

BLUEWATER

LOA 51', LWL 43.3', Beam 16.1', Draft 6'

Displacement 100,000 lb (cruising trim with full tanks)

Owners: Milt and Judy Baker

Designers: Jeff Leishman and Pacific Asian Enterprises

Built 2005 by Pacific Asian Enterprises, Xiamen, China

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Bluewater is hull number 32 of the Nordhavn 47 line of offshore passagemaking power boats. The N47 is one of the new generation Nordhavns—big boxy boats, with lots of freeboard and loads of interior volume. With three tons of ballast and heavy loads of fuel, water and machinery, it's a boat built to go to sea on extended passages and keep its crew safe and comfortable in the process, yet provide a comfortable platform for extended living aboard on the hook or alongside. More than 300 Nordhavns had been built and at least four have completed circumnavigations.

Bluewater was built for an experienced cruising couple in their mid-sixties who sought reliability and comfort in a capable passagemaker. As a member of the organizing committee for the Nordhavn Atlantic Rally 2004 and head of the rally's advance team, Milt Baker knew a lot about the boat before placing his own order.

Approaching *Bluewater*, the first impression is that this is one big fat 47-footer. The foredeck is a full eight feet above the waterline, meaning the boat can punch into a serious head sea and still keep the windshield dry. The design incorporates a wraparound Portuguese bridge with 36-inch bulwarks topped with 1¼-inch stainless steel rails on three sides of the pilot house. The reverse slant of the pilothouse windows and a 15-inch coachroof bill above help keep the sun at bay and reduce spray on the windshield.

Bluewater has the austere look of a workboat: high bow, all sharp angles without sheer, and more height and beam than a seaman's eye might want for the length overall. Yet many aficionados embrace the broad shoulders and salty, almost commercial look of a Nordhavn. If function is beauty, it's easy to argue that the Nordhavn 47 and her sisters are beautiful for, if nothing else, they are seriously functional cruising machines. "Beautiful" is a not word Milt uses to describe his boat, but he calls her "salty to the eye and definitely handsome."

The main engine is a Lugger 174 HP Turbocharged Diesel, driving a 34x30 inch propeller through a 3.96:1 reduction gear. Milt made it a point not to specify an electronically injected diesel engine for this boat. "There's no question that today's electronic diesels are more efficient across the whole range of power, but in my view reliability trumps efficiency in an ocean-crossing boat. With this engine, I can work on it myself or find a mechanic in any port to help me out, but electronic engines today are still rare, delicate creatures serviced with proprietary software as often as wrenches. Trying to get one fixed in far-flung ports is a problem I don't need!"

Speed trials show that the boat tops out at 9.3 knots in flat water. Carrying 1,480 gallons of fuel, she burns about 6 gallons per hour at 8 knots, yielding a no-reserve range of about 2,000 nautical miles. On long passages where stretching the range is critical, backing her off to 7 knots reduces the fuel burn to 3.5 GPH, giving a theoretical no-reserve range of 2,960 NM. With 24/7 (6 kW) generator use and a 10% fuel reserve, the yacht's theoretical range at 7 knots is 2,331 NM.

Most Nordhavns are dry stack boats which use keel coolers and send the exhaust out near the top of the mast. Milt and Judy had years of experience with wet exhaust boats, however, and insisted on a wet exhaust system. *Bluewater* was the first N47 delivered with a wet exhaust system: two raw water pickups for the main engine, one each to port and starboard of the keel, a water-lift muffler system, with the raw water and exhaust exiting the hull at the waterline just ahead of the transom on the port side. The standard N47 sends engine room heat "up the stack." In lieu of a stack *Bluewater* uses a large diameter 1,850 cubic feet per minute fan to send pressurized air into the engine room which, in turn, forces the hot air out through a large plenum. The yacht's engine room--even in the tropics--rarely exceeds 125 degrees.

