

Design Brief

Cruising Yacht

for

Russ Irwin & Fay Mark

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## I. Design Summary

### A. General

1. A 50' – 60' cruising sailboat capable of circumnavigation. She'll be sailed primarily in temperate waters with an emphasis on warmer climates, but with basic provisions for wintering in latitudes not more than 50 degrees N/S of the equator.
2. She'll be crewed by two people most of the time, with relatively brief periods during which there will be four people on board. Sail and boat handling systems will be designed under the assumption that there will be a crew of two with only one person normally on watch, thus designed to be essentially single handed once at sea.
3. For a given displacement, longer and narrower is preferred over shorter and beamier.
4. We're assuming that on average we live on the boat most of the time, probably all but 6-8 weeks per year. Of the time on the boat, 85% of the nights are spent at anchor, on a mooring or tied up, 15% at sea; or roughly 50 nights at sea each year. The interior design will emphasize living for two people, with an ability to accommodate 4-6 guest for entertainment and two overnight guests on occasion. Interior and bubble layout and design, both functional and esthetic, are thus equally important with sailing characteristics. That said, the goal is not to lower the quality of the sailing characteristics, but to ensure an excellent interior design. Aesthetically, simple elegance is the goal.
5. It is assumed that all systems will require regular maintenance and occasional repair. Systems will be located and installed with access and serviceability in mind considering Russ' height of 6'1'. Stowage will be provided for spares, and a work space for repair work will be included in the layout (though this space need not necessarily be dedicated solely to repair work).
6. The design process should continue until all regularly used components and systems, whether used under sail or at rest, have been fully anticipated and incorporated into the design.

### B. Required

1. Launch second half of 2007
2. Safe and secure at sea, comfortable and pleasant at anchor.
3. Considerations for outdoor living is of utmost importance while emphasizing protection from the sun as well as the need to feel secure and protected while underway, especially during a passage.
4. Safety is King, Comfort is Queen and Storage is princely.
5. Hard dodger – long and wide enough to seat a minimum of 4 seated adults and provide a horizontal berth for a 6'1" adult, and with the capability to use a portable table

- a) Canvas extension to hard dodger – long enough to cover a minimum of 6 adults
- 6. All systems located and Designed to be maintained and serviced by a 6’1” person. All components and systems should be designed for accessibility and maintainability. It should be assumed that half of the mechanical systems will be replaced and all electronic components will be entirely replaced at least once during the first seven years.
- 7. Russ’ height and weight: 6’1”, 185# and Fay’s height and weight: 5’7”; 130#. These measurements should be taken into consideration when designing shower, beds, door heights, counter heights, seating etc.
- 8.
- 9. Modern, All aspects of interior and exterior design will emphasize, as appropriate from a cost sensitivity perspective, European form and function using a blend of light and dark woods, easy to maintain fabrics (e.g. leather or ultrasuede) rounded edges, nickel or brushed steel finishes on fixtures and door hardware, European style hinges, esthetically pleasing and functional interior.

#### C. Under Discussion

- 1. Total cost of ownership not to exceed \$140,000 / year for seven years.

#### D. Master Cabin

Primarily for sleeping, centerline bunk, king size preferred however queen is acceptable with memory foam mattress

- 1. No need for sitting area, sit up in bed and read
- 2. Hanging locker, but mostly shelf and drawer storage for clothing. Cabinetry design, cost permitting, can be different than galley using more interesting/ornate woods such as curly maple. Flat panel doors preferred with European hinging and artistic use of knobs.
- 3. Master Head
  - a) Sink, toilet, shower hose with drain in floor so entire head can be used as shower per NM. Great lighting and mirror with mounted magnifier mirror for personal grooming. If space allows, could also be located in Master cabin with tuck away seating.
  - b) No wood, all fiberglass with a European look. If all fiberglass deemed too stark, would consider some use of wood or other elements to tone down starkness. Key is low maintenance.
  - c) Assorted cabinets for storing cleaning supplies, personal supplies, medical stuff, etc. 5-6’ vertical mirror with shallow inset medicine cabinet a nice to have.
  - d) Toilet orientation fore/aft or athwartship? Manual or electric (opposite of general use head).

#### E. Saloon

- 1. Eating, reading, game playing (cards, board games), flat plasma TV, two big comfy chairs with foot rest facing aft, storage for books both hardback and softback. U shaped booth with seating for four facing forward (like La Rossa).

