PHOTOGRAMMETRY BRANCH
COASTAL MAPPING PROGRAM

PROJECT CM-8504
COMPLETION REPORT

MISSISSIPPI

Mississippi Sound

Ship, Horn, and Petit Bois Islands
TP-01352, TP-01353, TP-01354, TP-01355

Agency Vault - Original Report

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Year of Source - 1986

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES

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Clearance and Approval

This report summarizes the photogrammetric operations related to project completion and is submitted for approval. The maps, associated project data, and this report meet the requirements and standards of the Photogrammetry Branch Coastal Mapping Program. Clearance for project registration is requested.

Submitted by,

Robert W. Rodkey, Jr.
Chief, Coastal Mapping Unit
Photogrammetry Branch, NCD

Approved by,

A. Y. Bryson 7/27/99

Commander A. Y. Bryson, NOAA Date
Chief, Photogrammetry Branch
Nautical Charting Division, Office of Charting and Geodetic Services

COMPLETION REPORT

COASTAL MAPPING PROGRAM PROJECT CM-8504
Mississippi
Mississippi Sound
Ship, Horn and Petit Bois Islands

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COASTAL MAPPING PROGRAM PROJECT CM-8504

Introduction

Coastal Mapping Program Project CM-8504 was planned to provide four coastal survey maps depicting the shoreline and other cartographic features of mapping interest in the coastal zones of Ship, Horn, and Petit Bois Islands. The islands are located within the confines of Mississippi Sound in the Gulf of Mexico. Refer to FIGURE 1 for a graphic reference of the project site location.

The maps were assigned map identifiers TP-01352 through TP-01355. Refer to FIGURE 2 for information on the general area of coverage for each map and geographic limit coordinates. All maps were prepared at 1:20,000 scale with the Transverse Mercator projection based on the North American Datum of 1927. The Mississippi State Plane Coordinate System (East Zone) is depicted on the graphics with grid ticks at a 10,000 foot interval.

The purpose of the project is consistent with the Photogrammetry Branch Coastal Mapping Program, which is to provide contemporary coastal zone survey data for the maintenance of the National Ocean Service Nautical Charting Program (NCP).

Planning

Mr. Elmer Pursel initiated the planning phase for this project in 1985 under the direction of Mr. Robert Williams, Chief, Coastal Planning Unit. The Atlantic Photo Party was assigned all horizontal control and tide coordination activities. The Flight Operations Unit of the Headquarters office was assigned the task of providing the proper conditions for aerial photography. Field instructions were issued on December 17, 1985 and are bound in Appendix A. They fully define requirements for the field operations phase of this project.

Field Operations

Field operations in support of this project were performed January through March 1986, and consisted of aerial photography and the recovery, establishment and identification (premarking) of horizontal control necessary for aerotriangulation. Field surveying activities conducted in January and February were summarized in a report by Mr. James E. Dunford. Mr. Philip B. Walbolt summarized the operations conducted in March 1986 in a report which is bound with Dunford's report in Appendix B. Refer to LISTING 1 for information on the horizontal control related to this project.

A Turbo Commander aircraft piloted by LT Bradley and copiloted by LT Wehling of the NOAA Corps was used for the photographic operation. The photography required for this project was executed by Mr. William Hawken, aerial photographer, in March 1986. Natural color photographs were acquired for basic aerotriangulation and compilation at 1:20,000 scale using a Wild RC-10 camera with "B" cone which has a calibrated focal length of 152.74 mm.

