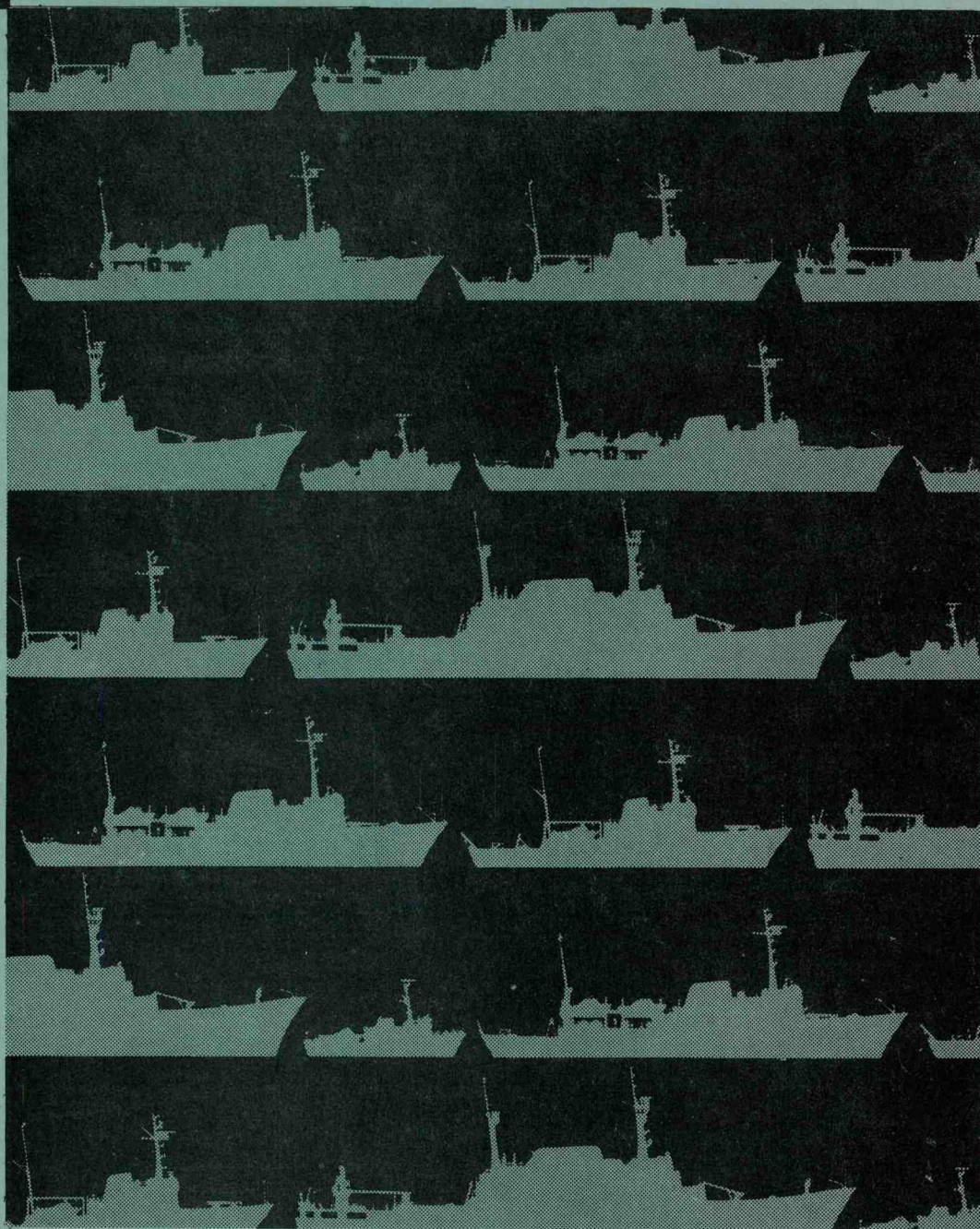


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National Ocean Survey SHIP CAPABILITIES

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



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1970

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

Ships of the National Ocean Survey
" Their Capabilities And Personnel

Prepared by:
National Ocean Survey.
Ship Facilities Group
Office of Hydrography and Oceanography
Revised: 1970



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INTRODUCTION

This document provides functional information about National Ocean Survey vessels for use in planning ship operations, and/or general information to organizations or individuals that are interested in the marine activities of NOAA.

Class II and III vessels are equipped primarily for marine charting surveys and afford limited oceanographic capabilities. Class I's are equipped for deep ocean surveys and oceanographic research activities including physical oceanography and geological, geophysical, and meteorological observations. Class IV's are special purpose vessels which are assigned exclusively to projects for which they are specifically equipped, such as wire drag and circulatory surveys.

Most of the ships have sufficient space to permit installation of additional instrumentation for collection of related data which are compatible with their scheduled assignments. There is space also available for a limited number of visiting scientists to engage in cooperative projects on the Class I and II's. The number of available berths will vary from ship to ship depending on physical characteristics of the vessel and the scheduled assignment.

Ships normal compliments consist of professional engineers, scientists and technicians capable of collecting scientific data for cooperative projects unless the specialized nature of the work may require the presence of visiting scientists.

All ships are equipped with navigational control of the highest accuracy available. Navigation equipment listed herein includes those instruments that are of special use to survey vessels. Each ship has other equipment for routine navigation.

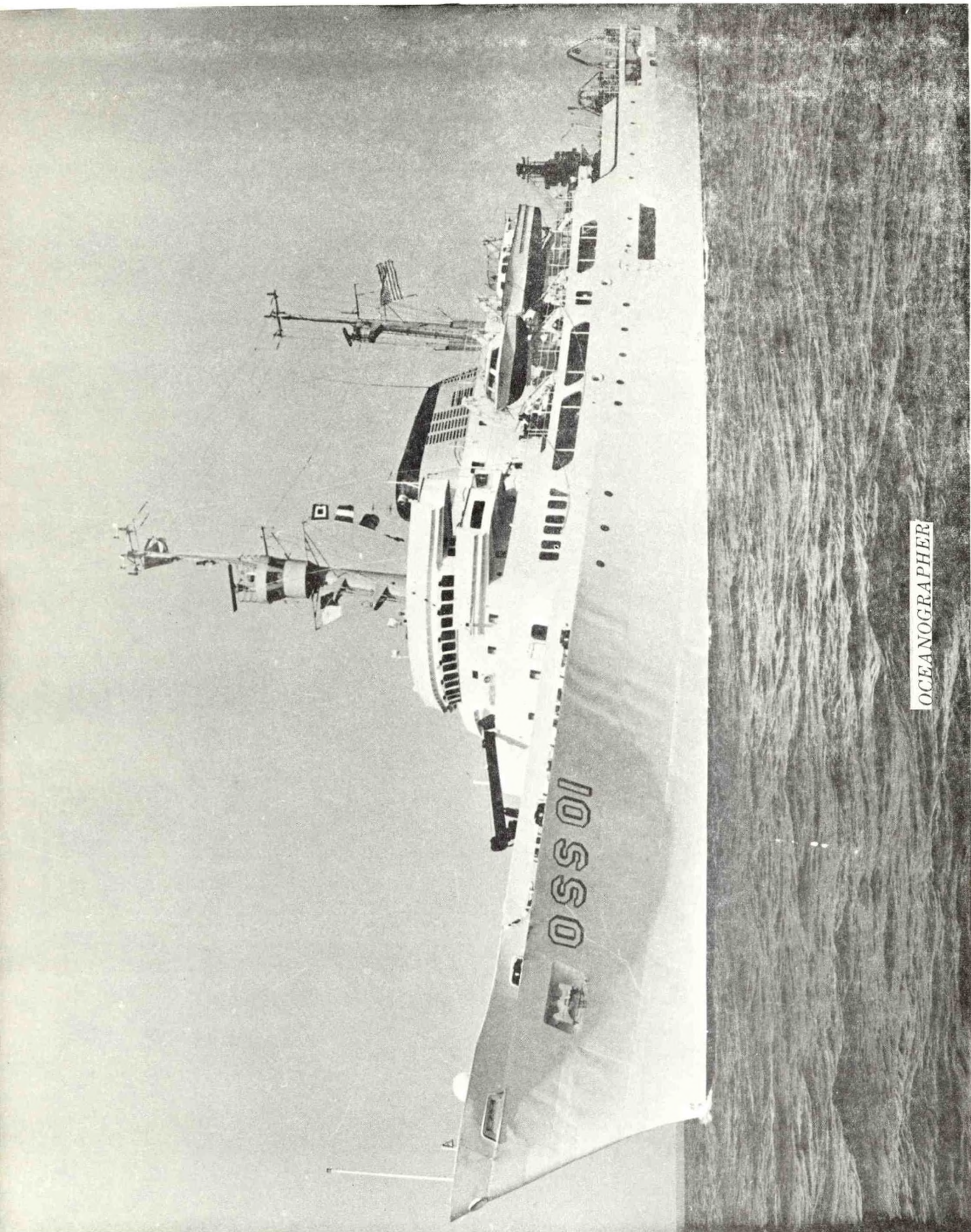
The values indicated for endurance and range are estimates. It may be possible to increase either the endurance or the range of a given vessel under special circumstances, but this is normally not done.

The class of vessel refers approximately to its size, as follows: Class IV - under 150 feet in length, special purpose, nearshore operations; Class III - about 170 feet, routine nearshore operations; Class II - about 230 feet, limited open sea capability; Class I - about 300 feet, unlimited open ocean capability.

Most of the vessels discussed herein devote the majority of their time to nautical chart surveys of the NOS. Much of the ship time remaining from nautical chart surveys is devoted to oceanographic and meteorological studies of the NOAA Research Laboratories.

THE FLEET AT A GLANCE

<u>CLASS I</u>	<u>LENGTH</u>	<u>DISPLACEMENT</u> <u>(L.T.)</u>	<u>YEAR</u> <u>DELIVERED</u>	<u>BASE</u>
DISCOVERER	303.0'	3959	1966	Miami
OCEANOGRAPHER	303.0'	3959	1966	Seattle
RESEARCHER	278.0'	2875	1970	Miami
SURVEYOR	292.3'	3150	1960	Seattle
<u>CLASS II</u>				
FAIRWEATHER	231.0'	1798	1967	Seattle
MT. MITCHELL	231.0'	1798	1968	Norfolk
PATHFINDER	229.3'	2000	1942	Seattle
RAINIER	231.0'	1798	1968	Seattle
<u>CLASS III</u>				
DAVIDSON	175.0'	995	1967	Seattle
McARTHUR	175.0'	995	1966	Seattle
PEIRCE	162.7'	760	1963	Norfolk
WHITING	162.7'	760	1963	Norfolk
<u>CLASS IV</u>				
FERREL	133.0'	363	1968	Norfolk
HECK	90.0'	190	1966	Norfolk
RUDE	90.0'	190	1966	Norfolk



OCEANOGRAPHER

CLASS I OCEANOGRAPHIC SURVEY SHIPS

Name of Ships

There are two sister ships of this class, the OCEANOGRAPHER (OSS-01) and the DISCOVERER (OSS-02).