Seating base cabinets to provide both vertical and horizontal bins for storage of odd sized things. Booth seating to have lumbar roll. Fabric to be ultrasuede or leather Total Saloon seating for six, no sleeping space required.

2. Hanging locker?
  3. Nav station
    - a) Sufficient space for communications, charts and general “office” space.
    - b) Bench seat comfortable for two side by side. However depending on relationship to Saloon, would consider captains chair if small swing out chair could tuck under nav station without discomfort.
    - c) Most likely facing fore/aft
    - d) Line of sight to galley and two saloon chairs
- F. Galley
1. Arranged per La Rossa: European flat panel light wood, flat panel door with hidden hinges and knickel or brushed steel pull knobs
  2. Garbage compactor
  3. Washer/dryer combo at aft end if it fits, otherwise will consider other location options
  4. All lower storage is wide, roll out full extension drawers with adjustable interior dividers, upper storage is cabinets, no sliders.
  5. dish storage / drying cabinet with drain
  6. pull out storage for Reidel stem less crystal: Chardonnay size glass
- G. Everyday head
1. Stall shower, separate from head (see La Rossa)
  2. All fiberglass
  3. Shower head to clip on and off vertical adjusting rod.
  4. 2<sup>nd</sup> spray head on sink with flex hose for rinsing toilet bowl
  5. Storage for cleaning / bathroom supplies
- H. Guest / Sea cabin
1. Two single berths, upper / lower, for guests and use at sea.
  2. Fold down desk per La Rossa at height to enable lower berth for seat; easy access to AC outlets.
  3. Storage cabinets for guests
  4. Good reading lights for each bunk and task lighting over drop down table.
- I. Bubble
1. Single forward facing seat for watch navigation station. Prefer starboard if no impact on design or below deck space. Will double as extra seat while entertaining.
  2. Bench seats with lumbar support and long enough for sleeping. Storage nice to have under bench seats (e.g. table)

3. Removable table between for dining / entertainment.
4. Open aft to cockpit, but can be closed off with canvas
5. Bench seating flush with cockpit/helm bench seating.
6. Fay's feet must be able to rest on sole.
7. Russ must be able to walk through bubble without ducking.

#### J. Cockpit

1. Primary design is to support sailing, line handling, etc.
2. Most lines lead to cockpit through clutches to winches
3. Two wheels
4. No cockpit table, open down center to aft swim steps

## II. Hull

### A. Required

1. Minimize transom slap and slamming when at rest.
2. Large ground plane bonded into hull for SSB (and other radios?)
3. Composite construction.

### B. Under discussion

1. Minimum beam of 14.5'.
2. Bow thruster; mounted in tunnel?
3. Glass viewing port to prop / rudder?

### C. Wish List

1. Lots of waterline.

## III. Keel

### A. Under discussion

1. Bulbed and moderate draft (6.5' – 7.5')
2. No moving parts.

### B. Wish list

1. No excessive "sailing" when at anchor.

## IV. Rudder / Steering

### A. General

1. Biased towards balanced spade rudder based on good experience with New Morning.

### B. Required

1. Rudder as deep as safely possible.
2. Hydraulic autopilots (two rams installed)

3. Autopilot pump(s) in soundproofed compartment
- C. Under discussion
1. Two wheels
- D. Wish list
1. Reliable rudder bearing with no leaks.

## V. Interior

### A. General

1. Forward “owner’s suite”, main saloon with adjacent navigation station and galley, aft “multi-purpose” cabin.
2. Design style similar to Trintella designs (ignoring fabric selections), with large radius curves



### B. Required

1. Interior spaces will be “modern” in design with light wood panels (e.g., maple), large radius curves and excellent lighting creating a light, comfortable and airy living space.
2. Minimize opportunities to bump head of 6’1” (185.5cm) owner.
3. Latching floorboards to be secure in the event of knockdown or roll.
4. Use of LED lighting wherever possible to minimize power consumption. Will consider fiber optics

### C. Under discussion

1. Minimum 6’6” (2m) headroom in all living spaces.

### D. Wish list

1. Interior designed by designer with name recognition to increase resale value

### E. Master suite

1. General
  - a) Excellent ventilation

2. Required
  - a) Centerline “queen” bed ( $\approx 60'' \times 78''$ , 1.5m x 2m)
  - b) Toilet and vanity; entire head can be used as shower when required (i.e., sump in floor).
  - c) Hanging locker for clothing.
  - d) Hull “windows” and at least one hatch to provide natural light and ventilation.
3. Wish list
  - a) King size bed

F. Saloon

1. General: Patterned after La Rossa saloon (ignoring fabric selection)



2. Required
  - a) Deep, wide, angled companionway steps (like New Morning)





- b) Dining table with “booth” style seating.
- c) Two fixed chairs, opposite each other (??), with retracting foot rests
- 3. Under discussion
  - a) Saloon table folds open to serve two fixed chairs.

