANKS  
NOV. 12, 1978  
DAY 216



DAY NO. 316  
SMR WINTER EXPERIMENT NO. - 15  
DATE: 11/12/78

Take off from: Fairbanks

Touchdown at Fairbanks



DAY No. 317

DATE: 11/13/78

SMMR WINTER EXPERIMENT PROGRAM - 16

Take off: Fairbanks

Touchdown at: Hilo

Flight Objectives:

**Primary:** Measure variations in Sea Surface Temperature between Anchorage, Alaska and Hilo, Hawaii.

**Secondary:** Fly over selected buoys to obtain surface truth information.

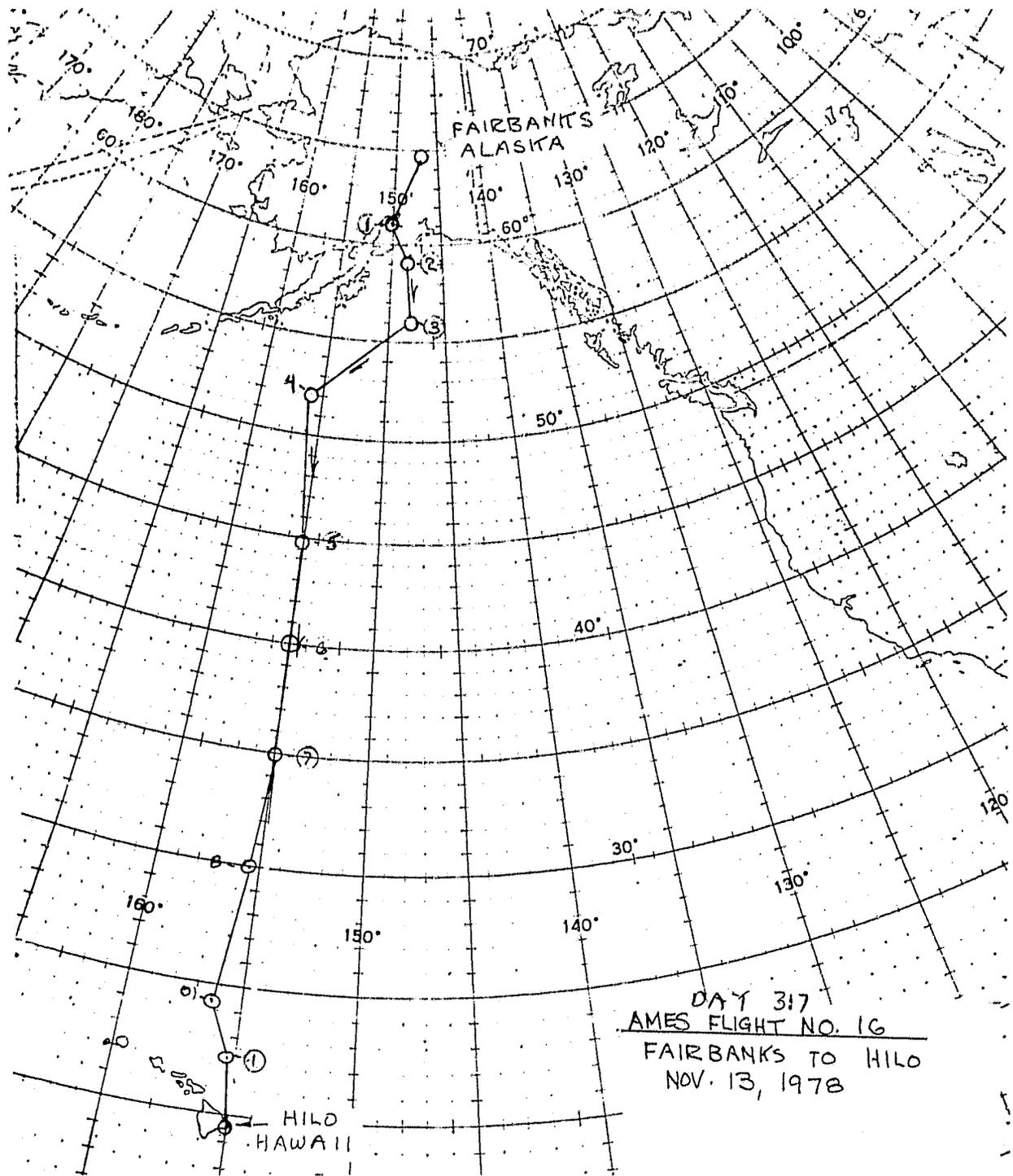
**Weather:** Predominantly clear. Only occasional fair weather. Cumulus clouds as the aircraft proceeded southward.