Type of Ship

Specifically designed and equipped for comprehensive deep sea oceanographic surveys. Welded steel construction, ice strengthened.

Characteristics

Length - 303.3'

Beam - 52'

Draft - 18.5'

Displacement - 3959 L.T.

Cruising Speed - 16 kts.

Range - 15,200 N.M.

Endurance - 35 days

Complement:

Officers - 13

Visiting Scientists - 20 plus 2 spares

Crew - 80 plus 1 spare

Propulsion

Twin screw, fixed pitch, propulsion from four main propulsion diesel generator sets supplying DC power to two 2,500 SHP propulsion motors, the bow thruster and the deep sea winch; with propulsion control from engine room, bridge, and aloft conning station. Navy standard diesel oil conforming MIL-F-16884 with H.H.V. of 19,350 BTU/lb. is used for all services.

Electrical Power

Three 400 KW ship service generators supply 450V, 60 cycle, 3 phase power for ship service; 120V, 60 cycle power for lighting, appliances, electronic equipment and special purposes; 120V, 3 phase, 6 cycle power for navigation, I.C. and fire alarm systems; 24 volt d.c. rectified power for general alarm and I.C. battery charging. Normal ship service power demand is about 400 KW. Shore connection is 450V, 3 phase, 400 amp.

Navigation and Communication Equipment

Navigation - Gyrocompass modified for 80 degree Latitude, with course recorders located in plotting room and gravity room, and synchro information to 8 stations; gyro pilot; under-water log; dummy log; navigation radar, one each port and star-board in wheelhouse; buoy tracking radar in plotting room; deep water depth sounders with transducers at bow and 1/3 length, and two recorders located in plotting room. Shoal water depth sounders located in plotting room, with one recorder in wheel house, with a pair of transducers P/S forward and a pair amidships, and recorders in plotting room, pilot house and oceanographic lab. PDR's one each in plotting room and oceanographic lab.; Loran A with receiver located between plotting room and pilot house; Loran C with 2 receivers in plotting room; radio direction finder, satellite navigation system. Narrow beam stabilized transducer range to 6000 fathoms, 37 KC; lodar with recorder located in pilot house.

Communication - Main radio receiver, HF and IF SSB, 18 bands covering 80 KC to 30 MC; emergency transmitter, MF, 350 to 515 KC, emergency receiver, LF and IF, 4 bands covering 15 to 650 KC; automatic alarm, two receivers 30 bands covering 0.54 to 30.5 MC, for AM, CW, SSB and FSK reception; transceiver, HF SSB 1.6 to 15 MC, one each in the 33 foot launches; one 1 KW transmitter, MF and HF 2 to 30 MC with frequency standard, radiotelephone 2 to 9 MC, with emergency transmission on 2182 KC; auxiliary radiotelephone, VHF 6 frequencies between 148 and 174 MC arranged for duplex operation: four portable radiotelephones NHF 170.2 to 171.8 MC, one in each boat; a 100 w base station VHF for transmission and reception on 170.2 and 171.8 MC; radio facsimile system operating from a receiver on 20 frequencies; standard frequency broadcast service WWV communication receiver, AM and CW, in 18 bands from 80 KC to 30 MC, with time signal circuits to six remote locations; main transmitter, 500 W, IF on ten frequencies; transmitter, HF SSB 50 frequencies in five bands covering 2 to 30 MC, with a remote HF receiver; portable lifeboat transmitter/receiver; radio teletype, operating with the HF communications receivers, and transmitters.

Hydrographic Winches and Equipment

Deep sea, 150 HP electro-hydraulic, with 45,000 ft. of 3/4" to 3/8" stepped wire, located on main deck aft; two double drum oceanographic, 30 electro-hydraulic, Northern Line, each with 30,000 ft. of 3/16" wire and 12,000 ft. of 6 conductor electrical logging cable, located on superstructure deck aft; dredge and trawl, 40 HP electro-hydraulic, Northern Line, with 6,000 ft. of 3/8" wire, located on superstructure deck aft; three BT, Northern Line, located two on main deck aft and one on boat deck forward.

Acoustical Characteristics

Not equipped for silent operation, one 33 ft. launch fitted for use as a silent platform.

Laboratories

All scientific working areas are air conditioned and are served by interconnecting wireway trunks and communication facilities. The oceanographic laboratory is rectangular, with sections for wet and dry work open to the central work and control centers, and a net total area of 3,400 sq. ft. including the office and a data center room.

A monorail loop serves the laboratory and adjoining fantail working areas. Facilities provided include salt water and H/C fresh water, compressed air, 120V at general service, 450V, 3 phase 60 cycle power, and a bank of wet cell batteries. It is equipped with GEK, magnetometer, salinity bridge, shoal water fathometer, PDR, sea water temperature recorder, and remote indicators for course, speed, gravity and winch data. Modular laboratory furniture units enable flexible arrangement of the central work center to suit individual projects. The meteorological office has 160 sq. ft. of working area and has direct access to the balloon inflation room and the meteorologists' stateroom. It is equipped with radiosonde and direction, and ship's course and speed. Gravity room, 80 sq. ft., net useful area. Plotting room, 350 sq. ft., net.. Photographic laboratory, 165 sq. ft., net..

Habitability

Comfortable quarters with air conditioning. Normal fresh water consumption for all purposes is approximately 5,000 gal./day. Storage capacity of about 10⁴ tons and distiller capacity of 8,000 gal./day are provided. Arrangements enable accomodation of women scientists.

Other Features

Main propulsion and principal auxiliary machinery and associated systems are automated by a centralized engine room control (CERC) system. A 6 x 8 ft. center well extending to the main deck in the oceanographic laboratory, with a hatch and handling gear located on the superstructure deck, is available for operation in higher sea state scuba diving operations, and for use with experimental equipment. The bow thruster is a 400 HP fixed pitch, thru-hull unit with 10,000 lb. thrust. Space and power for portable core freeze boxes are available in the oceanographic laboratory. A constant frequency system serves all applicable centers and stations. Cathodic hull protection is provided. The forward crane has a capacity of 7,300 lbs. at 40 ft. radius; the aft crane has a capacity of 5 long tons at 35 ft. radius and is mounted off-center to handle long cores. Six ports in the bow observation chamber enable viewing forward and to the sides. Three 33-ft. hydrographic launches are carried.

Type of Observations

Underway operations include continuous hydrographic, magnetic, gravity and surface temperature measurement, plus BT, and meteorological observations. Uncontaminated surface sea water is brought direct to the oceanographic laboratory from the forward sampling chest, and biological tows and trawls can be made at reduced speeds. On station operations can include water sampling by Nansen bottles and direct from sampling chart, light and heavy coring, rock dredging, bottom photography, bottom heat flow measurement, and other measurements requiring electrical conducting cable.

Scientific Equipment

Multisensor instrument (temperature, salinity, density)*

Bathythermograph (permanent and expendable)*

Bottom sampling equipment:

Snappers*

Dredges*

Corers*

Current meters

Magnetometer*

Gravity meter*

Subbottom profiling equipment*

Radiosonde receiver and recorder

Surface meteorological equipment*

Heat probes

Plankton nets

Tide gage*

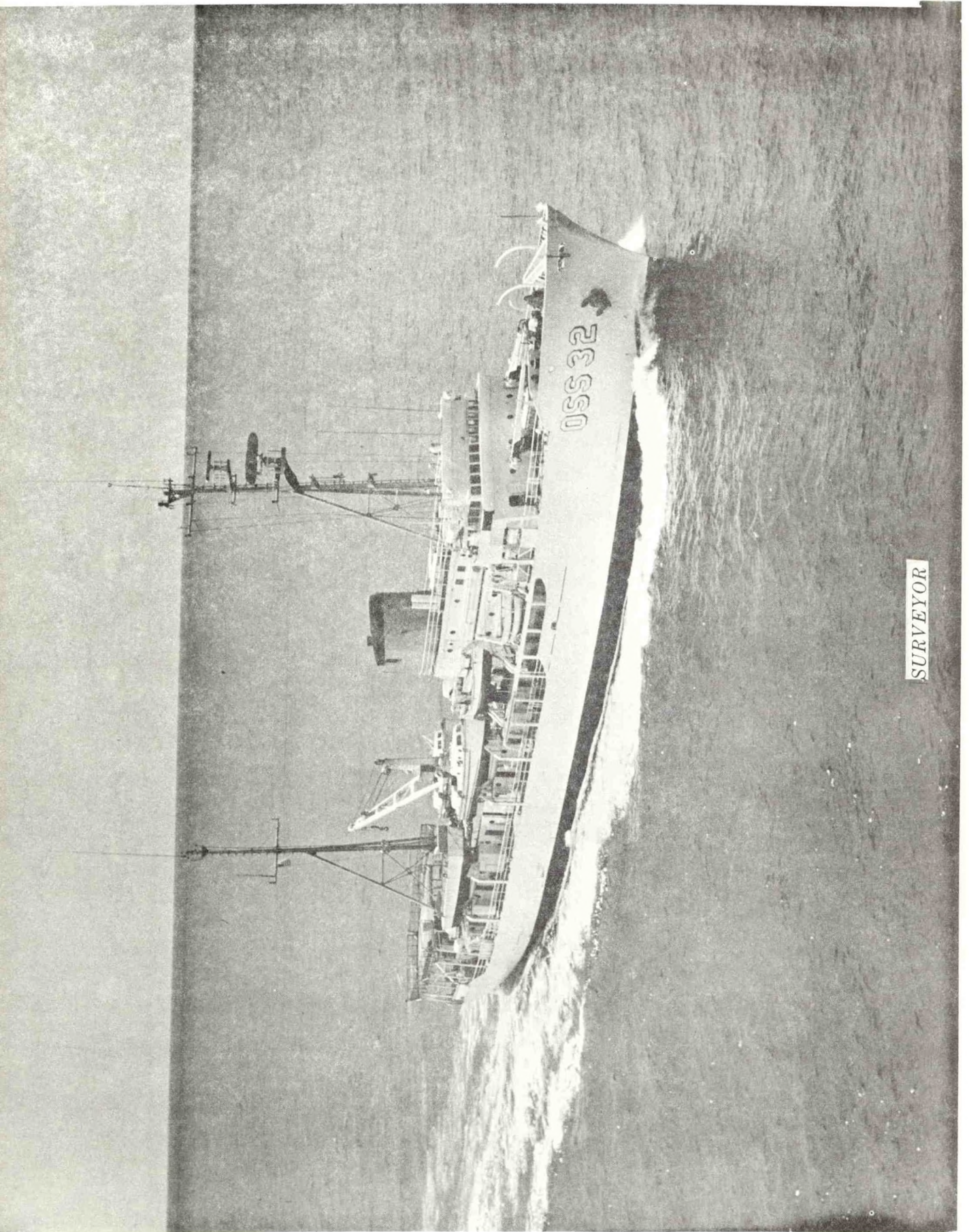
Nansen bottles*

Chemical analysis instrumentation*

Marine photographic equipment

A complete Data Acquisition System utilizing a 16K Computer, magnetic tape drives, a large flat-bed plotter, and central control equipment is provided for either on-line sensors on the ship and from an STD system. Readout on electric typewriters is available.

