

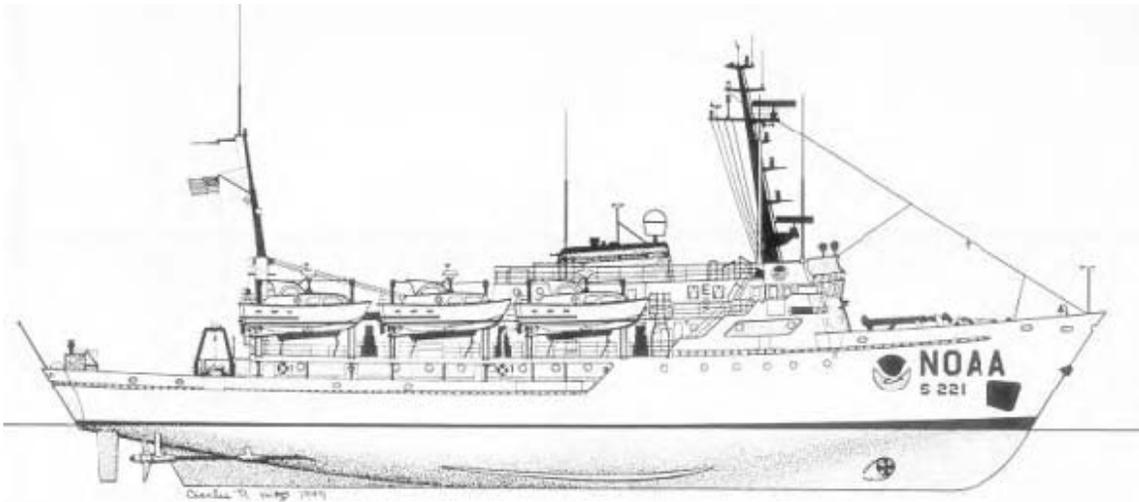
## NOAA Ship *Rainier*

*NOAA Ship Rainier* is one of the most modern and productive hydrographic survey platforms of its type in the world. The ship is designed and outfitted for conducting coastal hydrographic surveys in support of NOAA's nautical charting program. The ship supports high-precision near-shore surveys. The ship operates off the U.S. Pacific Coast, and in Alaskan coastal waters. *Rainier* is named for Mount Rainier in Washington state where *Rainier* is home-ported. The vessel is operated by NOAA's Office of Marine and Aviation Operations.

*Rainier* is equipped with the ELAC Seabeam 1050D MK II Multibeam Sonar System and the ship's six aluminum survey launches are equipped with for Reson 7125 dual-frequency multibeam sonars, one tilted Reson 8125 multibeam sonar, two Knudsen 320M vertical beam echosounders, and the HYPACK and HYSWEEP Hydrographic Data Acquisition System. The ship and launches also carry data acquisition and processing computers, Differential Global Positioning Systems (DGPS/PPK), Trimble POS MV Positioning Systems, sidescan sonar, and an assortment of bottom samplers, tide gauges, land survey equipment, and sound velocimeters. Two 19-foot small boats are used for diving and shore support operations, such as the installation and removal of tide gauges and DGPS control stations.

In 2008 and 2009 *Rainier* received four new survey launches, designed to support NOAA's multiple scientific missions. The launches were each outfitted with a large A-frame for deploying a variety of scientific equipment, swim platform for dive and rescue operations, and cutting edge survey systems and technology.

The concurrent use of several multibeam systems allows *Rainier* to cover large survey areas in a field season. The ship's hydrographers acquire and process massive amounts of data and create high-resolution, three-dimensional terrain models of the ocean floor. Using these models of the seafloor, hydrographers can quickly analyze the bottom and identify shoals and obstructions dangerous to navigation. Scientists can also use the three-dimensional images to study the geologic processes that created and are changing the shape of the bottom. Backscatter data acquired during the survey are now being utilized for fisheries habitat mapping.



