

Master Work List V2.0
(Billy Budd)

1. SAFETY and SAFETY EQUIPMENT:

- 1.1. Running Lights: COLREGS state that a motor vessel or motor driven sailing vessel of this size must have the red and green lights aft of the steaming light. Install LED lights by LOPO on lower spreader ends.
- 1.2. The engine and generator exhausts run through the guest accommodation spaces. Install carbon monoxides sensors in these areas and in the lazarette.
- 1.3. The hand-held fire extinguishers and engine room fire suppression system have just been serviced (April 2009) but 5 of the fire extinguishers are not marine approved and should be replaced.
- 1.4. Install a propane gas alarm in the galley.
- 1.5. Install a smoke detection system with heat sensor in the galley.
- 1.6. Install smoke hoods in cabins.
- 1.7. Update the life rafts to SOLAS approved zodiac 10 man offshore raft. Mounted on the deck just aft (port & stb) of the cockpit.
- 1.8. Remove item
- 1.9. Service the MOM.
- 1.10. Install a valve to shut off fuel from the day tank to all consumers. It should be remote operated from outside the engine room.

2. HULL STRUCTURE:

- 2.1. Replace missing water tight fitting port forward engine room bulkhead.
- 2.2. Lazarette bulkhead is not water tight. Several exhaust hoses pass through. Bulkhead is designed to be watertight. Make bulkhead watertight.
- 2.3. See "BILGE" heading that refers to replacement of some missing longitudinals. Reweld these longitudinals.

3. HULL BOTTOM:

- 3.1. Anti-fouling paint is due to be renewed at next dry docking. Heavy sanding required at wind and water area where there is heavy build up and flaking. Add 2.5 new coats – using aluminum safe copper-oxide free paint.
- 3.2. Six hull anodes. Remove and machine surface flat with milling machine.

- 3.3. Anode on thruster housing. Replace.
- 3.4. Bare areas on trailing edge of rudder and one spot starboard side aft hull near waterline: Take to bare metal and follow approved coating system guidelines (International Paints or equal) prior to anti-fouling.

4. *THROUGH-HULL FITTINGS:*

- 4.1. Zinc anodes on both sea strainers. Replace.
- 4.2. Through hull fitting in bottom forward of transducer is labeled no longer in use. This may have been a direct overboard for the galley. Service valve and re-coat up inside this fitting.
- 4.3. Main discharge valve forward in engine room. Remove for cleaning and service. Normal service (open/lube) for all other thru-hulls

5. *RUNNING GEAR:*

- 5.1. Remove item.
- 5.2. The shaft seal is sea water fed. Install a valve here as this is a through-hull fitting.
- 5.3. There is a bulls-eye type flow indicator for the seawater feed to the shaft seal. Adjacent is an indicator light and a sensor for either flow or temperature. Both have been disconnected. Put back into service. Install a low flow alarm and high temperature alarm at the seal.
- 5.4. The pitch indication does not match pitch indication numbers from past logs. At present when the propeller pitch is a zero the number reads 15. Pitch indication should be adjusted so the zero pitch reads "0" on the indicator. Set pitch calibration accurately.
- 5.5. Provide handle for manual pitch control. It should be stowed in an "easy to locate" position.
- 5.6. Shaft line is due to be greased at this time. Fit a pneumatic greaser for this system as it is a regular maintenance item. Acquire a grease fitting that can adapt to the thread of the pipe plug in the propeller hub.
- 5.7. The Hundestat gear box is set in chock fast. The chock fast around the perimeter of the gearbox is cracked. The gear box shows no signs of fore and aft movement but there is some vibration between the chock fast and the gearbox when normally it is all solid. Reset Hundestat gear box in chock fast. NOTE: On more modern installations the Hundestat gearboxes are on semi-elastic mounts to reduce noise and vibration. Do this instead of chock fast if there is space. For refit quotation purposes assume semi-elastic mounts.
- 5.8. Add Hundestat oil temperature gauge and alarm.

