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PRELIMINARY RESULTS FROM CONVAIR 240A MISSION 50, 12 JUNE 1967, OVER MISSISSIPPI DELTA AREA

Preliminary Report

by

Jack F. Paris

3 May 1968

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The work reported herein is of a preliminary nature and the results are not necessarily in final form.

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ABSTRACT

On June 12, 1967, Test Site 128 (Mississippi Delta) was overflown on three flights by the NASA Convair 240A aircraft equipped with multispectral sensors as a part of Mission 50. The data obtained were studied to determine their quality and scientific value.

Twenty-seven percent of the color photography taken by the RC-8 metric camera was judged to be useful. Many potentially useful photographs were lost due to untimely film changes. The sediment-boundary could easily be seen in the RC-8 photography.

Data from Mission 50 has been either late in arriving at the user agency or has never arrived.

The photographs obtained by the Itek 9-lens multiband camera show serious discrepancies and do not offer any advantages over the RC-8 photography.

The Reconofax IV infrared imager is judged to be the most useful of the remote sensors used on Mission 50. Water-mass boundaries and the surface flow field could be deduced from the infrared image in the area between South Pass and Southwest Pass.

Recommendations are made to conduct missions only when ground support is available, to place marker buoys at the outer ends of the radial flight lines and to set aside blocks of aircraft time for ocean studies.

ACKNOWLEDGEMENT

The author wishes to acknowledge the assistance of Mrs. Rosemary Boykin, Mr. Hector Cornelio and Mr. James Bell who were responsible for preparing the figures in this report.

Thanks are extended to LCDR Don Walsh for the use of his collected data on the Mississippi River outflow and to Capt. L.R.A. Capurro for his helpful comments.

Graditude is extended to Mrs. Corinne Pehl who typed the report and to my family who have so generously supported me throughout the years.

Aerial view of the Mississippi Delta taken by GEMINI IX. The view is looking east along the Gulf Coast and was taken at an altitude of 160 miles on 3 June 1966. Note the pronounced westerly flow of the discolored river discharge.

PRELIMINARY RESULTS FROM CONVAIR-240A MISSION 50

12 JUNE 1967

OVER MISSISSIPPI-DELTA AREA

BACKGROUND

Multispectral measurements have been made on several occasions by NASA sponsored aircraft from various altitudes over an area south of the Mississippi Delta known as Test Site 128 (see Figure 1). These aircraft flights are a part of the NASA Earth Resources Aircraft Survey Program (ERASP) which is part of the overall Earth Resources Survey Program (ERSP) whose function is to coordinate the national effort being made to find significant uses of remote sensing from spacecraft in studying certain geoscience problems. The data collected on these flights are being studied by the Space Oceanography Project at Texas A&M University under ONR Contract Number 2119(04).

The goal of the Space Oceanography Project is to determine what group of remote sensors is best for studying certain phenomena occurring in the Gulf of Mexico especially phenomena related to the mixing of river, coastal and ocean waters in the vicinity of the mouths of the Mississippi River.

The Mississippi-Delta area was chosen as a test site for these studies because there exists in this relatively small geographical area extremely large ranges of sea temperature, salinity, turbidity, biological activity and water-mass types. This area is also easily accessible

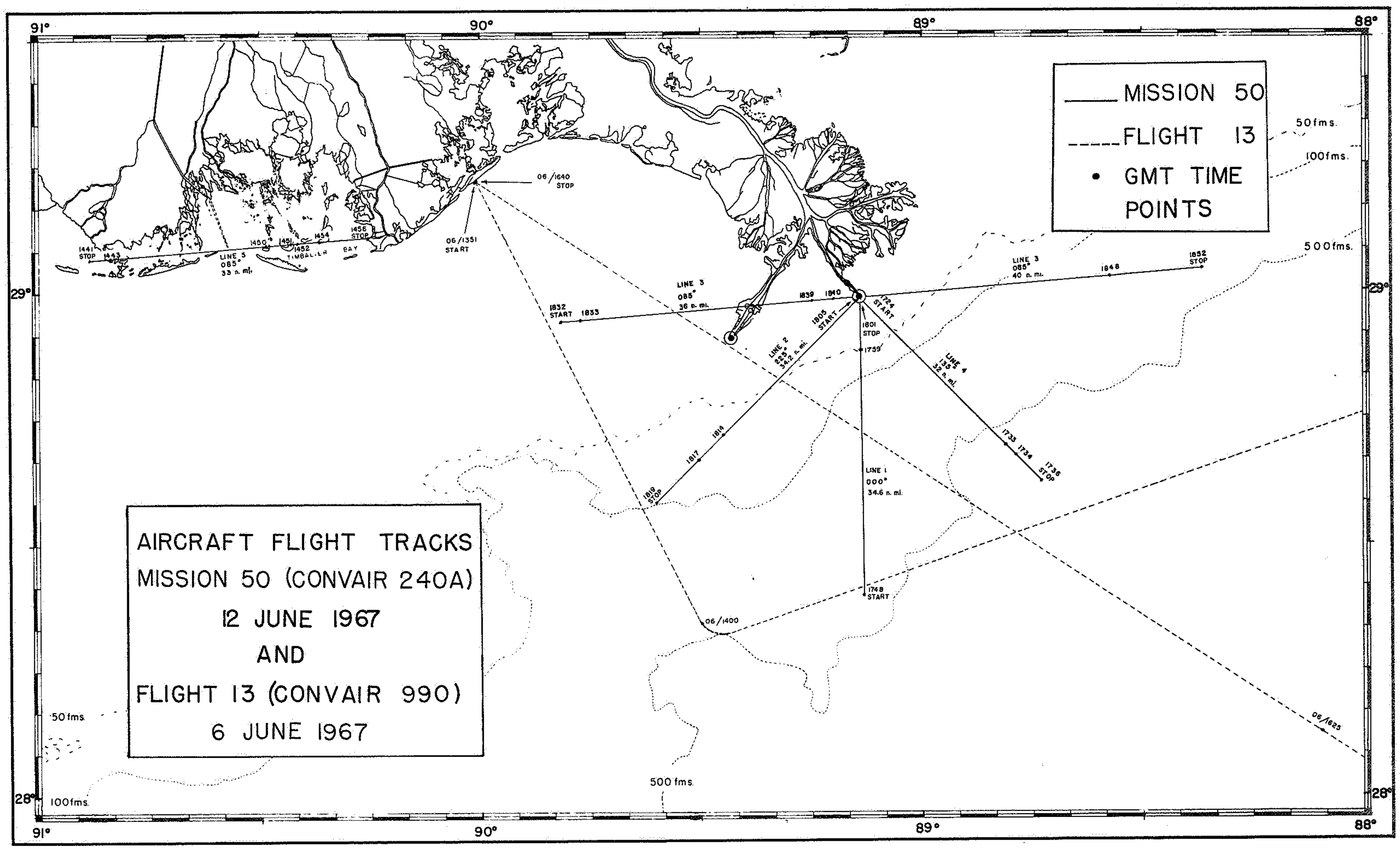

Figure 1. Aircraft flight tracks, Mission 50 (Convair 240A), 12 June 1967, and Flight 13 (Convair 990), 6 June 1967.

from Ellington AFB, Texas, which is the home base of the aircraft being used.

The distribution of the river outflow in time and space is of importance to coastal fisheries, energy and water budget studies, studies of dispersion of water pollutants, and many other oceanographic problems. Ship surveys of these coastal phenomena are expensive, time-consuming and often unrewarding. Coastal processes are dynamic--changing with time; but, studies of these processes require days of survey by snail-like research ships. It is felt that only aircraft or spacecraft can provide the vantage point needed to effectively survey the coastal areas of the world. Even photographs such as the one shown in the foreleaf taken from GEMINI IX show much detail of the river outflow unobtainable by classical oceanographic survey.

Site 128 is an excellent test site for studying the remote sensors themselves. If remote sensors prove incapable of making useful measurements over the Mississippi-Delta area, their practical use in other areas of the World Ocean is doubtful.

As these feasibility studies continue aircraft flights with remote sensors should be made over other phenomena in the Gulf of Mexico such as the Loop Current and upwelling areas. The history of oceanographic research in the Gulf of Mexico by Texas A&M University and other universities around the perimeter of the Gulf of Mexico made this general area ideal for studies conducted from spacecraft.