Almost as important as propulsion in a passage-making powerboat is roll reduction. The Nordhavn Atlantic Rally made it clear that the database on stabilizers for offshore passagemaking powerboats was painfully thin. Until then stabilizer systems had been spec'd based mostly on a boat's length, speed and displacement. But one corollary to the

Rally's lessons learned is this: what might work fine on a trawler doing coastal cruising for a couple of hundred hours per year will not necessarily keep working reliably on a passage maker under the continuous stress of crossing oceans. A larger, more robust system is needed.

Over 7,000 miles of cruising and 1,100 engine hours in *Bluewater's* first year, the Naiad 254 hydraulic stabilizer system and Datum electronic control system have worked extremely well, reducing roll and providing a comfortable ride for her crew in almost all sea conditions. To provide an independent backup, *Bluewater* is fitted with a paravane system similar to the stabilizing rigs on offshore fishing boats. The rail-mounted paravane poles are 24 feet long, meaning that the outer end of each pole is approximately 32 feet from the centerline of the yacht. Each 35-pound paravane, shaped like a delta-wing, is designed to dive down with little resistance when the pole dips downward. On the counter-roll when the pole attempts to pull it back up, the paravane resists the pull with great effectiveness; that's what provides the stabilization.

To gain paravane experience and test their own system at sea, the Bakers turned off the active fin stabilizers and ran the paravanes for four days in moderate weather enroute from North Carolina to Puerto Rico. In beam and quartering seas up to 6 to 8 feet, the paravanes did a fine job of stabilizing the boat. The motion was slightly "jerkier" than with the active fin stabilizers on, and they estimate that on the average the paravanes were perhaps 65 to 70 percent as effective as the Naiads at reducing roll.

One downside of paravanes is the drag penalty they impose. While the variable displacement hydraulic pump driving the active fin stabilizers uses a few engine horsepower and, therefore, burns a small amount of additional fuel, they seem to impart no speed penalty. On the other hand, the Bakers found that the paravanes slowed forward progress by .25 to .4 knots, a 4 to 6 percent speed loss assuming a nominal 7 knot speed of advance. That equates to a loss of 6 to 10 miles a day on a passage, an easy fare to pay if the alternative is no stabilization.

Fresh water capacity is 400 gallons, a big load for a 47 foot yacht. Somehow the Bakers manage to use a lot of water, and they get a lot of use from their 600 gallon per day Village Marine Tech water maker. The fresh water jet Headhunter heads use $\frac{1}{2}$ to $\frac{3}{4}$ gallon per flush and the clothes washer uses up to 30 gallons per load. The pressure water system employs a pair of Headhunter 24 volt pumps, a primary and a backup, along with separate breakers and a manifold allowing a quick switchover in the event of pump failure. Because the vessel's heads require considerable pressure, the domestic water system is operated at 70-80 PSI; during the first year both the pumps and the Whale brand hoses and fittings have handled this pressure without problems.

Lavatories and showers for the master and guest staterooms on the lower level of the yacht are below the waterline. They are drained by gravity to a 110 gal gray water tank low in the hull. The tank is fitted with a pump that automatically discharges gray water when it reaches a certain level. The 120 gal black water holding tank, on the other hand, must be pumped overboard by switching a breaker. Both tanks have 24-volt diaphragm

pumps and backup hand pumps, and both can be emptied via deck pumpout. Both tanks have TankWatch monitors, showing the tank levels at all times; the main water tank level has a conventional electric gauge. The heads have three-way valves allowing sewage to be pumped directly overboard when offshore.