*Normally on board.



SURVEYOR

CLASS I HYDROGRAPHIC SURVEY SHIP

Name of Ship

SURVEYOR (OSS-32)

Type of Ship

Specially built and equipped for Marine Charting and Geophysical Surveys.

Characteristics

Length - 292.3'

Beam - 46'

Draft - 18'

Displacement - 3150 L.T.

Cruising speed - 15 kts.

Range - 10,500 N.M.

Endurance - 35 days

Complement:

Officers - 14

Visiting Scientists - 8

Crew - 76

Propulsion

Main engine is steam turbine, capable of 3,520 HP. Turbines equipped with double helical and double reduction gears driving one right hand four blade propeller. A "Harbormaster" outboard is installed for positive directional steering at very low speeds. Fuel oil capacity 730 tons, diesel oil capacity 30 tons. Normally uses Navy Special Fuel Oil (Standard); may substitute Bunker "C" commercial grade. Diesel fuel oil may be used in emergency.

Electrical Power

Ship generates 800 KW. Normal ship operation requires 375 KW. Four hundred KW available for scientific work. Ship's service power: 450 volt a.c., 60 cycle, 3 phase; 115 volt a.c., 60 cycle, single phase; 115 volt a.c., 60 cycle, controlled frequency; 115 volt a.c., 400 cycle, single phase; and 28 volt a.c..

Navigation and Communication Equipment

Navigation - Gyrocompass, autopilot, course recorder, magnetic compass, main ship radar, auxiliary radar radio direction finder, electromatic underwater log, Loran-C receiver, Loran-A receivers, electronic position to 150 nautical miles. Launches carry single side band and/or FM communication equipment. Three shoal water depth sounders, two deep water, one deep water narrow beam, two PDR recorders which operate in conjunction with narrow beam. Sounding launches equipped with DE 723 echosounders.

Communication - One main 500W SSB HF Console, 200W MF Console, 75W MF 10 Chan. transceiver, 100W SSB HF 4 chan. transceivers, 60W VHF FM transceiver and weather fax..

Winches - Hydrographic and Oceanographic

One electric BT winch mounted on the port bridge wing with swing boom and sheave mounted to slide outboard along boom, one 15 H.P. electro-hydraulic oceanographic winch located on starboard boat deck level with 20,000 feet of 7 x 16, 3/16 inch stainless steel wire rope, one double-drum 150 H.P. electro-hydraulic deep sea winch unit. One drum equipped with slip rings containing approximately 10,000 feet of 0.292 inch dia. 6 - conductor Amergraph cable (24,000 feet of 7 x 7 3/16" Aluminized wire rope) and one drum carrying 45,000 feet of 3/4" to 3/8" stepped solid core wire rope (22,700 feet 3/4" to 1/2" IWRC wire rope). Both drums feed wire to fore-castle deck of ship. The solid core wire rope operates over a traction unit with capability of 30,000 lbs. line pull and over the bow A-frame or port/starboard bow using anchor davits. Line out and cable tension readouts are provided. One electro-hydraulic winch mounted on the stern with 2,500 lbs. line pull capacity. Two interchangeable drums are available for this winch, one grooved drum for 30,000 feet 3/16 inch cable and one ungrooved drum for 20,000 feet of 0.292 inch diameter cable (6,700 feet of 0.292 inch dia. 6-conductor Amergraph cable). Eight slip rings are provided. Telescoping electro-hydraulic rotating cargo booms mounted P&S on fore-castle with 2-1/2 ton capacity. Rotating, electro-hydraulic boat crane mounted on the boat deck (aft-amidships) with 12-1/2 ton capacity.

Laboratories

Chart room (460 sq. ft.); radio room (309 sq. ft.); photo laboratory (78 sq. ft.); oceanographic laboratory (88 sq. ft.); instrumentation room (186 sq. ft.); print shop (156 sq. ft.); plotting room, field operations and instrument shop (744 sq. ft.). All spaces have electric power and are air-conditioned.

Habitability

Structurally strengthened for ice navigation. Has adequate insulation, ventilation and air-conditioning, as well as cold storage locker spaces to permit operation for extended periods in tropical waters. Fresh water capacity 27,000 gal., distillation 7,000 gal./day. Salt water showers could be made available. Accommodations for two women scientists can be made available.

Other Features

Retractable outboard motor mounted on stern. Large bilge keels (18" x 70'), allows oceanographic observations to be performed up to Sea State 6. Three 36' hydrographic launches, one 36' landing craft, and two 26' motor whaleboats, and four 16' skiffs with out-boards. Also has a helicopter platform, photographic laboratory, and core storage room.

Type of Observations

Underway operations include continuous hydrographic, magnetic, gravity and surface sea water is brought directly to the oceanographic laboratory from the forward sampling chest, and biological tows and trawls can be made at reduced speeds. On station operations can include water sampling by Nansen bottles and direct from sampling chest, light and heavy coring, rock dredging, bottom photography, bottom heat flow measurements, biological tow, trawls, and dredges, deep current measurements, and other measurements requiring electrical conducting cable.

Scientific Equipment

Multisensor (salinity, temperature, density) instrument

Bathythermograph (permanent and expendable)*

Bottom sampling equipment:

Snappers*

Dredges*

Corers

Current meters

Remote current meter monitoring equipment

Magnetometer*

Gravity meter*

Subbottom profiling equipment

Radiosonde receiver and recorder

Surface meteorological equipment*

Heat probes

Plankton nets

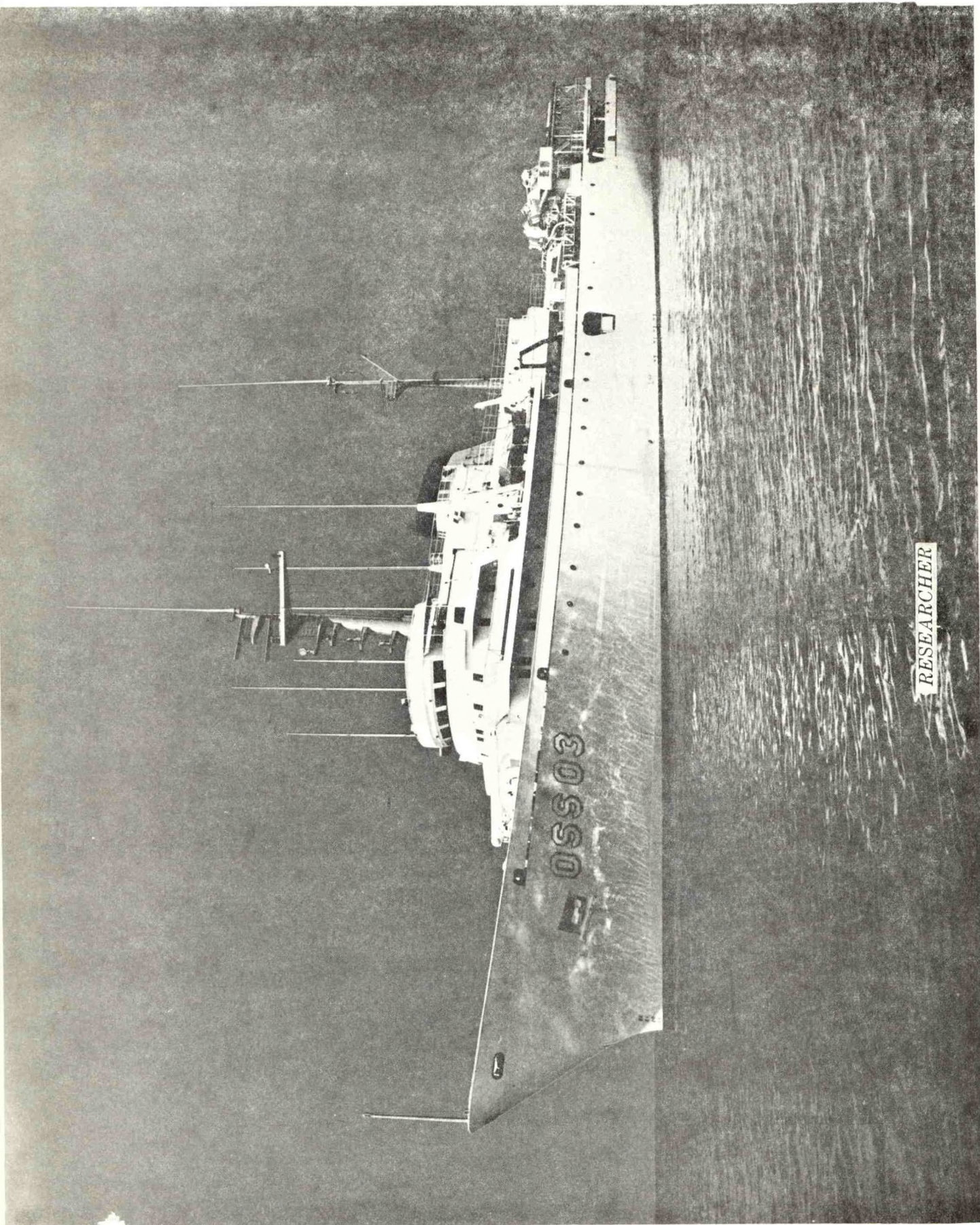
Tide gage*

Nansen bottles*

Chemical analysis instrumentation*

Marine photographic equipment

*Normally on board.



RESEARCHER

CLASS IA OCEANOGRAPHIC SURVEY SHIP

Name of Ship

RESEARCHER (OSS-03)

Type of Ship

Specifically designed and equipped for comprehensive deep sea oceanographic research. Welded steel construction, ice strengthened.

Characteristics

Length - 278'

Beam - 51'

Draft - 16'

Displacement - 2875 L.T.

Cruising Speed - 14.5 kts.

Range - 13,000 N.M.

Endurance - 35 days

Complement:

Officers - 13

Visiting Scientists - 10 plus 3 spares

Crew - 54 plus 6 spares

Propulsion

Two 1600 shp geared diesel engines driving controllable pitch twin screws enable a maximum speed of 16 knots and assure quick response in maneuvering. A 450 hp motor-driven 360-degree, retractable bow thruster propels the ship at sustained slow speeds up to 7 knots and assists in holding the ship's heading during on-station operations. Remote controls for both modes are located in the pilot house, bridge wings and aft control stations. The main propulsion and principal auxiliary plants are sufficiently automated to enable one man operation from the machinery control room after startup, with transfer of main engine and propeller controls to bridge when desired. Navy standard diesel oil conforming to MIL-F-16884 is used for all services.