#### G. Nav Station

- 1. General
  - a) Designed to provide access and facilitate change. The electronics are the systems most subject to improvement over time. Marine electronics have about a 3-4 year life cycle, so I anticipate at least one major upgrade during seven years and probably several minor upgrades. Everything should be mounted to provide easy access to installations and facilitate change.



- 2. Required
  - a) Sufficient space for mounting a large collection of communication and navigation equipment as well as at least one large flat panel display.
  - b) Full foot/leg room available (i.e., sufficiently inside curve of the hull).
  - c) Ventilation and air circulation to electronic equipment cabinets.
  - d) Sufficient space to use paper charts.
- 3. Under discussion
  - a) Usage of wireless instruments and systems where possible.
  - b) Flat panel display on fold out arm and/or tilt on vertical access
- 4. Wish list
  - a) Seating that would facilitate viewing by two people for short periods of time.
  - b) ?? fax machine?:

#### H. Galley

- 1. General
  - a) Long, narrow galley with lots of counter space and overhead cabinets. Not “U” shaped.



2. Required
  - a) Large, deep double sink; removable faucet with spray / stream head
  - b) Two-three burner gas cook top
  - c) Large oven (28"?)
  - d) Cabinets above and below; lower cabinets have large drawers, not doors/shelves.
  - e) Counters that are a good working height and don't require any bending over to work at them; higher than standard heights and definitely higher than New Morning.
  - f) Rounded peninsula as in picture
  - g) Refrigerator
  - h) Freezer
  - i) Washer dryer (located at aft end)
  - j) Trash compactor
3. Under discussion
  - a) Separate beverage refrigerator
  - b) Microwave integrated into oven (i.e., single unit)
4. Wish list
  - a) Separate oven from cook top.
  - b) Crystal storage (a couple of wine and champagne glasses)
- I. Guest cabin
  1. General
    - a) Multi use cabin, sea berths at sea, general use when at anchor, guest cabin as required.
  2. Required
    - a) Two berths suitable for use as sea berths.
    - b) Desk and "office" space.
  3. Under discussion
    - a) Pullman style bunks that fold away when not in use.
    - b) Fold away desk.
  4. Wish list
    5. Aerobic exercise equipment.

- J. Second head
  - 1. Required
    - a) Toilet, vanity
    - b) Separate shower tall enough and wide enough for owner (i.e., only dedicated shower on the boat)
  - 2. Wish list
    - a) Accessible from guest cabin and saloon/galley
- K. Engine / Equipment room
  - 1. General
    - a) A dedicated space for the main engine, water maker, genset, hydraulic pump(s), electric bilge pumps, water pumps, hot water heater, air heater, tool storage, charging rack (for rechargeable tools and toys), and work bench with vise.
  - 2. Required
    - a) Excellent, thermostatically controlled ventilation
    - b) Thoroughly sound proofed
    - c) Externally triggered fire suppression system
  - 3. Under discussion
    - a) Use cabin space to provide accessibility to water maker and fuel filters, freeing space in engine room. Mount behind panels or elsewhere such that the “elbow swinging” room necessary to work on them is provided by existing cabin space.
  - 4. Wish list
    - a) Standing headroom.
    - b) Water tight to improve the chances of having reliable systems in an emergency.

## VI. Sail Plan

- A. General
  - 1. Should be manageable for a female solo sailor (not Ellen MacArthur!).
  - 2. We assume 70% of the time the wind is aft the beam so the sail plan should reflect that bias and facilitate performance and handling off the wind without nylon sails.
- B. Required
- C. Under discussion
  - 1. Larger main and smaller fore triangle for easier sail handing and better off wind performance.
  - 2. Roller furling headsails which are not reefed. Ideally furl and move aft with smaller and smaller headsails as on solo racing boats.
  - 3. Sprit to get the tack of the reacher or gennaker further forward of the fore stay.
  - 4. What is normal downwind sail configuration?

