NASA Technical Memorandum 84608

Archival of Aircraft Scatterometer Data From AAFE RADSCAT Missions

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AUGUST 1983

25th Anniversary
1958-1983

NASA

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**Scientific and Technical
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1983

SUMMARY

This report documents aircraft scatterometer data obtained over the ocean with the NASA Langley Research Center developed Radiometer-Scatterometer (RADSCAT) instrument. The normalized radar cross section (NRCS) data have been obtained at 13.9 GHz for a variety of ocean surface wind conditions, which are also presented. All such valid RADSCAT ocean scatterometer data for which surface truth have been obtained are included, except for ice research missions during the last year of RADSCAT's lifetime (1977-1978). Aircraft scatterometer data for the SeaSat underflights were obtained with a second Langley instrument, the Airborne Microwave Scatterometer (AMSCAT) but are not reported herein. The RADSCAT data are archived on card image computer tapes and on microfiche, which are both available from the National Technical Information Service.

INTRODUCTION

The Radiometer-Scatterometer (RADSCAT) instrument was developed through the Advanced Applications Flight Experiment (AAFE) program to study the capability of the sensor to make measurements of target signature from a remote platform. The AAFE RADSCAT was similar to the S-193 RADSCAT that flew on the Skylab (ref. 1), except that it was designed to make measurements from an aircraft. A detailed description of the AAFE RADSCAT is available in reference 2. The RADSCAT was designed to make k_u-band scatterometer normalized radar cross-section (NRCS) measurements and radiometric brightness temperature measurements of the same target on the Earth's surface. Only the scatterometer data are reported here, since the radiometer measurement precision was found to be coarse (greater than ±10 K). Furthermore, only valid data over the ocean are presented.

Missions were flown with the RADSCAT antenna mounted on the open cargo ramp of a C-130 aircraft starting in 1972 and continuing through 1978. This report archives all data taken during this time period which have been reduced to NRCS values for which surface truth exists, except for ice research missions during 1977 and 1978.

The development of the AAFE RADSCAT instrument, under the guidance of Richard K. Moore, professor at the University of Kansas, and Willard J. Pierson, professor at the City College of the City University of New York, and direction of flight missions, by W. Linwood Jones, formerly of NASA Langley Research Center, are acknowledged.

SCATTEROMETER DESCRIPTION

The AAFE RADSCAT, which operated at 13.9 GHz, was developed to measure the microwave brightness temperature and scattering coefficient of the ocean from aircraft altitudes. The radiometer measurement precision was found to be coarse (greater than ±10 K); hence, no radiometer data are presented herein. A detailed description of the AAFE RADSCAT and its operations is given in references 2 and 3; therefore, only a brief description of the scatterometer portion is given herein. Figure 1 is a simplified block diagram of the scatterometer subsystem.

For the scatterometer measurement, "long" pulses (32 μsec at 1524 m) were transmitted to the surface so that the area illuminated was defined by the antenna pattern (beam-limited conditions). The antenna beamwidth was 1.5°, and the scatterometer receiver was range-gate controlled. The scatterometer signal processor selected a single spectral line by narrow-bandpass filtering 2-μsec scatterometer return signal samples.

For smooth seas and light winds, the backscattered signal at 13.9 GHz has a dynamic range of approximately 60 dB for measurements from the nadir to 55° incidence angle. Since the useful power measurement range of a square-law detector is typically 20 dB, four receiver channels were used in parallel with staggered sensitivities to ensure continuous operation over the complete dynamic range of the receiver. In each channel, the signal was square-law detected and then integrated for a selectable period ranging from 300 to 924 msec. The integrator outputs were analog-to-digital converted and recorded in a PCM format on an analog magnetic tape recorder.

In making scatterometer measurements, the quantity of interest is the normalized radar scattering cross section σ^o of the ocean. This quantity is determined by the target and is independent of the type of radar performing the measurement. In terms of the RADSCAT transfer function, the expression for σ^o is

$$\sigma^o = (16\pi)^2 \frac{A^2}{\lambda^2} \frac{V_{sea}}{V_{cal}} \frac{\tau_{cal}}{\tau_{sea}} \frac{\alpha\ GXR}{G^2 \cos\theta\ (\beta)^2} \tag{1}$$

where

A altitude of aircraft, m

G antenna gain

GXR receiver calibration loop attenuator

V output voltage of scatterometer integrator, V

α calibration attenuator value for appropriate channel

λ free-space wavelength, m

θ incidence angle, deg

τ scatterometer integration time, sec

β equivalent beamwidth, rad

and subscripts are

cal during calibration

sea during ocean operation

The measurements presented in this paper were obtained with the RADSCAT operating on a C-130B cargo aircraft (NASA-929). The instrument antenna and gimbal were mounted on the cargo ramp (lower door in the aft of the aircraft). For in-flight

ocean measurements, the ramp was lowered and the RADSCAT was extended to its operational position outside the fuselage. In this configuration, the antenna had an unobstructed view of the ocean surface without the use of a radome.

NRCS DATA

The flight experimental data reported herein were measured between 1973 and 1977. Table I identifies the mission number assigned by NASA, the flight number, the geographic location of the flight lines, and the time during which measurements were made referenced to Greenwich mean time (GMT).

The quality of the instrument (and hence, the measurements) has improved with time. In the earlier period (1973 and 1974), the instrument was under constant development. Therefore, many caveats have to be provided to qualify the use of the data. The most important have to do with uncertainties in σ^o due to the lack of temperature stabilization of the RF system and bandpass filters and with the stability of the periodic gain calibrations. (A discussion of the development and calibration of the instrument is given in ref. 2, and a brief description of the RADSCAT experimental measurement system is given in ref. 3.) These and other shortcomings in the data are indicated in table I and later in the text where important.

All data from runs listed in table I have been processed to produce NRCS (σ^o) using the AAFE RADSCAT processing algorithms developed for Langley Research Center (ref. 4). The resulting output data vectors have been filed on microfiche, and in card image form on magnetic tape with the following characteristics:

- Nine track
- 800 bits per inch
- Written on a CDC CYBER 175
- ASCII/BCD
- Unlabelled
- Each file contains a flight line or a segment of a flight line
- Each block is one record long
- Each record is 80 bytes long

The record format and contents are given in table II. The instrument output parameters include NRCS for all channels, instrument mode, integration time, depolarization factor, and data validation code. The remaining parameters, time (GMT), antenna incidence and cross track angles, polarity, and aircraft location and attitude are all used to characterize the geophysics of the measurement. For a detailed discussion and definition of these parameters, see reference 4.

A typical example of the data stored on these archival media is given in figure 2. The last four elements in the list of table II have not been shown since they are redundant with or supplemental to the data already shown.

Three algorithms have been developed to derive statistical properties and to perform parametric averages of the processed RADSCAT data. Archival copies of the source code of these algorithms are available on request. These algorithms are described as follows:

1. LINSTAT - This computer program performs a statistical analysis on RADSCAT straight and level flight-line data. For each antenna gimbal position, mode, and polarization combination that occurs in a given flight line, the mean of both incidence angle and σ^{o} (NRCS) in both ratio and decibels are calculated. These values, along with the number of data samples, are output. Plots of σ^{o} versus incidence angle are also produced. After these calculations have been performed for each specified flight line in a particular computer run, data from all flight lines analyzed in the computer run are used to form a composite statistical summary. This summary contains the mean and variance for each incidence angle, the mean and standard deviation of σ^{o} (ratio and decibels), and the number of data samples. This computer program is archived on tape LNSTAT.

2. UNCOREC - The purpose of this computer program is to perform a statistical analysis on RADSCAT circle flight-line data that have not been corrected to a constant incidence angle. For each polarization, the data are sorted into bins 10° wide in azimuth. For each of these bins, the mean and variance are calculated for both the incidence angle and σ^{o} (NRCS). These values, along with the number of data samples in each bin and the mean aircraft heading for each bin, are output. A composite statistical summary of all flight lines analyzed within a computer run is output at the end of the run. Plots of σ^{o} versus flight direction are produced. This computer program is stored on tape UNCORC.

3. CIRCLES - The purpose of this computer program is to correct RADSCAT circle flight-line data to the average incidence angle of the circle and to perform a statistical analysis on the corrected data. The data sorting and output products are the same as for computer program UNCOREC. This computer program contains subroutines that use regression curves or tables of NRCS versus incidence angle at upwind, downwind, and crosswind azimuths as the basis for incidence-angle corrections. The tables containing NRCS versus incidence-angle values are based on upwind, downwind, and crosswind straight and level flight lines. Corrections at intermediate azimuths are obtained by interpolating between the bounding correction tables. This computer program is stored on tape CORECT.

SURFACE-TRUTH MEASUREMENTS

For each flight, the local ocean surface wind speed and wave conditions were measured by either in-situ instrumentation or by onboard aircraft sensors. Typical in-situ measurements consisted of 10-min anemometer averages of wind speed and direction, air temperature, and near-surface sea temperature obtained hourly during the scatterometer experiment. Aircraft-derived surface truth was usually obtained at the beginning and the end of the flight, with these observations separated by 3 to 4 hours. These surface-truth flight lines were about 30 km long and were flown at low altitudes (100 to 150 m) in the upwind and downwind directions. The wind speed and direction measurements were obtained from the aircraft inertial navigation system (Litton LTN-51), and wave measurements were obtained from a laser profilometer (Spectra-Physics Geodolite 3A).

The surface wind measurements are presented at the conventional anemometer height of 19.5 m. The wind direction measured by the aircraft in the 100- to 150-m altitude range was assumed to be the same as at 19.5 m. The wind speed, however, was extrapolated using a boundary-layer wind profile model described in reference 5. In this model, the wind speed was first extrapolated to the ocean surface using the profile determined by the air-sea temperature difference and was then extrapolated back to 19.5 m using a logarithmic profile for zero air-sea temperature differential (neutral stability conditions). This wind speed is considered proportional to the surface wind stress and is not the actual wind speed at 19.5 m. During the low-altitude flight lines, the required air and sea surface temperatures were measured onboard using a Barnes PRT-5 infrared radiometer (sea surface temperature) and a Rosemont Model 103 temperature sensor (total air temperature).