Electrical Power

Two 500 kw ship service generators supply 450 volt, 60 cycle, 3 phase, primary power for 440 and 220 volt auxiliaries, ship systems, shops, laboratories, and deck receptacles, 120 volt constant voltage system, 120 volt navigation, I.C. and alarm systems, 120 volt single phase lighting and general service, and 24 volt d.c. rectified power.

An additional 500 kw diesel generator supplies power for the bow thruster and is tied into the main switchboard bus to supplement ship service power when needed.

Navigation and Communications Equipment

Navigation - Gyro compass, modified for 85-degree latitudes, with course recorders in operations control center and gravity room, 16 repeater stations, synchro information to 8 stations, and gyro pilot, radio direction finder, underwater log, navigation radar (2) in pilot house, and buoy tracking radar in operations control center. Shoal water depth sounder (3) with recorders in oceanographic laboratory, operations control center and pilot house, and deep water depth sounder (2) with recorders in operations control center. Narrow-beam depth sounder stabilized $2 \frac{2}{3}$ degree, 6000 fathom depth, with side-looking capability, using PFR recorders in operations control center, and horizontal ranging depth sounder with vertical system, in pilothouse. Loran C (2), in operations control center, Loran A/C, in pilothouse, controlled frequency system, in electronics shop, with 20 stations, precision recorders (2) in operations control center and one seismic reflection profiler.

Communications - Console, with reserve transmitter reserve receiver, auto-alarm, alarm signal keyer, main receiver with converter, HF radiotelephone, and controls and accessories. HF SSB (2), one unit in radio room and one in launch, MF and HF Transceiver, VHF radiotelephone, and VHF radiotelephone base station with 6 portable radiotelephones. WWV receiver with time signal to 8 locations. HF receivers (4), 1.9 to 30 M.C.. Radio teletype system with frequency shift converter. Facsimile recorder. Main transmitter, 1 kw radiotelegraph 355 to 500 K.C.. HF SSB transmitter, radiotelephone 1.9 to 30 M.C..

Winches and Equipment Handling Gear

Deep sea winch - 150 hp electrohydraulic. Located on superstructure deck at 3/4"-length, with power unit and double stowage unit holding 45,000' each of 9/16"-3 x 19 wire below.

Oceanographic winch (2) - 40 hp electrohydraulic, with interchangeable drums for 30,000' of 3/16" 3 x 19 elevated elastic limit wire, 12,000' of Amergraph 4-H-1 logging cable and, if desired, 6,000' of 3/8" 6 x 19 wire, located one each P/S on superstructure deck at 2/3-length.

BT winch (2) - electric, located on main deck aft.

Magnetometer and GEK winches (2) - electric.

Heavy crane - 20-ton telescoping model, electrohydraulic, capacity range from 40,000 pounds at 14-foot radius to 3500 pounds at 63-foot radius, and with an underhung "Link" type jib.

Auxiliary crane - electrohydraulic, telescoping boom, articulated jib, capacity, 10,000 pounds at 10-foot radius.

Service crane (4) - electrohydraulic telescoping boom, 5500-pound capacity at 28-foot radius.

A-frame - Fabricated, 28-foot throat, hydraulically activated, 20,000-pound lift capacity.

Laboratories

All command and data acquisition centers are linked by interconnecting wireways and patch panels in addition to standard IC systems.

Oceanographic laboratory - Net area 2350 sq. ft. including the scientific data center approximately 600 sq. ft. and Nansen bottle room at the forward end and an open work center aft. Facilities include peripheral laboratory benches served by salt water, H/C fresh water, five gases and compressed air, 440/220/110 ac power throughout, a monorail loop serving the laboratory and immediately adjacent open deck areas forward and aft, and instrumentation and equipment for centralized observation and data processing in the scientific data center.

Meteorological office - Net area 240 sq. ft. equipped with radiosonde, barometer and barograph, readouts on surface water temperature, wind speed and direction, and ship's course and speed, including 70 sq. ft. for storage of expendable gear and supplies.

Gravity room - Net area 180 sq. ft.

Photographic laboratory - Net area 175 sq. ft.

Bow observation room - Net area 195 sq. ft.

Operations control center - Net area 275 sq. ft.

Plotting room - Net area 540 sq. ft.

Habitability

Due attention has been given the arrangements, air conditioning, illumination and furnishings to assure a productive, harmonious environment throughout the scientific centers and living areas. Stateroom arrangements permit accomodation of women scientists.

Fresh Water

The ship has a storage capacity of 90 tons and a distiller capacity of 8000 gal./day.

Special Features

The ship is fitted with a modern Data Acquisition System to automatically sample, process and record oceanographic, geophysical, hydrographic and meteorological data, with capability for off-time computations as desired. A large Inui type bow bulb provides an optimum operating environment for the ship's principal sounding equipment. A special transport rack minimizes Nansen bottle handling operations and stowage space; a multi-station winch instrumentation instantaneous information throughout the ship on line out, speed and tension for any principal winch in operation. The 20-ton oceanographic crane is specially devised and constructed to launch and retrieve vulnerable equipments such as boats and deep research vehicles. Advance provisions are made in the oceanographic laboratory and principal open deck working areas to secure portable equipment and ready access to electrical power and other facilities.

Types of Observations

Underway operations include continuous hydrographic, magnetic, gravity and surface temperature measurements. Meteorological, bathythermograph, and geomagnetic electrokinetograph observations are also made primarily in the underway mode.

Seismic reflection profile observations and biological tows and trawls are typical of activities conducted at reduced speeds. Uncontaminated surface sea water is brought from a sampling chest direct to the oceanographic laboratory at all ship speeds.

On-station operations include water sampling by Nansen casts, multisampling, deep current, light transmission and other measurements using electrical conducting cables, light and heavy coring, rock dredging, bottom photography and heat flow measurements, planting and tending buoys, and launching and recovering deep research submarines.

Scientific Equipment

Bathythermograph*

Bottom sampling equipment:

Snappers*

Dredges*

Corers*

Current meters

Remote current meter monitoring equipment

Magnetometer*

Gravity meter*

Subbottom profiling equipment*

Surface meteorological equipment*

Tide gage

Nansen bottles*

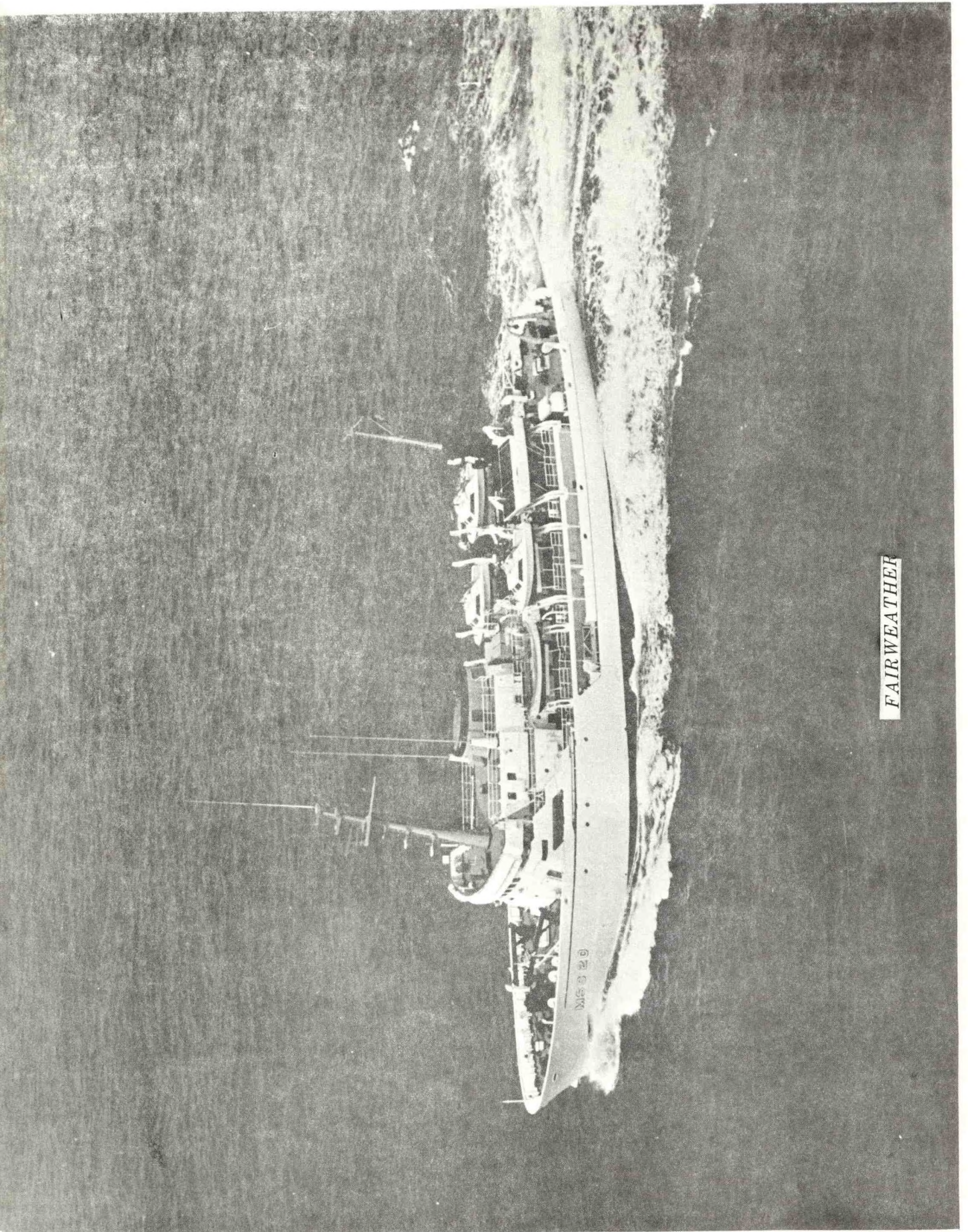
Chemical analysis instrumentation*

GEK*

STD*

SRP*

*Normally on board.



FAIRWEATHER

CLASS II HYDROGRAPHIC SURVEY SHIP

Name of Ships

There are three sister ships of this class, the FAIRWEATHER (MSS-20), the RAINIER (MSS-21), and the MT. MITCHELL (MSS-22).

Type of Ship

Specifically designed for combined hydrographic survey operations but will have limited oceanographic capabilities. The ship is a steel hull vessel and is ice strengthened.

Characteristics

Length - 231.0'
Beam - 42.07'
Draft - 13.9'
Displacement, 13.9' draft - 1798 L.T.
Cruising Speed - 13 kts.
Range - 9000 N.M.
Endurance - 30 days.
Complement:
 Officers - 12 plus 3 spares
 Crew - - - 62 plus 2 spares

Propulsion

Twin screw diesel, 1,200 SHP each, with controllable pitch propellers controlled from the engine room, pilot house, bridge wings or after control station; also, equipped with a tunnel bow thruster delivering 5,000 lbs. thrust from 200 BHP diesel engine. Bow thruster can also be controlled from the above stations.