**NIMBUS-7 Orbital Intercepts 284-285**

<u>Flight Path Way Points</u>	<u>Lat.(N)</u>	<u>Long.(W)</u>	<u>Time (GMT)</u>	<u>Altitude (Ft.)</u>	<u>Remarks</u>
Takeoff	64:47	147:51	19:51	32	
WP-1	61:09	150:12	20:25	33,200	
WP-2	58:33	148:11	20:43	33,700	
WP-3	56:00	148:03	21:03	33,800	Over data buoy EB-03
WP-4	52:00	155:58	21:52	33,800	Over data buoy EB-17
WP-5	45:00	154:58	22:47	33,000	
WP-6	40:00	155:00	23:23	37,600	
WP-7	35:00	154:59	00:04	37,900	
WP-8	30:00	155:31	00:46	38,000	
WP-1	24:28	156:14	01:32	38,300	
WP-2	22:21	155:15	01:50	38,400	
Touchdown	19:43	155:03	02:19	11	

Comments

This was an uneventful flight from Fairbanks to Hilo. The KS 87 camera was still in the same reduced mode of operation. All other sensors and data collecting systems appeared to operate satisfactory.



DAY 317  
 AMES FLIGHT NO. 16  
 FAIRBANKS TO HILO  
 NOV. 13, 1978

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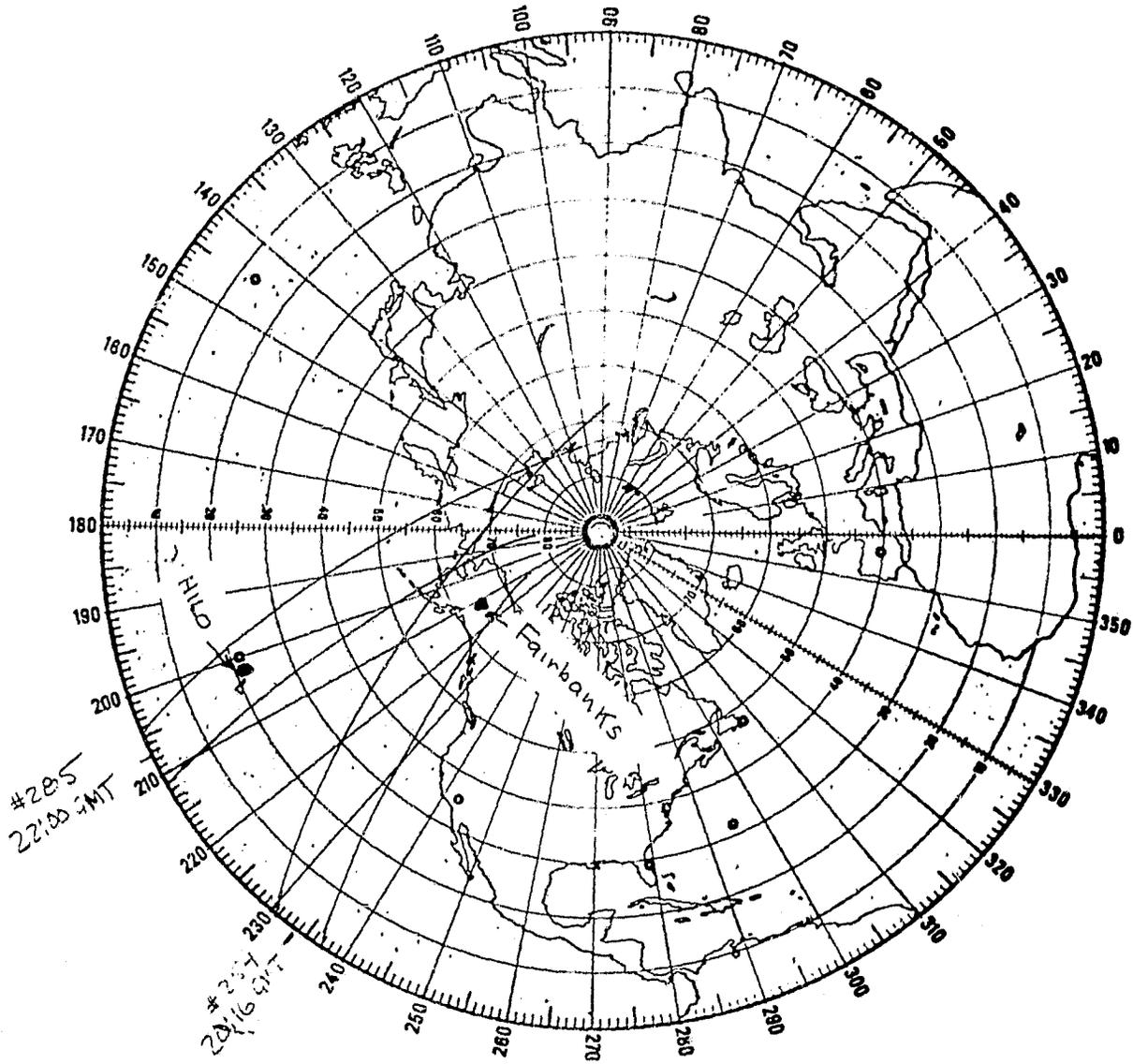
DAY NO: 317

SMMR WINTER EXPERIMENT NO. -16

DATE 11/13/78

Take off from: Fairbanks

Touchdown at: Hilo, Hawaii



DAY No. 320

DATE: 11/16/78

SMMR WINTER EXPERIMENT PROGRAM - 17

Take off from: Hilo

Touchdown at: McChord

Flight Objectives:

**Primary:** Obtain Sea Surface Temperature and Near Surface Wind radiance data using passive microwave and thermal IR instruments.