A summary of surface truth for missions 230, 238, and 288 is given in reference 3. For all other missions, table III gives a summary of the surface-truth measurements corresponding to these flight data. The list is chronological and gives the time, location, and source of the surface-truth data. The RADSCAT mission and flight are also given for cross reference. Winds given are the neutral-stability, 19.5-m winds, which have been calculated by using the model of reference 5. Where possible, the sea surface temperature, air temperature, and wave and swell height and direction are provided. Surface truth is not available for all missions.

DATA FROM OTHER SENSORS

As mentioned previously, laser profilometer measurements were made during most missions. The purpose of these measurements was to provide information about surface wave height and spectra. Also, photographs were made of the ocean surface with an onboard camera. These data have, in general, not been analyzed, and are not archived with these RADSCAT data.

DATA ANALYSIS

This report provides data archival of the RADSCAT NRCS measurements over the ocean and the corresponding surface-truth measurements. No analyses of these data have been presented herein. However, analyses of these data have been included in several publications. Among these are:

1. Missions 230, 238, and 288 - references 3 and 6

2. Mission 318 (JONSWAP) - references 7 and 8

3. Mission 335 - reference 8

4. Mission 353 - reference 9

5. All mission data - reference 10

DATA TAPE AVAILABILITY

Copies of data tapes and microfiche are available upon request to

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161

Langley Research Center
National Aeronautics and Space Administration
Hampton, VA 23665
May 20, 1983

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TABLE I.- AAFE RADSCAT FLIGHT EXPERIMENTAL OCEAN NRCS DATA

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
230	FCF[3]	4/11/73	2	2	19 12 45	38.9317	-74.5533	19 19 03	39.0801	-74.7533	407	4789	FA	HH,VV	4,5	M230	1
			2	3	19 22 50	39.0317	-74.7626	19 30 30	38.7973	-74.3539	461	4822	FA	HH,VV			2
			2	4	19 34 34	38.7983	-74.4092	19 45 31	39.0583	-74.7617	612	4825	FA	HH,VV			3
			2	5	20 01 00	38.9783	-74.7129	20 07 51	38.7950	-74.3334	314	4840	FA	HH,VV			4
			2	6	20 10 53	38.7066	-74.1783	20 37 52	37.8283	-72.8867	1470	4837	SS,FA,AA	HH,VV			5
			3	1	20 40 56	37.8833	-72.7600	20 52 21	37.9100	-72.6467	600	4824	SS,FA,AA	HH,VV			6
			4	1	21 01 18	37.7533	-72.9972	21 13 48	37.6965	-72.8833	1362	4820	SS	HH,VV			7
	1	4/18/73	5	2	16 41 06	36.8100	-73.7867	16 42 51	36.7433	-73.7816	181	2273	SS	VV	4,5,6		8
			2	2	16 53 06	36.9411	-73.8733	17 01 14	36.6250	-73.8519	452	2021	SS,FA,AA	HH,VV			9
			4	1	17 25 10	36.7983	-73.9133	17 31 15	36.8185	-73.9017	607	1995	SS	HH			10
			5	3	17 40 42	36.9371	-73.8776	17 46 40	36.7109	-73.8567	653	4714	SS	HH,VV			11
			2	4	17 58 46	36.8949	-73.9750	18 07 36	36.5583	-73.9648	420	5034	SS,FA,AA	HH,VV			12
			2	5	18 12 00	36.5311	-74.0017	18 23 12	37.0774	-73.9950	592	5086	SS,FA,AA	HH,VV			13
			4	5	18 27 11	36.9957	-74.0011	18 32 32	37.0286	-73.9870	584	5026	SS	HH			14
			5	4	18 57 41	36.6889	-73.8427	19 02 20	36.9070	-73.8321	310	7941	FA	VV			15
			2	6	19 07 02	36.9548	-73.8667	19 16 43	36.5279	-73.8367	502	10027	SS,FA,AA	HH,VV			16
			2	7	19 21 47	36.5324	-73.7967	19 30 26	36.9647	-73.7715	362	9979	SS,FA,AA	HH,VV			17
			3	1	19 35 43	37.0800	-73.5597	19 38 11	37.0833	-73.4050	95	10068	AA	HH,VV			18
			3	2	19 41 17	37.0450	-73.4925	19 43 43	37.0417	-73.6156	267	10013	SS	HH,VV			19
			4	13	19 57 00	36.9477	-73.7933	20 07 49	36.9867	-73.7284	1179	10016	SS	HH,VV			20
			2	10	20 11 56	36.8248	-73.7383	20 26 11	36.2201	-73.7617	537	9944	AA	HH,VV			21
			5	7	20 35 08	36.5750	-73.6967	20 43 30	36.9531	-73.6814	474	7777	FA	VV			22
238	20	6/5/73	2	3	17 55 26	24.6550	-92.2654	18 07 10	24.9621	-92.7567	660	5423	FA	HH,VV	4,5	M238	1
			2	4	18 10 44	24.9867	-92.7033	18 20 20	24.7867	-92.2838	499	5515	FA	HH,VV			2
			2	5	18 27 28	24.7128	-92.1133	18 33 34	24.6000	-91.8418	345	5451	FA	HH,VV			3
			3	1	18 38 06	24.4314	-91.8750	18 48 50	24.0033	-92.1317	603	5311	FA	HH,VV			4
			5	1	19 04 27	24.5185	-92.0156	19 25 55	25.2761	-92.7533	1189	5271	FA	HH,VV			5
			4	2	19 29 41	25.3100	-92.7730	19 40 03	25.3367	-92.7700	1129	5277	SS	HH,VV			6
			5	2	19 49 36	25.4408	-92.9342	20 11 24	26.2010	-93.6694	1190	5117	FA	HH,VV			7
			4	9	20 15 16	26.3383	-93.7883	20 28 15	26.3709	-93.8317	1421	5372	SS	HH,VV			8
			5	4	21 35 01	27.5722	-95.1639	21 38 15	27.6884	-95.2817	204	5294	FA	HH,VV			9
			5	5	21 40 53	27.7762	-95.3780	22 01 35	28.5496	-96.1147	1066	5193	FA	HH,VV			10
			4	17	22 05 00	28.4850	-96.0383	22 18 47	28.5250	-96.0767	1509	5215	SS	HH,VV			11

[1] FA = Fixed Angle; AA = Alternating Angle; SS = Short Scat. All modes defined in reference 2.
[2] Polarization (e.g., HV = Horizontal transmit, vertical receive).
[3] FCF = Functional Check Flight.
[4] Thermal environment of bandpass filter estimated, rather than controlled.
[5] Average calibration voltage of flight used, since periodic calibrations exhibited drift.
[6] Surface truth shows variability or questionable quality.
[7] Bandpass filter characteristics reconstructed subsequent to flight.
[8] Additional -2.33 dB added to calibration loop gain to normalize average flight NRCS to 5.5 dB at incidence angle of 10^{o}.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
238	27	6/11/73	2	3	16 30 32	26.4250	-88.5944	16 40 56	26.2768	-88.0984	584	5489	FA	HH,VV	4,5	M238	12
			2	4	16 50 00	26.5241	-88.3986	17 01 10	26.6862	-88.9333	621	5508	FA	HH,VV			13
			3	1	17 03 15	26.5997	-88.9667	17 03 48	26.5752	-88.9750	38	5514	FA	VV			14
			3	1	17 04 21	26.5540	-88.9850	17 16 30	26.1333	-89.2683	684	5512	FA	HH,VV			15
			3	2	17 19 27	26.2683	-89.2233	17 30 40	26.7864	-89.0452	661	5515	FA	HH,VV			16
			5	1	17 39 54	26.7850	-89.4074	18 02 20	27.5966	-90.1683	1235	5522	FA	HH,VV			17
			4	2	18 04 57	27.6267	-90.1500	18 17 37	27.6505	-90.1500	1256	5509	SS	HH,VV			18
			5	2	18 27 13	27.6331	-90.0883	18 48 49	28.4393	-90.7993	1142	5518	FA	HH,VV			19
			4	12	18 51 41	28.4505	-90.7972	19 03 39	28.5083	-90.7800	1306	5488	SS	HH,VV			20
247	37	9/12/73	3	1	18 27 41	25.7283	-92.2417	18 37 13	25.5833	-91.7854	342	3080	AA	HH,VV,HV	4,5	M247	1
			4	1	18 48 49	25.8933	-91.9212	19 00 41	25.4397	-92.0583	462	3099	AA	HH,VV			2
			5	1	19 03 28	25.5167	-92.0641	19 13 20	25.9783	-91.8768	383	3104	AA	HH,VV,HV			3
258	10	12/2/73	3	1	17 18 31	27.0365	-89.0717	17 30 04	27.5550	-89.0667	767	3022	FA	HH,VV	4,5	M258	1
			4	1	17 40 29	27.3717	-88.8600	17 51 50	27.3683	-89.4517	741	3019	FA	HH,VV			2
			4	2	17 57 23	27.3667	-89.4800	18 04 42	27.3667	-89.1594	481	3015	FA	HH,VV			3
			4	2	18 13 03	27.3683	-89.1944	18 21 14	27.3667	-88.8326	550	3022	FA	HH,VV			4
	44	2/1/74	5	1	17 35 52	45.0705	-126.1822	18 00 25	45.5374	-127.3724	1355	10037	FA	HH,VV	4,5		5
			2	3	18 04 07	45.6133	-127.5266	18 09 00	45.7850	-127.5950	283	10097	FA	HH,VV			6
			2	4	18 12 17	45.7986	-127.4766	18 15 20	45.6245	-127.3933	186	10084	FA	HH,VV			7
			3	2	18 17 52	45.4765	-127.3752	18 22 06	45.3400	-127.6078	226	10112	FA	HH,VV			8
			4	1	18 24 52	45.2583	-127.6883	18 42 11	45.0150	-127.5750	1895	10141	SS	HH,VV			9
			5	2	19 29 41	45.4633	-127.1684	19 53 41	45.9217	-128.3927	1186	10280	FA	HH,VV			10
			2	7	19 55 42	45.9733	-128.4783	19 59 19	46.0700	-128.6097	217	10297	FA	HH,VV			11
			2	8	20 01 52	46.0201	-128.6684	20 04 45	45.9000	-128.4900	146	10300	FA	HH,VV			12
			3	4	20 06 47	45.7952	-128.4415	20 09 50	45.6593	-128.5457	173	10307	FA	HH,VV			13