PURPOSE OF THIS REPORT

The purpose of this report is to examine the quality of the multispectral data taken from the NASA 926 Convair 240A aircraft during Mission 50 on June 12, 1967, over Site 128 and to comment preliminarily on its scientific value. This mission is considered representative of the various mission flown over Site 128 in the past two years. Walsh (1967) has reported on some early missions in the program and plans to report on Missions 26, 37, 41, 50, 58 and 66 in a report to be published this summer (Walsh 1968). This report will include the photographic and infrared aspects of these measurements. The author will soon publish a report dealing with the microwave aspects of these measurements.

GENERAL DESCRIPTION OF MISSION 50

The lines flown by the Convair 240A on Mission 50 are shown in Figure 1 in solid lines. Significant GMT-times are indicated along the flight lines. These lines were all flown on June 12, 1967 (local time), in a series of three flights. All of the flights were made at approximately 1500 feet above mean sea level. Specific information concerning the flights is shown in Table 1.

Flight	Line	Run	Start (GMT)	Stop (GMT)
1	5	1	14:41:20	14:56:10
2	4	1	17:24:15	17:36:25
2	1	1	17:48:35	18:01:35
2	2	1	18:05:25	18:19:35
2	3	1	18:32:05	18:52:01
3	4	1	13/00:54:30	01:11:30
3	1	1	01:24:05	01:38:40
3	2	1	01:42:50	01:53:00
3	3	1	02:02:10	02:19:20

TABLE 1. Lines Flown Over Site 128 on Mission 50, June 12-13, 1967 (GMT DATE).

The evening flight, Flight 3, is not shown in Figure 1; however, the flight lines flown during Flight 3 were very close to those flown during Flight 2.

Due to ship scheduling problems, there was no significant ground truth available to support this mission. The nature of this problem is covered adequately by Arnold, Capurro, Paris and Walsh (1967); steps have been taken to provide adequate ground truth to support all missions after Mission 50.

CONVAIR 240A AIRCRAFT

The NASA 926 Convair 240A aircraft is instrumented as shown in Figure 2. According to Bratton (1967), data was obtained during Mission 50 over Site 128 using the Reconofax IV infrared imaging system (Figure 2), the AAS-5 lateral-scanning ultraviolet system (Figure 2), the MR 62/MR 64 passive microwave radiometers (Figures 2 and 3), the Itek Multiband camera (Figure 2) and the RC-8 metric camera (Figures 2 and 4). To date no data has been received from the MR 62/MR 64 or AAS-5.

The Convair 240A aircraft is overloaded. This greatly shortens the time that it may be on station. Perhaps some of the other problems to be described later can be related to this overweight condition. The only quantitative remote sensor on board the Convair 240A aircraft is that obtained from the MR 62/MR 64 microwave radiometers. All other data obtained from the aircraft is recorded on film and is, therefore, qualitative in nature.

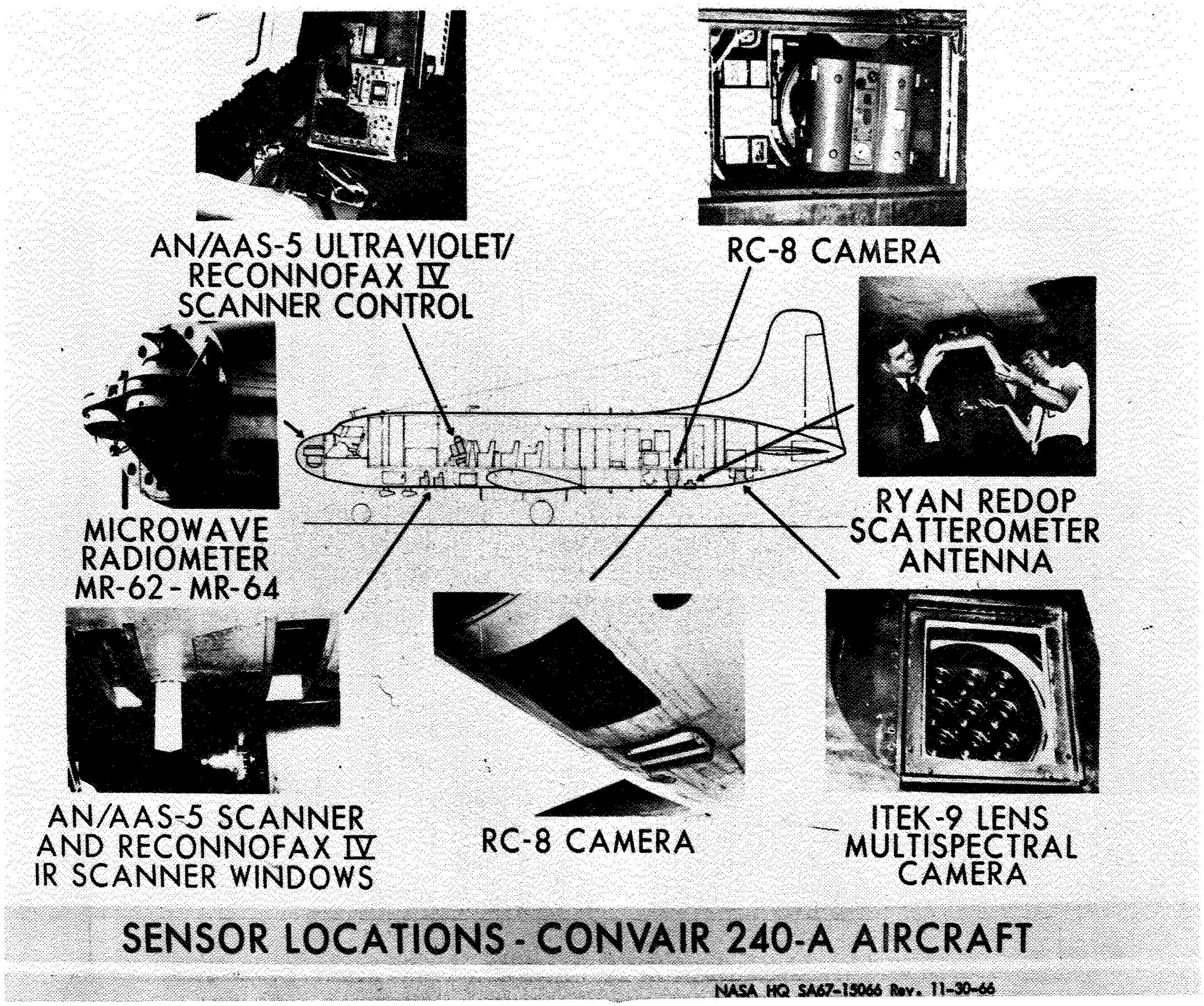

Figure 2. Sensor locations - Convair 240A aircraft.