**Secondary:** Fly over selected data buoys to obtain surface truth correlative information.

**Weather:** First three fourths of trip was clear with occasional fair weather cumulus. It was cloudy and overcast for the remainder of the flight.

NIMBUS-7 Orbital Intercepts 325-327

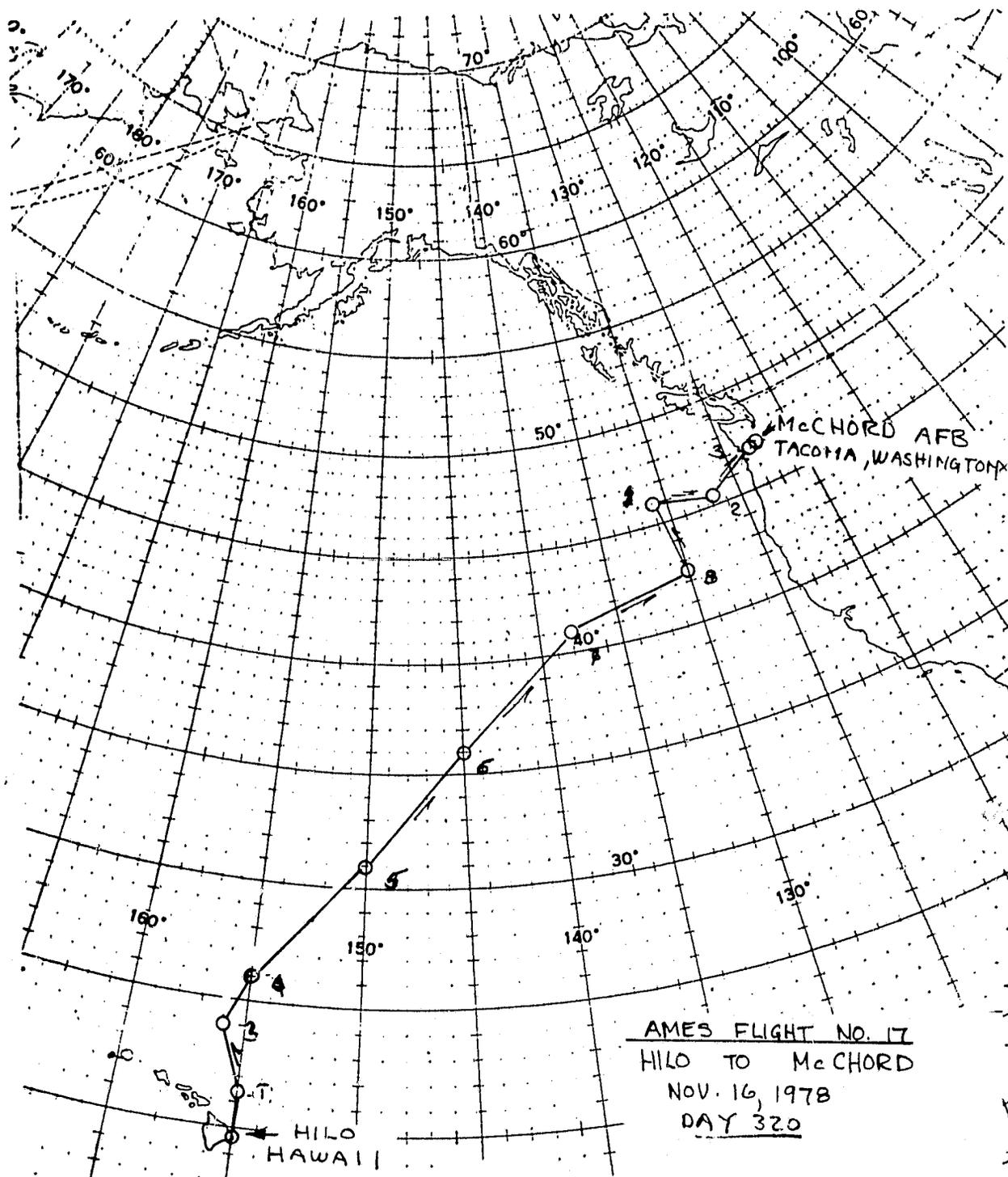
Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude Ft.)	Remarks
Takeoff	19:43	155:01	19:49	11	
WP-1	21:26	155:08	20:07	25,700	
WP-3	24:03	156:19	20:30	34,200	Bypassed WP-2
WP-4	26:00	155:00	20:47	34,200	
WP-5	31:00	150:00	21:37	33,200	
WP-6	36:00	145:00	22:27	34,000	
WP-7	41:00	138:00	23:26	34,000	Fly over buoy EB-20
WP-8	42:30	130:02	00:12	31,400	Fly over buoy EB-16
WP-1	45:52	130:59	00:44	31,200	Fly over buoy EB-21
WP-2	45:31	126:46	01:05	31,000	
WP-3	46:57	124:09	01:25	23,900	
Touchdown	47:09	122:25	01:43	98	

Comments

All objectives of this flight were apparently achieved.