See footnotes on page 8.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
288	5	11/11/74	4	1	11 31 52	57.0533	0.8696	11 40 39	57.0817	1.1363	964	9398	SS	HH,VV	7,8	M288	1
			2	3	11 48 16	57.0773	1.1683	11 59 37	57.5267	2.0326	512	9512	FA	HH,VV			2
			2	4	12 04 24	57.5630	2.1033	12 11 19	57.4226	1.8259	309	9524	FA	HH,VV			3
			2	5	12 18 24	57.2856	1.5556	12 35 16	56.9450	.8950	834	9585	FA	HH,VV			4
			2	6	12 41 41	57.1027	1.1911	12 56 58	57.6950	2.3666	790	9540	FA	HH,VV			5
			3	1	13 00 44	57.8100	2.2767	13 09 27	58.0383	1.8167	429	9489	FA	HH,VV			6
			3	2	13 12 38	57.9901	1.8532	13 20 30	57.7591	2.3143	386	9474	FA	HH,VV			7
			3	3	13 27 48	57.5665	2.5750	13 31 28	57.4447	2.7986	193	9629	FA	HH,VV			8
			3	4	13 34 05	57.4350	2.7533	13 40 57	57.6067	2.4217	333	9564	FA	HH,VV			9
			2	7	13 43 43	57.6350	2.2700	13 59 10	57.3133	1.6040	745	9606	FA	HH,VV			10
			4	8	14 09 58	57.5067	2.2145	14 26 34	57.6189	2.5978	1816	9582	SS	HH,VV			11
	6	11/14/74	4	1	13 05 44	56.8417	3.9800	13 14 02	56.9496	4.0350	908	9426	SS	HH,VV	7,8		12
			2	3	13 24 20	57.0183	4.0043	13 37 39	56.5708	3.8600	637	9549	FA	HH,VV			13
			2	4	13 41 06	56.4533	3.8200	13 54 30	56.0033	3.6759	633	9568	FA	HH,VV			14
			2	5	14 02 16	55.7615	3.6000	14 14 40	55.3683	3.4790	610	9541	FA	HH,VV			15
			2	6	14 20 10	55.3367	3.4580	14 33 13	56.0349	3.6900	620	9466	FA	HH,VV			16
			2	7	14 37 30	56.2583	3.7583	14 52 11	57.0302	4.0119	699	9450	FA	HH,VV			17
			4	7	14 55 09	57.0800	4.0133	15 07 56	57.2083	4.1283	1387	9380	SS	HH,VV			18
			3	1	15 47 19	56.8129	3.8712	16 01 00	56.9133	2.8867	643	9482	FA	HH,VV			19
			3	2	16 04 09	56.8833	2.9306	16 17 40	56.7512	4.1301	654	9513	FA	HH,VV			20
			2	10	16 26 10	56.5929	3.9003	16 39 30	57.2803	4.0956	626	9458	FA	HH,VV			21
306	FCF	4/4/75	4	1	20 01 32	38.0600	-72.4183	20 09 49	37.9974	-72.2729	444	5327	FA	HH,VV	6	M306	1
			4	4	20 09 53	37.9933	-72.2731	20 17 09	37.9514	-72.1800	347	5333	FA	HH,VV			2
			4	7	20 17 19	37.9433	-72.1800	20 27 04	37.8517	-72.0450	594	5337	FA	HH,VV			3
			4	11	20 30 57	37.8984	-72.1667	20 39 01	37.8219	-72.0751	436	5312	FA	HH,VV			4
			4	14	20 39 08	37.8183	-72.0717	20 48 45	37.7414	-71.9278	414	5307	FA	HH,VV			5
			3	2	20 54 54	37.4817	-72.0183	21 04 49	37.0817	-72.2083	455	5428	FA	HH,VV			6
	3	4/17/75	1	1	14 07 50	40.4752	-73.8567	14 17 49	40.4133	-73.8356	434	9772	FA	HH			7
			7	1	14 34 44	40.4317	-73.4994	14 45 01	40.3667	-73.5148	1049	9790	SS	HH			8
			6	1	14 48 10	40.2150	-73.4767	14 59 10	40.1367	-73.4450	1131	9815	SS	HH			9
			5	1	15 05 02	40.1317	-73.5433	15 15 30	40.0583	-73.5464	1068	9827	SS	HH			10
			13	1	15 19 51	39.8643	-73.5950	15 30 35	39.7717	-73.5647	1121	9834	SS	HH			11
			12	1	15 37 58	40.0489	-73.4500	15 48 15	39.9650	-73.4462	1071	9833	SS	HH			12
			11	1	15 53 58	40.0855	-73.1860	16 04 39	39.9917	-73.1717	1095	9824	SS	HH			13
			10	1	16 11 47	40.2576	-73.2074	16 22 02	40.1733	-73.2250	1066	9831	SS	HH			14
			9	1	16 24 24	40.2533	-73.1733	16 27 59	40.3767	-73.0817	228	9838	SS	HH			15
			9	2	16 29 28	40.4302	-73.0586	16 39 50	40.3508	-73.0900	1079	9844	SS	HH			16
			8	1	16 41 21	40.3940	-73.1532	16 45 30	40.5233	-73.3083	206	9826	SS	HH			17
			8	2	16 46 50	40.5633	-73.3631	16 57 21	40.4817	-73.3967	1097	9841	SS	HH			18
			8	4	17 00 14	40.4442	-73.5717	17 03 29	40.4400	-73.7683	145	9838	SS	HH			19
			1	5	17 05 39	40.4661	-73.8867	17 15 54	40.3850	-73.9049	1048	9898	SS	HH			20

See footnotes on page 8.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode [1]	Polarization [2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
318	13	8/29/75	3	1	08 22 37	54.9333	7.6117	08 26 03	54.8383	7.8367	157	10247	FA	HH,VV		M318	1
			3	2	08 38 55	55.2067	7.1167	08 42 13	55.3133	6.8983	158	10228	FA	HH,VV			2
			6	1	09 15 27	54.8900	7.1633	09 19 20	54.8900	6.8433	149	10224	FA	HH,VV			3
			2	2	09 55 57	55.1483	7.6267	10 01 17	54.9617	7.3483	217	10193	FA	HH,VV			4
			2	22	10 01 33	54.9533	7.3367	10 02 21	54.9250	7.2933	35	10192	FA	HH,VV			5
			4	1	10 12 05	54.9767	7.8767	10 16 00	55.0117	7.8183	226	10176	FA	HH,VV			6
			4	2	10 16 05	55.0083	7.8167	10 16 55	54.9883	7.8550	48	10179	FA	HH,VV			7
			4	3	10 17 24	55.0078	7.8817	10 22 26	55.0317	7.8783	284	10160	FA	HH,VV			8
			4	9	10 33 36	55.1233	7.8617	10 38 12	55.1217	7.8417	241	10148	FA	HH,VV			9
			4	11	10 39 04	55.1500	7.8733	10 51 31	55.1783	7.7983	614	10158	FA	HH,VV			10
	14	9/2/75	2	3	08 26 16	54.8933	6.7700	08 35 38	55.2267	7.2683	422	10042	FA	HH,VV			11
			3	1	08 51 42	55.3667	7.2750	08 58 42	55.1500	7.7183	318	10040	FA	HH,VV			12
			3	11	08 59 26	55.1260	7.7624	09 01 31	55.0583	7.8883	92	10040	FA	HH,VV			13
			3	2	09 13 29	54.8283	8.1267	09 18 30	54.9783	7.8133	234	10030	FA	HH,VV			14
			3	22	09 19 08	54.9967	7.7717	09 20 38	55.0417	7.6750	64	10022	FA	HH,VV			15
			4	1	09 44 35	54.9800	7.8650	09 58 26	54.9983	7.8250	809	9982	FA	HH,VV			16
			4	6	09 58 41	55.0100	7.8300	10 00 13	54.9800	7.8667	76	10033	FA	HH,VV			17
			4	7	10 00 44	54.9800	7.8283	10 12 15	54.9933	7.7433	624	9970	FA	HH,VV			18
			4	11	10 12 27	55.0033	7.7433	10 13 17	55.0067	7.7950	33	10074	FA	HH,VV			19
			4	12	10 13 32	54.9950	7.8017	10 25 31	54.9667	7.7233	480	10068	FA	HH,VV			20
	15	9/4/75	2	3	08 36 00	54.9400	8.0183	08 39 10	55.0017	7.8363	325	2552	SS	VV			21
			3	1	08 45 02	54.9067	7.9117	08 47 03	54.9817	7.9500	217	2558	SS	VV			22
			2	4	08 51 17	54.9383	8.0933	08 54 35	54.9700	7.8767	343	2541	SS	VV			23
			3	2	08 59 29	54.8750	7.9300	09 02 40	55.0033	7.9517	285	2559	SS	VV			24
			2	5	09 07 33	54.9333	8.0567	09 10 18	54.9650	7.8717	274	2563	SS	HH			25
			3	3	09 14 32	54.8833	7.9100	09 17 06	54.9883	7.9500	219	2575	SS	HH			26
			2	6	09 21 48	54.9767	7.8367	09 24 22	54.9567	8.0367	252	2566	SS	VV			27
			3	4	09 29 56	55.0033	7.9800	09 31 34	54.9383	7.9350	182	2578	SS	VV			28
			2	7	09 35 39	54.9333	8.0750	09 38 34	54.9817	7.8883	293	2572	SS	HH			29
			3	5	09 43 26	54.8883	7.9350	09 46 20	55.0000	7.9733	259	2576	SS	HH			30
	16	9/8/75	2	5	14 52 58	54.7201	7.8517	14 59 20	55.0117	8.1133	280	10129	FA	HH,VV			31
			4	4	15 30 35	54.9550	7.8517	15 44 52	55.0200	7.9519	791	10080	FA	HH,VV			32
			4	9	15 45 02	55.0217	7.9417	15 59 02	55.1283	8.0500	747	10077	FA	HH,VV			33
			4	14	15 59 14	55.1283	8.0350	16 13 13	55.2117	8.0600	535	10044	FA	HH,VV			34
			3	2	16 21 24	55.1414	7.5593	16 23 57	55.1933	7.3817	117	10105	FA	HH,VV			35
			3	22	16 24 23	55.2030	7.3517	16 30 54	55.3217	6.8950	277	10097	FA	HH,VV			36
			3	3	16 35 54	55.2950	6.8267	16 46 37	55.0267	7.6550	416	10094	FA	HH,VV			37