Electrical Power

Two 300 KW, 450 vac, 3 phase generators.
 2 KW, 118 vac, single phase electronic, regulated power.
 .3 KW, 118 vac, single phase, controlled frequency power.
One 75 KW, 450 vac, 3 phase, emergency generator.

Navigation and Communication Equipment

Navigation - Two deep water depth recorders, two shoal water depth recorders, one precision depth recorder, one loran A receiver-indicator, one loran A/C receiver-indicator, two surface search radars, one radio direction finder, one radio positioning system, one horizontal echo sounding system, one omega system and gyro pilot system with eighteen repeater outputs. Each of the ship's three hydrographic launches are equipped with one shoal water depth recorder and one radio position system.

Communication - One main, medium and high frequency console with transmitters and receivers, one 500 watt SSB/FSK transmitter, one 100 watt SSB transceiver, four 100 watt AM/SSB transceivers (one in each survey launch and one in the landing craft), one 60 watt VHF base station transceiver, four 5 watt VHF portable transceivers, one portable lifeboat transceiver and three radios communication receivers.

Hydrographic Winches and Equipment

The FAIRWEATHER and RAINIER are equipped with the following winches:

Two electro-hydraulic BT winches. Each winch has a drum capacity of 4,000 ft. of 3/32" dia. 7 x 7 stainless steel wire rope.

One electro-hydraulic double drum oceanographic winch with the upper drum capacity of 12,000 ft. of .298" dia. 6 conductor electric cable. This drum is also fitted with an eight conductor slip ring device. The lower drum capacity is 30,000 ft. of 3/16" dia. 3 x 19 wire rope.

One electro-hydraulic dredge and trawl winch with the drum capacity of 6,000 ft. of 3/8" dia. 6 x 19 wire rope.

The MT. MITCHELL is equipped with the following winches:

One electric BT winch with a drum capacity of 2,500 ft. of 3/32" dia. 7 x 7 stainless steel wire rope

Two electro-hydraulic winches with three interchangeable drums. One drum has a capacity of 12,000 ft. of .298" dia. 6 conductor electric cable fitted with an eight conductor slip ring device, one drum has a capacity of 30,000 ft. of 3/16" dia. 3 x 19 wire rope, and one drum has a capacity of 6,000 ft. of 3/8" dia. 6 x 19 wire rope. These two winches are also installed on turntables.

Laboratories

All command and data acquisition centers are linked by interconnecting wireways in addition to standard IC systems. The plotting room and field office has an area of 360 sq. ft., and the oceanographic lab. has an area of 240 sq. ft..

Habitability

Able to operate in both tropical and arctic areas. Is air-conditioned in all living and enclosed working areas. No provisions for women scientists. Potable water capacity is 16,821 gallons. Ship is equipped with two 3,000 gals./day distilling plants.

Other Features

The ship is provided with a centralized engine room control station, which together with controls and indicators in the pilot house console enables one man monitoring and control of the machinery plant operations. Maneuvering of the ship with respect to engine speed, propeller pitch, bow thruster operation and steering, can be controlled at the pilot house console, bridge wings and aft control station. Data recording and logger typewriting equipment logs temperature and pressure from sensors in the engine room. Automatic logging is also provided for recording propeller RPM, direction and degree of propeller pitch and controller position number, time and date. The ship is fitted with an anti-roll tank using diesel fuel for the stabilizing liquid.

Type of Observations

Continuous bottom profile, BT (0-900 ft.), bottom samples, (snapper, coring, dredging), current observations. Nansen bottle casts, plankton casts, magnetic observations (with towed proton precession magnetometer), with an output system.



PATHEINDER

CLASS II HYDROGRAPHIC SURVEY SHIP

Name of Ship

PATHFINDER (OSS-30)

Type of Ship

Specially built and equipped for Marine Charting Surveys.

Characteristics

Length - 229.3'
Beam - 39'
Draft - 15.5'
Displacement - 2000 L.T.
Cruising Speed - 12.4 kts.
Range - 4250 N.M.
Endurance - 14 days
Complement:
 Officers - 14
 Visiting Scientists - 4
 Crew - 69

Propulsion

Steam turbine, single fixed-blade propeller, 2000 IHP.
Tank capacity 96,000 gal.. Uses 1,500 gal./day at anchor
and 5,900 gal./day at service speed. Diesel oil used in
launches and galley ranges.

Electrical Power

Ship generates 200 KW, 110 volts a.c.. Normal operation
requires 84 KW. Alternating current obtained from two diesel
driven 30 KW generators.

Navigation and Communication Equipment

Navigation - Gyrocompass, magnetic compass, ship log, revolution counter, radar and loran "A". Shoal water depth sounder has two sounding scales, feet or fathoms, and six scale ranges of 50 fathom/foot each, with a 20 fathom/foot overlap. Trace resolution of graph plus or minus 0.1 foot/fathom. Two PFR-193, three scales, 0-100 fathoms, 0-400 fathoms, 0-4000 fathoms, variable pulse length, precision frequency built in.

Communication - Transmitters-Tranceivers A-1, A-6 communications system, single side band USB/LSB, amplitude modulation, 2-29, 999 mcs 1000 watts Tranceivers, single side band USB/LSB A-6, amplitude modulation, 1.6 - 15 mcs 100 watts A-6, Frequency modulated, 60 watts, 30-50 mcs. Transmitter A-1, 500 watts, ET-8010-C, 350-500 Kcs. Transceiver with variable transmitter output 0-1500 watts.

Hydrographic Winches

One electric BT winch. One electro-hydraulic oceanographic winch with 30,000' of 5/32" wire. One heavy winch for dredging.

Laboratories

Oceanography laboratory used for sea water analysis. Has electrical power.

Habitability

Cannot navigate in ice. Fresh water distillation 4,000 gal./day. Potable water tank capacity 22,000 gal.; feed water tank 20,000 gal..

Other Features

Has a rolling keel on each side of hull. Oceanographic operations can be performed up to Sea State 4. Four 26-foot launches are carried. One 26-foot motor whaleboat, one 24-foot pulling whaleboat.

Type of Observations

Hydrographic casts, coring, dredging, biological, magnetic, current surveys, hydrography.

Scientific Equipment

Bathythermograph*

Bottom sampling equipment:

 Snappers*

 Dredges

 Corers

Current meters

Remote current meter monitoring equipment

Magnetometer*

Subbottom profiling equipment

Surface meteorological equipment*

Plankton nets

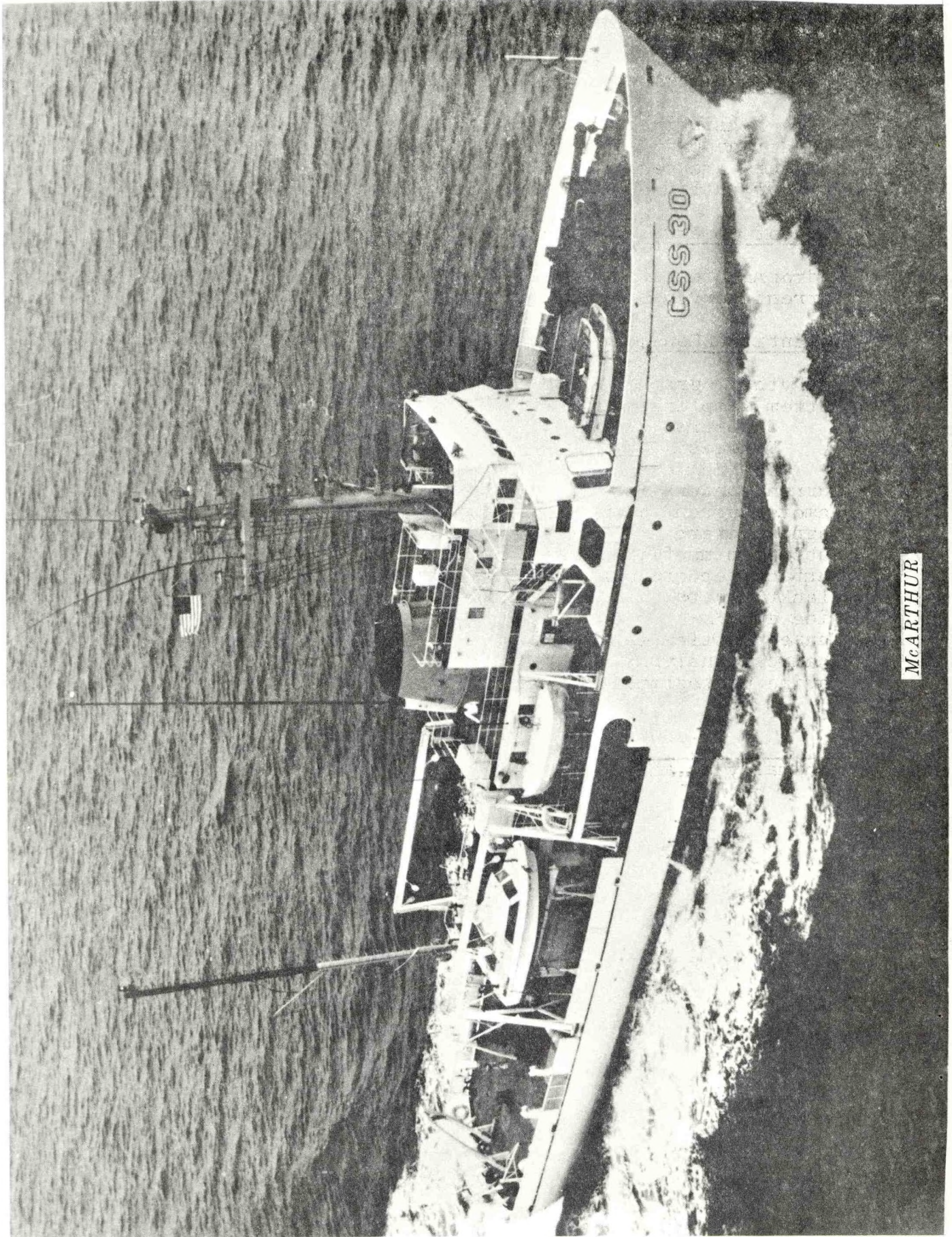
Tide gage*

Nansen bottles*

Chemical analysis instrumentation*

Marine photographic equipment

*Normally on board.



McARTHUR

CLASS III HYDROGRAPHIC SURVEY SHIP

Name of Ships

There are two sister ships of this type Class III, the McARTHER (CSS-30), and the DAVIDSON (CSS-31).

Type of Ship

Specifically designed for combined hydrographic survey operations, but has limited oceanographic capabilities. The ship has a steel hull and is ice strengthened.

Characteristics

Length - 175'

Beam - 38'

Draft - 11.5'

Displacement - 995 L.T.

Cruising Speed - 13.5 kts.

Range - 4500 N.M.