Instruments appeared to function normally except for the following:

- (a) The KS 87 camera still had a partial malfunction.
- (b) There was a break in the wave guide for the vertical 6.6 Megahertz SMMR simulator channel.
- (c) There was a problem, early in the flight, with the cold load for the L-Band Radiometer.
- (d) Based on post-flight assembly observations, under-carriage unit may have contained rain-water scooped up by hole blown in fairing caulking.



AMES FLIGHT NO. 17  
 HILO TO McCHORD  
 NOV. 16, 1978  
 DAY 320

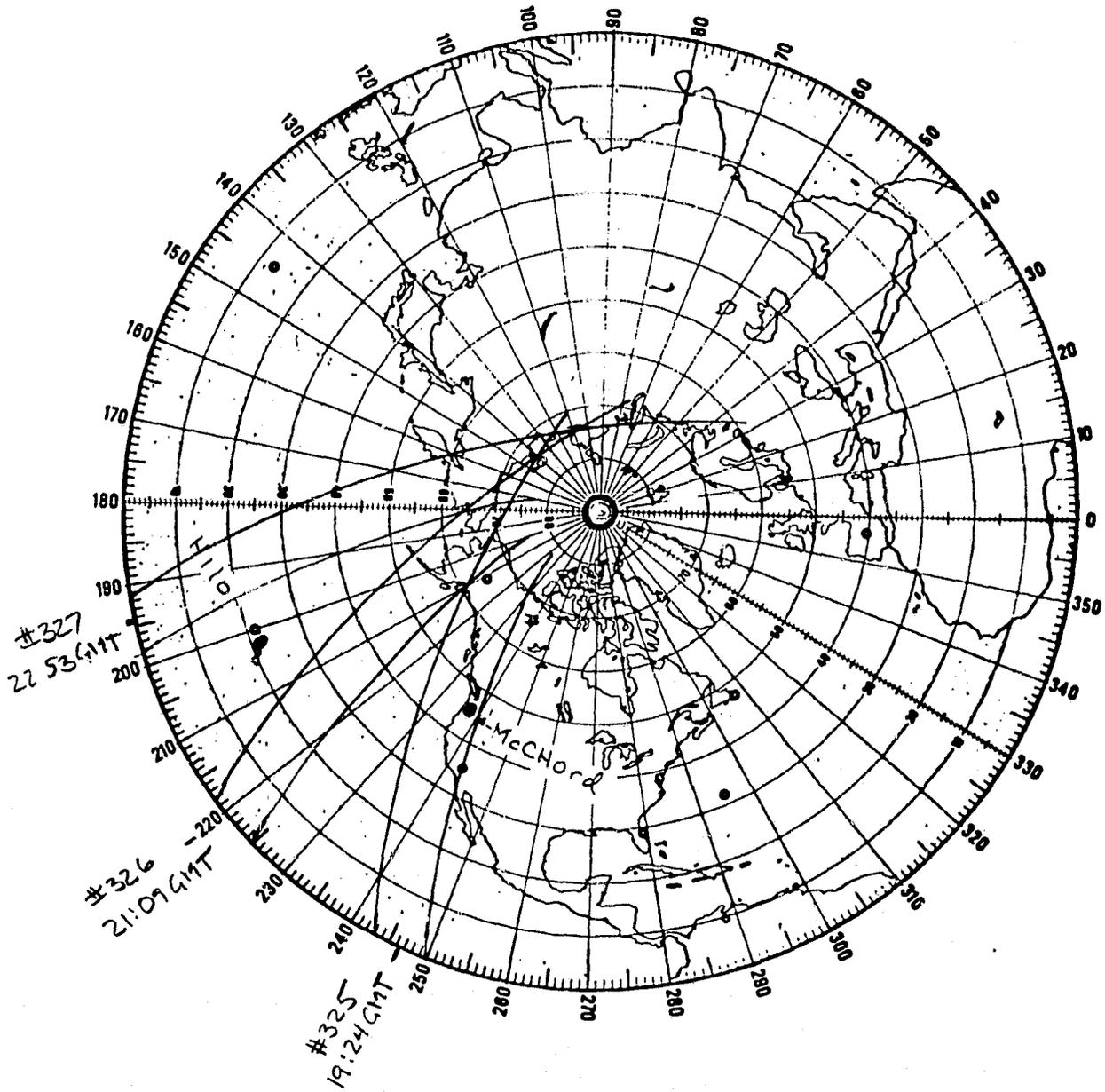
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DAY NO: 320

SMR WINTER EXPERIMENT NO.-17

DATE 11/16/78

Take off from: Hilo, Hawaii      Touchdown at: McChord



DAY No. 321

DATE: 11/17/78

SMMR WINTER EXPERIMENT PROGRAM - 18

Take off from: McChord

Touchdown at: McChord

Flight Objectives:

**Primary:** Continue to collect sea surface temperature data using passive microwave instrumentation. Coordinate flight with the NOAA P-3 Mission.

**Secondary:** a) Fly over NOAA experimental vessel "PAPA" for correlation surface truth information; b) obtain sea state information using an active microwave altimeter.