See footnotes on page 8.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode [1]	Polarization [2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
318	17	9/9/75	2	2	07 50 16	54.9333	7.9467	08 00 22	54.7350	7.7467	416	9878	SS,FA	HH,VV		M318	38
			3	3	08 08 35	55.0083	7.6583	08 15 09	54.8883	8.2083	288	10074	FA	HH,VV			39
			3	4	08 17 54	54.9617	8.1717	08 25 09	55.1467	7.7133	329	10076	FA	HH,VV			40
			4	1	08 33 53	54.8517	7.5689	08 46 23	54.9200	7.6800	731	9989	FA	HH,VV			41
			4	6	08 46 54	54.9233	7.6483	08 53 00	54.9883	7.7000	318	9977	FA	HH,VV			42
			4	8	08 53 08	54.9883	7.7133	08 59 29	54.9683	7.7633	337	9938	FA	HH,VV			43
			4	11	08 59 42	54.9733	7.7517	09 01 12	55.0017	7.8200	73	10169	FA	HH,VV			44
			4	12	09 01 50	54.9783	7.8150	09 12 58	55.0217	7.9283	444	10199	FA	HH,VV			45
	18	9/9/75	4	1	13 58 01	54.8083	7.5960	13 58 55	54.8450	7.5833	61	6165	FA	HH,VV			46
			4	2	13 59 33	54.8600	7.6358	14 10 18	54.9467	7.8100	648	6142	FA	HH,VV			47
			4	6	14 10 43	54.9533	7.7867	14 23 10	55.1000	7.9900	694	6149	FA	HH,VV			48
			4	11	14 23 21	55.1033	7.9783	14 36 06	55.2717	8.1583	493	6140	FA	HH,VV			49
	19	9/10/75	2	6	13 14 57	55.1133	8.2267	13 21 45	54.9883	7.7950	291	9988	FA	HH,VV			50
			3	3	13 27 36	55.0717	7.8433	13 34 19	54.8183	8.1317	297	10017	FA	HH,VV			51
			4	5	13 50 46	54.8883	7.7467	13 52 46	54.9167	7.7320	115	9992	FA	HH,VV			52
			4	6	13 55 22	54.9300	7.7517	13 56 06	54.9100	7.7867	52	9981	FA	HH,VV			53
			4	7	13 56 30	54.9017	7.7733	13 57 59	54.9450	7.7757	100	9937	FA	HH,VV			54
			4	8	13 58 59	54.9183	7.8000	14 01 23	54.9383	7.8283	143	9937	FA	HH,VV			55
			4	10	14 03 13	54.9783	7.8383	14 08 54	54.9967	7.9133	333	9957	FA	HH,VV			56
			4	12	14 09 26	54.9850	7.8933	14 11 08	55.0267	7.9317	107	9942	FA	HH,VV			57
			4	13	14 11 35	55.0117	7.9450	14 18 53	55.0783	7.9967	409	9955	FA	HH,VV			58
			4	17	14 19 51	55.0650	7.9550	14 34 26	55.1917	8.0433	383	9947	FA	HH,VV			59
	24	9/17/75	2	10	14 00 30	55.0317	7.9905	14 11 58	54.7650	7.4567	502	10127	FA	HH,VV			60
			2	11	14 14 19	54.8367	7.5600	14 20 08	55.0417	8.0350	276	10079	FA	HH,VV			61
			4	1	14 27 32	54.8733	7.7867	14 37 26	54.9417	7.9567	589	10028	FA	HH,VV			62
335	3	1/16/76	2	3	16 20 15	36.8586	72.4433	16 23 02	36.7639	72.3406	162	10054	FA	HH,VV		M335	1
			2	33	16 23 13	36.7600	72.3333	16 33 35	36.3983	71.9867	955	10062	FA,SS	HH,VV,VH			2
			4	1	16 36 47	36.3167	71.9467	16 39 42	36.3483	71.9167	216	10011	FA	HH,VV			3
			4	2	16 40 00	36.3550	71.8977	16 42 46	36.3733	71.8633	213	10033	FA	HH,VV			4
			4	3	16 42 53	36.3721	71.8550	16 50 00	36.3883	71.8283	494	10010	FA	HH,VV			5
			4	6	16 50 07	36.3950	71.8217	16 58 10	36.4317	71.7683	503	10016	FA	HH,VV			6
			4	9	16 58 29	36.4400	71.7483	17 02 50	36.4217	71.7267	238	9984	FA	HH,VV			7
			4	10	17 02 58	36.4250	71.7317	17 03 15	36.4350	71.7350	18	10032	FA	HH,VV			8

See footnotes on page 8.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
335	4A	1/22/76	4	1	16 51 08	38.7483	73.9617	16 53 03	38.7533	73.9050	145	10090	FA	HH,VV		M335	9
			4	2	16 53 10	38.7483	73.9083	16 56 29	38.7500	73.9050	251	9987	FA	HH,VV			10
			4	3	16 56 49	38.7633	73.8950	17 00 16	38.7533	73.8100	264	10010	FA	HH,VV			11
			4	5	17 00 36	38.7400	73.8033	17 05 58	38.7210	73.7367	395	10018	FA	HH,VV			12
			4	7	17 06 19	38.7167	73.7500	17 09 44	38.7317	73.7117	271	9991	FA	HH,VV			13
			4	8	17 10 04	38.7383	73.6917	17 11 21	38.7017	73.6700	108	9970	FA	HH,VV			14
			2	3	17 15 52	38.7600	73.8300	17 31 50	38.9117	74.4533	864	10029	FA	HH,VV,VH			15
			4	9	17 36 11	38.8783	74.2601	17 40 58	38.8677	74.2017	321	10007	FA	HH,VV			16
			4	11	17 41 17	38.8600	74.1833	17 51 05	38.8383	74.0667	665	9980	FA	HH,VV			17
			4	15	17 51 25	38.8250	74.0500	17 53 09	38.8283	74.0539	135	10016	FA	HH,VV			18
			4	16	17 53 37	38.8267	74.0233	17 55 09	38.8050	74.0333	100	10100	FA	HH,VV			19
			4	19	17 55 35	38.8200	74.0200	17 56 06	38.8210	73.9867	26	10033	FA	HH,VV			20
			3	1	17 58 12	38.8400	73.8767	18 08 00	39.2067	73.5217	504	9982	FA	HH,VV			21
			3	11	18 08 11	39.2133	73.5133	18 11 14	39.3267	73.4017	163	9922	FA	HH,VV			22
			4	17	18 13 28	39.3217	73.3532	18 17 36	39.3250	73.2400	233	10020	FA	HH,VV			23
			4	18	18 17 42	39.3200	73.2383	18 26 35	39.2933	73.1333	498	10046	FA	HH,VV			24
			4	22	18 27 58	39.3200	73.1550	18 39 12	39.2617	72.9517	654	9997	FA	HH,VV			25
	4B	1/22/76	4	1	19 41 23	38.1267	71.3567	19 50 54	38.1483	71.1633	605	10057	FA	HH,VV			26
			4	5	19 51 12	38.1367	71.1683	19 54 41	38.1483	71.1583	268	10021	FA	HH,VV			27
			4	6	19 54 59	38.1600	71.1517	19 56 35	38.1367	71.1050	135	10076	FA	HH,VV			28
			4	7	19 56 54	38.1367	71.1167	19 58 28	38.1683	71.0683	132	10113	FA	HH,VV			29
			4	8	19 58 52	38.1517	71.0600	20 00 22	38.1717	71.0797	126	10014	FA	HH,VV			30
			4	9	20 00 43	38.1800	71.0583	20 03 46	38.1750	71.0067	240	10043	FA	HH,VV			31
			4	10	20 04 47	38.1483	71.0183	20 08 22	38.1850	70.9900	256	10012	FA	HH,VV			32
			4	11	20 08 53	38.1850	70.9567	20 10 24	38.1700	70.9800	117	9948	FA	HH,VV			33
			4	12	20 11 02	38.1933	70.9563	20 12 22	38.1550	70.9283	103	10045	FA	HH,VV			34
			4	13	20 12 42	38.1517	70.9400	20 17 26	38.1567	70.8783	312	10031	FA	HH,VV			35
			4	14	20 17 31	38.1567	70.8783	20 20 33	38.1400	70.8733	213	9942	FA	HH,VV			36
			4	16	20 20 52	38.1483	70.8833	20 24 25	38.1633	70.8283	239	10061	FA	HH,VV			37
			4	17	20 24 57	38.1483	70.7983	20 45 40	38.1033	70.5267	1140	10025	FA	HH,VV,HV			38
			3	1	20 48 04	38.0056	70.5233	20 53 34	37.7700	70.5300	316	10099	FA	HH,VV,HV			39
			3	11	20 53 39	37.7683	70.5267	20 56 16	37.6567	70.5333	149	10145	FA	HH,VV			40
			3	111	20 56 22	37.6517	70.5317	20 59 01	37.5367	70.5367	155	10165	FA	HH,VV			41
			3	1111	20 59 47	37.5033	70.5383	21 04 55	37.2917	70.5683	272	10626	FA	HH,VV			42
			2	3	21 07 14	37.2683	70.6267	21 13 38	37.3783	70.8417	355	11106	FA	HH,VV			43
			2	33	21 13 57	37.3867	70.8533	21 23 21	37.5333	71.1750	538	11111	FA	HH,VV			44
			3	2	21 24 50	37.5683	71.2033	21 34 10	37.9583	70.8650	544	11074	FA	HH,VV,HV			45

See footnotes on page 8.

