

Bolger on Design

From the correspondence with a client who wanted to do a somewhat more ambitious adventure with Micro. This is all very hush hush stuff:

Dear Q,

Good to talk with you recently. Here is some more fuel for your extended cruising dreams, the Micro Navigator. It is based on the standard Micro configuration and assumes relatively limited surgery on your boat for the upgrade. The point is to maximize the safety of you and your boat during that endeavor, no doubt a serious concern for you for the adventure you are contemplating. We wanted to address avoiding fatigue, exposure, and injury, and a significant increase in Micro's reserve buoyancy under demanding conditions.

Shelter for the crew is the most vital consideration, shelter against too much sun, rain, sleet (!), wind, bugs, and spray. Polycarbonates in her sides and aft, with laminated clear glass forward left and right and in that little ventilation pane on centerline, so that you can use mechanical or electric windshield wipers to cut through too much spray and rain. With the overhead hatch, the companionway aft, the centerline pane, and the hatch forward, plus the down draft off the main sail, there should never be any greenhouse effect inside usually

first suspected by detractors of such houses. Sailing aboard a birdwatcher style cruiser in the desert climate of Lake Mead in Nevada at 122°F (44-45°C) last July, her inside with two vent hatches open was far more habitable than the cockpit under the intense sun.

Aboard Micro, this shelter would offer you full protection and dry working/living quarters, be it for navigation or preparing meals, or for taking catnaps when raising the head will assure you of your safety, or having a bonafied sleep tucked away in your windward berth in remoter waters offshore.

Here you can stretch out on full-size bunks, filler for full-width comfort to get the body located just so, sit up with 3'8" headroom over the bunk and a standard 16-18" leg height, and even stand up to pull your pants up if you are just 5' with floorboards, up to 5'8" without and under the hatch.

Stowage under the bunks, in the forward dressers, and the bin alongside the WC storage are both ample for your purpose and well accessible. With two crew, shifts are obvious and comfortable.

And you never leave the safety of at least hip-deep structure around you to either deal with ground tackle from the forward hatch, or fussing with the outboard sitting on the short afterdeck over the tiller and the WC surrounded by two stout transom-bolted corner posts supporting two lifeline cables running from the house aft, across, and forward again to the house. Pelican hooks would undo the connection to the house for hopping onto docks or climbing into a dinghy.

At sea, Micro can always stand more reserve buoyancy, now multiplied by this house. Your location at the tiller and within immediate reach overhead of the running rigging on centerline puts you where you should be or stay for good trim, with a chart ahead of you on that bunk for instant check. The storage volume is spread out well to allow good control of trim, whether out alone for just a **daysail**, or provisioned fully for a longer section of that circumnavigation with second crew.

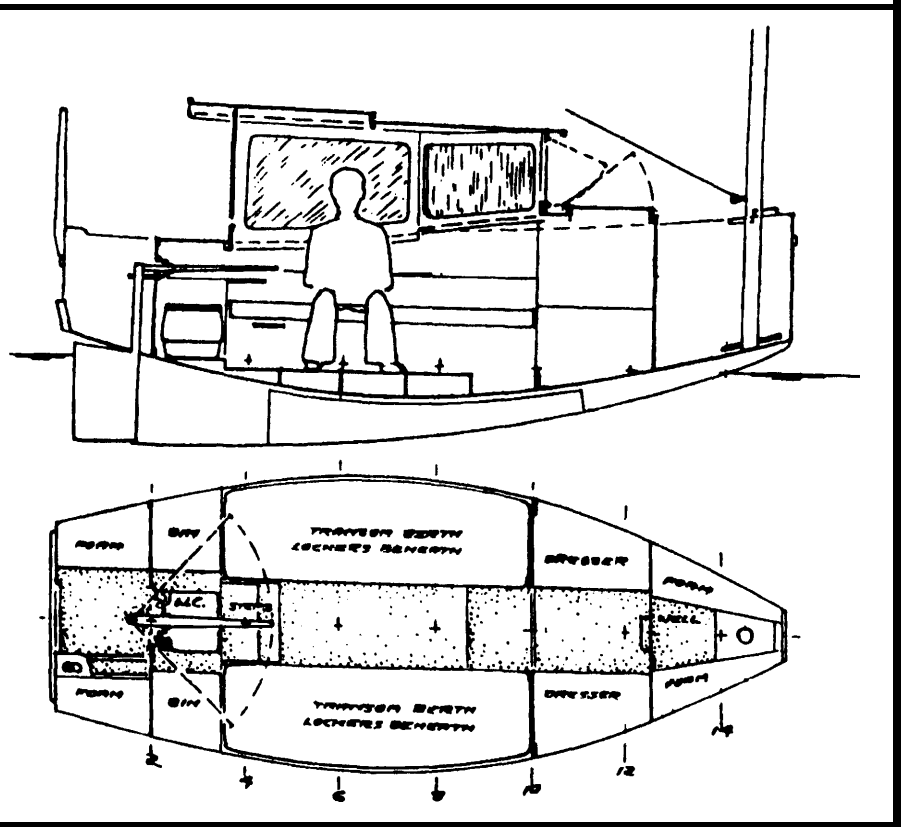
With no openings in her side, all her hatches properly on centerline, and various adjustable openings for ventilation, weathering a storm at sea or just waiting out a downpour at anchor with the companionway open but dry under the longer house overhang, should be as safe as possible in such a small craft.