Endurance - 10 days

Complement:

Officers - 6 plus 1 spare

Crew - 30 plus 2 spares

Propulsion

Twin screw diesel, 800 SHP each with controllable pitch propellers that are controlled from a pilot house and engine room console and an aft steering station.

Electrical Power

Two diesel driven ship service generators of the drip-proof, self-ventilated brushless type 450 volt, 3 phase, 60 cycle, a.c. having a rated continuous capacity of not less than 220 KW each. The generators are arranged for parallel operation and either unit is capable of carrying the maximum normal sea or port load of the vessel. The emergency generator is of the brushless type and has a continuous capacity of not less than 60 KW. The emergency generator is also capable of providing the necessary power for cold ship starting. Ships service power is 115 volt a.c., 60 cycle single phase; 115 volt a.c., 60 cycle single phase regulated power and 115 volt a.c. 60 cycle single phase controlled frequency power is also available for certain electronics and scientific equipment.

Navigation and Communication Equipment

Navigation - One deep water depth recorder, one precision depth recorder, two shoal water depth recorders with associated equipment, one Loran A/C indicator system, one Digital Micro-circuit Loran C receiver, one surface search radar system, one transistorized surface search radar system, one radio direction finder, one electronic positioning system, one underwater log, electro-magnetic type, one gyro compass system and repeaters and one gyro pilot system.

In addition to the above, standard navigation equipment such as magnetic compass, whistle, rudder angle indicator, etc., is aboard.

Communication - One main radio telegraph console, one high frequency single sideband transceiver, one 1000 watt medium and high frequency transceiver, one 150 watt Radiotelephone transmitter/receiver, one narrow band very high frequency Radiotelephone, four narrow band very high frequency two channel frequency modulated (FM) Radiotelephones, one communication receiver, one narrow band very high frequency Base Station, one portable lifeboat radiotelegraph transmitter-receiver, and two high frequency communication receivers.

Winches

One BT winch, electro-hydraulic. The drum capacity is 4,000 feet of 3/32" diameter 7 x 7 aircraft cord stainless steel wire rope.

One oceanographic winch arranged to accommodate any one of three drums, which can be changed at sea. One drum handles 12,000 feet of .298 inch diameter, electrical double 30,000 feet of 3/16 inch diameter cable 3 x 19 seale construction, improved plow steel and the third drum construction, improved plow steel. The winch is a selfcontained hydraulically operated unit, complete with electric motor, hydraulic pump and motor controls. The winch is mounted on a rotating base and the area swept by such rotation does not exceed that of a circle 12 feet in diameter.

Laboratories

Chart and Plotting room	258 sq. ft.
Radio Room and workshop	144 sq. ft.
Oceanographic laboratory	176 sq. ft.

These spaces are all air conditioned and the navigation instruments and communications equipment are in compartments as applicable. A magnetometer system is installed in the oceanographic laboratory.

Habitability

Officer and crew messing and berthing areas are completely air conditioned.

Fresh Water

Fresh water capacity 22 tons, distillation 2,500 gallons per day.

Anti-Rolling Device

The ship is fitted with an anti-roll tank using diesel oil for the stabilizing liquid.

Type of Observations

Continuous bottom profile, BT (0-900 ft.) bottom samples (snapper, coring, dredging), current observations, Nansen bottle casts, plankton casts, magnetic observations (with towed proton precession magnetometer).

Scientific Equipment

Bathythermograph*

Bottom sampling equipment:

Snappers*

Dredges

Corers

Current meters

Remote current meter monitoring equipment

Magnetometer*

Two 25-foot hydrographic launches*

Subbottom profiling equipment

Plankton nets

Tide gage*

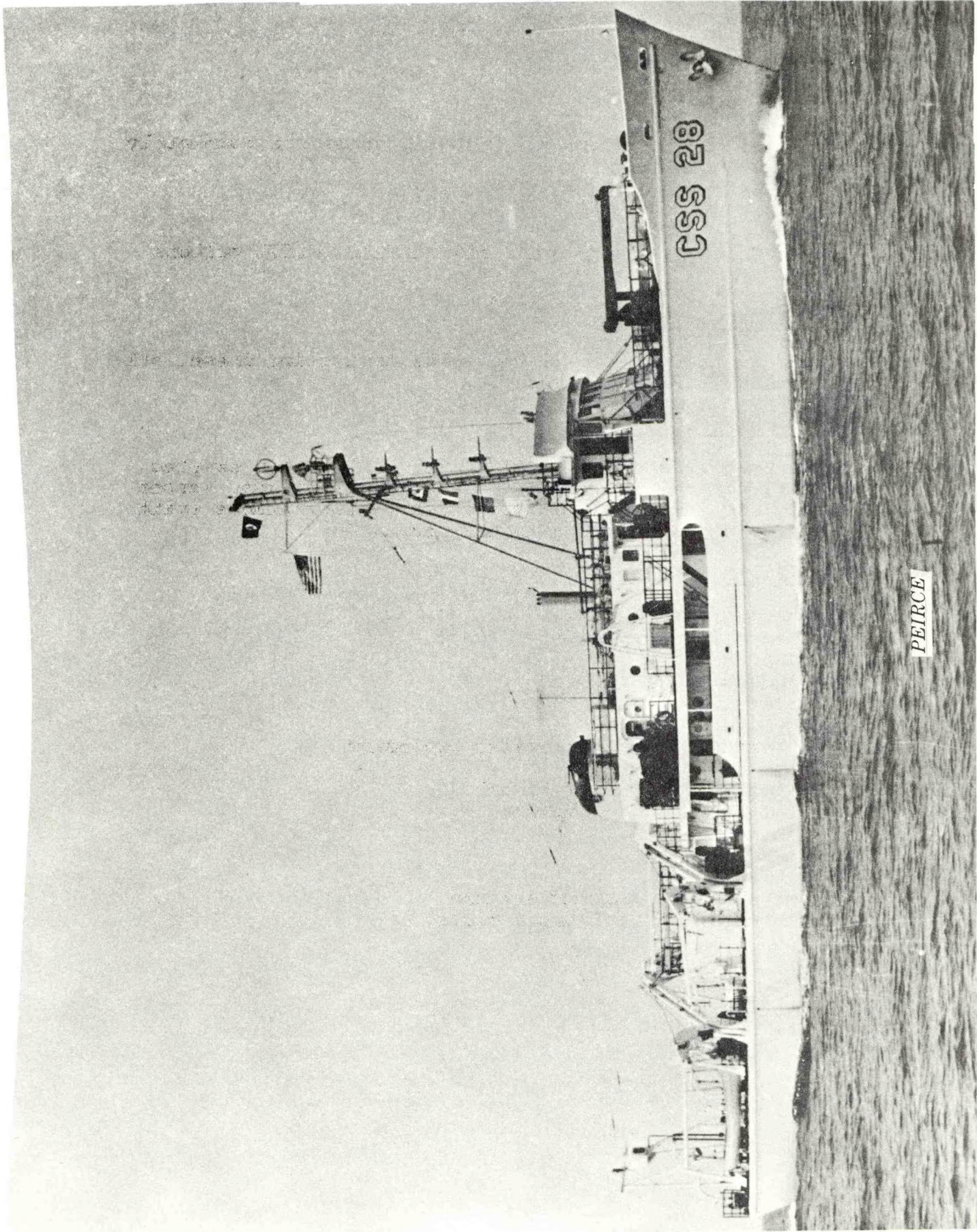
Nansen bottles*

Chemical analysis instrumentation

Surface meteorological instruments

GEK

*Normally on board.



PEIRCE

CLASS III HYDROGRAPHIC SURVEY SHIP

Name of Ships

There are two sister ships of this type class III, the PEIRCE (CSS-28) and the WHITING (CSS-29).

Type of Ship

Specifically built and equipped for combined hydrographic survey operations. The ship has a steel hull and is ice strengthened.

Characteristics

Length - 164'
Beam - 33'
Draft - 10.1'
Displacement - 760 L.T.
Cruising Speed - 12.5 kts.
Range - 4500 N.M.
Endurance - 10 days
Complement:
 Officers - 6
 Crew - 30 plus 2 spares

Propulsion

Twin screw diesel, 800 SHP each with controllable pitch propellers controllable from both a pilot house and engine room control console.

Electrical Power

Ship service generators are two 220 KW, 450 volt a.c., 60 cycle, 3 phase units. The emergency diesel generator is one 60 KW, 450 volt a.c., 3 phase, 60 cycle unit. Ship service power is 115 volt a.c., 60 cycle single phase; 115 volt a.c., 60 cycle; single phase regulated power and 115V AC, 60 cycle single phase controlled frequency power is also available for certain electronics and scientific equipment.

Navigation and Communication Equipment

Navigation - One deep water depth recorder, one PDR; two shoal water depth recorders with associated equipment; one Loran "A" receiver - indicator system; two surface search radar systems; one electronic positioning system; one underwater log, electro-magnetic type; one gyrocompass system and one gyro pilot system. In addition standard navigation equipment such as, magnetic compass, whistle, rudder angle indicator, etc..

Communications - Two MF/HF SSB transceivers; two radio telephone T/R (intermediate powered); radio telephone T/R (FM, UHF); portable radio telephone T/R (FM UHF) and two communication receivers.

Hydrographic Winches and Equipment

One BT winch, electric. The drum capacity is 4,000 ft. of 3/32" diameter 7 x 7 aircraft cord stainless wire rope. One double drum oceanographic winch, electro-hydraulic. The upper drum capacity 6,000 ft. of .298" electrical double armored cable, 6 conductors. The lower drum capacity is 15,000 ft. of 3/16" dia. 3 x 19 wire rope. One dredge and trawl winch, electro-hydraulic. The drum capacity is 6,000 ft. of 3/8" dia. 3 x 19 wire rope.

Laboratories

Chart and plotting room 256 sq. ft.; radio room and workshop 112 sq. ft. and oceanographic laboratory 80 sq. ft.. These spaces are all air conditioned.

Habitability

Ship is able to operate in both tropical and arctic areas. Officer and crew messing and berthing areas completely air conditioned. Fresh water capacity 5,768 gals., distillation 2,000 gals./day.

Other Features

Ship is fitted with an antiroll tank located under the pilot house.

Types of Observations

Continuous bottom profile, BT (0-900 ft.), bottom samples (snapper, coring, dredging), current observations, Nansen casts, plankton casts.