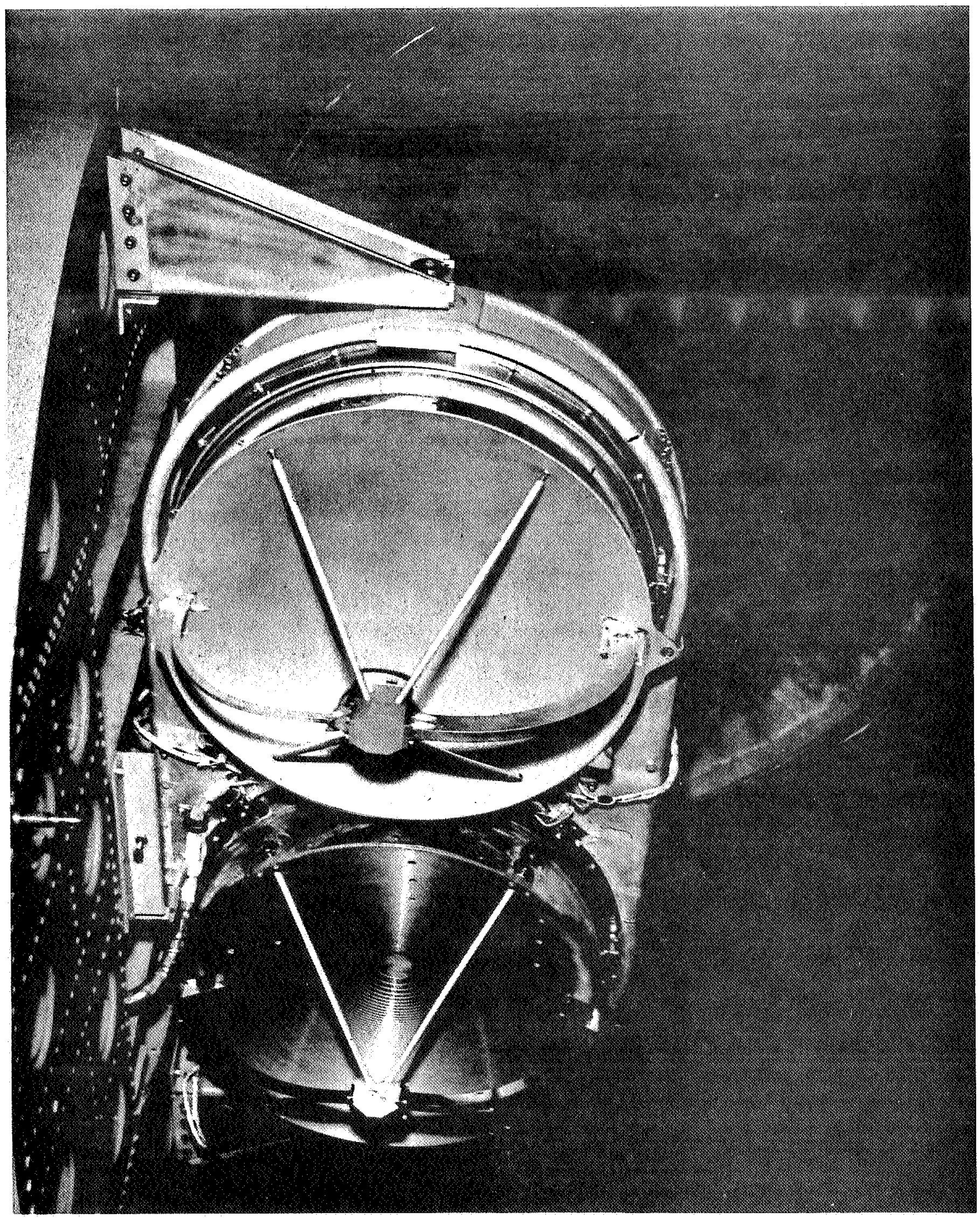

Figure 3. Microwave radiometer servo mount and radome modification, NASA 926.

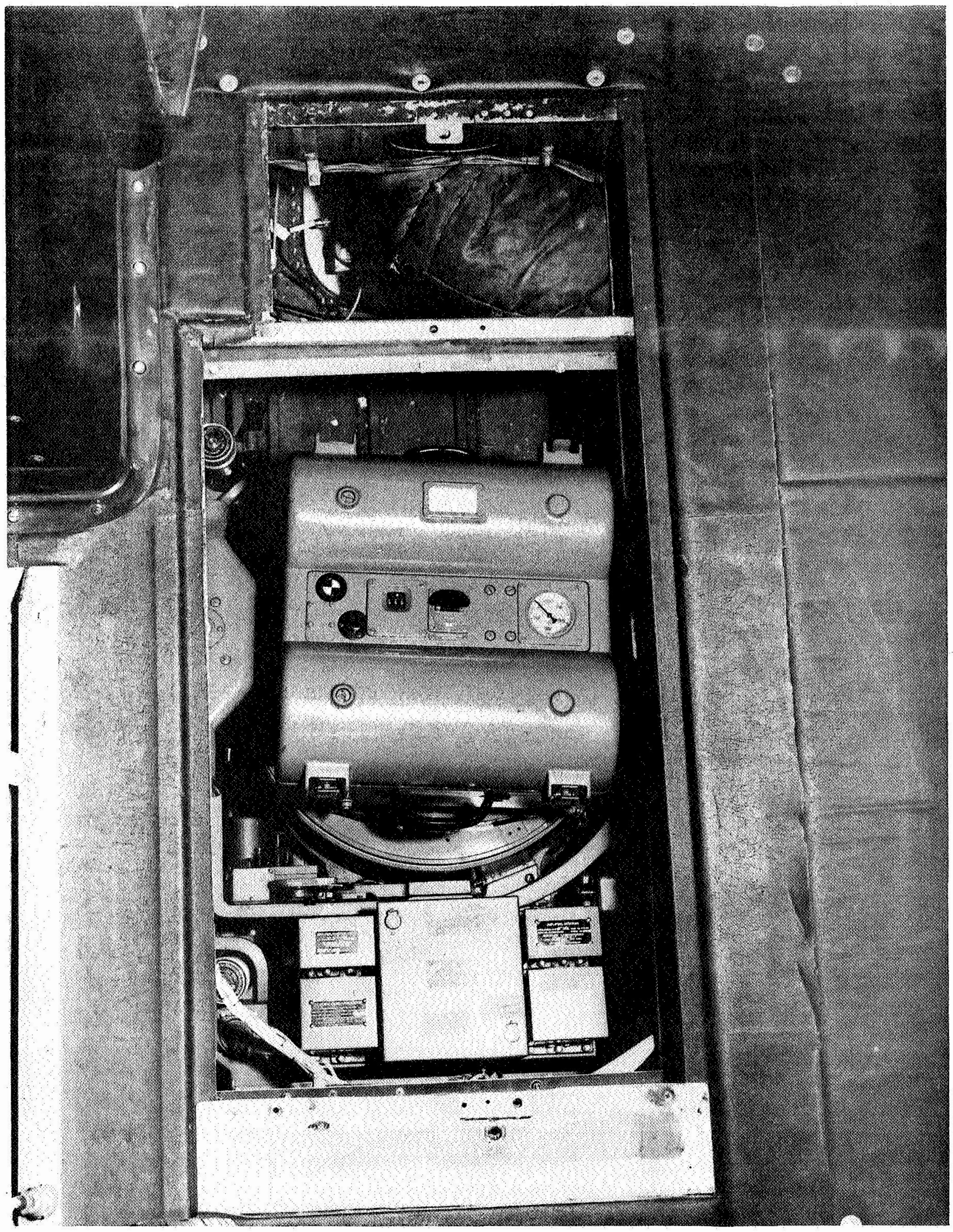

Figure 4. RC-8 metric camera housing.

CONVAIR 990 AIRCRAFT

It was recently discovered that remotely sensed data was taken over parts of the Mississippi-Delta test-site on June 6, 1967, from high altitude with a Convair 990 aircraft sponsored by the Goddard Space Flight Center. Fourteen flights were made by this Convair 990 from May 5, 1967, to June 8, 1967, over various portions of the North American continent in support of the NIMBUS meteorological satellite program. The details of these flights are given in a report by Tobin (1967). The ground track of Flight 13 by the Convair 990 on June 6, 1967, is shown by the dashed line on Figure 1. A request for data from various portions of Flights 12 and 13 by the Convair 990 has been sent to Goddard Space Flight Center, and the data is expected to arrive at Texas A&M University in mid-June 1968. This request is summarized in Table 2. After these data are received they will be compared to data taken six days later during Mission 50.

Of the fourteen types of sensors on board the Convair 990 aircraft, the Medium Resolution Infrared Radiometer (MRIR), the 19.35 GHz scanning microwave radiometer, and T-11 camera are of value.

It is interesting to note that although little pre-mission planning was made for the various flights by the Convair 990 over ocean areas, much useful information is expected to be derived from these data in support of the overall goal of the Space Oceanography Project.

Date (GMT)	Flight	Time of Data Requested (GMT)	Type of Data Requested	Rationale
June 5, 1967	12	17:17:15 - 17:20:35	MRIR (Ch. 2), Pan over Houston, Texas	Heat island study over Houston, Texas
June 5, 1967	12	17:24:28 - 17:27:58	MRIR (Ch. 2), Pan over Texas Coastal water	Coastal temperature study; visible coastal features
June 5, 1967	12	18:03:38 - 18:04:28	MRIR (Ch. 2), MR, Pan, 35 mm Color Ekta over central western Gulf of Mexico	Compare MRIR & MR to ground truth over clear, calm ocean.
June 6, 1967	13	13:49:50 - 13:57:50	MRIR (Ch. 2), Pan over La. coastal water & CB	Study infrared and microwave radiance over thunderstorm
June 6, 1967	13	16:26:30 - 16:40:00	MRIR (Ch. 2), MR, Pan over Mississippi River outflow	Compare data to similar data obtained on Mission 50.

Legend: MRIR (Ch. 2) - Medium Resolution Infrared Radiometer, Channel 2, 10 - 11μ.
Pan - Panchromatic 9 X 9 photos taken by T-11 metric camera.
MR - 19.35 GHz electronically scanned passive microwave radiometer (Space General).

TABLE 2. Summary of Request for Data from Space Oceanography Project to Goddard Space Flight Center.