D. Wish list

1. Ability to “shift gears” across wind velocities and points of sail by furling and unfurling sails already on stays.

## VII. Sail Handling

A. General

B. Required

1. Powered halyard and primary winches.

C. Under discussion

1. Hydraulic roller furling and winches?
2. LeisureFurl boom for furling main?
3. If no furling main, then secondary method of securing reefed main (e.g., tack and/or clew hooks).

## VIII. Deck Plan

A. General

1. A clean, uncluttered deck that does not present an obstacle course when the deck must be traversed at night in poor conditions and encourages rather than inhibits casual usage.
2. Anticipate and integrate the design of all items normally required while at sea or at rest. Avoid a deck which has numerous necessary items “tacked on” and inevitably results in some items in conflict with others.

B. Required

1. Hard dodger, possibly with extended top for sun shade. Optionally closed aft with canvas; canvas stows securely when not in use in a manner that will survive waves washing the dodger. Forward panels open for ventilation. This space provides a casual living space as well as a space to stand watch in poor conditions. Smooth flow from space under dodger to cockpit. Seat back height sufficient for extended sitting (i.e., watch standing). Front “windshield” panels open for ventilation, yet are water tight (like magic!). Solar panels covering all available space on hard dodger. Once again ignore the fabric selection!



2. Post or arch aft for radome, GPS antenna, sat comm antenna, etc.
3. Secure and accessible storage for everything that is used on deck including sails, fenders, dock lines, life raft, deflated dinghy, outboard, outboard fuel (working tank and additional fuel), snorkeling and fishing equipment, etc.
4. Davits or some form of night time dinghy storage.
5. Stern anchor roller, secure mount for anchor, storage for rode and a method for retrieval of the anchor (windlass? Primary winch?).
6. Swim ladder.
7. No teak decking or cap rails, no exterior wood.
8. Canvas bimini that stows securely on deck or into the back of the hard dodger, not propped up against davits or stern arch.
9. Perforated toe rail for attachment of snatch blocks, lines, whatever.
10. Ground Tackle
  - a) Required
    - (1) Permanent mounting for one large bow anchor (e.g., 50kg Bruce)
    - (2) Chain locker for 100m of chain for primary anchor.
    - (3) Bow roller and “ears” to support the anchor in the worst of conditions and angles.
    - (4) One windlass forward
    - (5) Mechanical assistance and roller to recover stern anchor
  - b) Under discussion
    - (1) Permanent mounting for second bow anchor.

- (2) Two separate chain lockers forward, third locker aft.
- (3) Anchor sprit?
- (4) Hydraulic windlass, dual capstan?

C. Under discussion

- 1. Anchor forward edge of bimini to hard dodger, like a car convertible top (implies probably only used when at rest since thus impossible to see over dodger).
- 2. Center cockpit?
- 3. Integrated jack lines.
- 4. Storage space for trash bags
- 5. Paine “bubble”, step down or level with cockpit? Dimensions from Can Can:
  - a) Pilot house
    - (1) Length of bench: 75”
    - (2) Ceiling: 73”
    - (3) Step down from cockpit (2 steps): 21”
    - (4) Step down from pilot house to saloon sole: 26”
    - (5) Length from pilot house to front of helmsman’s bench: 72”
    - (6) Bench height from sole of pilot house (too high): 33”
  - b) Other
    - (1) Saloon ceiling height: 75.5”
    - (2) 6” step up from cockpit sole to helmsman’s standing position, 19’5” up to helmsman’s bench

D. Wish list

- 1. Chain locker(s) positioned further aft to move the weight off the bow.
- 2. Flush hatches (Rondal or Nirvana).
- 3. Companionway hatch: one piece lexan, lowers into slot, raises (manually) to latch at half or full open (a la Swan 46).
- 4. Passarelle integrated and out of the way when not needed.

## IX. Standing Rigging and Spars

A. General

- 1. Simplify sail handling and reduce the opportunity for error. Design in all items that are routinely needed to maintain well trimmed and controlled sails and spars.

B. Required

- 1. Carbon fiber mast, boom and spinnaker pole(s)
- 2. Vang
- 3. Boom control / preventer
- 4. Spinnaker pole(s) stored vertically on mast.