### Design

- Designer: Maritime Administration
- Builder: Aerojet-General Shipyards, Jacksonville, FL
- Launched: March 1967
- Delivered: April 1968
- Commissioned: October 1968

- Hull Number: S 221
- Call Letters: WTEF
- Home Port: Seattle, WA
- Length (LOA): 70.4 m (231 ft.)
- Breadth (moulded): 12.8 m (42 ft.)
- Draft, Maximum: 4.4m (14.3 ft.)
- Hull: Welded steel/ice strengthened
- Displacement: 1,800 tons
- Gross Tonnage: 1,591
- Net Tonnage: 578

## **Speed & Endurance**

- Cruising Speed: 12 knots
- Range: 5,898 nmi
- Endurance: 22 day
- Endurance Constraint: Stability

## **Complement**

- Commissioned Officers: 12
- Licensed Engineers: 4
- Crew: 35
- Scientists: 4 (Max)

## **Food-Service Seating**

- Wardroom: 12
- Ship's Officers Mess: 11
- Technicians Mess: 18
- Crew's Mess: 18

## **Berthing Capacity**

- Single staterooms: 5
- Double staterooms: 18
- Four bunk rooms: 9
- Total bunks: 79

## **Medical Facilities**

- Emergency and first-aid equipment aboard, administered by trained vessel personnel.

## **Scientific Laboratory Facilities**

- Dry Oceanographic lab: 240 sq. ft.

## **Diving Equipment**

- Onboard dive air compressor
- 17 SCUBA tanks
- NOAA certified divers

## **Cranes and Booms**

- Telescoping Boom Crane
  - Quantity: 2
  - Manufacturer: Skagit
  - Drive: Electrohydraulic
  - Location: Foredeck, Port and Starboard
  - Boom length: 25 ft.
  - Lifting capacity: 2,500 lbs (boom extended)
- Fixed Length Crane
  - Quantity: 1
  - Manufacturer: Skagit
  - Drive: Electric
  - Location: Aft Mast
  - Boom length: 40 ft.
  - Lifting capacity: 5,000 lbs

## **Winches**

- Oceanographic Winch
  - Manufacturer: Northern Line
  - Drive: Electrohydraulic
  - Location: Main Deck, Starboard Quarter
  - Line speed: 0-400 ft./min.
  - Maximum pull: 1,000 lbs.
  - Drum capacity: 30,000 ft. of 3/16 in. wire rope

## **A-Frame**

- Type: Movable
  - Quantity: 1
  - Drive: Electrohydraulic
  - Location: Main Deck, Strb. Qtr.
  - Clearance over side: 3 ft.

## **Ground Tackle**

- Bower Anchor
  - Quantity: 2
  - Type: Stockless
  - Weight: 4,850 lbs
- Anchor Chain
  - Quantity: 2
  - Size and type: 1 3/8 inch stud link
  - Length: 165 fathoms

## **Launches and Small Boats**

- Aluminum Survey Launch
  - Quantity: 4
  - Manufacturer: All-American Marine
  - Length: 29 ft.
  - Propulsion: Diesel
  - Special Features: Power isolation protection for scientific equipment, 120V generators, A-frames
- Aluminum Survey Launch
  - Quantity: 1
  - Manufacturer: The Boatyard (Jensen)
  - Length: 29 ft.
  - Propulsion: Diesel/Jet Drive
  - Special Features: Power isolation protections for scientific equipment.
- Aluminum Survey Launch
  - Quantity: 1
  - Manufacturer: American Eagle (Munson)
  - Length: 29 ft.
  - Propulsion: Diesel/Hamilton Jet Drive
  - Special Features: Power isolation protections for scientific equipment.
- Aluminum Open Boat

- Quantity: 1
- Manufacturer: SeaArk
- Length: 19 ft.
- Propulsion: Gasoline Outboard
- Aluminum SAFE Boat
  - Quantity: 1
  - Manufacturer: American Eagle
  - Length: 19 ft.
  - Propulsion: Gasoline Outboard

## Engineering

### General

- Cruising Speed: 12 knots
- Range: 5,898 nmi
- Power: 2,400 hp
- Fuel Capacity: 107,000 gal.
- Fuel Consumption: 120 gal./hr.
- Fuel Type: #2 diesel
- Endurance: 22 days
- Endurance Constraint: Stability

### Propulsion Plant

- Main Propulsion
  - Type: Geared Diesel
  - Quantity: 2
  - Manufacturer: General Motors EMD
  - Rated power (each): 1,200 hp
- Propellers
  - Type: Controllable Pitch
  - Quantity: 2
  - Diameter: 8.5 ft.
  - Blades: 3
- Auxiliary Propulsion
  - Type: Through Hull Bow Thruster
  - Quantity: 1
  - Manufacturer: Detroit Diesel/Bird Johnson
  - Drive: Geared
  - Rated Power: 200 hp