The standard N47 is delivered with two electric bilge pumps, one normal and one for high water, plus a backup manual pump. The normal pump is a 24-volt Jabsco diaphragm pump with a capacity of 10.8 GPM, powered through a bilge pump panel in the pilot house and operated by an auto-on-off switch. A red status light on the bilge pump panel illuminates to alert the person on watch whenever the pump is operating, and a counter displays the number of times the pump has cycled on since the display was reset. A Groco bilge strainer is at the lower end of the intake hose. The high water pump is a 24 volt Rule submersible pump rated at 3700 GPH or about 60 GPM. This is also powered through the pilothouse bilge pump alarm panel and operated by an auto/manual switch, with a red light similar to the one for the normal bilge pump. The switch for the high water bilge pump also activates a piercing audio alarm (silenced at the touch of a switch) when the high water pump is on. The third or “backup for the backup” bilge pump is a large Edson 638 hand-operated pump located high in the engine room and accessible from the main saloon

The fuel system is straightforward and elegant, developed, shaken down, and improved with input from many Nordhavn owners. Two large fuel tanks, one each port and starboard, have sight gauges showing the amount of fuel remaining. These tanks gravity feed through valves to an aluminum 70-gallon day tank mounted on the centerline of the boat. With the day tank mounted significantly lower than the bottom of the wing tanks, every last gallon of fuel can gravity-feed into the day tank. Selecting appropriate valves, it's easy to supply the day tank from either or both of the main tanks. All fuel for the main engine and both generators is taken from the day tank, and fuel returning from those units is returned to the day tank. The day tank has three features of note:

- A Racor model RK3056 water detection kit, which sounds an alarm and illuminates a red light on the pilot house panel to denote the presence of water in the bottom of the day tank.
- A small sump at the very bottom that is valved, allowing the operator to take a sample from the bottom of the tank--something Milt does before heading offshore--or to drain off water or dirty fuel.
- A three-gallon supply reservoir at the top, with a calibrated sight gage to facilitate measuring fuel consumption over a short period of time.

Air conditioning is generous: a total of 60,000 BTUs worth! *Bluewater* carries separate compressor units and air handlers for main salon, galley, pilot house, master stateroom, and guest stateroom. The air conditioning units are all reverse cycle, offering heat in seawater down to about 50 degrees. Air conditioning condensate is plumbed to drain either overboard or into the gray water tank, depending on the location of the unit; no condensate drains to the bilge.

Windows and doors to the accommodation are heavily-built aluminum Diamond Seaglaze brand, proven over many Nordhavns, with ½-inch tempered glass. *Bluewater* carries large Plexiglass storm shutters for the six side windows in the main saloon; the storm shutters bolt in place and can be installed in 45 minutes. The two pilot house doors and single main saloon door are Dutch doors, meaning the bottom can be left closed with the top open. The three doors are easily dogged against large diameter rubber gaskets to keep water on the outside.

Bluewater is the first N47 with two generators in the engine room. During the yacht's first year of operation the 6 kW genset accumulated close to three times as many hours as the 12 kW. The six sips ½ gallon per hour, yet it will carry the house load and run up to three air conditioners. The 12 kW generator is put online when it's necessary to recharge the batteries using both the Xantrex inverter-charger and the 100-amp Mastervolt charger at the same time or carry more of a load for air conditioning, washing or drying clothes, heating water, or running heaters. Underway, the house load is supported by the Leece-Neville 175-amp 24 volt charger on the main engine. In fact, if there's no need for 240-volt service (air conditioners, water maker, washer and dryer), when the yacht is underway the big alternator easily carries the full house load and keeps batteries topped off.

The DC electrical system operates on 24 volts, using 12-volt LifeLine AGM batteries in pairs. Most of them are out of sight beneath shelves in the lazarette, meaning that adding water would be nigh-unto impossible. In addition to the 24-volt banks, the yacht has two 12-volt banks: the 6 kW generator starting battery and a pilot-house communications battery which powers all radios and the satellite phones.

The Bakers enjoy being at anchor for days at a time. Depending on the outside temperature and equipment being run on the boat, they can remain at anchor without recharging for up to 18 hours, but batteries are typically charged twice a day. They monitor the Victron Energy BMV-501 battery monitor carefully, generally starting a genset to begin charging the house bank batteries before they get down to 60% of capacity. Using both the Xantrex inverter-charger and the Mastervolt charger together, batteries can be charged at a starting rate of about 200 amps at 24 volts, but that quickly tapers off. To assure long life the AGM batteries should be recharged to a full 100% regularly, and to accomplish this typically, Milt has found it takes running the generators and chargers 3-4 hours at a time, a practice which has added a lot of generator hours in *Bluewater's* first year. Normal protocol is to start with the 12 kW generator (burning about 1 GPH) for one to two hours of charging, often running the water maker and sometimes the washer and dryer at the same time. Once the load tapers, the more economical 6 kW generator is used for the balance of the charging. This approach consumes less fuel and keeps generators loaded appropriately. At anchor in non-tropical climates, *Bluewater* uses about six to seven gallons per day for charging, refrigeration, making water, laundry and other house services.