Scientific Equipment

Bathythermograph*

Bottom sampling equipment:

Snappers*

Dredges

Corers

Current meters

Remote current meter monitoring equipment

Magnetometer*

Two 26-foot hydrographic launches*

Subbottom profiling equipment

Plankton nets

Tide gage*

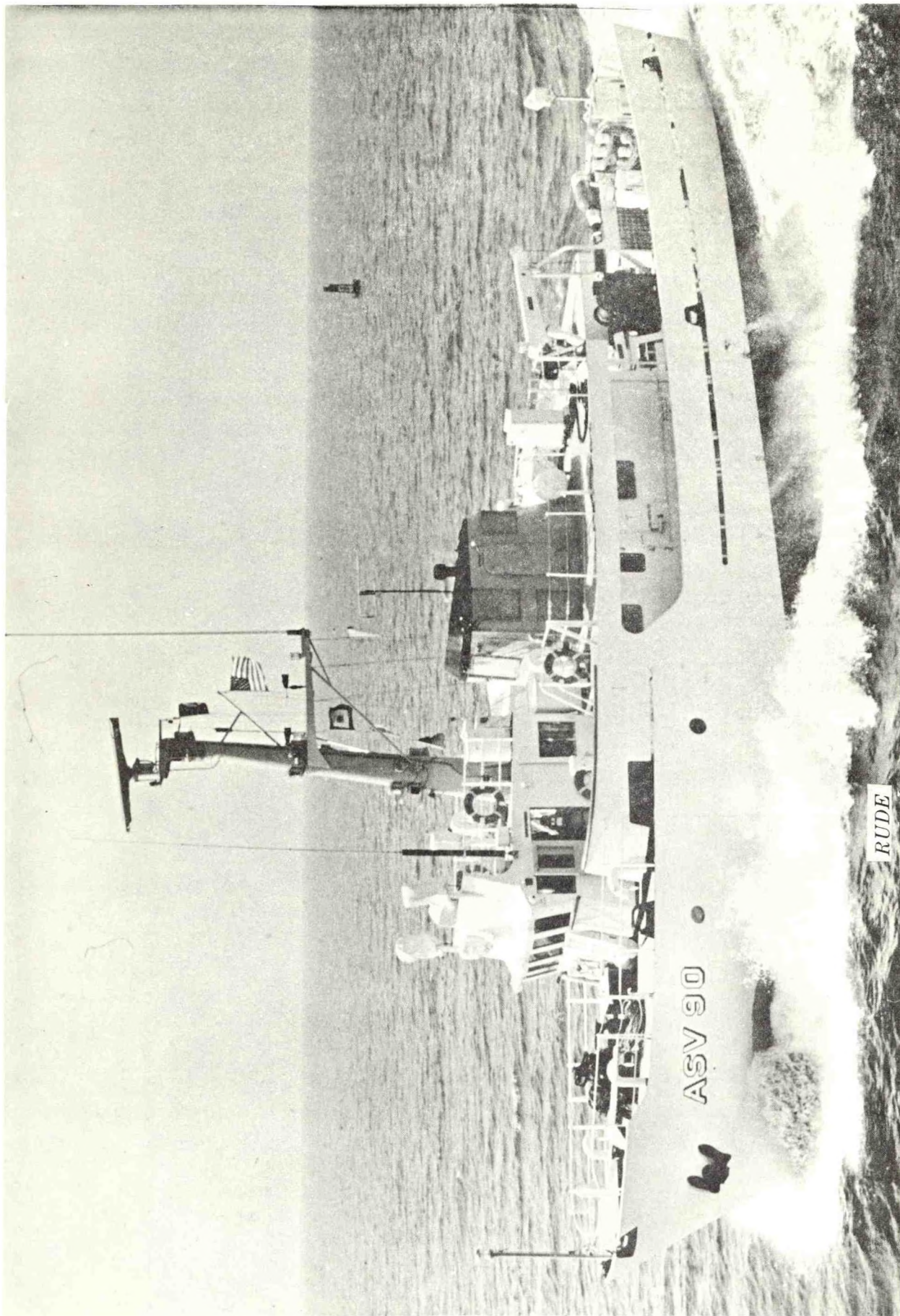
Nansen bottles*

Chemical analysis instrumentation

Surface meteorological instruments

GEK

*Normally on board.



CLASS IV WIRE DRAG VESSELS

Name of Vessels

There are two sister ships of this type Class IV, the RUDE (ASV-90) and the HECK (ASV-91).

Type of Vessel

Specially built and equipped for Wire Drag Surveys.

Characteristics

Length - 90'
Beam - 22'
Draft - 7.0'
Displacement - 214 L.T.
Cruising Speed - 11.5 kts.
Range - 740 N.M.
Endurance - 8 days
Complement:
 Officers - 2
 Crew - 9

Propulsion

Twin diesels, 400 SHP each engine; through reduction gears to each of two fixed pitch propellers guarded by shrouds similar to Kort nozzles. Auxiliary propulsion provides 50 horsepower to each propeller for dragging operations through the master hydraulic system, powered from the ship's service. Diesel generators operating a hydraulic pump, driving a hydraulic motor with V-Belts drive on the main propulsion shafting.

Navigation and Communication Equipment

Navigation - One gyro compass system, one reflector magnetic compass, radio compass direction finder (portable), short range, high frequency sonar system - sea scannar precision profiling sonar set, Shoal Water Depth Recorder, Electronic Positioning System and One surface search radar.

In addition, standard navigation equipment is installed, such as rudder angle indicator, whistle, plotting table, air, horn, repeaters, port starboard wing controls and aft control station for all power functions.

Communications - One mobile single sideband transceiver (voice only), one ship to shore communication transceiver (voice only), and one ten channel marine telephone.

Wire Drag Winch and Special Equipment

One wire drag winch with drum capacity of 8000' of 3/16" wire rope, one buoy hoist, and one buoy retrieving capstan working in conjunction with the wire drag winch.

Plotting Area and Field Office

Plotting area, 100 sq. ft. of pilot house and field office, 150 sq. ft..

Habitability

The ships are air conditioned in the field office, berthing and mess areas. A laundry area is provided in a separate compartment aft of the engine room. Heat is provided in all living and working spaces.

Fresh Water

Each ship carries 13.5 long tons of potable water and has the capability of producing additional water by means of a salt water distilling plant having a normal capacity of approximately 225 gallons of fresh water per 24 hours.

Fuel Oil

Each ship carries 13.0 long tons of fuel oil for propulsion. Heating is supplied by the use of same type of oil used for the generators and main engines.

Special Equipment and Features

One 20' launch (wire drag tender), one 16' work launch, one hydraulic crane to handle launch, work boat and buoys, one hydraulic anchor windlass and hydraulic rudder control.

Inner Bottom

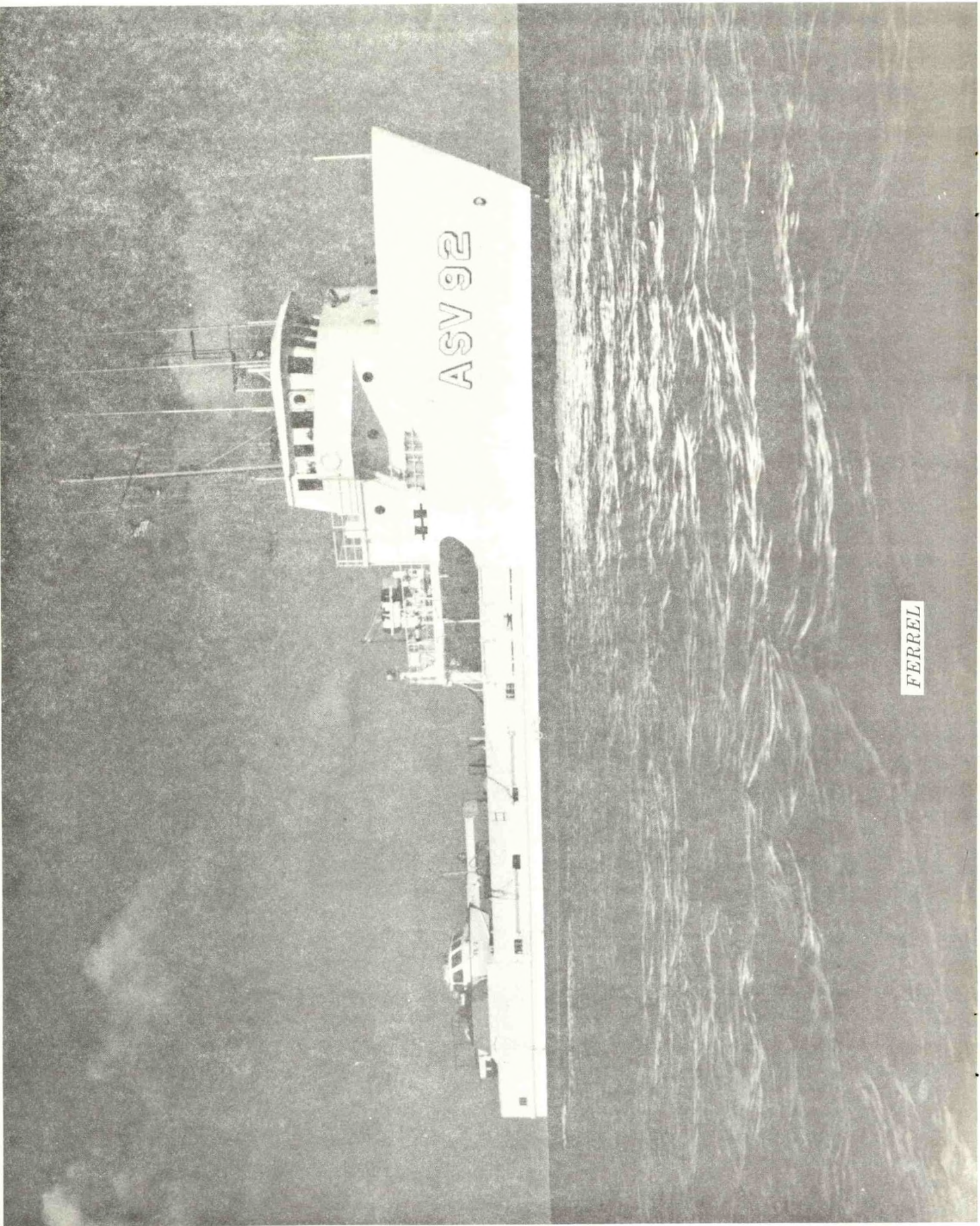
An inner bottom is provided for the entire length of the ship, normally used for ballast.

Automation

Ships are controlled from a centralized engine room control console in the pilot house with auxiliary control station on deck, port starboard including an aft deck station. Gyro repeaters are in these locations.

Range and Provisions

The ships are capable of carrying provisions and fuel for eight days, at reduced speed.



FERREL

CLASS IV CIRCULATORY SURVEY VESSEL

Name of Vessel

FERREL (ASV-92)

Type of Vessel

Specially built and equipped for Circulatory Surveys.

Characteristics

Length - 133' 3"

Beam - 32'

Draft - 7'

Displacement - 363 L.T.

Cruising Speed - 10 knots

Endurance - 15 days

Complement:

Officers - 3

Crew - 13 plus 2 spares

Propulsion

Twin screw, diesel, 410 SHP each engine, through reduction gears to each of two fixed pitch propellers. Additional maneuverability is obtained by a 100 HP electric driven bow thruster.