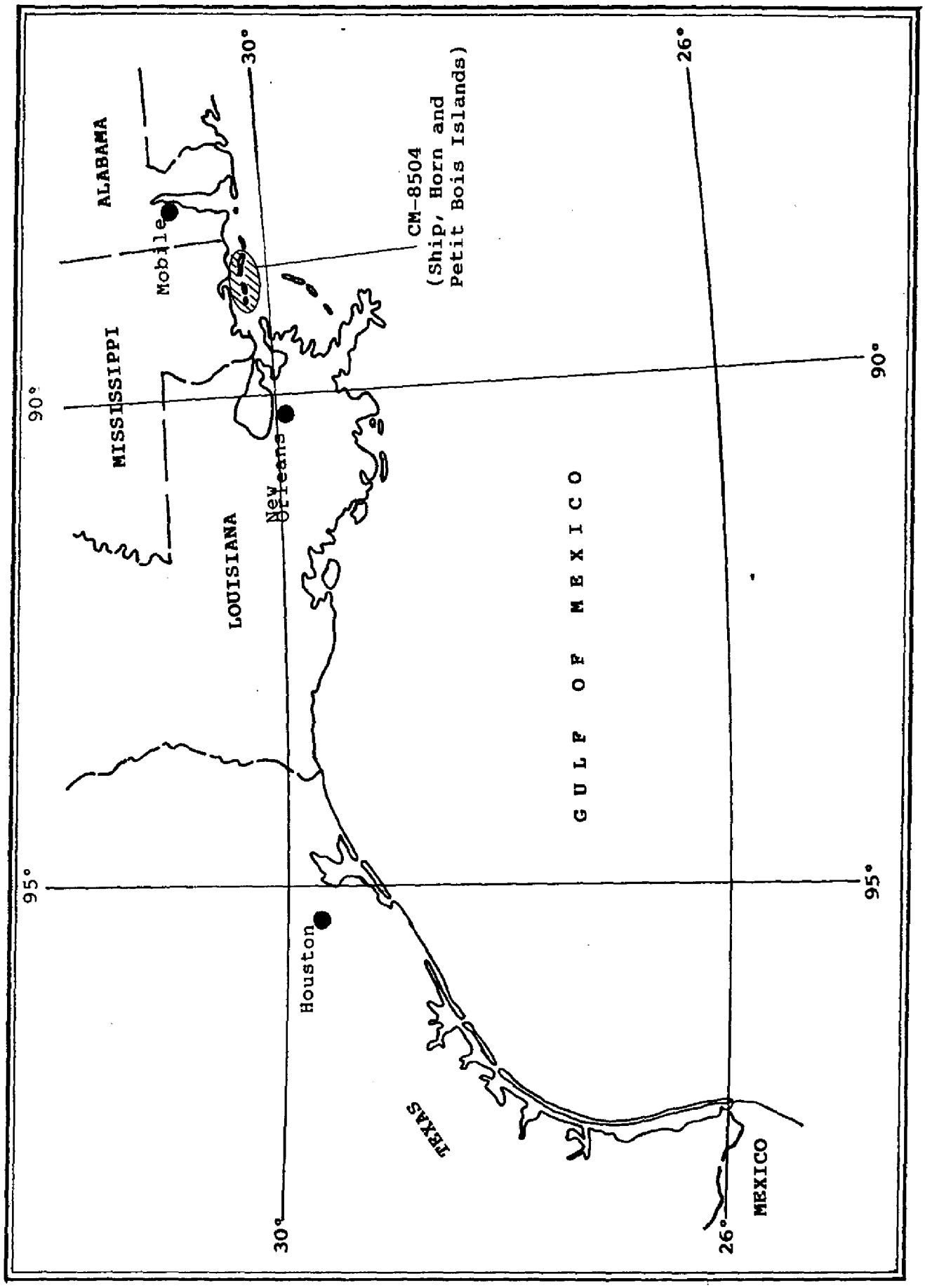


FIGURE 1. Project Site Location Diagram

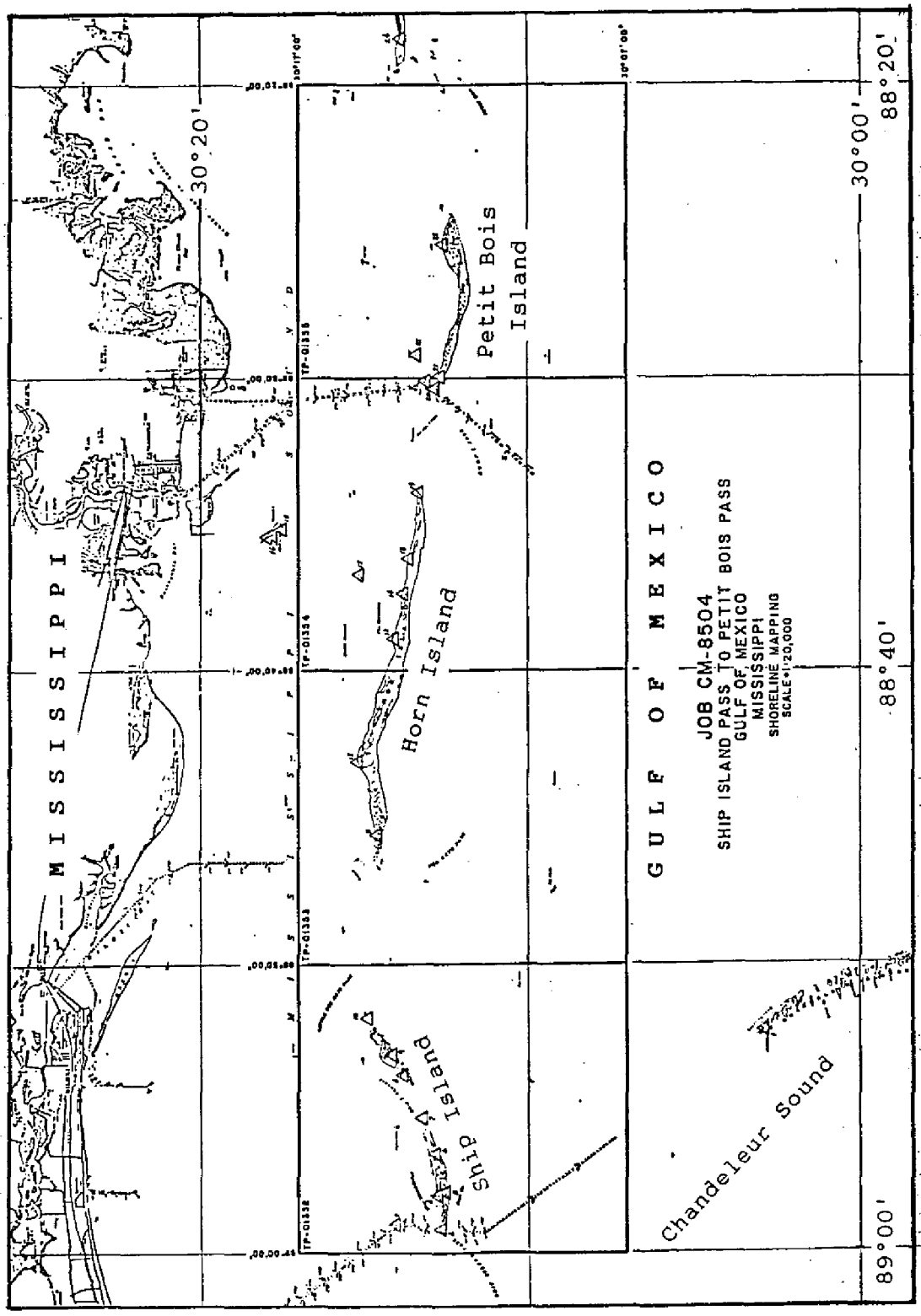


FIGURE 2. Project Diagram

Tide coordinated black and white infrared photographs were acquired for the delineation of the mean high water and approximate mean low lower water lines at 1:40,000 scale using a Wild RC-10 camera with "B" cone. The tide staff at Cadet Point, Mississippi was used as reference for all tide coordinated photography. The aerial photographs of the project site were reviewed by Mr. James McNamara for proper endlap, horizontal control target visibility and adequate coverage of the project site. The photographs were also reviewed by Mr. Robert Clark, Quality Control Unit, for the proper qualities required for mapping photographs under the quality assurance program.

Aerotriangulation

Formal instructions for the aerotriangulation phase were issued on December 17, 1987 and are bound in Appendix C. The aerotriangulation phase was completed by Mr. James H. Taylor in March 1987 under the direction of Mr. Don Norman, Chief, Aerortriangulation Unit of the Headquarters office. The Aerotriangulation Report is bound in Appendix D and contains information on placement of horizontal control, photographs selected for data acquisition as well as a summary of the procedures employed in project completion and fit to control.

Compilation

Formal instructions for the office phase were issued on June 11, 1987 and are bound in Appendix E. The instructions offer a limited summary of project operations and define standards and specifications for compilation. Basic procedures and requirements of the coastal mapping program were followed for the completion of the project.

The compilation phase was completed in March 1988 by Mr. James W. Massey of the Coastal Mapping Unit, Headquarters Office. Compilation was accomplished using both an analytical plotter and graphic methods. The final maps were smooth drafted except for the application of annotation which was accomplished using waxed back stripper film.

Geographic names depicted on the maps were acquired from corresponding NOS nautical charts and USGS quadrangles and applied after approval by the Staff Geographer. The Final Geographic Names Listings are bound in this report as Appendix G.

For information on the photographs selected for this project, refer to Diagrams AR-2,3 and 4 of the aerotriangulation report bound in Appendix D. Map Compilation Sources (MCS) pages also provide information on the photographs used and personnel involved with the completion of each map. The MCS pages are bound in Appendix F. The actual limits of this photogrammetric survey may not coincide with the geographic limits of each map. The limits of a photogrammetric survey are determined by the extent and quality of photographic coverage, the density and placement of geodetic and aerotriangulated control and program requirements.

Office review of the project products was conducted by Mr. Edward Allen in April 1988. The results of the comparison against the NOS Nautical Charts of the area were annotated on the Chart Maintenance Print for each map.

Comparisons were made against the following NOS nautical charts:

11372, 19th Edition (Feb 23, 1985), 1:40,000 scale
11373, 30th Edition (Sept 6, 1986), 1:80,000 scale
11374, 20th Edition (Dec 29, 1984), 1:40,000 scale
11375, 25th Edition (Jan 3, 1987), 1:20,000 scale

Final Review

The final review phase was initiated in May 1988 by Mr. Robert Rodkey, Chief, Coastal Mapping Unit of Headquarters office. The coastal survey maps and associated discrete point data of this project were evaluated as meeting the requirements of the National Standards of Map Accuracy. Refer to Appendix H for the final listing of cartographic features of charting interest for application in the nautical charting program. The coastal survey maps and project data sets comply with the general requirements for a standard coastal mapping project. All source data and photogrammetric measurement instruments meet the standards of accuracy established for the disciplines of field surveying and photogrammetry.

During the final review phase, all necessary copies of project products and data were acquired. A Chart Maintenance Print was generated for each map within the project.

This Project Completion Report is the authoritative summary and is in compliance with Section 15, Project Completion Report of the Photogrammetry Branch Coastal Mapping Program Operations Manual.

Dissemination of Project Data

The dissemination of project data was executed in accordance with the following:

Federal Records Center of the National Archives and Records Admin.
- Copy of this Project Completion Report
- Brown Jacket containing:
  - Field Data Binder containing Control Station Identification forms, numerous computational forms and diagrams
  - One copy of Descriptive Report Control Record (4 pages)
  - One copy of Aerotriangulated Control listing
  - One copy of Project Diagram (page size)
  - One copy of Detailed Project Diagram (folded)
  - Three NOAA Form 76-77, Leveling Record - Tide Station
  - One NOAA Form 77-53, Tides
  - One copy of Aerotriangulation Report
  - One copy of Cartographic Features of Charting Interest listing

Agency Archives
Registration Copy of Each Map
Original Project Completion Report

Photogrammetric Electronic Data Library
There is no digital data of this project maintained in the library

Reproduction Branch, Aeronautical Charting Division
8X Reduction Negative of Each Map

Marine Chart Branch
Chart Maintenance Print of Each Map
Abbreviated Copy of this Project Completion Report

All final project data and products were forwarded to the Production Control Unit, Headquarters office in July 1988 for project registration and dissemination of products.

PROJECT GEODETIC CONTROL LISTING

PROJECT: CM-8504; Ship Island - Petit Bois Pass, Mississippi Sound, Mississippi

GEODETIC DATUM: North American Datum of 1927

The following permanent geodetic control was recovered or established during project operations. Data pertaining to stations is resident in the National Geodetic Survey Division (NGSD) Horizontal Control Databank.

The Station Identifier **(STA ID)** consists of the NGS Quad Number (Q) and the assigned station number (S) within the Quad, e.g., QQQQQQSSSS.

Refer to Nautical Charting Division Standard Digital Data Exchange Format documentation for quality code **(QC)** criteria.

STATION NAME	STA ID	Geodetic Coordinates (°-'-") Latitude	Longitude	QC	Location Day/Year
FORT 1944	3008831027	30-12-42.989	88-58-19.353	3	001/1944
MARK 1985	UNKNOWN	30-13-20.475	88-34-24.871	4	031/1986
MID 1986	UNKNOWN	30-14-28.334	88-40-36.125	4	032/1986
NPS 46 - 46 CFRL	UNKNOWN	30-14-40.036	88-46-31.827	4	032/1986
NPS PIPE	UNKNOWN	30-14-50.959	88-52-12.730	4	044/1986
PASS 1986	UNKNOWN	30-12-54.117	88-30-22.019	4	031/1986
PETE	UNKNOWN	30-14-16.814	88-53-24.131	4	044/1986
PETIT AZ MK	UNKNOWN	30-12-11.828	88-28-08.766	4	029/1986
POND 1986	UNKNOWN	30-15-02.582	88-42-42.396	4	032/1986
SHIP ISLAND RGE R LT	UNKNOWN	30-12-44.676	88-57-58.588	4	044/1986
SHOE 1986	UNKNOWN	30-13-38.264	88-36-21.086	4	031/1986
SIGNAL 1966	3008831185	30-12-38.149	88-59-00.626	3	001/1966
SOUND 1986	UNKNOWN	30-12-37.954	88-24-07.897	4	029/1986
STOOL 1970	UNKNOWN	30-12-49.548	88-56-32.040	4	001/1970
TIM 1986	UNKNOWN	30-13-19.254	88-54-44.401	4	038/1986

- end -

Remarks: The aforementioned stations were recovered in 1986 by the Atlantic Marine Center Photo Party or confirmed during the aerotriangulation and map compilation phases.