One enhancement Milt hopes to add is an array of solar panels. The pilot house top and boat deck offer ample real estate for a series of 120-watt solar panels, and Milt is optimistic that this will supplement their battery charging and reduce generator run times.

“In our first year we have put the yacht through her paces,” Milt said. “We’ve been chased by a hurricane, we’ve cruised her for months in the warm tropical waters of the Caribbean and South America, in the temperate waters of Bermuda, and also in the much cooler waters of Maine. We’ve had one offshore passage of a week, a couple of five or six days, and many more passages or two or three days. We’ve lived aboard continually for a year, underway and in marinas and at anchor. And we have found this boat easy to love!” Although barely a year old, *Bluewater* is a proven passage maker, and Milt and Judy Baker are betting she’ll make many more safe, comfortable passages. They plan to take her to the Mediterranean in 2007, and they feel they have an ideal boat for the passage over and for cruising in the Med.



Bluewater's hull, recently out of the mold. Nordhavn 47s are built to heavy scantlings. The hull is a solid laminate of fiberglass and Vinylester resin with a network of full-length, longitudinal and transverse stringers for stiffness. Forward sections feature extra laminates for collision protection, and collision bulkheads and watertight doors are included in the design. Bulkheads and longitudinal and transverse stringers are glassed in place while the hull is in the mold.