TABLE I.- Continued

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
335	5	1/23/76	4	1	18 48 50	38.1367	71.1700	18 53 17	38.1517	71.1150	325	10021	FA	HH,VV		M335	46
			4	3	18 53 42	38.1567	71.0833	19 11 15	38.1017	70.7950	1258	10062	FA	HH,VV			47
			4	9	19 11 33	38.1033	70.8050	19 13 22	38.1150	70.7367	141	10167	FA	HH,VV			48
			4	10	19 13 48	38.0983	70.7383	19 33 03	38.0200	70.3317	1297	9976	FA	HH,VV			49
			4	17	19 33 10	38.0183	70.3367	19 33 54	38.0417	70.3383	47	10020	FA	HH,VV			50
			4	18	19 34 22	38.0550	70.3067	19 38 07	38.0067	70.2033	226	9954	FA	HH,VV			51
			4	19	19 38 11	38.0033	70.2033	19 47 17	37.9733	70.0567	500	10028	FA	HH,VV			52
			4	22	19 47 38	37.9883	70.0467	19 54 35	37.9433	69.8683	404	10011	FA	HH,VV			53
			2	5	19 59 35	37.9733	69.8767	20 05 30	38.0717	70.0600	345	10027	FA	HH,VV			54
			2	55	20 06 49	38.0950	70.1017	20 16 27	38.2500	70.3990	551	9995	FA	HH,VV,VH			55
			3	1	20 19 04	38.1967	70.4500	20 35 24	37.4217	70.5233	923	10052	FA	HH,VV,HV			56
			3	2	20 38 44	37.4683	70.5333	20 55 25	38.0817	69.7483	937	9998	FA	HH,VV			57
			4	25	21 21 47	37.8650	70.7833	21 35 10	37.8033	70.4933	833	9992	FA	HH,VV			58
	6	1/28/76	4	1	20 49 31	38.2567	71.3600	20 56 24	38.3353	71.2300	479	9945	FA	HH,VV			59
			4	4	20 56 36	38.3283	71.2233	21 11 33	38.4350	71.1050	1045	9932	FA	HH,VV			60
			4	9	21 11 54	38.4533	71.0912	21 15 03	38.4700	71.0383	212	9958	FA	HH,VV			61
			4	11	21 15 24	38.4617	71.0233	21 22 17	38.4890	71.0100	464	9908	FA	HH,VV			62
			4	13	21 22 17	38.4890	71.0100	21 33 05	38.5349	70.9047	625	9882	FA	HH,VV			63
			4	17	21 33 33	38.5550	70.8834	21 43 57	38.5933	70.7600	689	9899	FA	HH,VV			64
			4	21	21 44 06	38.6017	70.7533	21 55 03	38.6567	70.5800	624	9900	FA	HH,VV			65
			3	1	22 00 22	38.5817	70.6833	22 06 10	38.3667	70.7183	331	9944	FA	HH,VV			66
			3	11	22 06 35	38.3517	70.7233	22 13 11	38.1100	70.7567	382	9912	FA	HH,VV			67
			2	3	22 15 26	38.1500	70.8183	22 30 28	38.6933	71.1600	713	9917	FA	HH,VV			68
			3	2	22 33 02	38.6000	71.1617	22 46 59	38.2067	71.5317	730	9888	FA	HH,VV			69
			4	25	22 49 07	38.2200	71.4667	23 00 26	38.2400	71.2983	704	9856	FA	HH,VV			70
353	9	3/2/77	4	1	20 10 00	32.7617	-117.5083	20 23 53	32.6633	-117.4218	1348	9684	SS	HH,VV		M3531	1
			4	6	20 38 02	32.9767	-117.6100	20 50 09	32.9000	-117.5433	473	9757	SS	HH,VV			2
			4	11	20 51 00	32.8683	-117.5150	21 03 46	32.7800	-117.4283	1222	9748	SS	HH,VV			3
			4	16	21 03 53	32.7733	-117.4300	21 16 34	32.6933	-117.3633	1245	9728	SS	HH,VV			4
			3	3	22 14 22	32.0133	-117.7983	22 24 19	32.2483	-117.3383	818	9742	SS	HH,VV			5
			3	33	22 26 13	32.2517	-117.3698	22 28 33	32.1617	-117.4517	204	9732	SS	HH,VV			6
	10	3/3/77	4	1	20 25 42	32.7583	-117.4983	20 38 37	32.7083	-117.3833	1272	9528	SS	HH,VV			7
			4	6	20 42 49	32.8217	-117.4633	20 54 44	32.7600	-117.3683	1168	9513	SS	HH,VV			8
			4	11	21 02 22	32.9100	-117.5633	21 16 16	32.8283	-117.4583	1373	9519	SS	HH,VV			9

See footnotes on page 8.

TABLE I.- Concluded

Mission	Flight	Date	Line	Run	At line start			At line stop			Number of samples	Average altitude, ft	Mode[1]	Polarization[2]	Data quality	Archive tape	
					Time H M S	N.lat., deg	E.long., deg	Time H M S	N.lat., deg	E.long., deg						Number	File
353	11	3/8/77	2	5	21 45 03	43.4167	-129.8200	21 50 56	43.3200	-129.9917	503	9352	SS	HH,VV		M3531	10
			3	2	22 10 17	42.8517	-129.9083	22 19 45	42.5183	-129.4417	802	9514	SS	HH,VV			11
			2	6	22 27 28	42.5005	-129.6400	22 37 34	42.4050	-129.9800	840	9513	SS	HH,VV			12
			4	1	22 40 44	42.3783	-130.0917	22 53 29	42.5000	-129.8283	1126	9537	SS	HH,VV			13
			4	6	22 53 41	42.5017	-129.8367	23 06 39	42.5983	-129.5900	1251	9539	SS	HH,VV			14
			4	11	23 06 46	42.5983	-129.5950	23 19 22	42.6683	-129.3167	1238	9335	SS	HH,VV			15
	13	3/10/77	4	1	00 04 27	32.8775	-117.7500	00 17 40	32.7183	-117.7117	1302	9583	SS	HH,VV			16
			4	6	00 27 13	32.9317	-117.5550	00 41 06	32.8283	-117.5300	1374	9535	SS	HH,VV			17
			4	11	00 42 37	32.7750	-117.4933	00 56 10	32.6833	-117.4983	1335	9595	SS	HH,VV			18
			4	16	00 59 42	32.8067	-117.4983	01 09 49	32.7350	-117.4867	560	9645	SS	HH,VV			19
			4	20	01 09 58	32.7400	-117.4867	01 19 58	32.6800	-117.4700	967	9650	SS	HH,VV			20
			2	6	01 21 54	32.7367	-117.5217	01 30 40	32.8967	-117.9283	733	9635	SS	HH,VV			21
	14	3/11/77	2	5	22 57 36	42.5183	-129.9217	23 03 22	42.5780	-130.2167	500	9486	SS	HH,VV		M3532	1
			3	2	23 09 24	42.3733	-130.2467	23 24 00	41.7647	-130.2200	1243	9514	SS	HH,VV			2
			4	1	23 56 38	42.3567	-130.2617	00 09 42	42.4050	-130.1367	1046	9481	SS	HH,VV			3
			4	6	00 09 54	42.4017	-130.1233	00 23 21	42.4533	-129.9883	1304	9473	SS	HH,VV			4
			4	11	00 23 29	42.4533	-129.9783	00 28 42	42.4667	-129.9333	505	9485	SS	HH,VV			5
	15	3/14/77	4	1	20 12 58	32.8650	-117.5450	20 25 45	32.8500	-117.4883	1253	9492	SS	HH,VV			6
			4	6	20 31 02	32.8333	-117.4517	20 36 29	32.8317	-117.4317	13	9586	SS	VV			7
			4	11	20 48 17	32.9217	-117.5583	20 56 27	32.9283	-117.5150	782	9498	SS	HH,VV			8
			4	16	20 56 35	32.9260	-117.5083	21 09 09	32.9233	-117.4650	1135	9503	SS	HH,VV			9
	20	3/22/77	4	1	19 45 03	32.7500	-117.5583	19 58 43	32.7699	-117.5800	1348	9756	SS	HH,VV	6		10
			4	6	20 04 13	32.8133	-117.2767	20 18 28	32.8550	-117.3217	1385	9663	SS	HH,VV			11
			4	11	20 22 14	32.8500	-117.5067	20 36 00	32.8683	-117.5450	1335	9687	SS	HH,VV			12
			4	16	21 09 56	32.8983	-117.3317	21 18 07	32.9233	-117.3450	139	9697	SS	HH,VV			13
			4	21	21 21 47	32.9067	-117.3883	21 35 14	32.9300	-117.4317	1305	9729	SS	HH,VV			14
			4	26	21 35 21	32.9300	-117.4383	21 48 41	32.9400	-117.5150	995	9765	SS	HH,VV			15
	21	3/24/77	4	1	20 07 17	32.7617	-117.5867	20 19 46	32.7800	-117.5083	1228	9416	SS	HH,VV,HV			16
			4	7	20 24 32	32.8333	-117.5533	20 37 11	32.8417	-117.4650	1243	9459	SS	HH,VV			17
			4	12	20 37 20	32.8483	-117.4617	20 49 58	32.8733	-117.3567	1007	9500	SS	HH,VV			18
			3	3	21 57 27	33.0950	-117.4433	22 09 12	32.6150	-117.4333	919	9519	SS	HH,VV,HV			19

See footnotes on page 8.

TABLE II.- RECORD FORMAT FOR SCATTEROMETER DATA ARCHIVAL

Parameter description	Scale	Length, bytes
Time (GMT), sec	0.1	6
RADSCAT operating mode[1]		1
Antenna incidence angle, deg	.1	3
Antenna cross-track angle, deg	.1	5
Transmit/receive polarity[2]		1
Scat integration time, sec	.001	3
Normalized radar scattering cross section, dB	.01	5
Depolarization factor	.001	4
Data validation code[3]		6
Aircraft altitude, ft		5
Aircraft heading, deg	.1	4
Aircraft latitude, deg north	.001	6
Aircraft longitude, deg east	.001	7
Aircraft drift angle, deg	.1	4
SCAT 1, dB	.01	5
SCAT 2, dB	.01	5
SCAT 3, dB	.01	5
SCAT 4, dB	.01	5

[1]0 = Radiometer only mode; 1 = Short Scat mode; 2 = Fixed-angle mode; 3 = Alternating-angle mode.