Listing approved by: Robert W. Lockley Jr. — **Final Reviewer** — **Date** July 28, 1988

APPENDIX A

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

December 17, 1985 N/CG2313:EP

Chief, Photogrammetry Branch
Atlantic Marine Center

PROJECT INSTRUCTIONS: FIELD - Job CM-8504, Ship Island Pass to Petit Bois Pass, Mississippi, Shoreline Mapping

1.0. PURPOSE

These instructions provide specifications and a schedule for: (1) placing targets on horizontal control stations required for aerotriangulation, and (2) furnishing field support to obtain tide-coordinated infrared aerial photography.

2.0. AREA

Shoreline mapping at 1:20,000 scale will cover the shoreline from Ship Island Pass to Petit Bois Pass, Mississippi.

3.0. PHOTOGRAPHY

3.1. Aerotriangulation photography, at 1:20,000 scale, will be obtained using color film. Also, black-and-white infrared photography, tide coordinated at mean high and mean lower low water, will be obtained at 1:40,000 scale.

3.2. Target identification photography will be obtained at 1:10,000 scale and may be obtained at less than optimum photographic conditions.

4.0. ASSIGNMENT

You are assigned all field operations required to: (1) place targets on horizontal control stations, and (2) provide ground support needed to obtain tide-coordinated photography. The Chief, Air Photo Mission 2 (APM 2), will be responsible for scheduling photography at the required times, based on tide staff observations furnished by radio.

5.0. HORIZONTAL CONTROL

5.1. Horizontal control requirements for aerotriangulation have been furnished as part of the field data.

5.2. Limit recovery of horizontal control stations to those needed to meet aerotriangulation requirements. Prepare and submit recovery notes for each station for which a search was made.

5.3. New control stations, where needed, shall be established by triangulation, trilateration, traverse, satellite positioning, or a combination of the four methods, in accordance with Third-Order, Class 1 specifications provided in Standards and Specifications for Geodetic Control Networks, dated September 1984.

5.4. Notify the Chief, Coastal Planning Unit (N/CG2313), if recovery of existing control does not meet aerotriangulation requirements. An alternative will be selected, if possible, to avoid establishing new control.

6.0. PREMARKING OF CONTROL

Note 1: As soon as possible after all control stations have been paneled, the field party will forward to the Rockville Office, Attention N/CG2313, a chart section, quad, or any graphic depicting the station location, panel array used, and the panel number. This will assist in the film quality review and target identification and will help expedite the results to the field unit.

Note 2: Wing panels will be used with all targets in accordance with established specifications but may be modified to conform with local terrain conditions.

6.1. Panel each station selected to meet horizontal control requirements in accordance with specifications but may be modified to conform with local terrain conditions.

6.2. Use panel array No. 1 for targets with a normal background; it may be modified, as necessary, to conform with local terrain conditions. Any deviation from given panel and spacing dimensions should be indicated on the large-scale sketch on NOAA Form 76-53, Control Station Identification Card.

6.3. Panel array No. 3 shall be used in areas where the background offers poor contrast to the center panel, such as on sandy terrain.

6.4. The distance given for dimension "C" may be increased, but not decreased.

6.5. Panel substitute stations wherever shadows or relief displacement will obscure the home stations.

6.6. In cases where the target might be subject to vandalism, select two photoidentifiable objects. Observe directions and distances to them from the home station and record with sketch and description on separate NOAA form 76-53.

7.0. CONTROL STATION IDENTIFICATION CARD

Prepare and submit a NOAA form 76-53 for each paneled station. Observe Photogrammetric Instruction No. 22, Revised September 30, 1965, except as follows:

a. Record distances and directions in the usual manner to the center of the station panel of all targets used as substitutes for horizontal control stations.

b. In the space provided for the sketch of Substitute Station A, make a large-scale sketch of the immediate vicinity showing the array used.

8.0. TIDE OBSERVATIONS AND RECORDS FOR TIDE-COORDINATED PHOTOGRAPHY

8.1. Tide-coordinated photography will be flown when the stage of tide is mean high water ±0.3 foot and mean lower low water ±0.3 foot.

8.2. The tide staffs to be monitored during tide-coordinated photography and the mean high water and mean lower low water datums will be furnished in advance of the field work.

8.3. Periods when the tides are predicted to be in range for mean lower low water and for mean high water occur throughout the months of January through March. Tide water predictions will be furnished with tidal data.

8.4. Staff readings are required at 15-minute intervals during all tide-coordinated photographic flights. Use NOAA Form 77-53, Tides, to record staff observations.

9.0. LEVELING

Make a level connection to the tide staff from at least two tidal bench marks. Use NOAA Form 76-77, Leveling Record--Tide Station, to record leveling data.

10.0. TIME

Coordinated Universal Time (UTC or Zulu, Z) shall be used for all tide staff observations for agreement with standard air photo mission timekeeping procedures. APM 2 will provide UTC time checks before and after each session of photography.

11.0. COMMUNICATIONS

Radio transceivers shall be used for communications between the tide observer and the air photo mission. On the day prior to initial photography, the field unit should confer with the Chief, APM 2, and make mutually satisfactory arrangements for regular contacts and/or conferences as appropriate.

12.0. SCHEDULE

All stations shall be premarked and ready for photography by February 1, 1986. If premarking is not completed by this date, inform the Chief, Coastal Planning Unit (N/CG2313), so that this information can be relayed to the air photo mission.

13.0. REPORT

A field operations report covering all pertinent information as to field work performed, tide staffs monitored, etc., is required promptly upon completion of the field phase of the project.

14.0. RECORDS

All field records will be sent through N/MOA2222 for review prior to being forwarded to the Rockville Office, Attention: N/CG2313.

15.0. MODIFICATIONS OF INSTRUCTIONS

If changes in procedures and methods seem advisable, please make appropriate recommendations to this office.

16.0. COSTS

All costs incurred on this assignment shall be charged to Task 8K6C01.

17.0. RECEIPT

Receipt of these instructions shall be acknowledged.

J. Austin Yeager

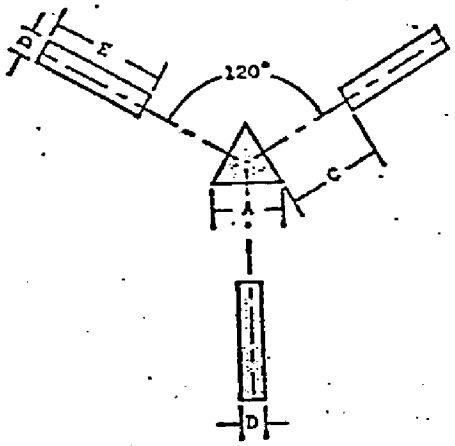
Wesley V. Hull
Director
Atlantic Marine Center
Marine Operations

J. Austin Yeager
Chief, Nautical Charting Division
Charting and Geodetic Services

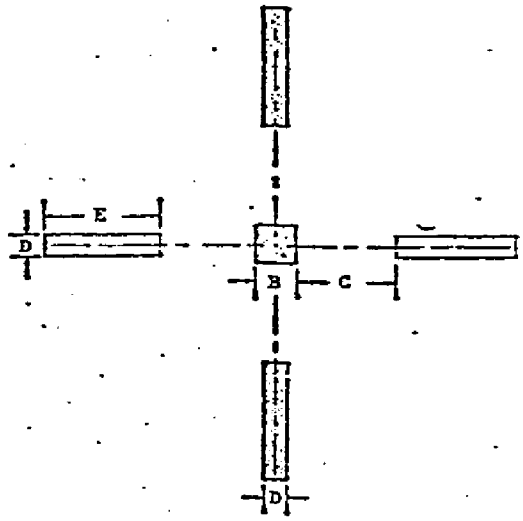
SPECIFICATIONS FOR PREMARKING CONTROL STATIONS

Revised November 23, 1976

ARRAY NO. 1



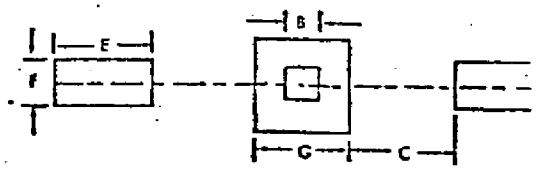
ARRAY NO. 2



NOTE:

1. The dimensions and centering of center panel over station or substitute station are critical.
2. Panel array No. 1 is preferred but No. 2 is acceptable.
3. Array No. 3 - for contrast in very light colored areas. The border surrounding center panel and the recognition panels shall be black.
4. Chief of party will select array that makes best application of field conditions and is authorized to adjust or omit one of the recognition panels if terrain is not suitable for placement of entire array.