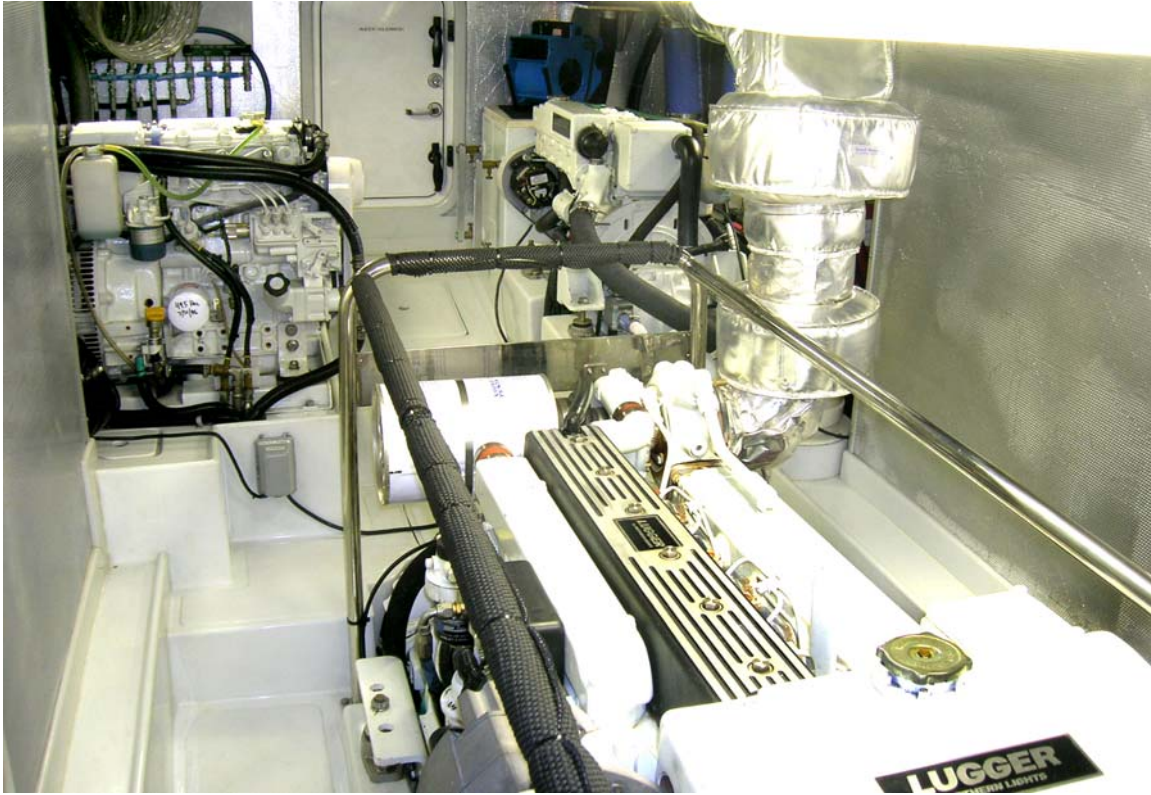


Bluewater underway on the Patuxent River, off Chesapeake Bay, less than a month after being delivered to her new owners off the coast of Florida. The full stern sections help to reduce squatting and extend the top end of the cruising speed range. A slight tunnel area above the propeller allows the boat to slow-turn a large-diameter prop without unduly increasing draft. The large prop reduces cavitation and vibration, delivering a smooth, quiet ride.

The boat deck accommodates the yacht's 10-foot tender and the 1500-lb. Steelhead davit, plus two deck boxes. The boom has been raised to a position about six feet above the boat deck, making dinghy handling and other boat deck gymnastics easier.

At first glance the paravane rig looks complex, but to a sailor it's quite straightforward, using what we commonly know as topping lifts, downhauls, and guys. The hinged poles are stowed in an upright position tight against purpose-designed spreaders. The paravanes, connected to the poles by nylon line and light chain, are stowed in stainless steel mounts on the transom. Launching the paravanes requires dropping the poles, then using electric winches with dedicated wire cables to lift each paravane from its mount and slowly lower it into the water until it reaches the end of its chain. (Retrieval simply

reverses the process.) The only real trick is to prevent a paravane, while swinging as a pendulum, from taking a bite from the transom or swim platform!



Bluewater's stand-up engine room, looking aft from the entry on the starboard side. In the foreground is the main engine, a Lugger 174 HP Turbocharged LP668T Diesel. To the left in the picture are the Northern Lights 12 kW and 6 kW generators. The auxiliary "wing" engine, a Lugger 40 HP Diesel, is aft and to the right of the main engine. Astern of that is a 24-gallon lube oil tank. The watertight door leads to the lazarette.

In the trawler world, the idea of a separate get-home or "wing" engine remains controversial. Detractors point out that thousands of commercial fishing vessels operate with a single diesel engine and no get-home capability and make out just fine on the oceans of the world. Yet every Nordhavn owner knows another who has had to use the wing engine after developing a problem that prevented use of the single main engine, transmission, shaft or propeller. In the final analysis, nearly all new Nordhavns are ordered with get-home engines. The wing engine has a dedicated transmission, shaft and folding propeller and its own dedicated fuel tank. In flat water and wide-open-throttle it moves the boat a 5 knots; in flat seas it can cruise for days at 4 knots on 1.4 GPH.



Bluewater's electrical panels are located adjacent to the helm. To the left is the 24-volt panel, with the smaller 12-volt panel in the center. AC power is controlled on the right side, with 120 VAC loads at the top and 240 VAC loads beneath. Switching for shore power and generators is at the bottom of the right panel. Twelve digital gauges give a clear picture of what's happening.