Electrical Power

Two 150 kw diesel generators, 440 volts, 3 phase, 60 cycle, and 24 volt d.c. system and ships service 120/208 volt, 3 phase.

Navigation and Communication Equipment

Navigation - One gyro compass system, one magnetic compass, radio direction finder (portable), one radar system, shoal water depth recorder and auto pilot steering system.

Communication - One Radio Telephone and the communications system required for the TICUS System. Sound powered telephones are in seven locations and two-way talk-back speaker systems in five additional locations. One Radio Telephone 1 KW, 2-30 MC.

Cranes and Winches

Three motor driven buoy winches with removable drums, two deck cranes, four hand operated boat mooring winches, and anchor windless with wildcats.

Buoy Stowage and Shop Areas

450-square feet of enclosed deck area accomodates the buoy workshop. Buoys are stowed on the open after deck. Buoy moniotoring facilities are separate from the workshop and stowage areas.

Habitability

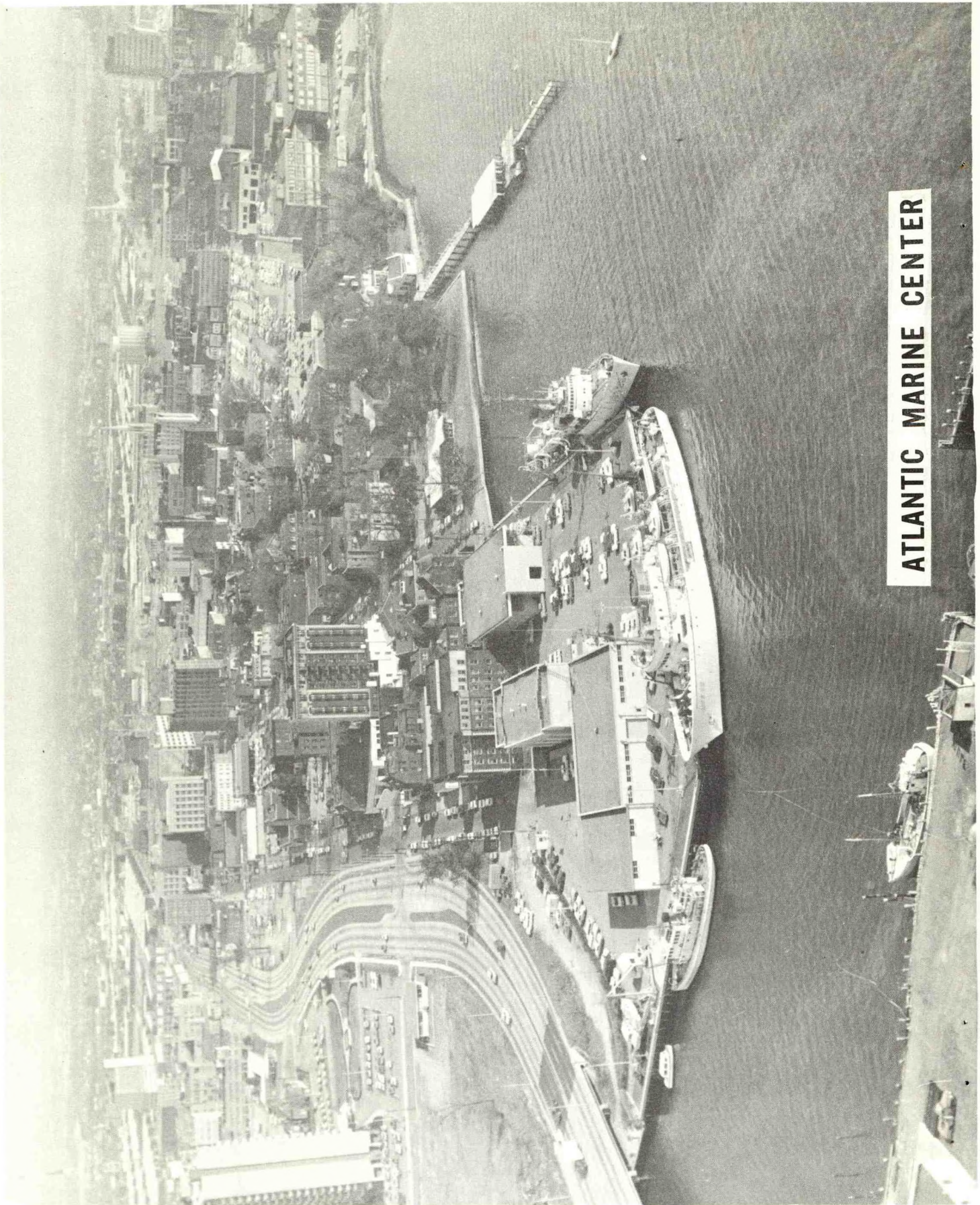
Air-conditioned spaces include the buoy plotting area, buoy workshop, berthing and mess compartments and pilot house. All living and work areas are heated.

Auxiliary Equipment

A 59' High Speed Launch and a 28' Jo-Boat are assigned to the ship to perform functions that cannot feasibly be accomplished by the FERREL.

Types of Observations

Nearshore and estuarine current surveys. Limited surface meteorological observations are also made. A Tidal Current Survey system including STD is installed.



ATLANTIC MARINE CENTER

NATIONAL OCEAN SURVEY MARINE CENTERS

The National Ocean Survey has two major operational bases: the Atlantic Marine Center (AMC) and the Pacific Marine Center (PMC). Both marine centers implement and coordinate the general operations of the NOS. Each center is responsible for both fleet and field projects, and is a fully equipped vessel support activity.

ATLANTIC MARINE CENTER

At the Atlantic Marine Center, hydrographic and oceanographic data is processed and verified. Operation and maintenance of a network of tide stations is supervised for the Atlantic, Gulf and Caribbean Coasts. Photogrammetric field operations and office compilation and processing are conducted.

Location

Downtown Norfolk, Virginia

NOAA Units

National Ocean Survey

Berthing Data

Berthing Space---800 feet
Depth alongside piers---20 feet
Depth approaching piers---20 feet

Facilities at Six Locations

Telephone
Fresh and Salt Water
Electrical Power: 440, 220, and 110 volts a.c.

Crane Capacity

Fifteen tons

Total Office Space

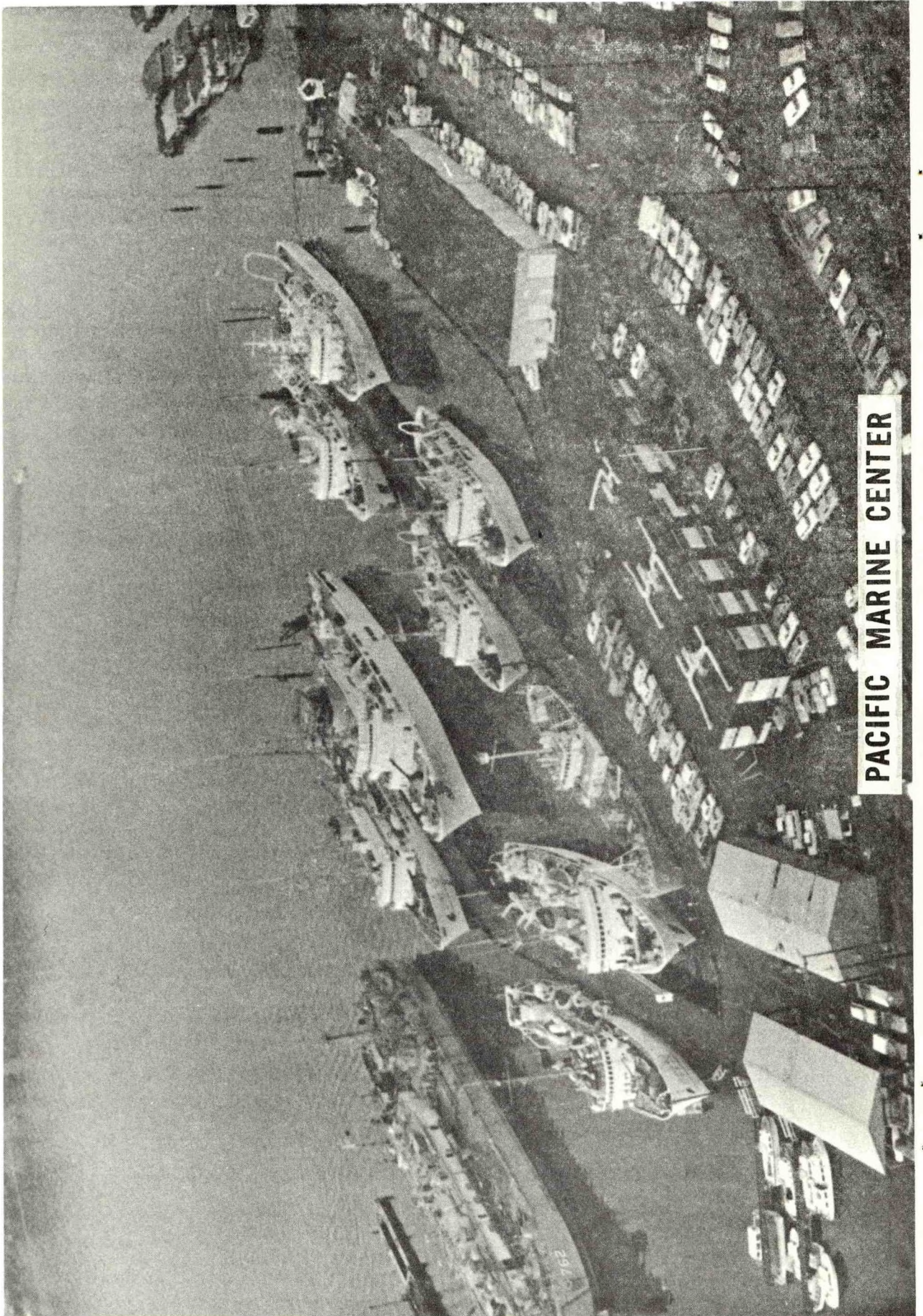
25,000 square feet

Warehouse Storage Capacity

14,000 square feet

Base Auxiliary Craft

Two 26 ft. launches



PACIFIC MARINE CENTER

PACIFIC MARINE CENTER

The Pacific Marine Center directs and supports the operation of West Coast survey ships and field parties in the acquisition and processing of hydrographic and oceanographic data. Supervises the operation and maintenance of control tide stations on the West Coast.

Location

East side of Lake Union, Seattle, Washington

NOAA Units

National Ocean Survey
Pacific Oceanographic Laboratory

Berthing Data

Berthing Space---2200 feet
Depth Alongside Piers---25 feet
Depth Approaching Piers---25 feet

Facilities at Eight Locations

Telephone
Fresh Water
Electrical Power: 440 and 110 volts a.c.
Sewage Outlets

Mobile Crane Capacity

Five tons

Total Office Space

17,000 square feet

Warehouse Storage Capacity

12,000 square feet

Base Auxiliary Craft

One 36 ft. utility boat