**Weather:** Mostly partial cloudy. Some clouds in low level runs.

**NIMBUS-7 Orbital Intercepts 338-339**

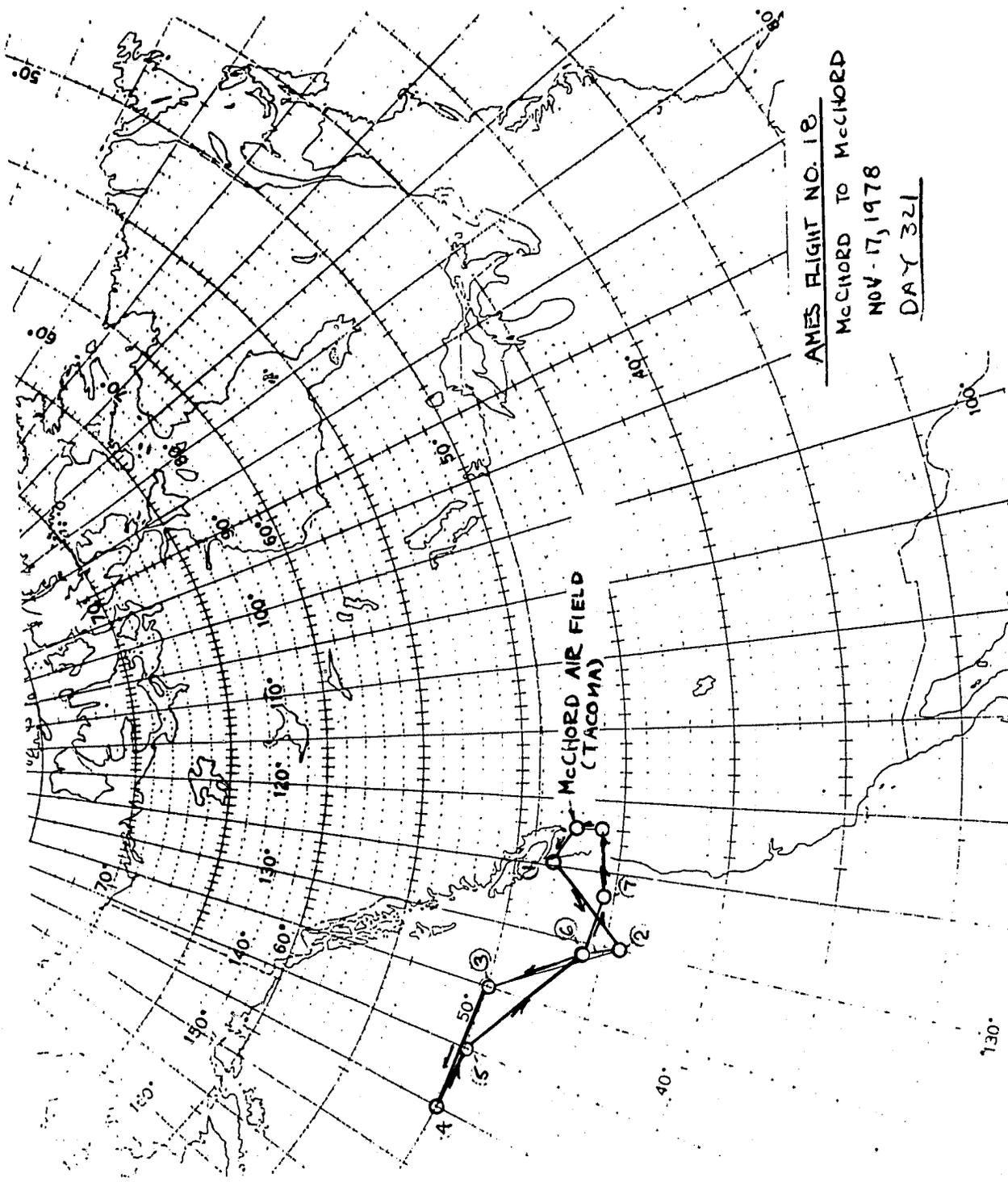
Flight Path Way Points	Lat.(N)	Long.(W)	Time (Z)	Altitude (Ft.)	Remarks
Takeoff	47:09	122:28	19:13	98	
WP-1	48:18	124:38	19:36	30,800	
WP-2	44:22	130:05	20:13	29,100	
WP-3	49:48	135:00	20:41	28,900	
WP-4	50:00	145:11	21:35	30,400	2151Z Precip at flight level; RFI on 6.6GHz channel from PAPA (5.6GHz radar)
WP-5	50:00	140:00	23:02	800	2156Z: directly over PAPA!
WP-6	46:00	131:00	00:04	27,500	Over Buoy EB-21
WP-7	45:31	126:43	00:25	27,200	
	46:44	123:58	00:43		Wingover
Touchdown	47:09	122:28	19:13	98	

Comment

This flight was coordinated with a NOAA P-3 aircraft which dropped Airborne Expendable Bathy-thermographs (AXBT's).

A major destination was the NOAA research vessel "PAPA". When "PAPA" was reached, there were low clouds (500 ft) and heavy precipitation on the windshield of the aircraft. The data collection effort was mainly confined to the short pulse radar.