ARRAY NO. 3



Photography Scale	PANEL AND SPACING DIMENSIONS (IN METERS) A	B	C	D	E	F	G
1:10:000	0.5	0.3	1.3	0.2	0.9	0.9	1.5
1:20,000	1.1	0.7	2.6	0.4	1.8	0.9	1.9
1:30,000	1.6	1.0	3.9	0.5	2.7	0.9	2.2
1:40,000	2.2	1.3	5.2	0.7	3.6	0.9	2.5
1:50,000	3.2	2.0	7.8	1.1	5.4	1.8	3.8
1:60,000	3.8	2.3	9.1	1.3	6.3	1.8	4.1
1:70,000	4.4	2.6	10.4	1.4	7.2	1.8	4.4
1:80,000	5.0	3.0	11.7	1.5	8.0	1.8	4.8
1:100,000	6.4	4.0	18.2	2.2	10.8	3.6	7.6

RECEIVED
1986 JAN -7 P 6:33
NAUTICAL CHARTING DIVISION

RECEIPT

TO: N/CG2 - J. Austin Yeager
ATTN: N/CG23

THRU: N/MOA - Wesley V. Hull WVHull

Receipt of Project Instructions FIELD - Job CM-8504, Ship Island Pass to Petit Bois Pass, Mississippi, Shoreline Mapping, dated December 17, 1985, is acknowledged.

R. H. Bryan
Chief, Photogrammetry Branch
Atlantic Marine Center

1/2/86
Date

APPENDIX B

FIELD REPORT

CM-8504

The premarking for this project was performed according to Project Instructions dated 17 December 1985. A change was made in the target array where there was poor background contrast. A black target Array #1 for 1:40,000 was used on stations surrounded by white sand. This was discussed by Mr. J. Shea and Mr. J. McNamara. Stations with this type array are 1, 3, 5, 8, 9, 12, and 13.

Positions for stations 1 through 9 were established by a third-order traverse from station PETIT BOIS AZ MK to Station CHIMNEY RM 2. Positions for stations 10 through 15 were established by a third-order traverse from Station STOOL to Station SIGNAL. Three bench marks were positioned as requested by the Bureau of Marine Resources. One on Petit Bois Island, BM E on Horn Island and SIGNAL AZIMUTH MARK on Ship Island.

A level connection to the tide staff at Biloxi was verified and checked.

All stations were checked prior to and immediately after bridging photography. All targets were in place at time of photography.

All field records and data are being forwarded to Rockville, N/CG2313.

James E. Dunford

James E. Dunford

TIDE COORDINATED PHOTOGRAPHY - JOBS CM-8504 and CM-8510

On 1/27/86, we recovered the tide gage and tide staff at Cadet Point, Biloxi Bay. We ran levels from three (3) Tidal Bench Marks to the staff, and return. Our levels verified the data submitted by Chapin and Associates. On the same day, we contacted the tide observer for Chapin and Associates, Mr. Errol White.

On 3/5/86, the NOAA Air Photo Mission arrived. Each morning we met at 0630, after having viewed the NOAA Weather Broadcast on cable television. If the weather looked promising for photography, the Photo Mission phoned various airports in the area to check on visiblity. This cooperation was very beneficial to all of us. Throughout this period we continued to monitor the pre-mark photo targets on a regular basis. The Park Rangers for the National Park Service helped us to monitor the targets on Petit Bois, Horn, and Ship Islands in addition. The black targets on white sand were difficult to keep clean.

We flew photography on 3/7, 3/16, 3/17, and 3/21.

The afternoon of 3/13, Mr. McNamara of the Rockville office called to say that he had seen all the targets for Job CM-8504 on the photos, and that we could remove those targets. We informed AMC of this news the following morning.

On 3/20 we went to the staff to compare the readings with the prediction, and found the old staff gone, and a new staff in a place nearby. We ran levels to the new tide staff immediately, using the same tidal bench marks as before. The next day (3/21) we flew two lines based on the new staff, and again ran levels to the new staff.

On 3/25 we called Chapin and Associates to inquire about the old tide staff. They said that their old staff had been destroyed by a boat, and their observer (Mr. Errol White) had informed them shortly thereafter. The following day they installed the new staff. This is the new staff to which we ran levels on both 3/20 and 3/21.

The afternoon of 3/25, Mr. McNamara of the Rockville office left a message that the bridging targets for CM-8510 showed on the photos. He called again the following morning to ascertain that we had received the message. We informed AMC of this shortly thereafter.

We removed the Bridging targets on 3/26 and 3/27, and departed for AMC the following day.

Throughout this job, we found the cooperation of the personnel of the National Park Service to be most helpful.

Submitted by,

Philip B. Walbolt

Philip B. Walbolt
4 April 1986

APPENDIX C

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

December 17, 1986 N/CG2321:GF

TO: N/CG2322 - Don O. Norman

FROM: N/CG232 - Gregory L. Fromm

SUBJECT: Instructions - AEROTRIANGULATION - Job CM-8504, Ship Island Pass to Petit Bois Pass, Mississippi, Shoreline Mapping

1.0. PURPOSE

This project will provide contemporary shoreline and other photogrammetric data in support of the nautical charting program, These instructions indicate the basic aerotriangulation requirements that will provide the network of control necessary for compilation. The accuracy of aerotriangulated control shall meet the requirements of National Standards of Map Accuracy.

2.0. GENERAL

2.1. Scope. Four 1:20,000-scale maps (TP-01352 through TP-01355) will be produced. These maps will cover the areas of Ship Island, Horn Island, and Petit Bois Island. Supplemental data sets associated with each final map will be prepared for use by nautical charting and hydrographic activities. All data collection and processing will be based on NAD 27.

2.2. Field Operations. Field work generally consisted of aerial photography and the recovery, establishment, and identification (premarking) of geodetic control necessary for aerotriangulation. There was no field inspection of the shoreline.

2.3. Photography. General information relating to project photography is indicated below.

Type	Scale	Camera	Date
Color	1:20,000	Wild RC-10 (B)	3/6/86
Infrared	1:40,000	Wild RC-10 (B)	3/16/86
Infrared	1:40,000	Wild RC-10 (B)	3/21/86

2.4. Charts Affected. Charts 11372 through 11375 will be affected by this survey.

3.0. DATA FURNISHED

a. Control data
b. USGS quadrangles
c. Nautical charts
d. Project diagrams
e. Color contact prints and film positives
f. Field data

4.0. AEROTRIANGULATION OPERATIONS

4.1. Analytic aerotriangulation is required for the 1:52,000-scale color photographs. Field identified geodetic control is premarked (paneled). Elevations from U.S. Geological Survey quadrangles will be used as the vertical control.

4.2. Locate all visible landmarks and fixed aids to navigation during bridging.

4.3. Establish common shoreline points between the bridging and infrared photographs and determine ratio values necessary to prepare enlargement prints at map scale. Include values as part of the Aerotriangulation Report.

4.4. Perform the final adjustment of aerotriangulated points to ground on NAD 1927.

4.5. Base manuscripts will be prepared based on NAD 27 and depict the following:

a. Transverse Mercator Projection
b. Grid ticks based on the Mississippi State Plane Coordinate System (East Zone)
c. Recoverable geodetic control
d. Aerotriangulated and field established control points

Manuscript coordinates are identified on the project diagram.

5.0. SCHEDULE

Schedule the aerotriangulation operations on a routine basis. The assignment and schedule for map production will be determined when the aerotriangulation phase is completed.

6.0. MODIFICATION OF INSTRUCTIONS

If any changes in procedures and methods seem advisable, please make appropriate recommendations to this office.

7.0. COST

Charge all costs to 8K6C01.

APPENDIX D

AEROTRIANGULATION REPORT
CM-8504
SHIP ISLAND PASS TO PETIT BOIS PASS, MISSISSIPPI

MARCH 1987

21. AREA COVERED

The area covered by this report is from Ship Island Pass to Petit Bois Pass in the Gulf of Mexico, Mississippi. This area is covered by four 1:20,000-scale manuscripts. The manuscripts are TP-01352, TP-01353, TP-01354, and TP-01355.

22. METHOD

Four strips of 1:20,000-scale color photographs were bridged and adjusted to ground with the IDPF system.

Ratio values were determined for the color bridging photographs and the black-and-white infrared photographs.

Six fixed aids to navigation and one landmark were located during aerotriangulation.

The bridge points are in plane coordinates using the Mississippi East State Plane Coordinate System with the Transverse Mercator Projection. All data is based on the North American Datum of 1927.

The map manuscripts will be plotted on the Kongsberg flatbed plotter.

The bridging photographs were drilled so the project could be compiled by both analog and analytic methods.

Ties between the strips were made where applicable.

23. ADEQUACY OF CONTROL

The horizontal control provided for this project was adequate. Fifteen control stations were provided and used in the adjustment. This project meets NOS requirements for map manuscripts.