The rig calls for the replacement of about 90% of Micro's standard geometry; only the mizzen's sprit, **boomkin**, and sail remain, albeit with its foot cut down (optionally?) by a few feet.

The reason for this change is your safety at sea, combined with the long overdue need for more sail area. Micro would thus become a Chinese Gaff Cat Yawl. With the best attributes of the western gaff rig and the eastern junk rig combined, this geometry controls each others' well-known vices, allows more sail area (here up to 203 ft² total) which still can be reefed rapidly from within the house while using existing structural geometric relationships between masts placement, rudder, and keel. We've sailed the 525 ft² prototype rig and so far so good in terms of utility, safety, and convenience. We've drawn the geometry for single sails in sizes ranging from this proposal to about 1100 ft².

The prototype proved that the geometry can be raised and lowered, reefed and unfurled again while remaining on course using the sheets, lazyjacks, and the reef lines. Micro Navigator's halyards, sheets, ends, and reef lines would run from left and right of the mast up aft under the housetop overhang for a reasonably dry entry via fairleads into the house and to cleats/clutches on the underside of that top. Standing in the companionway or sitting inside, her light sail and moving spars can be manipulated from amidships, without shifting trim dramatically or opening her bow hatch.

The new rig geometry would have main and mizzen masts that are unpainted stock industrial untapered aluminum pipe, as is the boom, while the purely arbitrarily bent gaff could either be a bent tube or a wood lamination. There are no lacings of sailcloth to the mainmast or tracks. Rather, gaff jaws cut of plywood are connected to each other by bolts through the **sailcloth** and the battens/boom/gaff, allowing the cloth and battens to rotate freely around the mast controlled on the mast by parrels on each jaw and on the other end by spans between two battens/spars linked to one sheet each.



We show three (short) sheets to control the twist, eliminating it, of the mainsail along its trailing edge up, by sheeting only two battens/spars per sheet; the stresses per sheet are marginal. Thus you can produce a good shape without high-tension rigging and fancy hardware, not that Micro's size would eat up much of that either. The boomvang shown has just the function to keep the boom from rising under the pull of the lower span. Use plans and boat to measure ropage through 188 arc!

Without the risk of the death roll from twist-generated oscillation of a gaffer downwind, or the efficiency losses beating and reaching from a sagging gaff, not to mention the aerodynamic plate shape losses of the typi-

cal junk rig, Micro Navigator could thus run with sail areas as desired on whatever course is geometrically possible, without traditional gaff hazards and the bad aerodynamics of the junk rig.

The issue remaining on each version of this geometry is the relative stiffness of the battens along their length, as none can be alike in stiffness and all have to work together to produce a reasonable sailshape, i.e., some draft forward and flatter near the trailing edge. With Micro Navigator's proposed 176 ft² main and shortish smallish battens, that task would not be overwhelming. Starting out with too much stiffness, you'd observe the cloth's shape under various conditions for week in your home

waters, to then unbolt and pull the battens, and taking the planer/belt sander to each batten, in respective locations softening it where it needs it. Errors in removing too much could be corrected, for instance, by adding a layer of glass tape or put back strips of veneer.

For the long trip, we feel these attributes are most promising in performance and safety, more sail on demand, still a shorter mast reefed in a blow, and none of that sprawling across her raised deck.

Between the shelter and the rig, the vastly enhanced safety of the Micro Navigator would make your adventure a reasonably rational proposal on a "Micro budget" of hardware.

The modifications shown on the plans sheet assume the seasoned skills of the Micro-builder, who does not need much hand-holding. It would be done by you based on measurements right off your boat, rather than us doing more elaborate detailing of the proposal, as your Micro's Micro-meter dimensions throughout are bound to vary somewhat here and there. The overall geometries should be reasonably clear. If not, ask us.

Thus, if you find the idea interesting enough to engage in the upgrade, look at this proposal, scale it approximately, and carefully perform respective surgery on the existing structure. Incidentally, one side effect of the new cabin layout is the further stiffening of her bottom fore and aft.

We think her looks would be perfectly acceptable in light of her sensible capability, Micro sets her own aesthetic standard anyway. No one would argue looks when you return to your home port after the deed has been done.

Plans for #422 Micro on seven 17" x 22" sheets, including improvements, such as the Navigator, are \$100, and available from us at Phil Bolger & Friends, Box 1209, Gloucester, MA 01930-1 209. Navigator upgrade sheet is \$35.

There is nothing—absolutely nothing—
half so much worth doing