[2]Transmit/receive polarity: 0 = HH, 1 = VV, 2 = HV, 3 = VH.

[3]Key to codes -

0	No flag
1	Possibly outside range gate
10	Outside dynamic range
100	Excessive Doppler
1000	Polarization reversal
10000	Excessive depolarization
100000	Receiver temperature abnormal

TABLE III.- SURFACE TRUTH FOR RADSCAT MISSIONS

Mission	Flight	Date	Data source	Location, deg		Time	Neutral stability 19.5-m winds		Temp., °C		Anemometer		Wave height, m	Swell		Data quality (a)
				Lat.	Long.	H M	Speed, m/sec	Direction, deg	Air	Sea	Height, m	Average time, min		Height, m	Direction, deg	
306	FCF	4/4/75	NASA-929	37.391	-72.730	19 48	21.5	300			135	23				Average
			S.S. Wilmington Geddy	37.6	-73.7	18 00	[b]28.3	290	4.5	13.9			[c]3.0			
				38.1	-74.1	24 00	[b]15.4	330	9.0	12.2			[c]4.5			
306	3	4/17/75	Ambrose Tower	40.444	-73.846	14 00	4.3	315								Good
						17 00	1.7	270								
318	13	8/29/75	Land Station	54.926	8.305	8 45	[b]2.8	124			>20		Smooth			Fair
						9 45	[b]3.0	146								
						10 45	[b]3.8	146								
						11 45	[b]3.8	146								
			List	55.021	8.425	9 45	[b]4.9	149			>20					
						10 45	[b]4.9	149								
						11 45	[b]5.1	149								
318	14	9/2/75	Land Station	54.926	8.305	8 15	[b]4.7	34					1.1			Good
						9 15	[b]5.1	34								
						10 15	[b]5.1	34								
						11 15	[b]4.2	34								
			List	55.021	8.425	8 15	[b]5.4	50								
						9 15	[b]5.6	50								
						10 15	[b]4.7	70								
						11 15	[b]4.1	70								
			Pisa	54.995	7.906	8 15	4.4	45			17	10				
						9 15	5.0	47								
						10 15	5.7	46								
						11 15	5.3	60								
318	16	9/8/75	Land Station	54.926	8.305	14 45	[b]4.9	214					1.1			Good
						15 45	[b]4.5	214								
						16 45	[b]4.5	191								
						17 45	[b]4.2	191								
			List	55.021	8.425	14 45	[b]6.1	240	15.6	17.9						
						15 45	[b]5.5	230								
						16 45	[b]5.6	220								
						17 45	[b]5.7	220								
			Pisa	54.995	7.906	14 45	7.9	198								
						15 45	8.0	198								
						16 45	7.8	188								
						17 45	8.3	184								
			Hornum Pile	54.958	8.210	14 45	5.7	238								
						15 45	5.6	236								
						16 45	5.9	232								
						17 45	6.5	230								
			NASA-929	54.986	7.913	14 45	7.3	212			225.5	258				

[a]Data quality is defined in terms of the standard deviation of wind speed and wind direction, respectively, as follows: Good - 1.0 m/sec, 10°; Fair - 1.5 m/sec, 15°; Average - 2.0 m/sec, 20°.

[b]Measurements uncorrected for height and stability.

[c]Measurements were in World Meteorological Organization units of half-meters, and hence were divided by 2 before entry into this table.

[d]Snow could affect the quality of RADSCAT data.

[e]Wind speeds in parentheses are from reference 9.

TABLE III.- Continued

Mission	Flight	Date	Data source	Location, deg		Time	Neutral stability 19.5-m winds		Temp., °C		Anemometer		Wave height, m	Swell		Data quality (a)
				Lat.	Long.	H M	Speed, m/sec	Direction, deg	Air	Sea	Height, m	Average time, min		Height, m	Direction, deg	
318	17	9/9/75	Land Station	54.926	8.305	7 45	[b]9.4	214					1.5		240	Good
						8 45	[b]8.8	214								
						9 45	[b]9.4	214								
			List	55.021	8.425	7 45	[b]9.8	230	17.9	17.7						
						8 45	[b]10.9	230								
						9 45	[b]12.1	230								
			Pisa	54.995	7.906	7 45	12.2	209								
						8 45	12.3	205								
						9 45	12.1	206								
			Hornum Pile	54.958	8.210	7 45	11.5	237								
						8 45	11.1	239								
						9 45	11.6	239								
			NASA-929	54.982	7.798	7 45	13.0	233			161.5	52				
318	18	9/9/75	Land Station	54.926	8.305	14 15	[b]7.6	191					1.8		240	Fair
						15 15	[b]7.9	191								
			List	55.021	8.425	14 15	[b]10.6	220	18.7	17.7						
						15 15	[b]10.1	220								
			Pisa	54.995	7.906	14 15	11.3	187								
						15 15	10.9	188								
			Hornum Pile	54.958	8.210	14 15	10.5	237								
						15 15	9.7	236								
			NASA-929	55.029	7.811	14 15	12.5	202			228.6	174				
318	19	9/10/75	Land Station	54.926	8.305	11 15	[b]9.5	214					2.4		240	Good
						13 15	[b]8.5	214								
						14 15	[b]8.6	214								
						15 15	[b]7.8	214								
			List	55.021	8.425	11 15	[b]8.8	270	16.9	17.4						
						13 15	[b]8.2	270								
						14 15	[b]8.0	270								
						15 15	[b]7.6	270								
			Pisa	54.995	7.906	11 15	9.2	248								
						13 15	7.8	245								
						14 15	8.0	245								
						15 15	7.5	244								
			Hornum Pile	54.958	8.210	11 25	7.9	260								
318	24	9/17/75	Land Station	54.926	8.305	13 15	[b]10.4	214								Good
						14 15	[b]10.4	214					2.7		226	
						15 15	[b]8.9	214								
			List	55.021	8.425	13 15	[b]11.8	240	17.0	16 ± 1.0						
						14 15	[b]10.9	240								
						15 15	[b]8.2	250								
			Pisa	54.995	7.906	13 15	13.0	222								
						14 15	12.5	216								
						15 15	9.5	233								

See footnotes on page 17.

TABLE III.- Continued

Mission	Flight	Date	Data source	Location, deg		Time	Neutral stability 19.5-m winds		Temp., °C		Anemometer		Wave height, m	Swell		Data quality (a)
				Lat.	Long.	H M	Speed, m/sec	Direction, deg	Air	Sea	Height, m	Average time, min		Height, m	Direction, deg	
335	3	1/16/76	NASA-929	36.7	-72.7	16 00	14.6	159	18.0	19.0	137	30	2.0			Fair
335	4A	1/22/76	NOAA buoy EB-41	38.7	-73.6	15 00	17.0	280	-.6	7.9	5	10	3.0			Good
						16 00	26.7	275	-.6	7.9	5	10	3.0			
			NASA-929	38.82	-73.61	16 10	17.5	289	.0	8.5	98	22				
			NOAA buoy EB-41			17 00	16.9	291	-.6	8.0	5	10	3.0			
						18 00	17.0	287	-.5	7.9	5	10	2.6			
335	4B	1/22/76	Weather ship Hotel	38.0	-71.0	15 00	21.6	290	3.7	12.8	21	1	5.5			Good
						18 00	20.2	300	3.4	13.4	21	1	5.5			
			NASA-929	38.06	-71.15	19 15	21.1	290	2.9	13.3	162	18	5.0			
			Weather ship Hotel			21 00	25.2	290	2.1	12.8	21	1	5.5			
						23 00	25.6	300			21	1				
						24 00	22.7	290	2.7	12.8	21	1	6.0			
335	5	1/23/76	Weather ship Hotel	38.0	-71.0	15 00	19.5	310	-3.0	11.9	21	1	4.5	5.5	340	Good
			NASA-929	38.07	-71.06	17 45	17.0	295	-.3	11.4	101	24				
				38.07	-71.07	18 10	15.4	293	-.3	12.0	158	30				
			Weather ship Hotel			18 00	18.8	300	-.2	11.5	21	1	4.0	5.0	330	
						19 00	15.2	300	-.3	11.5	21	10	3.0	3.4	285	
						20 00	12.1	294	-.3	11.5	21	10	3.8	1.8	281	
						21 00	13.8	291	-.3	11.5	21	10	3.4	2.3	280	
						21 00	16.8	300	.4	11.5	21	1	3.5	2.7	330	
						22 00	12.1	294			21	10	2.8	2.1	288	
			NASA-929	38.20	-71.29	22 00	12.9	286	1.3	13.2	146	44				
				38.00	-70.70	22 15	13.4	288	1.3	13.2	98	44				
			Weather ship Hotel			24 00	12.1	270	2.0	13.3	21	1	2.5	4.0	300	
335	6	1/28/76	Weather ship Hotel	38.0	-71.0	18 00	17.7	300	9.2	15.0	21	1	2.5	4.0	300	Good
						20 00	16.0	292	9.2	15.0	21	10	1.8	4.6	185	
			NASA-929	38.25	-71.26	20 25	15.0	294	7.9	13.7	101	44				
			Weather ship Hotel			21 00	12.1	250	7.9	13.7	21	10	3.8	3.7	189	
						21 00	16.8	300	7.7	13.4	21	1	2.5	4.0	240	[d]Snow
						22 00	11.3	316	7.7	13.4	21	10	2.4	3.7	180	
						23 00	11.0	315	7.7	13.4	21	10	2.7	2.7	180	
353	9	3/2/77	NASA-929	32.75	-118.57	19 34	13.6	318	10.4	14.3	190.5	20				Good
			Sonic anemometer	32.78	-117.29	21 00	5.4	320	12.5	14.2	8.0					
			NASA-929	32.82	-117.45	22 47	[e]7.1 (6.9)	294	10.5	14.4	175.3	8				
			Sonic anemometer	32.78	-117.29	24 01	6.1		13.6	14.1	8.0					
353	10	3/3/77	Sonic anemometer	32.78	-117.29	20 05	5.2	180	12.8	13.7	8.0					Fair
			NASA-929	32.75	-117.38	21 37	[e]5.6 (5.4)	234	12.4	14.4	100.6	6				
353	11	3/8/77	NASA-929	42.45	-130.08	20 38	17.7	246	10.0	11.0	211.8	11	5.5			Good
			NOAA buoy EB-16	42.50	-130.00	21 00	15.1	250			10.0	8				
			NASA-929	42.67	-130.00	23 38	15.5	277	8.6	10.6	103.6	10				
			NOAA buoy EB-16	42.50	-130.00	24 00	15.6	270			10.0	8	6.0			

See footnotes on page 17.