24. SUPPLEMENTAL DATA

Nautical charts were used to try to identify objects on the color bridging photographs.

25. PHOTOGRAPHY

The coverage, overlap, and quality of the photographs proved adequate for this project. Some control station panels were difficult to measure due to poor image quality.

Submitted by

James H. Taylor

Approved and Forwarded

Don O. Norman
Chief, Aerotriangulation Unit

CM-8504
FIT TO HORIZONTAL CONTROL
▲ = CONTROL HELD

NAME	PANEL NUMBER	POINT NUMBER	X	Y
Sound 1986	1	▲606100	-0.2	-0.1
Bench Mark E	2	▲608101	+0.5	-0.3
Petit Bois AZ MK	3	▲610100	-0.1	+0.5
Pass 1986 Sub Station 4	4	▲612101	0.0	-0.2
Mark 1985	5	▲595100	0.0	+0.6
Shoe 1985 Sub Station 6	6	▲593101	0.0	-0.3
Mid 1985	7	▲589100	-0.3	-0.8
Pont 1985 Sub Station 8	8	▲587101	+0.3	+0.2
NPS 46-46-CFRL	9	▲584100	0.0	+0.3
NPS Pipe Sub Station 10	10	▲636101	+0.2	-0.4
Pete 1985 Sub Station 11	11	▲634101	-0.4	+0.3
Tim 1986	12	▲632100	+0.2	+0.3
Stool 1985 Sub Station 13	13	▲621101	-0.2	+0.3
Fort 1985 Sub Station 14	14	▲623101	+0.6	-0.9
Signal 1985 Sub Station 15	15	▲624101	-0.4	+0.4
Ship Island Range Rear Lt.		623110	+3.5	+3.4