## Freshwater System

- Storage capacity: 16,000 gal.
- Normal consumption: 3,500 gal/day
- Evaporators
  - Quantity: 2
  - Type: Waste Heat/Evaporative Distillers
  - Manufacturer: Alpha Level
  - Maximum Production: 7,000 gal/day

## Pollution Control

- Sewage Waste Control
  - Type: Electrocatalytic
  - Manufacturer: Sigma Chapman Inc.
  - Holding Capacity: 8,000 gal
- Oily Waste Control
  - Type: Oily water separator
  - Manufacturer: SRS
  - Holding Capacity: 1,700 gal

## Electrical System

- Ship Service Generator
  - Quantity: 2
  - Manufacturer: Detroit Diesel/GE
  - Output Voltage: 450 VAC, 60 Hz, 3Ø
  - Power Rating: 300 kW
- Emergency Generator
  - Quantity: 1
  - Manufacturer: Detroit Diesel/GE
  - Output Voltage: 450 VAC, 60 Hz, 3Ø
  - Power Rating: 75 kW
- Electrical Service
  - 450 VAC, 3Ø
  - 120 VAC, 3Ø
  - 120 VAC, 1Ø
  - 120 VAC, 1Ø uninterruptible power for scientific equipment.

## Communications

- VHF-FM Marine Band Transceivers
- MF/HF Marine Band Transceivers
- HF Alarm Watch Radio Receiver (2182 kHz)
- Radio Teletype Capability
- NAVTEX Receiver
- Cellular Telephone
- Portable VHF-FM transceivers
- INMARSAT Standard B Radio Transceiver
- INMARSAT Standard C Radio Transceiver
- Emergency Position Indicator Radio Beacons
- Search and Rescue Transponders (X-Band Radar Frequency)
- E-mail (*Rainier's* E-mail address is: [NOAA.Ship.Rainier@noaa.gov](mailto:NOAA.Ship.Rainier@noaa.gov) )

## Navigation

- X&S- Band Radar with an ARPA display.
- Differential Global Positioning System ( DGPS) Receivers
- Electronic Chart Navigation System ( ECS)
- Gyrocompass

## Scientific Equipment

- Sea-Bird Electronics, Inc. SBE 19, SBE 19 Plus, SEACAT CTD Profilers
- Shipboard Environmental *Data* Acquisition System (SEAS)
- Air and Seawater Temperature Sensors
- Pentium 4 PC's with Windows XP operating systems
- Power isolation protection for scientific equipment.
- ODIM MVP30 Moving Vessel Profiler Sound Velocimeter

## Survey Equipment

- CSi MBX-2 Radio Beacon Receiver
- Knudsen 320 Verticalbeam Echosounders
- RESON 8101 & RESON 7125 Multibeam Sonar Systems
- SeaBeam 1050 D MKII
- Ceeducer Verticalbeam Echosounder
- Trimble DSM212L
- TSS/Applanix Position and Orientation System POS/MV
- Monitor Repeaters for coxswains
- Digital Cameras
- Sutron 8210 Nitrogen Bubbler Tide Gauges
- Zeiss Ni-2 Optical Levels
  
- Ashtech Z-FX GPS Receivers, Data Loggers, and L1-L2 GPS Antennae
- miniTROLL SSP-100 Least Depth Gauge

## Software

- Acquisition Software
  - HYPACK and HYSWEEP Survey Data Acquisition Program
  - POS/MV Controller for positioning
  - SonarPro for side scan acquisition
  - Hydrostar for multibeam acquisition
- Processing Software
  - Hydrosoft Software for singlebeam data manipulation and conversion
  - CARIS HIPS & SIPS for data processing and analysis
  - MapInfo for data plotting and analysis
  - CARIS Notebook for survey planning, shoreline acquisition, and feature management.
  - Pydro for feature management and report generation
  - Fledermaus for data visualization
- Horizontal Control Software
  - TSIP Talker
  - DSX/National Geodetic Society DSData Extraction
  - Ashtech WinPrism and Mission Planner
  - Fillnet
- Vertical Control Software
  - Sound Velocity VelocWin

- MS DOS SeaCat Profiler
- Newiz Leveling Software
- Tides LogPlot
- Tides LogStat
- Tides LogPrn Convert