OUTFLOW OF MISSISSIPPI RIVER

One of the most important parameters of the Mississippi River is the temporal distribution of the rate of outflow of the river. It has been the hope of this project to conduct surveys of the distribution of the river outflow during periods of peak rate of outflow. The aircraft program has been very unsuccessful in this effort. Figures 5 and 6 show the rates of outflow of the Mississippi River in 1966 and 1967 as measured at Vicksburg, Mississippi, which is a major gauging station in the Mississippi River 430.4 miles upstream of the mouth of the river. The rates of outflow occurring during the several missions flown by the NASA 926 or NASA 927 aircraft are annotated on the figures. The rate of outflow during Mission 50 was the largest among other missions in 1966 or 1967; however, this rate of outflow is still less than half the peak amounts occurring in both years. The average monthly rates of outflow based on seven years data are shown in Figure 7. Although it would appear that April is the most likely month in which maximum rate of outflow would occur, the rates of outflow in April 1966 and April 1967 are minimums. In fact, the rate of outflow is quite variable throughout the year. This fact implies a need to survey the outflow area more repeatatively than has been done. It must be frustrating to program managers to note that the chance flight of the Convair 990 on June 6, 1968, and of the GEMINI IX Mission, found the rate of outflow at a higher level than was found

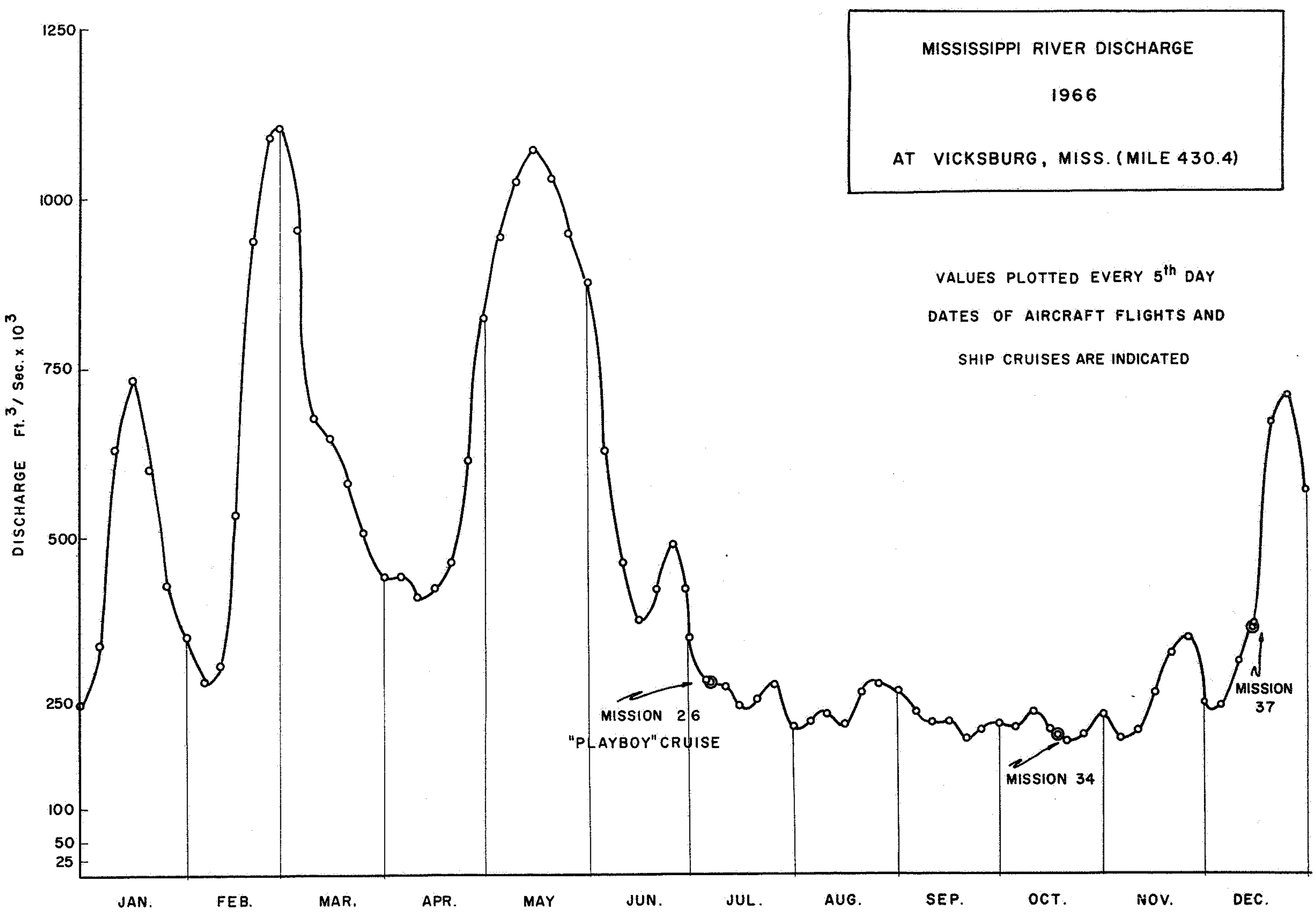

Figure 5. Mississippi River discharge, 1966, at Vicksburg, Mississippi, (mile 430.4), after Walsh (1968).

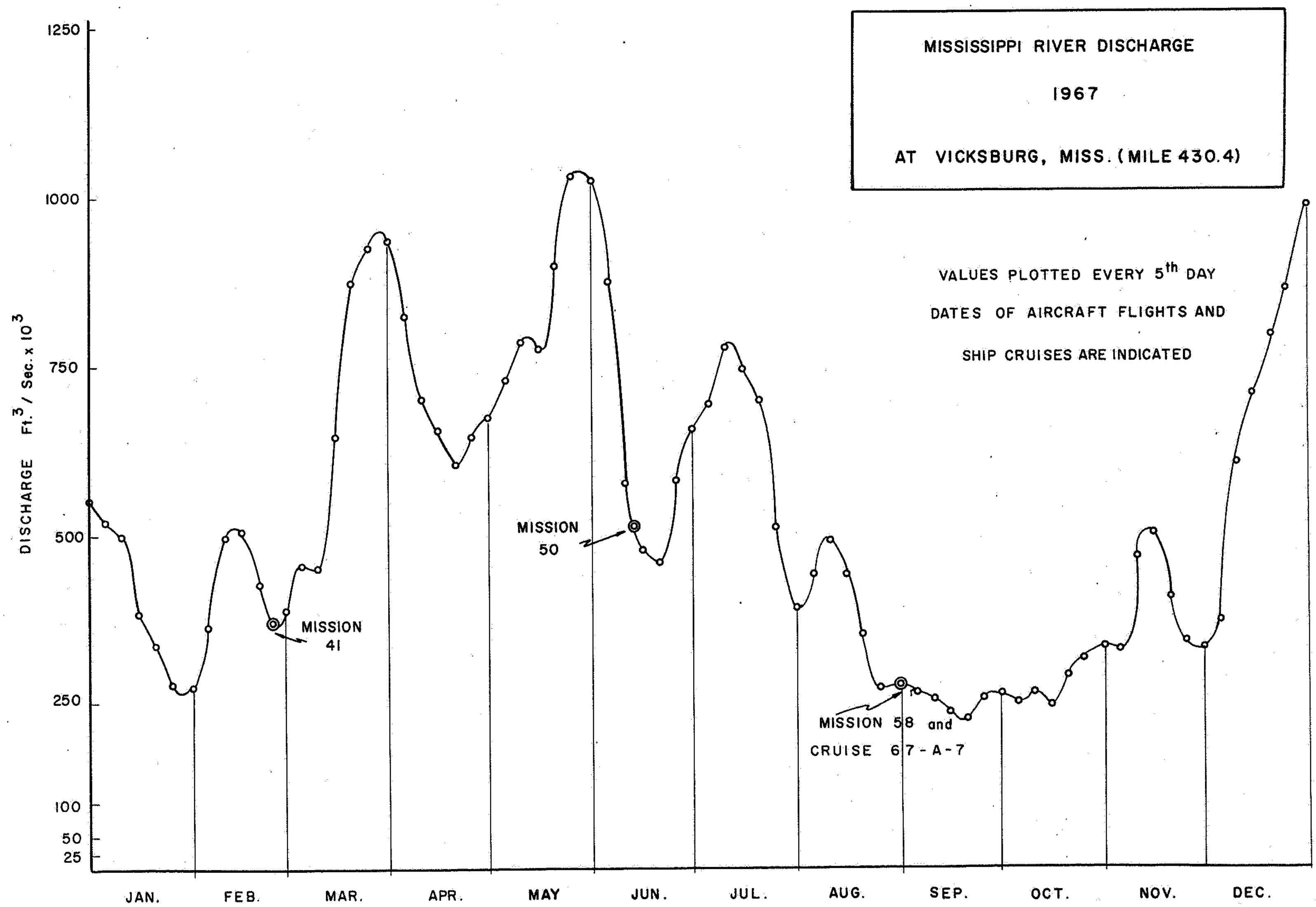

Figure 6. Mississippi River discharge, 1967 at Vicksburg, Mississippi, (mile 430.4), after Walsh (1968).