C. Under discussion

- 1. Swept spreaders?
- 2. Roller furling main

3. wire or rod shrouds?
4. Mechanical or hydraulic vang?
5. Mechanical or hydraulic headsail furling?
6. Bow sprit for asymmetrical?

D. Wish list

1. Simplicity.

## **X. Running Rigging**

A. Required

1. Most lines led to the cockpit, not under dodger, excluding only those which are more conveniently handled on the foredeck.

B. Under discussion

1. Ability to reef from the cockpit versus fixed tack reef points?
2. No traveler, use vang for leech control?
3. Which lines not led aft?

## **XI. Electrical System**

A. General

1. A primarily DC boat with 24V system. Large AC consumers (e.g., air conditioning, water heater, clothes dryer) only operated when on shorepower.

B. Required

1. 24V DC system
2. Inverter
3. Lightning grounding
4. Shorepower isolation transformer.

C. Under discussion

1. 110v or 240v AC.

D. Electricity Generation

1. Required

- a) As much solar generation capability as can be safely and reliably installed on dodger roof and coach roof (e.g., Solara panels).
- b) DC genset.
- c) Dual engine mounted high output alternators (house / start).

2. Under discussion

- a) See Table 1 for list of electrical consumers and projected consumption.

3. Wish list

- a) Solar plus batteries should provide at least 3-4 days of power.

- E. Batteries
  - 1. General
    - a) Batteries sufficient for minimum of X days of usage when at sea or rest (whichever is greater).
  - 2. Required
    - a) Separate battery banks for starting and house. Possibly also for thruster and/or windlasses

## **XII. Plumbing**

- A. Required
  - 1. High capacity water maker – 40GPH, filter membrane(s) probably not mounted in engine compartment.
  - 2. Water maker filters easily accessed for maintenance (not necessarily adjacent to pumps).
  - 3. Water maker pumps in sound proofed location.
  - 4. Fresh water flushing for heads (manual, not electric), with valves to enable usage of salt water.
  - 5. AC hot water heater (operated from shorepower)
  - 6. Salt water deck wash pumps fore and aft
  - 7. At least two high capacity submersible electric bilge pumps
- B. Under discussion
  - 1. Locate filters away from pumps and membrane to improve accessibility and maintainability.
  - 2. Eberspacher hydronic heat / water heater?
  - 3. Second water maker for redundancy?
  - 4. Hot water heating when not connected to shorepower?

## **XIII. Heating / Ventilation**

- A. Required
  - 1. Excellent air flow through the cabin(s)
  - 2. Forced air heater (e.g., Espar)
  - 3. Air conditioning for at least forward cabin
- B. Under discussion
  - 1. Hydronic heating instead of forced air?
  - 2. Separate small DC powered air conditioning units for each cabin?
- C. Wish list
  - 1. Less deck clutter than traditional array of Dorade vents with large bells and guards.
  - 2. Dome shaped dorade vents as on Swan 46 which might not require guards?



## XIV. Main Engine / Propulsion

### A. Required

1. Easily accessed for all regular maintenance and repairs (oil changes, fuel filters, transmission, coolant, raw water pump, etc).
2. Parallel primary fuel filters (e.g., Racor).
3. Engine oil changing system
4. Folding prop.
5. Ability to crank / start engine from engine room (to facilitate bleeding of fuel system).
6. Visibility to water traps in fuel filters without use of a mirror.
7. Vibration and sound isolation
8. Not like this!



### B. Under discussion

1. Locate fuel filters apart from engine room if that improves accessibility.
2. Bow thruster.
3. Electronic engine control to facilitate control from either steering station and under dodger?
4. Speedseal (PS Vol 31 #14 7/15/2005)

### C. Wish list

1. Minimal vibration and noise
2. Minimize turbulence and force on rudder when under power (saildrive?)

## **XV. Electronics**

### **A. General**

1. Electronics will be the items with the shortest life cycle on the boat and should be installed in a manner which anticipates and facilitates regular change and reconfiguration.
2. Although the list of electronics is extensive, the owner is fully trained in the use of their respective on/off switches to minimize power consumption.

### **B. Required**

1. SSB, VHF, Satellite phone
2. Boat instruments (wind speed/direction, boat speed, depth forward/aft)
3. Radar, GPS/Plotter, Computer, baroscope
4. Radar display repeater under hard dodger (may require some sort of security cover) and at helm.
5. Flat panel display for TV tuner and DVD/Computer
6. Audio tuner / amplifier with speakers (saloon, forward cabin, cockpit)

### **C. Under discussion**

1. Wireless boat instruments (e.g., TackTick)
2. Wireless viewing / controller (e.g., B&G, Raymarine)
3. Sounder
4. OCENS weather receiver
5. Radome or open array?