To facilitate use of the boat in ports away from the U.S. electrical grid, the yacht's 120-volt AC load is powered by a 4 kW Xantrex inverter. Whether the yacht is at anchor with no incoming power, running a generator, or plugged into shore power, that means refrigerator, freezer, microwave, AC lights and electrical outlets all receive clean, conditioned power directly from the inverter. It also means that in a 230-volt, 50-hertz electrical environment like that found in Europe, normal U.S. household appliances can continue to be used because they receive their power from a 60-hertz inverter, not directly from the shore power. A dedicated Mastervolt 100-amp battery charger is used to charge batteries in a 50-hertz environment and, in turn, the batteries supply power to the house load through the inverter. In case of inverter failure, an inverter bypass allows operating the house AC system directly from either shore power or generator.



A 400-gallon fiberglass fresh water tank for a Nordhavn 47 (foreground) awaits pressure testing and gel coating at the factory. In the background is a 700-gallon fiberglass fuel tank. PAE's approach is to build what it calls "lifetime tanks" of fiberglass, pressure test them to 4 PSI, then glass them firmly in place. No rusty tanks on these boats! *Bluewater* has two fuel tanks of about 700 gallons each, a 400-gallon water tank, a 120-gallon holding tank, and a 110-gallon gray water tank, all fiberglass. Fuel and water tanks have access plates allowing an average-sized man to climb inside, and fiberglass baffles are bolted in place. The baffles can be removed with a pair of wrenches, giving access to every corner of the tanks. Fills for the water and fuel tanks are conveniently located above deck level, reducing the likelihood of seawater intrusion. However, plumbing from filler to tanks goes through a series of turns and the vent hoses are small, making filling water and fuel tanks a bit more of a chore than it ought to be.



The dual Racor filters and vacuum gauge for the main engine (right) and for fuel transfer and polishing (left). The transfer pump is at the far right. A dual 75/900 MAX Racor filter/water separator rated at 180 GPH handles fuel going to the main engine, a bit of overkill for an engine typically operated at well under 9 GPH! Milt uses 10 micron filters (the same rating as in the secondary filter on the engine) in this unit which has two separate elements together with a four-way valve allowing filter elements to be changed while the vessel is underway. Fuel can be transferred between the tanks and “polished” along the way using a 60 GPH Walbro 24-volt fuel transfer pump and dedicated model 500MA Racor filter also rated at 60 GPH using 2 micron elements.



Bluewater's foredeck, showing the raised and dammed platform for ground tackle, the Freeman hatch to starboard leading to the chain locker, and the 30-inch stanchions and rail. Red LED fixtures, two visible just beneath the first stanchions aft of the bow pulpit, light the foredeck and other deck areas. The large hatch at the left of the picture leads to the forward head. The stout fiberglass and stainless bowsprit has two bronze rollers to accommodate either a pair of modest sized anchors or a single large one, but it does not have the width to accommodate two large anchors. *Bluewater* carries a single Delta 110 lb. anchor secured to 400 feet of 3/8-inch high test chain. The angle of the bowsprit and rollers is such that the Delta is not self-launching—it must be given a push. The shank of the yacht's secondary Fortress FX-55 anchor is at the left left of this photo. The anchor rodes are stowed in a massive chain locker ahead of a collision bulkhead. The chain locker, large enough to accommodate two men, is accessed through the 20-inch Freeman hatch. *Bluewater* carries several other anchors with their own rope and chain rodes. The windlass is a 24-volt vertical Maxwell 35 with a maximum pull of 3,500 lbs. A Lewmar anchor chain counter display in the pilot house provides a real-time count of the amount of chain deployed. Fresh and saltwater outlets and hoses are available on the foredeck for anchor wash down. The raised dam immediately aft of the windlass keeps muddy water from running aft before it drains overboard.



Bluewater's cockpit. A transom door is offset to starboard, offering access to the swim platform. Shown in the port side bulkhead is one of two plenums providing engine room ventilation. The vertical post at the right of the picture is a compression post for the davit on the boat deck. Three 20-lb. propane tanks are stowed in the locker on the after port side of the cockpit; the locker drains overboard.

By any measure, the cockpit would have to be considered small, measuring about 14 feet wide by a scant 5 feet long. It has 40-inch bulkheads and is about 2/3 covered by the coachroof to keep crewmembers dry while they fumble for keys in the rain. It's also self-draining through large scuppers. A 33x48-inch fiberglass hatch in the cockpit provides access to the lazarette.