TABLE III.- Concluded

Mission	Flight	Date	Data source	Location, deg		Time	Neutral stability 19.5-m winds		Temp., °C		Anemometer		Wave height, m	Swell		Data quality (a)
				Lat.	Long.	H M	Speed, m/sec	Direction, deg	Air	Sea	Height, m	Average time, min		Height, m	Direction, deg	
353	13	3/10/77	Sonic anemometer	32.78	-117.29	21 25	4.4	315	14.0	14.3	8.0					Good
			NASA-929	32.92	-117.86	22 57	7.9	295	13.0	15.2	85.3	10				
			Sonic anemometer	32.78	-117.29	23 35	5.7	315	14.2	14.5	8.0					
			NASA-929	32.88	-117.53	01 46	13.1	306	11.0	14.4	100.6	11				
353	14	3/11/77	NOAA buoy EB-16	42.50	-130.00	21 00	13.2	290			10.0	8	3.5			Fair
			NASA-929	42.43	-130.25	21 37	10.5	276	5.6	10.2	207.3	18				
			NASA-929	42.75	-130.00	23 45	13.7	252	4.9	10.7	96.0	11				
			NOAA buoy EB-16	42.50	-130.00	24 00	18.9	280			10.0	8	3.0			
353	15	3/12/77	Sonic anemometer	32.78	-117.29	20 10	4.2	270			8.0					Good
353	20	3/22/77	Sonic anemometer	32.78	-117.29	20 05	2.4	245	13.3	15.1	8.0					Variable
						21 00	1.3	245	13.6	15.1						
						21 40	2.5	245								
			NASA-929	32.67	-117.51	22 13	2.8 to 8.3	265	10.2	14.7	86.9	19				
353	21	3/24/77	Sonic anemometer	32.78	-117.29	18 20	5.9	300			8.0					Fair
						19 30	5.5	300								
			NASA-929	32.79	-117.67	21 10	5.4 (4.7)	284	10.1	15.5	71.6	5				
				32.76	-118.11	22 43			10.8	14.2	91.4	30				
				32.78	-118.02	23 00	6.0	282	10.6	14.2	84.4	30				

See footnotes on page 17.

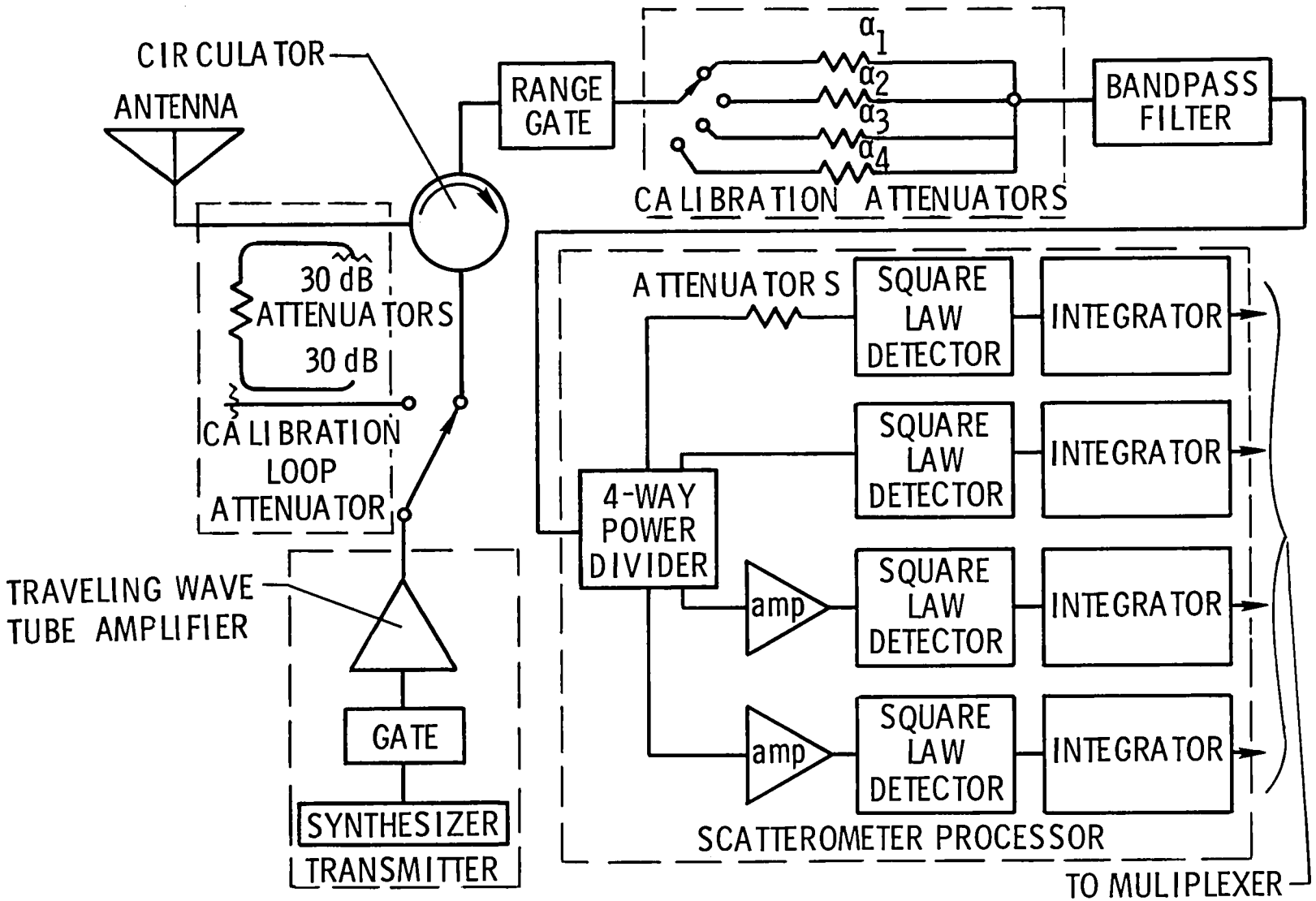

Figure 1.- Block diagram of scatterometer.