A wingover was executed on the return flight. The landing at McChord was uneventful.



AMES FLIGHT NO. 18  
McCHORD TO McCHORD  
NOV - 17, 1978  
DAY 321

McCHORD AIR FIELD  
(TACOMA)

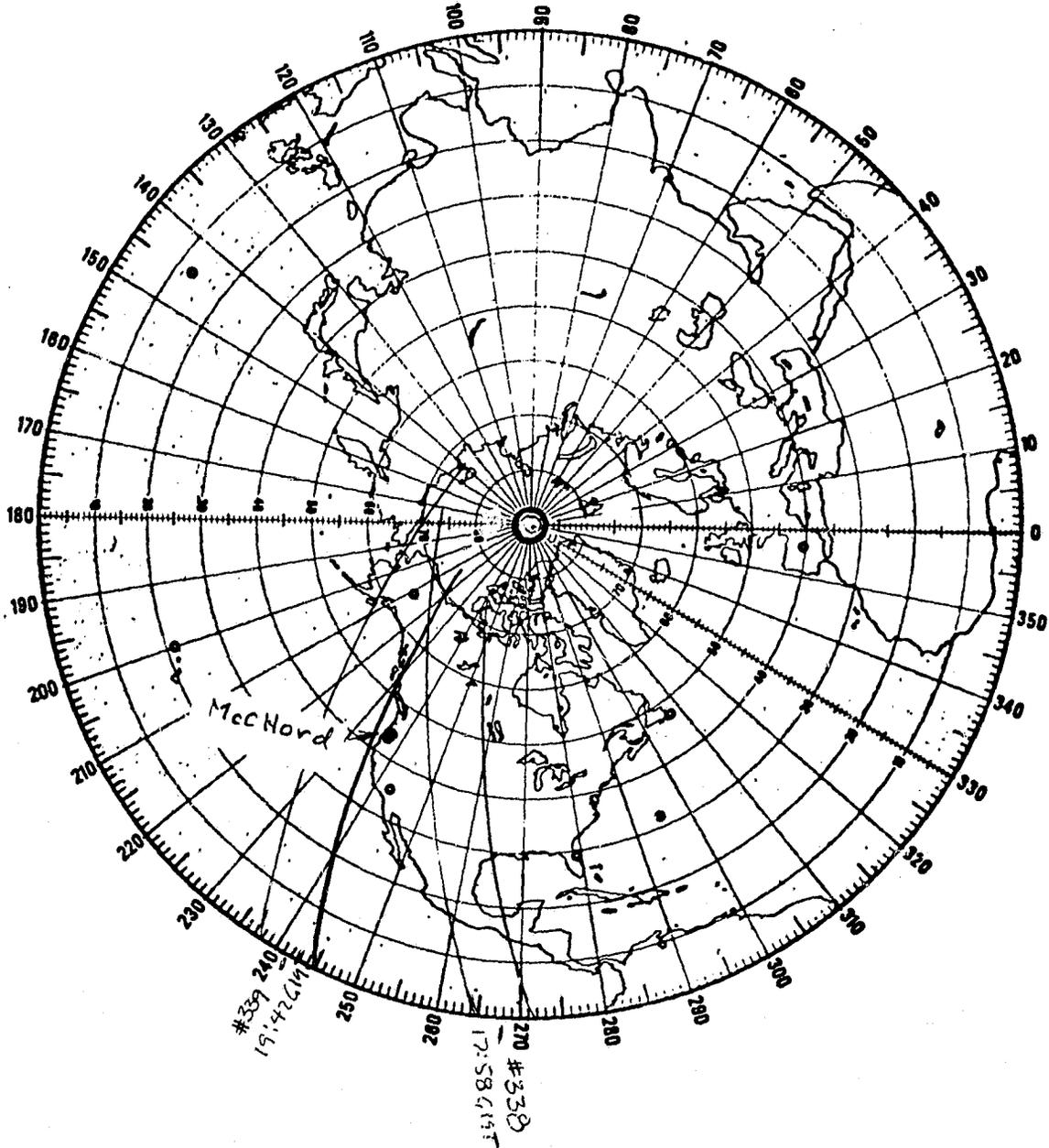
DAY NO. 321

SMHR WINTER EXPERIMENT NO. -10

DATE 11/17/78

Take off from: McChord

Touchdown at: McChord



DAY No. 323

DATE: 11/19/78

SMMR WINTER EXPERIMENT PROGRAM - 19

Takeoff from: McChord

Touchdown at: Moffett

Flight Objectives:

Primary: Continue to collect data on sea surface temperatures and near surface winds.

Secondary: Fly over selected data buoys.