### **D. Wish list**

1. Self leveling radar antenna / radome

## **XVI. Tankage**

### **A. Required**

1. Fuel to provide motoring range of 1,000 miles
2. Water: 150 gallons
3. 25 gallons black water in two tanks
4. Dinghy fuel storage (5 gallons?) – maybe a compartment dedicated to storage of a 5 gallon jerry jug.
5. Propane tanks (2)

### **B. Under discussion**

1. 150 gallons water in two-three tanks. 100 gallon main tank and 50 gallon reserve tank?

## **XVII. Safety**

### **A. Required**

1. The below decks injuries seem much more common than the on deck injuries. Floor boards and cabinets will have some positive latching mechanism that we are confident will keep them secure in a knockdown or rollover. The mechanism may not always be active for convenience, but there has to be some system to enable them to be secured.
2. Cockpit anchor points for harnesses that keep sailor in/on the boat, not dragged alongside. They should enable a safe passage from the companionway to the helm and jack lines.
3. On deck storage of life raft for easy launching.
4. Boom above head height of owner when standing in cockpit.

### **B. Under discussion**

1. Integral jack lines on deck, designed in from the start, not added later. Some system that enables us to go forward or aft from the cockpit while being connected to the boat.
2. Lifelines: 30" stanchions, stainless tube on top, wire for second line.
3. Storm windows for hard dodger? Or irrelevant because open at aft end anyway, just close companionway? Storm windows for other ports or hatches?

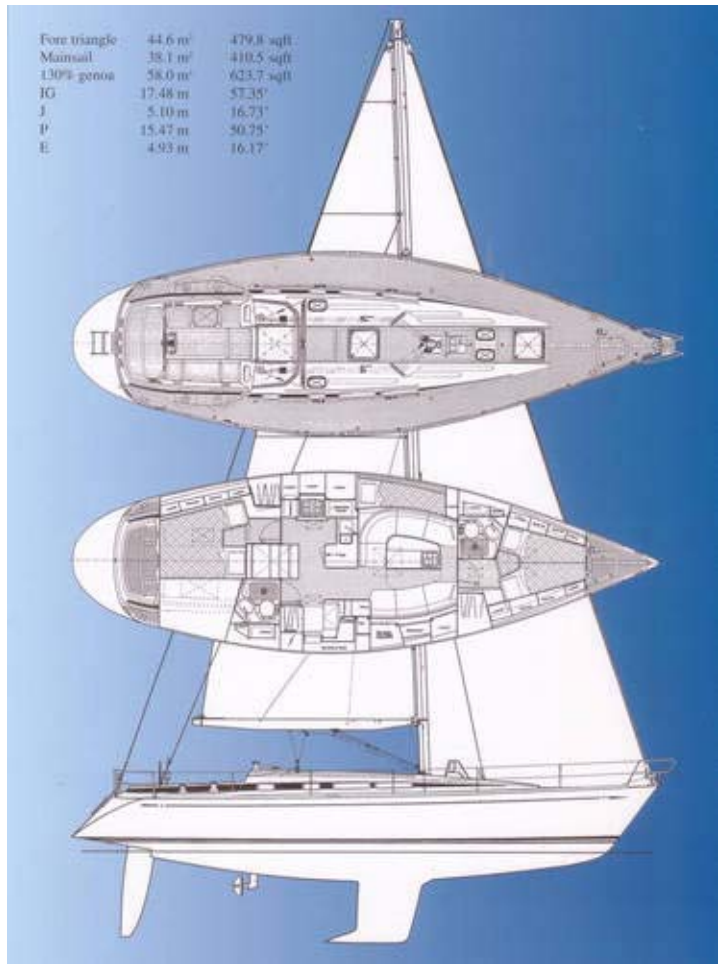
## **XVIII. Reference**

### **A. La Rossa**

1. A Trintella 51A, see [www.larossa.de](http://www.larossa.de)

### **B. New Morning**

### **C. Current boat, Swan 44 MK II**



## **XIX. Table 1 – Electric Consumers**

### **Table 1 - Electric Consumers**

Lots of good stuff in this space coming soon!