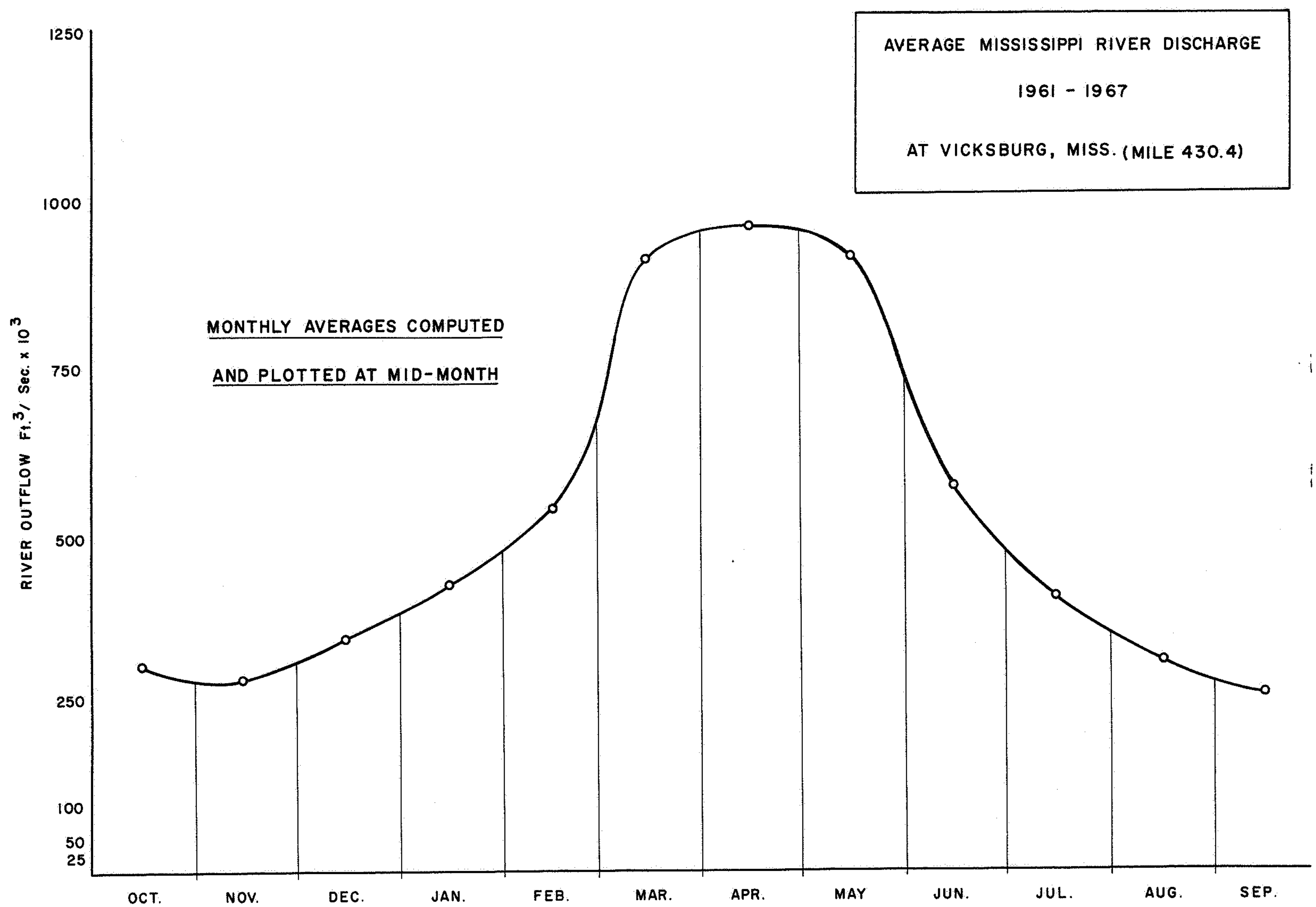

Figure 7. Average Mississippi River discharge, 1961-1967, at Vicksburg, Mississippi, (mile 430.4), after Walsh (1968).

during any of the planned missions over Site 128. The lesson to be learned from this is that blocks of time should be scheduled for surveys over regions where dynamic processes are under study.

REVIEW OF THE DATA

MR 62/MR 64 Data. Even though almost one year has elapsed since Mission 50, no partially reduced microwave data has been sent to this project. Such data has been received from Mission 41 conducted in February, 1967. The Goddard Convair 990 aircraft flew a 19.35 GHz scanning microwave radiometer built by Space General. A preliminary report of this data has been made by Cator, et. al. (1967).

AAS-5 Data. No copies of the AAS-5 imagery taken on Mission 50 have been received to date.

RC-8 Metric Camera. A complete set of the 9 X 9 color Ektachrome photographs taken during Mission 50 have been received. A summary of the quality of these photographs and their scientific usefulness is presented in Table 3. Five hundred and forty-five (545) photographs were taken. Of these, 147 were good photographs of significant areas of interest; 79 were good photographs, but showed no features; 91 were processed incorrectly (indicators of time and frame number were green instead of orange); 149 were either under or over exposed; and 70 were blank or missing. A mosaic of frames 0001, 0002 and 0003 is shown in Figure 8. The boundary between the river water (light colored) and the coastal water (dark) can be traced through these three frames. The same type of boundary can be seen in the picture taken from GEMINI IX in the foreleaf. A recent survey of the test site by the R/V ALAMINOS showed that many boundaries are present in

Flight	Line	Frames	Comments
1	5	9894 - 9983	Wave Pattern and slope distribution are easily discernable. Oil slicks are easily seen. Wind streaks can be seen. Color rendition is excellent. Surface flow can be determined at some points.
1	5	9984	Missing photo. Break in coverage.
1	5	9985 - 9999	Same as 9894 - 9983 above.
2	4	0001 - 0003	Boundary between river and coastal water is easily seen and traceable. Wave pattern and slope distribution is easily discernable.
2	4	0004 - 0011	Gradual color change indicating crossing of second boundary zone.
2	4	0012 - 0071	Film appears to be over exposed.
2	4	0072 - 0086	Film either half-exposed or under exposed.
2	4	0087 - 0090	Normal exposure; but no features are seen.
2	1	0091 - 0181	Color rendition is poor. Time and film makers appear green. Water appears to be too blue. Film appears under exposed. Last photo taken 8 miles from South Pass; result--no useful data taken on line.
2	2	0182 - 255	Line did not start over South Pass on photography. Film appears under exposed. No features noted.
2	2	256 - 270	Missing.
2	2	271 - 288	No features in open sea.
2	3	289 - 295	Good pictures. Shallow water.
2	3	296	Apparent boundary marked by color change.
2	3	297 - 310	Good photography. No features.
2	3	311 - 320	Foam lines and wind streaks visible.
2	3	321 - 326	Crossing Southwest Pass leg.
2	3	327 - 332	Crossed weak boundary line marked by color change.
2	3	333 - 359	Few features. Good photography.
2	3	360 - 414	Frames are all black; but, indicators are clearly shown. Shutters apparently not opened. Valuable data over South Pass and to east was lost.
2	3	415 - 439	Over open water. No features.

TABLE 3. Summary of the Quality of the RC-8 Color Ektachrome Photographs Taken Over Site 128 During Mission 50.