Since the deckhouse is offset and there is no access outside on the port side, lying portside to a dock is difficult; the only access is via the swim platform and through the transom door, a real challenge when the dock is more than a foot or two above the waterline. For that reason, the Bakers always request a starboard side tie, backing into the pier.



Bluewater's cockpit control station on the starboard side makes easy work of backing into a slip or Med mooring. (Top, left to right) anchor windlass control, jog stick for rudder control, depth sounder, (Bottom, left to right) bow and stern thrusters, rudder angle indicator, controls for main and wing engines. Maneuvering a single-screw 100,000-pound yacht in close quarters can be intimidating, so Milt specified bow and stern thrusters. In retrospect, he says, the boat is so well mannered a stern thruster has proved unnecessary.



Quality joinery is evident everywhere one looks in *Bluewater's* accommodation. Corners are properly radiused, sturdy sea rails double as grab-rails, and interior paneling is made entirely from grain-matched teak veneer, the matched grain carrying through the entire yacht. A semi-gloss finish shows off the joinery to advantage. The galley and head counters are owner-selected granite. The sole is hand-fitted solid teak and holly, but Judy likes the softening the carpet provides. Interior lockers, drawers, and stowage spaces easily gobble up all the spares and cruising stuff a cruising couple can muster. All drawers and opening cabinets are equipped with positive-lock push-button closers.



The port side of the main saloon has two reclining leather chairs. To starboard is the dinette which seats four. The table has an extension which allows the dinette to seat six by adding two seats on the inboard side. Directly outboard of the dinette is a 32-inch flat screen television which disappears beneath the settee at the touch of a switch. The boat carries a SeaTel satellite television system with a 24-inch dish able to receive signals in the U.S., the Caribbean and Europe. Eight Diamond Seaglaze windows, four of them opening, provide light and ventilation.