Weather: For the most part, part cloudy

NIMBUS-7 Orbital Intercepts 366-367

Flight Path Way Points	Lat.(N)	Long.(W)	Time (GMT)	Altitude (Ft.)	Remarks
Takeoff	47:09	122:28	19:25	98	
WP-1	46:57	124:08	19:38	25,000	
WP-2	45:32	126:52	19:58	28,300	
WP-3	46:00	131:00	20:23	28,600	Fly over Buoy EB-21
WP-4	40:56	138:00	21:19	29,300	Fly over Buoy EB-20
WP-5	40:00	140:00	21:33	29,200	
WP-6	42:36	129:54	23:10	28,700	Fly over Buoy EB-16
WP-7	40:38	126:56	23:31	28,600	
WP-8	39:17	123:46	23:52	28,900	
	38:41	123:07	23:58	17,500	Wingover
Touchdown	37:26	122:01	00:23	12	

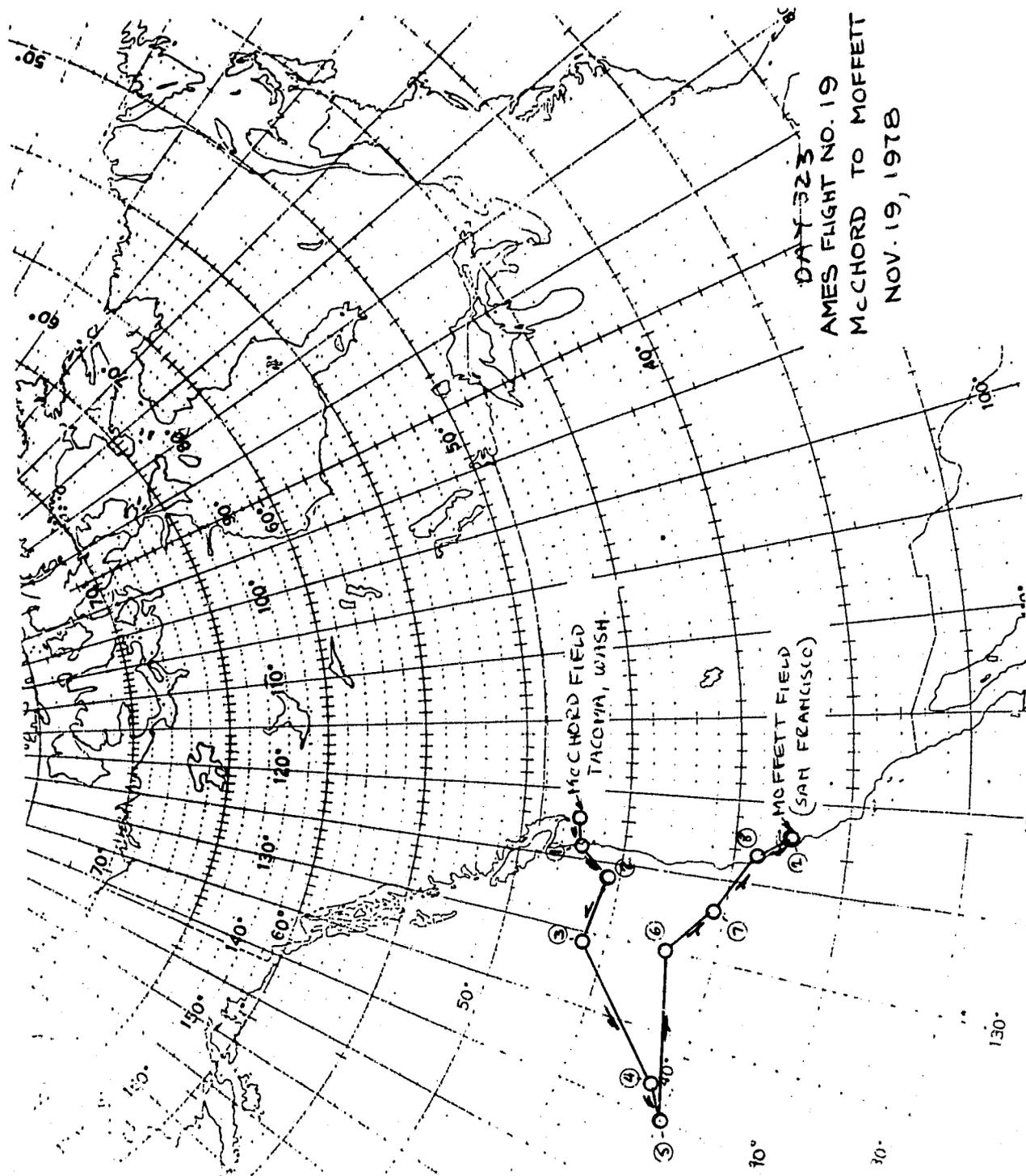
Comments

A scheduled night flight to Moffet Field was cancelled due to an unexpected and severe snowstorm.

The aircraft was able to depart from McChord the next day. A number of data buoys located at different positions in the Pacific Ocean were overflown.

The swell patterns in the Pacific were easily distinguished and provided interesting short pulse radar images.

Towards the end of the mission, a final wingover was executed before landing at Moffet Field.



DAY 323  
 AMES FLIGHT NO. 19  
 McCHORD TO MOFFETT  
 NOV. 19, 1978

McCHORD FIELD  
 TACOMA, WASH.