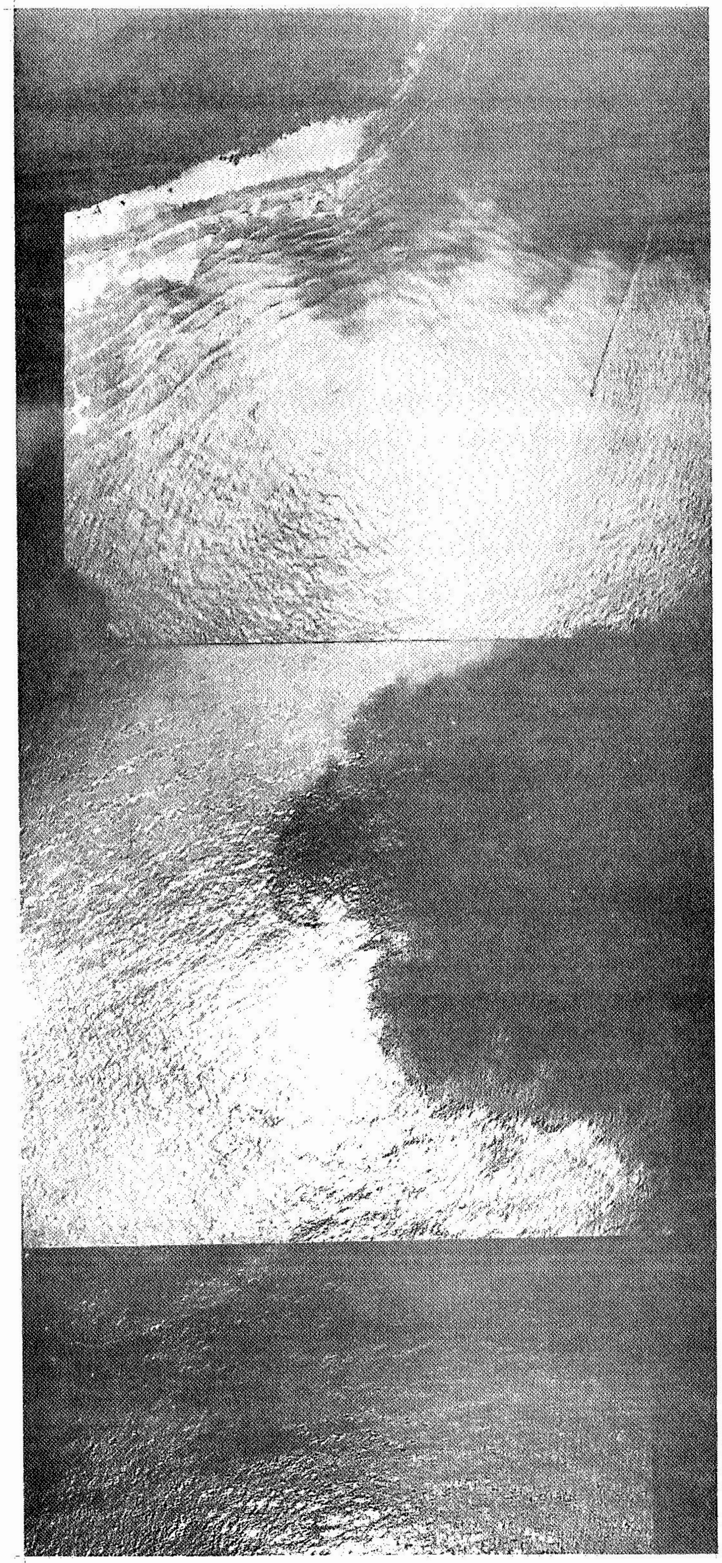

Figure 8. Mosaic of frames 0001-0003, Flight 2, Line 4-1, Mission 50.

the test site due to the mixing of river and coastal water. The first or inner boundary is marked by a strong change in the turbidity and sediment content of the water mass; this change is easily seen as a change in color from muddy brown to dark green water. The appearance of this sediment boundary as seen from ship (R/V ALAMINOS cruise 68-A-1) is shown in Figure 9. The upper picture in Figure 9 was taken from outside the sediment boundary; the lower picture was taken from within the sediment boundary.

On Mission 50, boundaries other than the sediment boundary could not be detected in the photography. The other boundaries did exist and were easily located in the Reconofax IV infrared images (see next section).

Some of the major outer boundaries have been detected in photographs in the past. These boundaries are usually marked by long foam lines on the surface of the water that result from surface convergence that takes place between two water masses.

The poor quality (in amount and timing of coverage) of the photographic data was in part due to poor planning. Of the four passes over South Pass, good photographs were obtained over only one pass (Figure 8). On two of these passes, no pictures were obtained because the cameras ran out of film before the critical part of the flight line was overflown. The effect of this poor timing on the value of the mission is easily seen by noting the parts of the area unsurveyed (by RC-8) during the following camera reloading times:

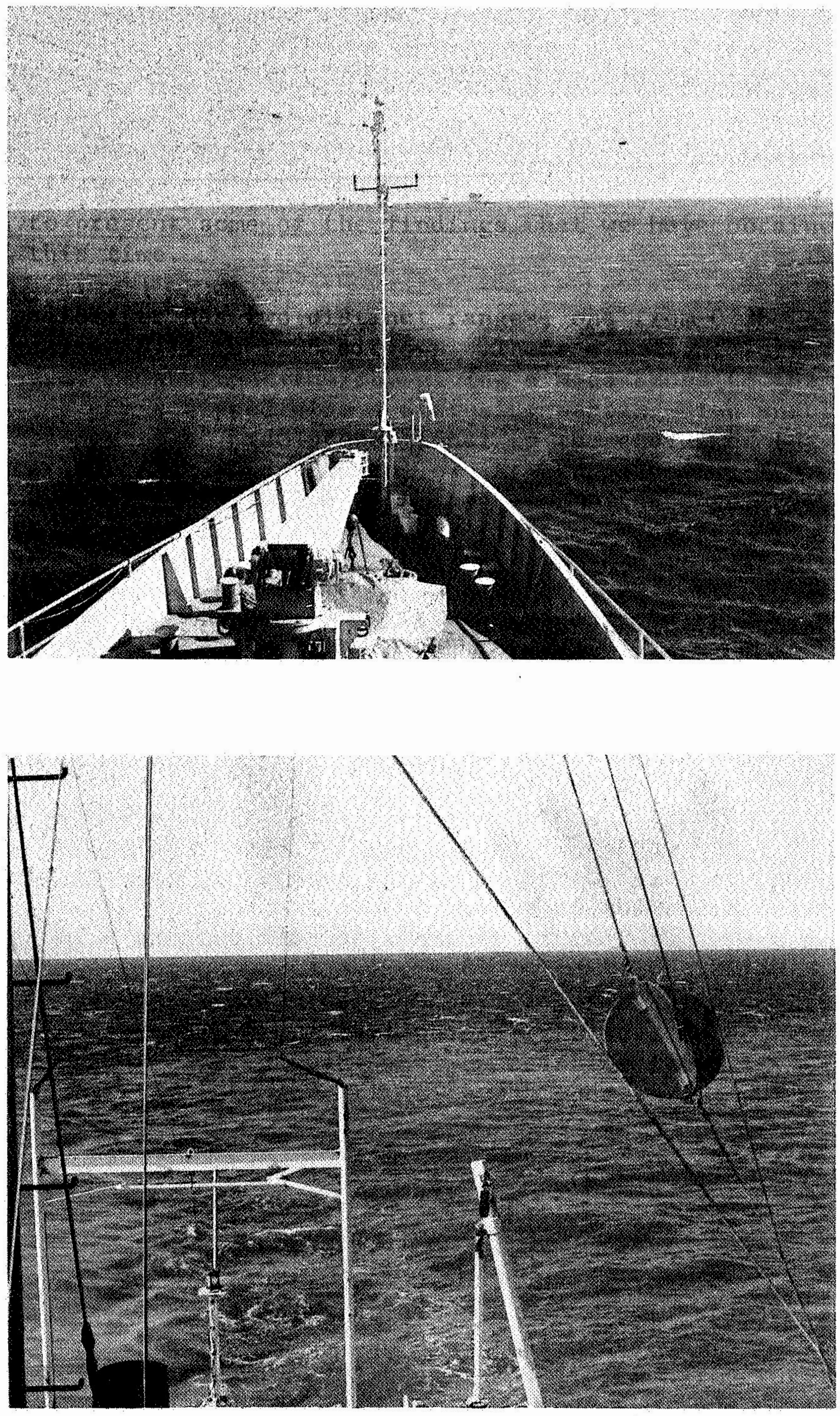

Figure 9. Boundary between river and coastal water as seen from R/V ALAMINOS on February 11, 1968, on cruise 68-A-1.

1452-1454Z, 1759-1805Z, 1814-1817Z and 1840-1848Z (see Figure 1). These omissions also made impossible the accurate placing of the photographs taken on lines 1, 2 and 3 in space.