MICROWAVE DATA

MISSION-288 FLIGHT- 5 DATE- 11 11 1974 FLT LINE- 4 RUN- 1

TIME	MODE	INCID ANGLE (DEG)	CROSS ANGLE (DEG)	T/R POL	S INT TIME (SEC)	SCAT (DB)	DEPOL FACTOR	S/R CODE	ALT (FT)	A/C HEADING (DEG)	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	DRIFT ANGLE (DEGREES)
41511.7	S.S.	23.9	-88.8	H H	.300	-9.21	0.000	101000	9495.	231.8	57.053	.870	-7.9
41512.1	S.S.	24.4	-88.8	H H	.300	-9.42	0.000	101000	9493.	230.7	57.053	.868	-8.8
41512.6	S.S.	24.8	-88.9	H H	.300	-10.71	0.000	101000	9494.	229.4	57.053	.867	-9.8
41513.0	S.S.	25.0	-89.0	H H	.300	-10.52	0.000	101000	9491.	228.8	57.053	.867	-10.0
41513.9	S.S.	25.4	-89.9	H H	.300	-9.29	0.000	101000	9487.	227.5	57.053	.867	-10.9
41514.3	S.S.	25.5	-90.0	H H	.300	-8.56	0.000	101000	9486.	227.0	57.053	.867	-11.5
41514.8	S.S.	25.6	-90.1	H H	.300	-8.52	0.000	101000	9485.	225.3	57.053	.867	-12.0
41515.2	S.S.	25.6	-90.1	H H	.300	-10.47	0.000	101000	9486.	223.3	57.053	.867	-12.4
41515.7	S.S.	25.7	-89.5	H H	.300	-9.32	0.000	101000	9486.	221.5	57.053	.867	-12.8
41516.1	S.S.	25.8	-89.7	H H	.300	-10.16	0.000	101000	9487.	221.0	57.053	.867	-13.1
41517.0	S.S.	25.9	-90.1	H H	.300	-7.78	0.000	101000	9486.	217.2	57.053	.866	-14.0
41517.4	S.S.	25.9	-90.3	H H	.300	-8.36	0.000	101000	9484.	214.6	57.053	.865	-14.4
41517.9	S.S.	25.9	-90.4	H H	.300	-10.11	0.000	101000	9483.	213.5	57.053	.865	-14.7
41518.3	S.S.	25.9	-90.6	H H	.300	-9.51	0.000	101000	9482.	213.1	57.053	.865	-14.9
41518.8	S.S.	26.1	-90.6	H H	.300	-9.67	0.000	101000	9483.	211.4	57.052	.864	-15.5
41519.2	S.S.	26.4	-91.1	H H	.300	-8.80	0.000	101000	9484.	209.5	57.050	.864	-16.2
41520.1	S.S.	27.2	-91.0	H H	.300	-10.41	0.000	101000	9485.	206.8	57.048	.864	-16.9
41520.5	S.S.	27.7	-90.4	H H	.300	-9.55	0.000	101000	9485.	205.9	57.048	.864	-17.0
41521.0	S.S.	28.3	-90.3	H H	.300	-11.57	0.000	101000	9485.	204.2	57.048	.864	-17.3
41521.4	S.S.	28.8	-90.2	H H	.300	-10.23	0.000	101000	9485.	202.8	57.048	.865	-17.6
41522.3	S.S.	29.4	-90.4	H H	.300	-10.25	0.000	101000	9486.	199.4	57.048	.865	-18.0
41522.7	S.S.	29.6	-90.3	H H	.300	-10.79	0.000	101000	9486.	198.1	57.048	.865	-18.3
41523.2	S.S.	29.8	-89.9	H H	.300	-9.70	0.000	101000	9486.	196.9	57.048	.865	-18.8
41523.6	S.S.	29.9	-89.8	H H	.300	-10.32	0.000	101000	9486.	195.5	57.048	.865	-19.1
41524.1	S.S.	30.1	-89.4	H H	.300	-9.97	0.000	101000	9486.	192.7	57.048	.865	-19.3
41524.5	S.S.	30.3	-89.3	H H	.300	-10.63	0.000	101000	9486.	190.5	57.047	.865	-19.5
41525.4	S.S.	30.5	-89.3	H H	.300	-10.73	0.000	101000	9484.	189.2	57.047	.865	-19.8
41525.8	S.S.	30.5	-89.5	H H	.300	-10.51	0.000	101000	9483.	186.8	57.046	.865	-19.8
41526.3	S.S.	30.5	-89.7	H H	.300	-11.42	0.000	101000	9481.	183.1	57.046	.865	-19.8
41526.7	S.S.	30.5	-89.6	H H	.300	-10.20	0.000	101000	9479.	181.3	57.045	.865	-19.8
41527.6	S.S.	30.6	-90.5	H H	.300	-10.20	0.000	101000	9476.	179.5	57.045	.865	-19.8
41528.5	S.S.	30.6	-90.7	H H	.300	-10.78	0.000	101000	9474.	174.0	57.043	.865	-19.5
41528.9	S.S.	30.6	-90.5	H H	.300	-11.04	0.000	101000	9474.	173.4	57.043	.865	-19.5
41529.4	S.S.	30.5	-90.6	H H	.300	-10.93	0.000	101000	9474.	172.7	57.043	.865	-19.5
41529.8	S.S.	30.5	-90.7	H H	.300	-10.09	0.000	101000	9476.	171.8	57.043	.866	-19.4
41530.7	S.S.	30.4	-90.7	H H	.300	-10.22	0.000	101000	9480.	169.4	57.043	.867	-19.3
41531.1	S.S.	30.4	-90.6	H H	.300	-9.30	0.000	101000	9478.	167.7	57.043	.867	-19.2
41531.6	S.S.	30.4	-91.1	H H	.300	-9.43	0.000	101000	9476.	165.7	57.043	.867	-19.1
41532.0	S.S.	30.4	-91.1	H H	.300	-9.67	0.000	101000	9475.	164.6	57.043	.867	-19.0
41532.5	S.S.	30.4	-90.6	H H	.300	-9.29	0.000	101000	9474.	163.2	57.043	.867	-18.8
41532.9	S.S.	30.4	-90.7	H H	.300	-9.48	0.000	101000	9475.	160.9	57.042	.867	-18.6
41533.8	S.S.	30.4	-90.9	H H	.300	-9.46	0.000	101000	9477.	156.9	57.040	.867	-18.1
41534.2	S.S.	30.5	-90.8	H H	.300	-9.37	0.000	101000	9477.	156.3	57.039	.867	-17.9
41534.7	S.S.	30.5	-90.8	H H	.300	-8.92	0.000	101000	9478.	154.5	57.038	.867	-17.7
41535.1	S.S.	30.6	-90.7	H H	.300	-9.42	0.000	101000	9479.	151.6	57.038	.868	-17.4
41536.0	S.S.	30.6	-90.8	H H	.300	-10.00	0.000	101000	9479.	148.1	57.038	.868	-17.0
41536.4	S.S.	30.6	-90.8	H H	.300	-9.94	0.000	101000	9479.	147.6	57.038	.869	-16.9
41536.9	S.S.	30.6	-90.8	H H	.300	-8.57	0.000	101000	9479.	145.4	57.038	.871	-16.7
41537.3	S.S.	30.6	-90.7	H H	.300	-10.78	0.000	101000	9479.	143.3	57.037	.872	-16.5
41537.8	S.S.	30.5	-90.6	H H	.300	-10.37	0.000	101000	9478.	141.5	57.037	.873	-16.4
41538.2	S.S.	30.5	-90.5	H H	.300	-9.84	0.000	101000	9477.	140.5	57.037	.874	-16.4
41539.1	S.S.	30.4	-90.9	H H	.300	-10.16	0.000	101000	9476.	137.4	57.037	.875	-15.9
41539.5	S.S.	30.4	-90.9	H H	.300	-9.89	0.000	101000	9476.	135.9	57.037	.875	-15.6
41540.0	S.S.	30.4	-90.5	H H	.300	-9.83	0.000	101000	9475.	133.7	57.036	.875	-15.3
41540.4	S.S.	30.5	-90.5	H H	.300	-9.93	0.000	101000	9474.	132.0	57.036	.876	-15.1
41540.9	S.S.	30.5	-90.6	H H	.300	-10.52	0.000	101000	9474.	130.4	57.036	.876	-14.6
41541.3	S.S.	30.5	-90.6	H H	.300	-9.81	0.000	101000	9472.	129.3	57.035	.876	-14.0
41542.2	S.S.	30.6	-90.6	H H	.300	-9.91	0.000	101000	9470.	124.7	57.035	.877	-13.5
41542.6	S.S.	30.6	-90.6	H H	.300	-10.47	0.000	101000	9468.	122.8	57.035	.878	-13.4
41543.1	S.S.	30.7	-90.6	H H	.300	-9.66	0.000	101000	9465.	122.1	57.035	.878	-13.2
41543.5	S.S.	30.8	-90.6	H H	.300	-9.12	0.000	101000	9462.	121.5	57.035	.878	-13.0
41544.4	S.S.	31.1	-91.0	H H	.300	-10.02	0.000	101000	9459.	115.1	57.035	.882	-12.0
41544.8	S.S.	31.1	-91.0	H H	.300	-10.91	0.000	101000	9458.	114.0	57.035	.883	-11.7
41545.3	S.S.	31.2	-91.0	H H	.300	-10.62	0.000	101000	9457.	113.2	57.035	.883	-11.5
41545.7	S.S.	31.2	-90.6	H H	.300	-10.99	0.000	101000	9456.	111.8	57.035	.884	-11.1
41546.2	S.S.	31.1	-90.6	H H	.300	-11.27	0.000	101000	9454.	108.8	57.034	.886	-10.4
41546.6	S.S.	31.0	-90.7	H H	.300	-11.10	0.000	101000	9452.	106.8	57.033	.887	-9.9
41547.5	S.S.	30.8	-90.5	H H	.300	-10.66	0.000	101000	9450.	104.1	57.034	.888	-9.6
41547.9	S.S.	30.7	-90.6	H H	.300	-10.77	0.000	101000	9447.	102.4	57.034	.889	-9.0
41548.4	S.S.	30.6	-90.3	H H	.300	-11.34	0.000	101000	9443.	100.1	57.035	.890	-8.2
41548.8	S.S.	30.6	-90.4	H H	.300	-12.17	0.000	101000	9441.	98.3	57.035	.890	-7.8
41549.7	S.S.	30.7	-91.1	H H	.300	-12.16	0.000	101000	9437.	94.5	57.035	.892	-7.1
41550.6	S.S.	31.0	-91.4	H H	.300	-11.31	0.000	101000	9438.	91.5	57.035	.894	-5.9
41551.0	S.S.	31.1	-91.5	H H	.300	-12.27	0.000	101000	9435.	89.2	57.035	.894	-5.5
41551.5	S.S.	31.2	-91.7	H H	.300	-10.80	0.000	101000	9432.	86.3	57.035	.896	-4.9
41551.9	S.S.	31.2	-91.8	H H	.300	-11.93	0.000	101000	9431.	85.7	57.035	.896	-4.5
41552.8	S.S.	31.1	-91.9	H H	.300	-11.69	0.000	101000	9429.	82.5	57.035	.898	-3.5
41553.2	S.S.	31.0	-92.0	H H	.300	-11.98	0.000	101000	9428.	79.5	57.035	.899	-3.0
41553.7	S.S.	30.9	-92.0	H H	.300	-10.91	0.000	101000	9428.	77.2	57.035	.900	-2.5
41554.1	S.S.	30.8	-92.1	H H	.300	-11.54	0.000	101000	9430.	76.9	57.035	.900	-2.3

KEY TO CODES-

0 NO FLAG
1 POSSIBLY OUTSIDE RANGE GATE
10 OUTSIDE DYNAMIC RANGE
100 EXCESSIVE DOPPLER
1000 POLAR REVERSAL
10000 EXCESSIVE DEPOL
100000 REC TEMP ABNORMAL

COMBINATIONS OF FLAGS CAN OCCUR.

Figure 2.- Typical output listing of archived data. (Last four elements of table II not listed because they are redundant.)

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA TM-84608		

4. Title and Subtitle	5. Report Date
ARCHIVAL OF AIRCRAFT SCATTEROMETER DATA FROM AAFE RADSCAT MISSIONS	August 1983
	6. Performing Organization Code 146-40-05-05
7. Author(s)	8. Performing Organization Report No.
Lyle C. Schroeder and John L. Mitchell	L-15590
	10. Work Unit No.
9. Performing Organization Name and Address	
NASA Langley Research Center Hampton, VA 23665	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	Technical Memorandum
National Aeronautics and Space Administration Washington, DC 20546	14. Sponsoring Agency Code

15. Supplementary Notes

Lyle C. Schroeder: Langley Research Center, Hampton, Virginia.
John L. Mitchell: Kentron International, Inc., Hampton, Virginia.

16. Abstract

This report documents aircraft scatterometer data obtained over the ocean with the Radiometer-Scatterometer (RADSCAT) instrument developed at NASA Langley Research Center. The normalized radar cross section (NRCS) data have been obtained at 13.9 GHz for a variety of ocean surface wind conditions, which are also presented. All such valid RADSCAT ocean scatterometer data for which surface truth has been obtained are included, except for ice research missions during the last year of RADSCAT's lifetime (1977-1978). Aircraft scatterometer data obtained for the SeaSat underflights were with a second Langley instrument, the Airborne Microwave Scatterometer (AMSCAT), but are not reported herein. The RADSCAT data are archived on card image computer tapes and on microfiche, which are both available from the National Technical Information Service.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
k_u band Scatterometer Ocean wind vector Radar cross section	Unclassified - Unlimited Subject Category 48

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	24	A02

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