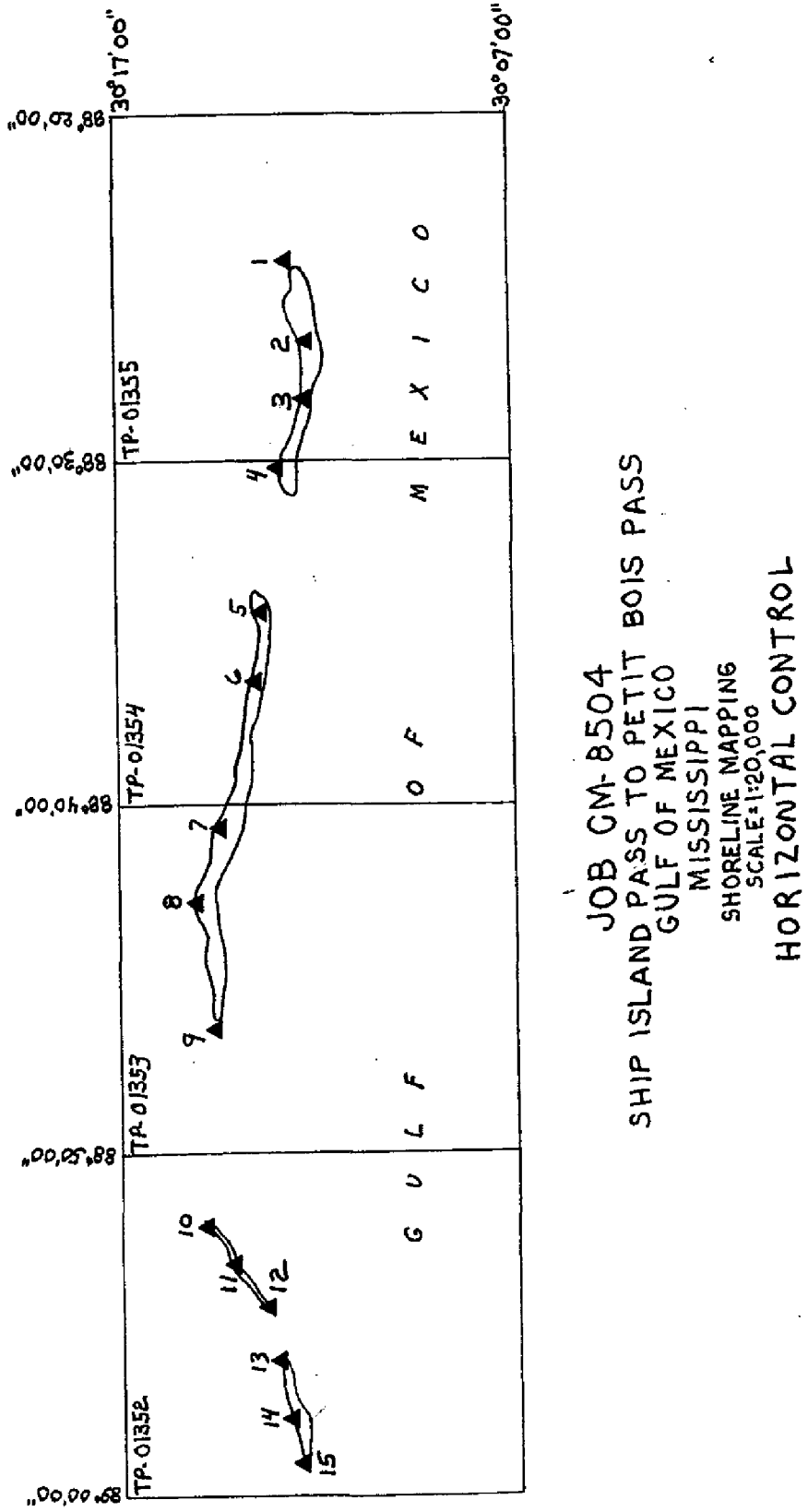


Diagram AR-1. Horizontal Control

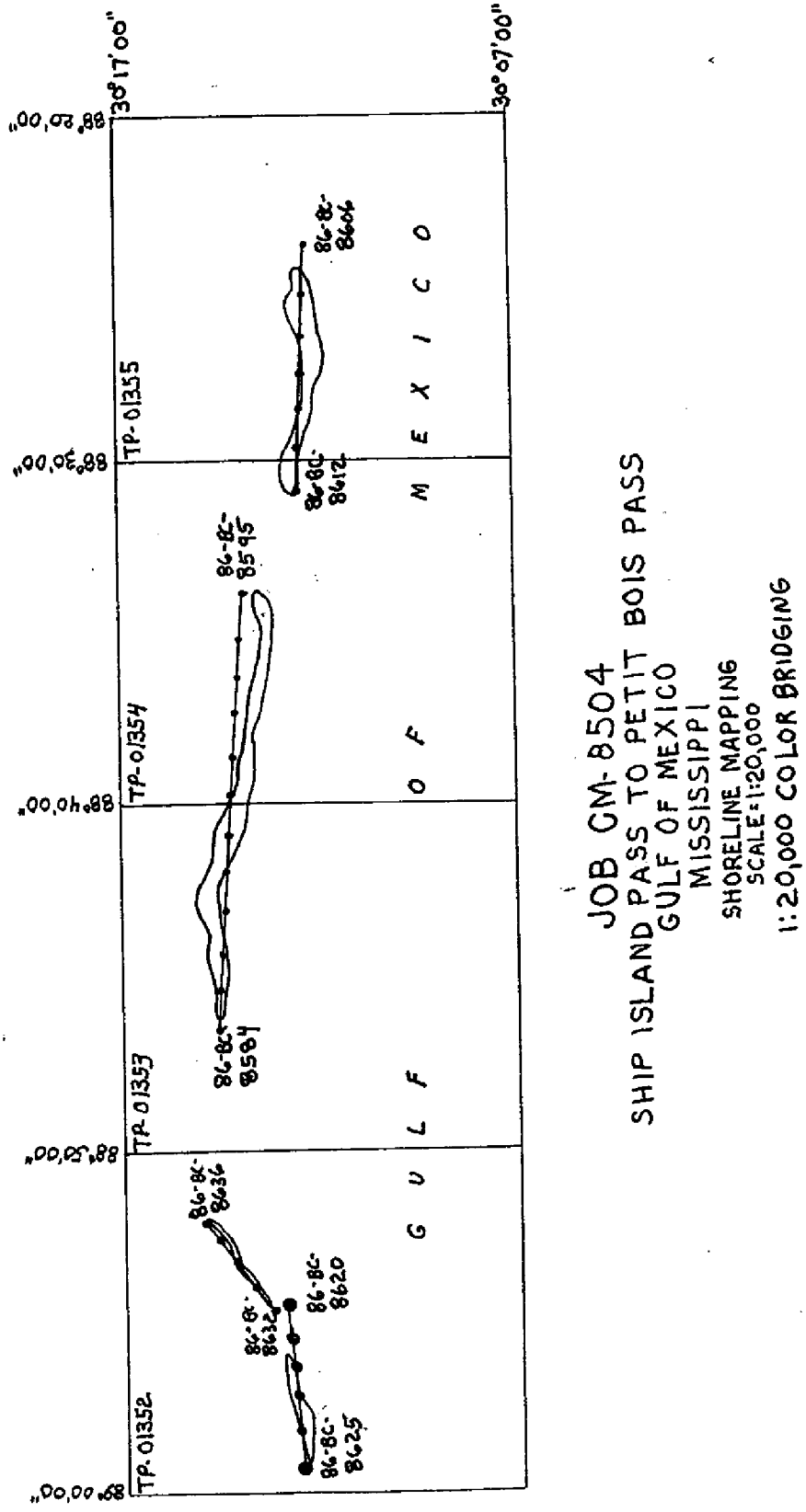


Diagram AR-2. Color Bridging Photographs

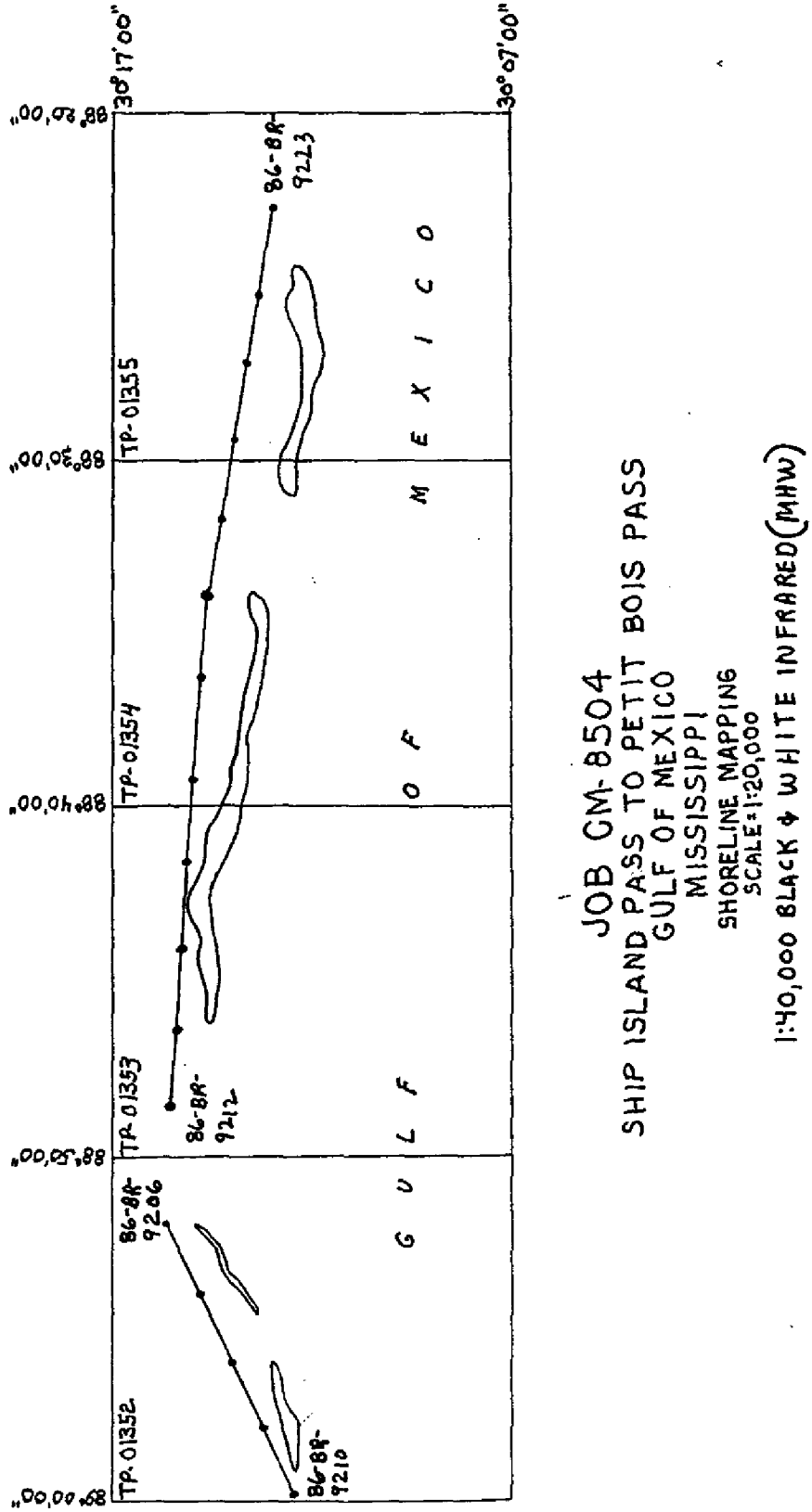


Diagram AR-3. MHW Infrared Photographs

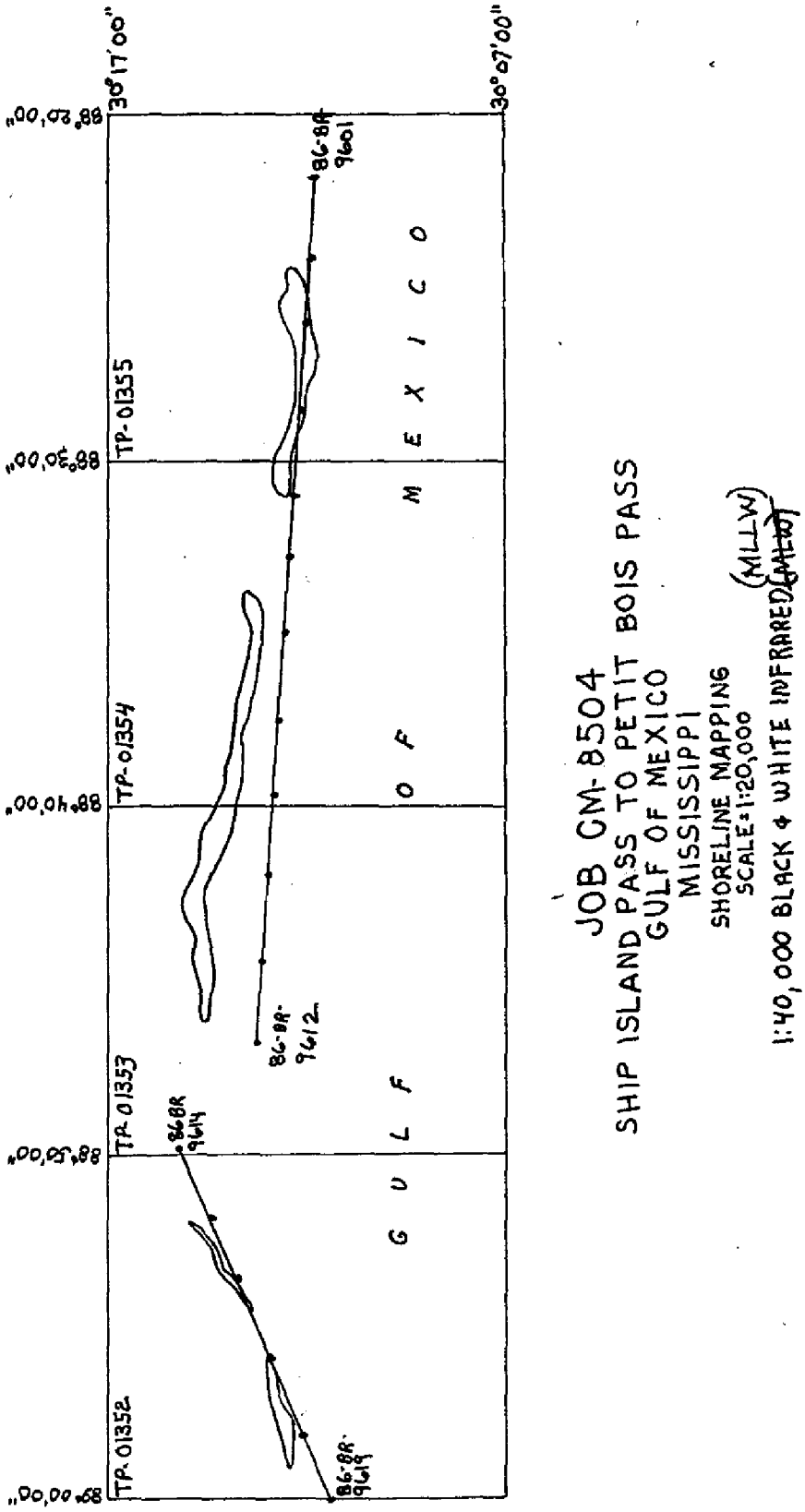


Diagram AR-4. MLLW Infrared Photographs

CM-8504
RATIO VALUES

COLOR PHOTOGRAPHS

STRIPS	RATIO
86-BC-8584 thru 8595	1.021
86-BC-8606 thru 8612	1.021
86-BC-8621 thru 8625	1.021
86-BC-8632 thru 8636	1.020

BLACK-AND-WHITE INFRARED PHOTOGRAPHS

STRIPS	RATIO
86-BR-9207 thru 9209	2.015
86-BR-9213 thru 9222	2.016
86-BR-9602 thru 9612	1.953
86-BR-9616 thru 9618	1.952

APPENDIX E

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

June 11, 1987 N/CG2321:GLF

Chief, Coastal Mapping Unit
Photogrammetry Branch
Rockville, Maryland 20852

PROJECT INSTRUCTIONS: OFFICE - Job CM-8504, Ship Island Pass to Petit Bois Pass, Mississippi, Shoreline Mapping

1.0. PURPOSE

1.1. These instructions provide basic specifications for the compilation of data to be used in the nautical charting program. Compilation shall be based on aerotriangulation that has met the requirements of National Standards of Map Accuracy and on an office interpretation of aerial photographs.