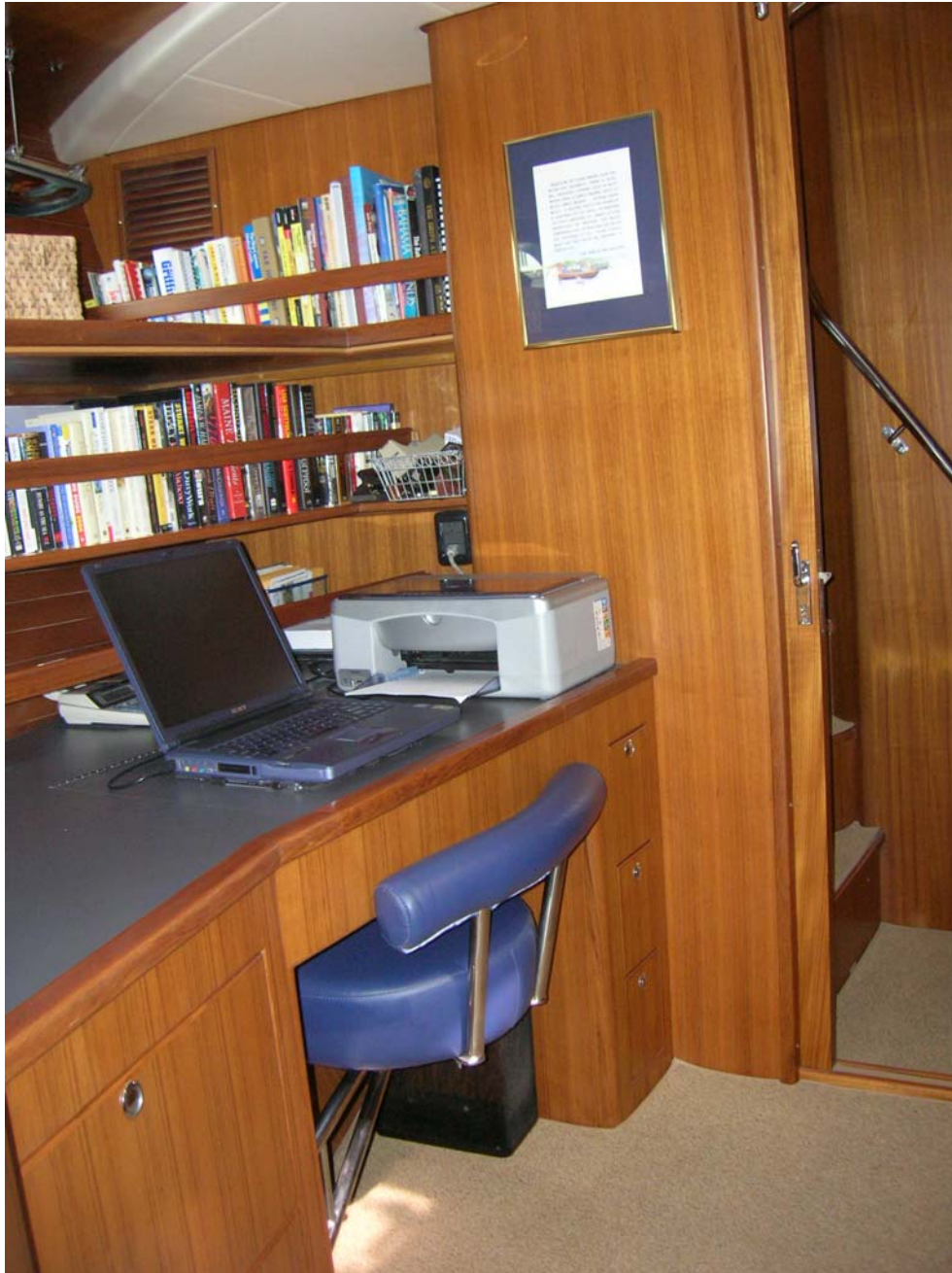
The main saloon opens into the U-shaped galley, and the two rooms are perceived as a single space. The galley measures 6½ by 8¾ feet and boasts 22 square feet of counter space. It's outfitted with premium home-style appliances including a 15-cu. ft. refrigerator with two freezer drawers and icemaker, four-burner LPG stove with oven, convection-microwave oven, trash compactor, and disposal. An apartment-size washer and dryer, the latter externally vented, are hidden behind a door opposite the galley. A separate freezer is located forward of the pilothouse.



Up five steps is the pilothouse. Height of eye at the helm station is 11 feet above the waterline, giving a horizon of about 3.75 NM, and providing good sightlines ahead and to port and starboard, with 14 windows. Sightlines aft are obstructed by the stack and dinghy, so an aft-looking television camera provides a convenient “rear-view mirror.” Visitors say the helm area reminds them of a ship, with the comfortable Stidd chair facing a wraparound dashboard with plenty of room for electronic displays. The electronics were spec’d and laid out with redundancy in mind: two radars, two electronic charting systems, two autopilots, two VHF radios, two satellite telephones, three depth sounders, AIS and ARPA among other electronics.



Aft of the helm station is a settee and L-shaped table, a perfect perch for crewmembers not otherwise occupied because it's just aft of the pitch axis where motion is minimized. Aft of the settee is a three-by-six-foot berth for off-watch crew. When underway, this berth is often occupied by Katy, the Bakers' 13-pound Schipperke.



The forward stairway leads nine steps down to the yacht's two sleeping areas, a master stateroom aft and a forward guest stateroom which doubles as an office. Each has its own head and enclosed shower. The master stateroom, with a centerline queen-sized berth, is located amidships, where motion is the least. The master stateroom is immediately forward of the engine room, but with the honeycombed Nidacore[®] bulkhead and deck beam insulation engine noise is barely perceptible. The forward or guest stateroom has a double bunk to port, with a hideaway pipe berth that can be easily deployed above. To starboard is a desk and built-in seat, together with file drawers and bookshelves, making it an ideal onboard office. Drawers and hanging lockers in both staterooms are generous.