MOFFETT FIELD  
 (SAN FRANCISCO)

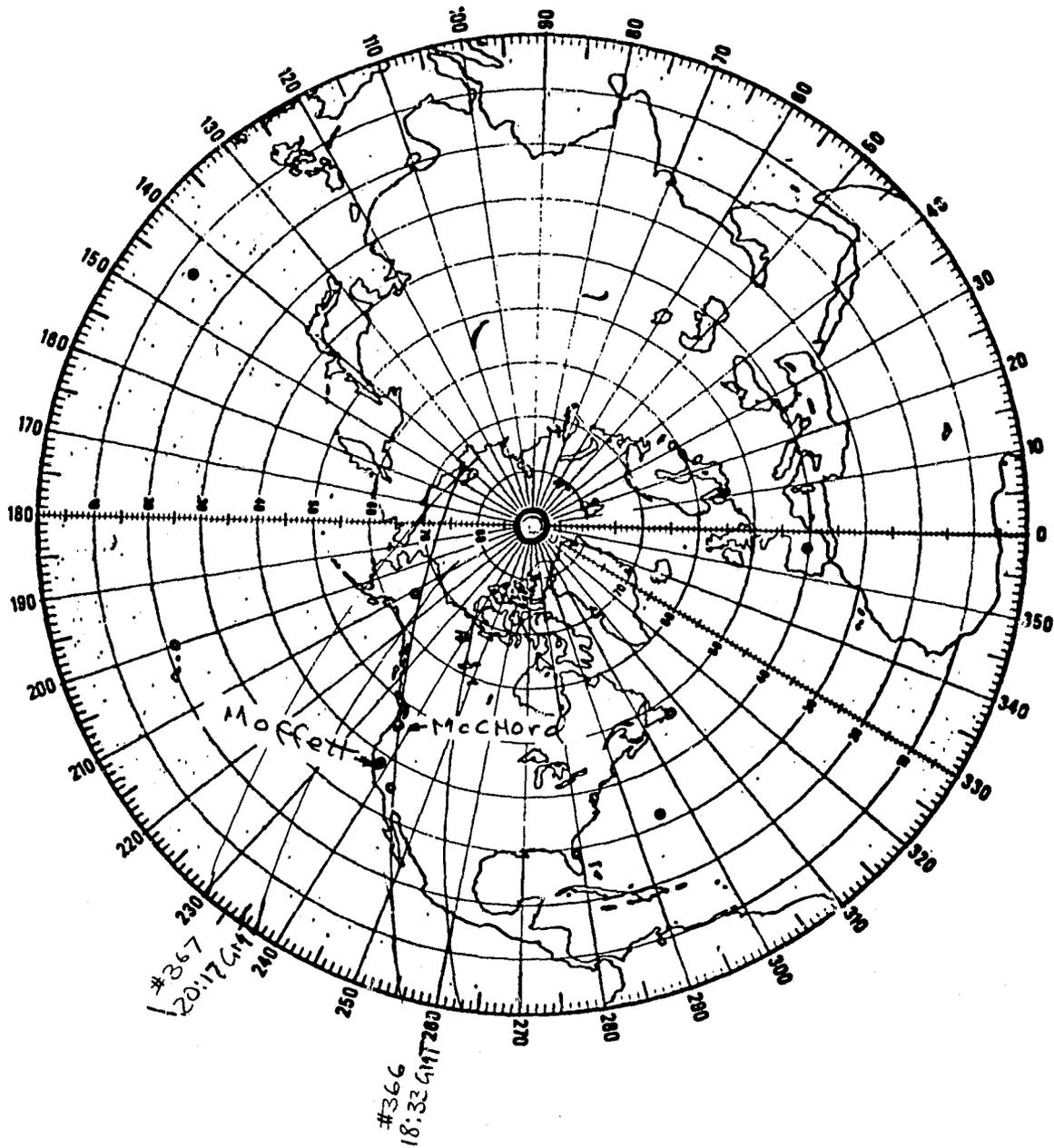
DAY NO. 323

SMMR WINTER EXPERIMENT NO. -19

DATE 11/19/78

Take off from: McChord

Touchdown at: Moffett Field



## BIBLIOGRAPHIC DATA SHEET

1. Report No. TM 80662	2. Government Accession No.	3. Recipient's Catalog No.	
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		6. Performing Organization Code 913	
7. Author(s) P. Gloersen, J. Crawford, L. Hardis		8. Performing Organization Report No.	
9. Performing Organization Name and Address Goddard Space Flight Center Greenbelt, Maryland 20771		10. Work Unit No.	
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12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, D.C. 20546		14. Sponsoring Agency Code	
		15. Supplementary Notes	
16. Abstract  <p style="margin: 0;">The main objective of this mission was to gather "surface truth" information during underflights of the SMMR-7 over open oceans, sea ice, and continental ice sheets. On board the NASA CV-990 aircraft were the SMMR-7 Simulator, the Ocean Temperature Scanner, and an imaging scatterometer/altimeter operating at 14GHz. Seventeen of the nineteen flights were devoted to this purpose. One of the two remaining flights was dedicated to an unrelated mission over frozen lakes near Barrow and the other to a demonstration of the CV-990 airborne laboratory to interested individuals from the Royal Norwegian Research Council, the University of Bergen, and the Christian Michelsen Institute, who in turn were providing comprehensive surface truth during the CV-990 flights over the Norwegian Sea.</p>			
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