1.2. Unless otherwise specified in these instructions, compilation, processing, and dissemination of all data shall be in accordance with the C&GS Topographic Manual, Part II, and applicable amending NOS Photogrammetric Instructions.

2.0. GENERAL

2.1. Scope. Four 1:20,000-scale maps (TP-01352 through TP-01355) will be produced. These maps will cover the areas of Ship Island, Horn Island, and Petit Bois Island. Supplemental data sets associated with each final map will be prepared for use by nautical charting and hydrographic activities. All data collection and processing will be based on NAD 27.

2.2. Field Operations. Field work generally consisted of aerial photography and the recovery, establishment, and identification (premarking) of geodetic control necessary for aerotriangulation. There was no field inspection of the shoreline performed.

2.3. Photography. General information relating to project photography is indicated below.

Type	Scale	Camera	Date
Color	1:20,000	Wild RC-10 (B)	3/6/86
Infrared	1:40,000	Wild RC-10 (B)	3/16/86
Infrared	1:40,000	Wild RC-10 (B)	3/21/86

2.4. Aerotriangulation

2.4.1. Four strips of 1:20,000-scale color photographs were bridged using analytical aerotriangulation methods. Premarked geodetic control was used. Elevations from U.S. Geological Survey quadrangles provided the vertical control. The amount of aerotriangulated control proved adequate and meets the National Standards of Map Accuracy. Positions were also determined for visible landmarks and fixed aids to navigation.

2.4.2. Aerotriangulated control is based on NAD 27; data measurements and aerotriangulation adjustments were executed using the IDPF system. A data base file was generated during this phase and contains the information required for absolute model orientation. This file is a resident of the NOSAP system; the file code identifier is the project number.

2.5. Charts Affected. Charts 11372 through 11375 depict areas which are common to this survey.

2.6. Datums. The horizontal datum requirement is NAD 27; the vertical datums and planes of reference to symbolization are MHW and MLLW. The symbolization of rocks, reefs, ledges, and wrecks shall be referred to MLLW, all other coastal features will be referred to MHW.

2.7. Tide Data. Tide levels current with the exposure times of the color and infrared photography will be furnished. The information that corresponds to the tide-coordinated infrared photography has been generated based on field observation records. Reference station records for the staff at Cadet Point, Mississippi (8743735), which were provided by N/OMA123, were used to determine the tide levels associated with the color photography.

2.7. Prior Surveys. Projects PH-5704 and PH-6625 provided mapping of areas that are common to this survey; maps from these projects are registered.

3.0. DATA FURNISHED

a. Control data
b. Bridging data
c. Nautical charts and USGS quadrangles
d. Project diagrams
e. Color contact prints and film positives
f. Field data
g. Tide data
h. Aerotriangulation Report
i. Base manuscripts

4.0. ASSIGNMENT

You are assigned all office operations necessary to effect mapping and prepare the data sets required in support of nautical charting and hydrographic activities.

5.0. COMPILATION

5.1. Limits. Standard shoreline maps are required. The offshore limit of compilation is directly related to the extension, density, and placement of the aerotriangulated control provided.

5.2. Delineation

5.2.1. Compilation will be accomplished using analytical stereo and graphic methods. Instrument delineation will be based on interpretation of bridged color photographs. Graphic methods using enlargement prints of the infrared photographs will be used to develop the approximate MLLW line and complement the delineation of the shoreline.

5.2.2. Where selectivity is required because of density of detail, features that have landmark significance or of interest to a mariner are always retained. When features are too small or too numerous to show to scale, no attempt should be made to show all. Instead, a representative pattern of the symbol or area outline is to be shown, augmented by an explanatory note. Small features, especially when dangerous to navigation, may be sightly exaggerated in size, closely resembling their true shape; e.g., bare rock, islet.

5.2.3. Final manuscripts will depict, based on NAD 27, the Transverse Mercator Projection (full line) and grid ticks based on the Mississippi State Plane Coordinate System (East Zone)

5.3. Cartographic Comparison. A comparison with the most recently published charts shall be made during all compilation phases. This effort (1) is particularly important to ensure charted open-water features shown as bare or uncovering are investigated and (2) will complement the interpretation of detail and/or the identification of conflicts. Questionable differences between map detail and the charts shall be noted and reported on map copies prepared in support of charting and hydrography: e.g., Chart Maintenance Print, Notes to Hydrographer Print

5.4. Geodetic Control. Refer to memorandum instructions "Listing and Plotting of Control Stations on Shoreline Manuscripts, dated July 23, 1968, and "Labeling Triangulation Stations Field Positions on NOS Maps and in NOS Descriptive Reports," dated November 3, 1978.

5.5. Navigational Aids

5.5.1. Locate or confirm aerotriangulated and geodetic positions of visible charted landmarks, fixed aids to navigation, and/or cartographic features that have possible landmark value using analytical methods. Review personnel shall resolve any discrepancies that may exist in the identification of objects between the aerotriangulation and compilation phases.

5.5.2. Refer to Photogrammetric Instruction No. 78 for symbolization and labeling. Cartographic features of possible landmark value are to be symbolized the same as charted landmarks, however, label with upper and lower case letters; e.g., Tank (Possible Landmark).

5.5.3. Prepare a listing of the charted landmarks and/or fixed aids identified on each final map. The listing shall also contain features of possible landmark value. The listing shall outline:

a. Map identifier
b. Map scale
c. Feature description
d. Carto Code
e. Geographic position
f. NCD quality code
g. Date of photogrammetric source
h. Horizontal datum

Refer to Nautical Charting Division Standard Digital Data Exchange Format (NCD SDDEF), Version 1 documentation dated April 1, 1985, for clarification of NCD quality and carto codes. Carto code "993" shall be assigned to cartographic features of possible landmark value. Geodetic position shall be reported to three decimal places; positional data determined using approved photogrammetric methods as described in NCD SDDEF, appendix D, shall be reported to two decimal places.

5.5.4. The medium for reporting information concerning charted navigational aids investigated and not compiled will be the Chart Maintenance Print.

5.6. Rocks, Reefs, and Ledges. Symbolization shall be in accordance with the latest edition of publication, Nautical Chart Symbols and Abbreviation, Chart No.1, section O. (Dangers). Refer to section 2.6.

5.7. Drafting. Manuscripts will be drafted in accordance with Photogrammetric Instruction No. 55 Revision 2. When drafting small features or related symbols, the minimum length/size shall be .7 mm.

5.8. Geographic and Object Names

5.8.1. Requirements for names, including their placement, are outlined in Photogrammetric Instruction No. 63.

5.8.2. Obtain final geographic names list using the procedures outlined in Photogrammetric Instruction No. 63, section 2.03.1, last paragraph.

5.9. Reports. Refer to section 1.2. and 7.2.

5.10. Support Data. Supplemental survey data required to support charting and hydrographic activities are indicated below; coordinate distribution of these data with N/CG2321. Refer to sections 2.1, 5.5.3, and 5.11.

Type of Data	Distribution
Chart Maintenance Prints Listings of navigational aids	N/CG2222
Notes to Hydrographer Prints Listings of navigational aids	N/CG241

5.11. Chart Maintenance Print. Prepare a stable base copy of each reviewed map and label Chart Maintenance Print. General requirements are specified in Photogrammetric Instruction No. 69 for completing this print. When preparing this print, keep in mind the objective is to provide comprehensive information about the adequacy, reliability, and completeness of map detail, as well as differences noted between the map and chart(s). Examples are (1) the inability to satisfactorily interpret photographic detail and (2) a difference between the chart(s) and map in the representation of a feature. This effort cannot be emphasized too strongly, because proper evaluation and usage of map detail will depend on this information. Include a statement regarding features not located as discussed in section 5.5.4.

5.12. Communication. Forward a copy of each transmittal letter to N/CG2314.

6.0. SCHEDULE

Schedule completion by October 15, 1987. Inform this office immediately if this schedule cannot be met.

7.0. MODIFICATION OF INSTRUCTIONS

7.1. If any changes in procedures and methods seem advisable, please make appropriate recommendations to this office.

7.2. Departures from basic specifications, as necessitated by unique characteristics and special requirements for this mapping project, shall be contained in supplementary instructions or described in the text of the Project Completion Report and each applicable Descriptive Report; e.g., feature symbolization.

8.0. COST

Charge all costs to 8K6C01.