Itek 9-lens Camera. Photographs were taken by the Itek 9-lens camera for the first time over Site 128 on Mission 50. An example of one set of these photographs is given in Figure 10. This set was taken over the Southwest Pass leg on Line 3, Flight 2. There appears to be some serious discrepancies in this data. One would be hard pressed to explain the apparent peaks of brightness in frames 3 and 5 which are not accompanied by a similar brightness in frame 4. These discrepancies seem to indicate that a problem with the filters and emulsions exists. The Itek 9-lens camera did not seem to offer any relative advantages over the RC-8 photography.

Reconofax IV Data. The infrared images obtained by the Reconofax IV infrared imaging system seemed to be of the greatest scientific value among all of the data obtained during Mission 50. The original images are, of course, classified; however, thermal boundaries detected along chosen flight lines were traced on vellum paper. These tracings are presented in Figures 11(a) - 11(f). Most of the boundaries traced were easily followed in the imagery. Especially sharp boundaries are shown with broad lines. It should be noted that only boundaries cutting the line of flight diagonally could be detected since the Reconofax IV is A.C. coupled i.e. the intensity of the image is automatically reset on each line scan to provide maximum grey-scale contrast along the

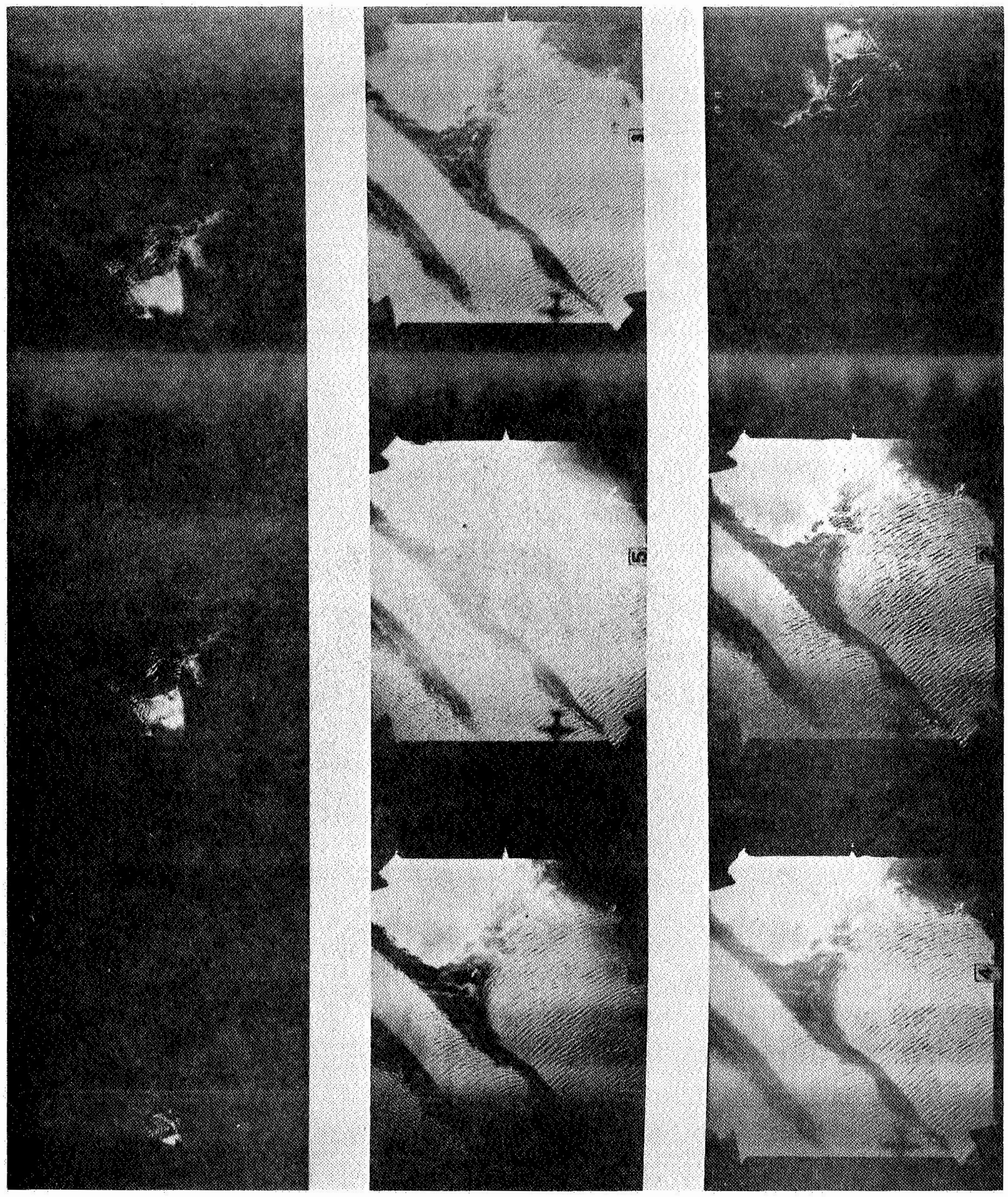

Figure 10. Set of photographs taken by Itek 9-lens camera over S.W. Pass on Flight 2, Line 3-1, Mission 50.

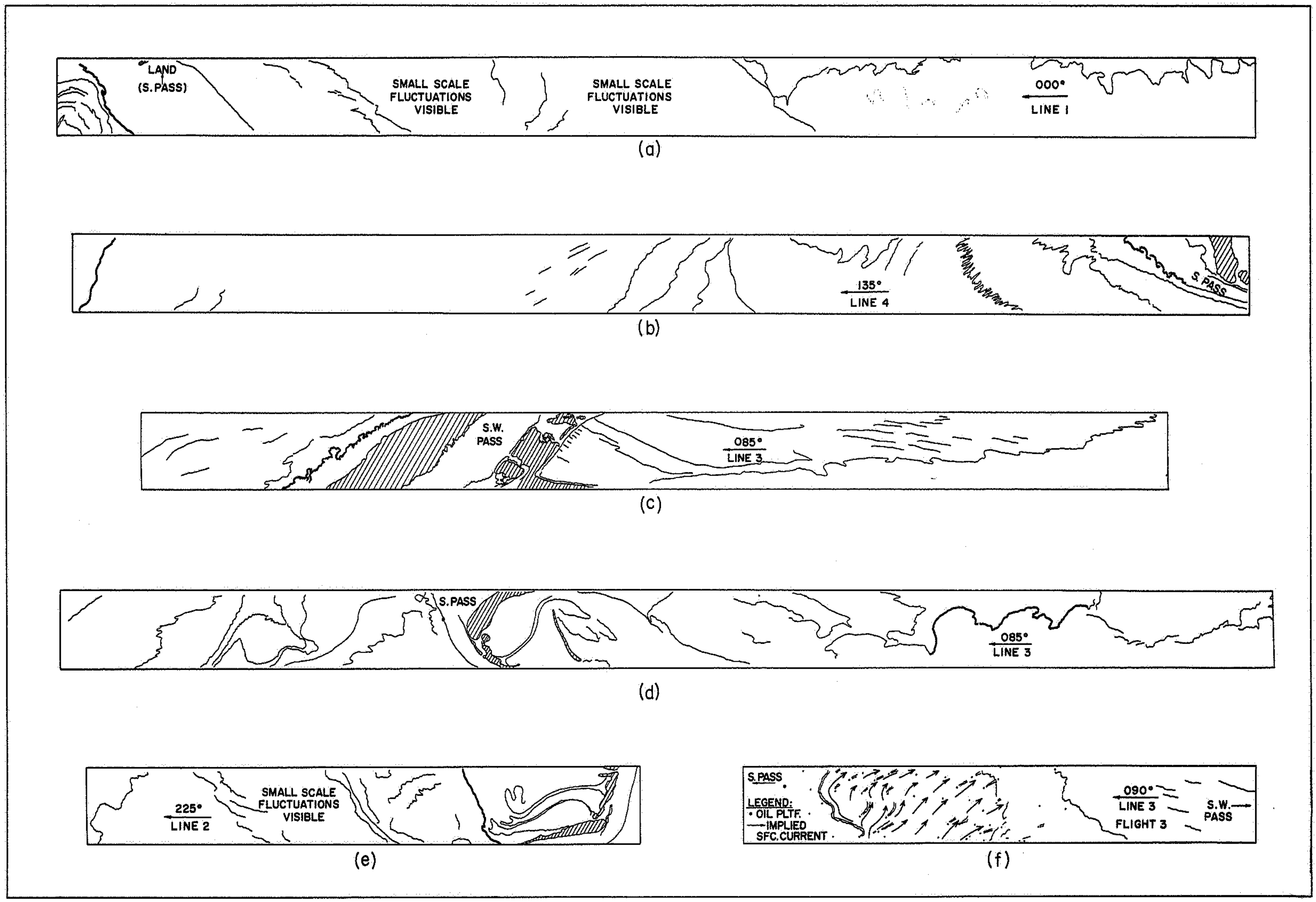

Figure 11(a) - 11(f). Selected tracings from Reconofax IV infrared imagery, Mission 50.

scan line. If it were possible to fix the gain of the imager during a given flight track, it would be possible to deduce isothermal patterns from the IR image.