9.0. RECEIPT

Acknowledge receipt of these instructions.

A. Y. Bryson

Commander A. Y. Bryson
Chief, Photogrammetry Branch
Nautical Charting Division

R E C E I P T

TO: N/CG23 - Commander A. Y. Bryson

THRU: N/CG232 - Ivey O. Raborn

Receipt of Project Instructions Office - Job CM-8504, Ship Island Pass to Petit Bois Pass, Mississippi, Shoreline Mapping, dated June 11, 1987, is acknowledged.

Robert W. Rodway

Chief, Coastal Mapping Unit
Photogrammetry Branch

June 12, 1987

Date

APPENDIX P

MAP COMPILATION SOURCES for PROJECT CM-8504

MAP TP-01352 MAP SCALE = 1:20,000

PHOTOGRAPHY

YEAR/TYPE/NUMBERS	DATE	TIME	SCALE	STAGE OF TIDE/TIDE GAGE
86B(C)8621 - 8625	03/06/86	0931-0933	1:20,000	-0.9 FT MLLW/See Remarks
86B(C)8632 - 8636	03/06/86	0948-0950	1:20,000	-0.8 FT MLLW/See Remarks
86B(R)9207 - 9209	03/16/86	1138-1140	1:40,000	-0.1 FT MHW/See Remarks
86B(R)9616 - 9618	03/21/86	1154-1155	1:40,000	-0.1 FT MLLW/See Remarks

Photography Types: (C) = Natural Color, (R) = Infrared
Standard Time is referenced to Central Time Zone (Meridian = 90°)

Compiler - James Massey; Date of Compilation = March 1988
Office Reviewer - Robert Rodkey; Date of Review = May 1988

REMARKS: The stage of tide for infrared photographs is based on observations of the Cadet Point tide gage. The stage of tide for natural color photographs is based on reference station records.

****

MAP TP-01353 MAP SCALE = 1:20,000

PHOTOGRAPHY

YEAR/TYPE/NUMBERS	DATE	TIME	SCALE	STAGE OF TIDE/TIDE GAGE
86B(C)8584 - 8590	03/06/86	0907-0909	1:20,000	-0.9 FT MLLW/See Remarks
86B(R)9213 - 9216	03/16/86	1146-1148	1:40,000	-0.1 FT MHW/ See Remarks
86B(R)9609 - 9612	03/21/84	1143-1145	1:40,000	-0.1 FT MLLW/See Remarks

Photography Types: (C) = Natural Color, (R) = Infrared
Standard Time is referenced to Central Time Zone (Meridian = 90°)

Compiler - James Massey; Date of Compilation = March 1988
Office Reviewer - Robert Rodkey; Date of Review = May 1988

REMARKS: The stage of tide for infrared photographs is based on observations of the Cadet Point tide gage. The stage of tide for natural color photographs is based on reference station records.

MAP COMPILATION SOURCES for PROJECT CM-8504

MAP TP-01354 MAP SCALE = 1:20,000

PHOTOGRAPHY

YEAR/TYPE/NUMBERS	DATE	TIME	SCALE	STAGE OF TIDE/TIDE GAGE
86B(C)8590 - 8595	03/06/86	0909-0911	1:20,000	-0.9 FT MLLW/See Remarks
86B(C)8611 - 8612	03/06/86	0922-0923	1:20,000	-0.9 FT MLLW/See Remarks
86B(R)9216 - 9220	03/16/86	1148-1150	1:40,000	-0.1 FT MHW/See Remarks
86B(R)9605 - 9609	03/21/86	1139-1143	1:40,000	-0.1 FT MLLW/See Remarks

Photography Types: (C) = Natural Color, (R) = Infrared
Standard Time is referenced to Central Time Zone (Meridian = 90°)

Compiler - James Massey; Date of Compilation = March 1988
Office Reviewer - Robert Rodkey; Date of Review = May 1988

REMARKS: The stage of tide for infrared photographs is based on observations of the Cadet Point tide gage. The stage of tide for natural color photographs is based on reference station records.

****

MAP TP-01355 MAP SCALE = 1:20,000

PHOTOGRAPHY

YEAR/TYPE/NUMBERS	DATE	TIME	SCALE	STAGE OF TIDE/TIDE GAGE
86B(C)8606 - 8611	03/06/86	0920-0922	1:20,000	-0.9 FT MLLW/See Remarks
86B(R)9220 - 9222	03/16/86	1150-1151	1:40,000	-0.1 FT MHW/ See Remarks
86B(R)9602 - 9605	03/21/84	1137-1139	1:40,000	-0.1 FT MLLW/See Remarks

Photography Types: (C) = Natural Color, (R) = Infrared
Standard Time is referenced to Central Time Zone (Meridian = 90°)

Compiler - James Massey; Date of Compilation = March 1988
Office Reviewer - Robert Rodkey; Date of Review = May 1988

REMARKS: The stage of tide for infrared photographs is based on observations of the Cadet Point tide gage. The stage of tide for natural color photographs is based on reference stations records.

APPENDIX G

AUG -7 1987

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8504 (Ship Island Pass to Petit Bois Pass, MS)

TP-01352

East Channel
Gulf of Mexico
Mississippi Sound
Northwest Bluff
Old Fort Massachusetts (cultural feature)
Ship Island
Ship Island Channel
Ship Island Flats
Ship Island Harbor
Ship Island Pass
West Point

Approved:

Charles E. Harrington

Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

AUG - 7 1987

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8504 (Ship Island Pass to Petit Bois Pass, MS)

TP-01353

Dog Key Pass
Gulf of Mexico
Horn Island
Mississippi Sound
West Point

Approved:

Charles E. Harrington

Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

AUG - 7 1987

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8504 (Ship Island Pass to Petit Bois Pass, MS)

TP-01354

Gulf of Mexico
Horn Island
Horn Island Pass
Mississippi Sound
Petit Bois Island

Approved:

Charles E. Harrington

Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

AUG - 7 1987

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8504 (Ship Island Pass to Petit Bois Pass, MS)

TP-01355

Gulf of Mexico
Mississippi Sound
Petit Bois Island

Approved:

Charles E. Harrington

Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

APPENDIX H

CARTOGRAPHIC FEATURES OF CHARTING INTEREST

COSATAL MAPPING PROJECT: CM-8504; Ship Island - Petit Bois Pass, Mississippi Sound, Mississippi

NOS Nautical Charts Affected: 11373, 11372

Geodetic Datum: North American Datum of 1927

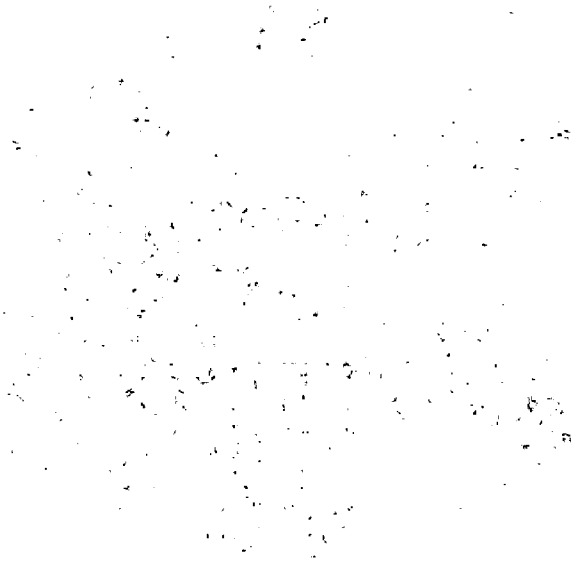
The following charted cartographic features have been identified and measured during photogrammetric operations. Refer to Nautical Charting Division Standard Digital Data Exchange Format documentation for quality code (QC) criteria and clarification of cartographic codes (CC). Clarifications in upper and lower case are for internal use.

FEATURE DESCRIPTION	NCD CC	GEOGRAPHIC POSITION(°-'-") LATITUDE	LONGITUDE	NCD QC	DATE OF LOCATION
Charts 11372 and 11373: SHIP ISLAND RGE R LT	209	30-12-44.676	088-57-58.588	4	044/1986

- end -

Listing approved by: Robert M. Rodley Jr. 7/20/88
Final Reviewer Date

APPENDIX I



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

December 3, 1987 N/CG2321:GLF

MEMORANDUM FOR: Distribution

FROM: Gregory L. Fromm
Acting Chief, Production Control Unit
Photogrammetry Branch, NCD

SUBJECT: Photogrammetric Support Data for OPR-J217-HFP

To facilitate hydrography, an advance copy of map TP-01355, project CM-8504, has been forwarded to N/CG241 for distribution to the hydrorgraphic field party. The copy is labeled "For Field Use Only." The map has not been reviewed; detail is subject to change by final review personnel. A copy of the final map will be required by N/MOA232 for use in the hydro verification process; the scheduled date for map completion is June 1988.

cc:
File CM-8504
N/CG2323 - Rodkey
N/CG241 - Armstrong
N/MOA232 - Sanocki
N/MOA233 - Perrin