One impressive aspect of the infrared image from the Reconofax IV is that the detail that can be seen in the thermal patterns could not be obtained through survey by ship on the surface. Yet it is this detail that is needed in studying the distribution of the river outflow. Also, the thermal patterns at night can be surveyed by use of an infrared imager.

The infrared image for the first part of Line 4, Flight 2, is traced in Figure 11(b). The inner boundary (shown by the bold line) is identical to the boundary visible in the mosaic of RC-8 frames 0001-0003 (Figure 8). The other boundaries shown in Figure 11(b) were not detected in the RC-8 photographs. The major boundary on the left-hand side of the Figure 11(b) is the outer boundary that exists between the coastal water and the ocean water of the Gulf of Mexico. This boundary is sometimes visible in the photography as a foam line.

The infrared image for the end of Line 1, Flight 2, is depicted in Figure 11(a). It is obvious from this image that South Pass was missed to the left by this flight line. The major boundary shown on the left-hand side of this figure is one that separates river water and shore water. Many small scale features are also noted in this strip. These features are probably the result of wave motion.

The thermal imaging for Line 3, Flight 2, is depicted in Figure 11(c) and 11(d). A major boundary is shown in Figure 11(d) which separates the shore waters from an intrusion of ocean water which is present in the area between South Pass and Southwest Pass. This intrusive area can be clearly seen in the GEMINI IX photograph as a darker mass of water lying between South Pass and Southwest Pass surrounded by sediment loaded water. The series of streaks on the right-hand side of Figure 11(c) are wind streaks and wind-blown foam lines which are clearly visible in the RC-8 photographs (see Table 3, Frame 311-320).

Figure 11(e) depicts the IR image along the first part of Line 2, Flight 2. No extra details were noted.

Figure 11(f) depicts the IR image along Line 3, Flight 3. Flight 3 occurred in the evening. The oil platforms along this flight track could be seen in the thermal image due to the differential cooling of the oil platform and the surrounding water. More importantly, one can detect streamers of oil leaving most of the platforms. One platform produced a streamer that could be traced across a large area. Assuming that a steady surface-flow existed, streamlines were drawn based on the streamers, indicating the surface-current field in the region. There appears to be stagnant water outside the thermal boundaries surrounding this area of surface motion. In order for mass to be conserved, upwelling must be occurring in the area enclosed by the thermal boundaries. It has been noted that an area of extremely saline water characteristic of ocean water appears to be present in the area between South Pass and Southwest Pass throughout the year. This area of saline water could not exist unless upwelling (of the saline water that underlies the less dense river water) occurred in the area. Thus, the surface flow-pattern deduced from the infrared imagery suggests a mechanism for maintaining the anomalous saline area of surface water. This phenomena was not known to exist before our work with remote sensors began in the Mississippi Delta and will be studied more intensely.

CONCLUSIONS

The remotely sensed data obtained from the NASA 926 Convair 240A aircraft over Site 128 (Mississippi Delta) during Mission 50 on June 12, 1967, is representative of the data obtained during several previous aircraft missions. Since our study of the feasibility of using remote sensors for oceanographic purposes involves seasonal studies of a dynamic process, one mission taking place on one day has little value when viewed by itself; however, its value is greatly enhanced when it is studied with other data obtained by other aircraft missions. Walsh (1968) will consider all of the missions flown in a report to be published this summer.

The data from Mission 50 was either very late in arriving at the user agency or has not arrived. This places an extreme burden on user agencies who must depend on data from the aircraft program to exist from year to year.

The quality of the RC-8 photography was poor. Only twenty-seven percent of the photography obtained over Site 128 on Mission 50 was of acceptable quality. Some potentially valuable data was lost due to untimely film changes. Only one-half of one percent of the photographs taken by the RC-8 camera showed any significant features of the river outflow. The photographs taken along Line 1, Flight 2, appear to be incorrectly processed.

In most of the data, no definitive "landmarks" could be used by which to establish the beginnings and endings of flight lines. South Pass was to be the starting or ending point for most of the lines flown; but, this landmark was missed or not shown in the photography three out of the four times it was overflown. Even though South Pass may have been properly overflown, there is a need to establish easily "seen" beginning and ending points for all flight lines. This is a very difficult problem for flights over water.

Based on the data obtained during Mission 50, it appears that the infrared imager is better suited to locate the boundaries that exist between water masses in the region of the outflow of the Mississippi River than is the RC-8 metric camera. The RC-8 metric camera can be used to locate the sediment boundary and on occasions outer boundaries well-marked by foam lines. Also, there is less distortion with the RC-8 camera than with the infrared imager. Of course, the presence of clouds in the field of view of either one of these sensors negates their usefulness in surveying water mass boundaries.

The Itek 9-lens camera does not offer any advantages over the RC-8 metric camera. In fact, there appear to be serious problems in comparing images due to differences in filters and emulsion processing.

It is possible to deduce the surface current field at night using the Reconofax IV infrared imager in an area where there are many oil platforms. The surface current field deduced from infrared images taken on Mission 50 implies that upwelling of saline water occurs in the area between South Pass and Southwest Pass.

RECOMMENDATIONS

Timing of data received. Every effort should be made to insure that the user agencies be supplied with a complete set of data obtained on any aircraft mission within a reasonable time.

Quality of data received. Care should be taken to insure that no data is lost due to improper handling of the data after it is acquired.

Block time for ocean studies. Due to the dynamic nature of the ocean and its related phenomena, block times should be allowed for aircraft surveys over ocean areas. This procedure has proven successful for sea state measurements by Scatterometer recently in Iceland. The variability of the rate of outflow of the Mississippi River dictates the necessity of scheduling at least one two-week period in the spring to enable one to make a complete study of the usefulness of remote sensors for coastal problems. Several sites located along the Gulf coast could be surveyed during this block of time e.g. Site 155 (BCF).

Ground truth. No aircraft mission should be flown over a test site that does not have adequate ground support. This policy has been adopted by our project for the past year, and as a result two successful missions (Mission 58 and 66) have been conducted with adequate ground truth.

Flight line markers. Flight lines should be well marked by natural or man-made targets at both ends. These markers should register identifiable signatures in all of the spectral bands used. For the

Mississippi-Delta study, some type of anchored buoy preplaced by the ground-support ship would be required to mark the outer end of the radial flight lines being flown. This anchored buoy should be similar to parachute drogues used for ocean current surveys. A light beacon should be included for night flights. Large resolution panels that fold out could be used to mark the photography. An intense heat source emitting colored smoke should be employed to mark the infrared sensors and aid the aircraft pilot. Large microwave reflectors could be placed on the buoy to mark passive microwave and RADAR sensors.

Reconofax IV. The data from the Reconofax IV infrared imaging system seems to be the most useful in locating water-mass boundaries. It would be desirable to obtain an infrared imager that maintains an absolute temperature reference i.e. one that is D.C. restored.

Itek 9-lens camera. Further use of the Itek 9-lens camera should be postponed until a more consistent multiband camera is developed.

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13. ABSTRACT

On June 12, 1967, Test Site 128 (Mississippi Delta) was overflown on three flights by the NASA Convair 240A aircraft equipped with multispectral sensors as a part of Mission 50. The data obtained was studied to determine its quality and scientific value.

Twenty-seven percent of the color photography taken by the RC-8 metric camera was judged to be useful. Many potentially useful photographs were lost due to untimely film changes. The sediment-boundary could easily be seen in the RC-8 photography.

Data from Mission 50 has been either late in arriving at the user agency or has never arrived.

The photographs obtained by the Itek 9-lens multiband camera show serious discrepancies and do not offer any advantages over the RC-8 photography.

The Reconofax IV infrared imager is judged to be the most useful of the remote sensors used on Mission 50. Water-mass boundaries and the surface flow field could be deduced from the infrared image in the area between South Pass and Southwest Pass.

Recommendations are made to conduct missions only when ground support is available, to place marker buoys at the outer ends of the radial flight lines and to set aside blocks of aircraft time for ocean studies.