6. *STEERING:*

- 6.1. There are no anodes on the rudder. Install a bonding wire from the top of the rudder stock to the hull.
- 6.2. Remove item
- 6.3. Autopilot motor is noisy. One issue is the motor cooling fan or cover. The other is a noisy valve. Disassemble, investigate and repair as necessary.
- 6.4. Remove item
- 6.5. Several hydraulic lines running to autopilot are in poor condition and due for replacement.
- 6.6. Hydraulic line running through lazarette bulkhead on port. Fit proper watertight gland.
- 6.7. Emergency steering system must be operated from the lazarette. Make simple taller tiller assembly that reaches above the deck and can be turned by lines to the two big aft winches.
- 6.8. Install a new steering system and new lowest friction rudder bearings. The objective is for the system to be as low friction as possible with the best possible steering feel. The only parts of the current system that will be kept are the wheels and consoles. It will be a chain and rope (vectran) system with the two wheels connected to the quadrant (2 cables). One cable will run down the existing port tube to the lazarette to quadrant and the other cable will lead down a new starboard side tube (mirror location to the current tube) to the lazarette to quadrant. The forward blocks will be replaced with 8"/200mm blocks (Harken or equiv) and the lazarette blocks with 12"/300mm . The rubber belts and clutches will be removed, so the wheels directly drive the chain. The new quadrant must be a machined and fabricated part (not cast). (S&S and edson will provide steering system design).
- 6.9. Remove item
- 6.10. We will need canvas covers constructed to protect the wheels and pedestal tops.

7. *BOW THRUSTER:*

- 7.1. Devise system to lift thruster in the event of failure of 24-volt electric actuator.
- 7.2. Parts of thruster housing in forepeak bilge are rusty. Take to bare metal and re-paint.
- 7.3. There is a 4 – 5 second delay in bow thruster action. This needs to be reduced to perhaps 2 seconds. And it would be best if when you took your hand off the control lever it stopped immediately.

8. *BILGES:*

- 8.1. Access all bilges and touch up any paint failures. In some cases, such as the engine room, lower salon, guest bilge and lazarette, this will require equipment removal.
- 8.2. The forepeak bilge needs to be repainted properly and paint should be removed from all hydraulic hoses and other equipment.
- 8.3. Main salon bilge should be accessed for repainting. It is to bare metal in the bilge pick up area.
- 8.4. Clean and degrease the engine room bilge. Accessing the area under the air conditioning chiller is a must. The tank top here has seen a lot of salt water over the years and is completely inaccessible.
- 8.5. The engine room sides have insulation that is covered with riveted aluminum plate. Remove the lowest level of plate. It is possible that the insulation has become wet from sea water and will have to be removed and replaced. There could be corrosion in aluminum structure in these areas above the lowest stringer. Note that on port there is the water maker and the AC chiller and on starboard is the refrigeration. All use sea water.
- 8.6. Forward guest bilge needs to be accessed for re-painting. Longitudinal stringer has been removed to make room for the submersible bilge pump. Re-weld longitudinal in place.
- 8.7. Lazarette bilge: Replace cut longitudinal on port side by re-welding.
- 8.8. Lazarette: Limber holes required in some frames.

9. *BILGE and FIRE SYSTEM:*

- 9.1. The lazarette and guest bilge alarms are not operational. Replace.
- 9.2. The engine room bilge alarm is either not operational or too high in the bilge. Replace and re-locate lower in the bilge. And install a second high alarm.
- 9.3. Main bilge manifold is missing one valve handle. Replace handle.
- 9.4. Deck wash/Fire pump is leaking badly. Replace with new (3 phase).
- 9.5. Change the submersible pumps in the salon, guest cabin and lazarette to DC (now AC) pumps.
- 9.6. Fire hoses all appear to be original. Replace. Provide proper non-corrosive holders.
- 9.7. For emergency install a cross system to connect fire pump to bilge suction manifold.
- 9.8. Oily Water: Most vessels of this size and type are now fitted with some type of system to prevent oily water discharge, particularly from the

engine room. Install filter for discharge from the bilge. (See Halyard Marine Wavestream or DMA Sorption)

10. *BILGE PUMPS:*

10.1. Replace all bilge pumps (except one in engine room) with new 24vt units – keep ac pump in engine room

11. *FUEL SYSTEM:*

11.1. Day tank sight gauge weeps fuel. Replace with magnet gauge with no possibility of leaking. (GEMS or equivalent)

11.2. Separ filters for main engines and Racors for gensets are located low down in the engine room bilge. Re-locate in a more accessible area for ease of maintenance. Fix/replace water alarm.

11.3. Fill points on deck are corroded, replace all.

11.4. Convert one water tank to diesel and split the other water tank into two tanks.

11.5. Remove item.

12. *TANKS:*

12.1. Fresh water tank coating: System is starting to fail with some blisters. Remove (sand blasting or water blasting) and renew.

12.2. Coating system on gray water tank has failed. Anticipate coating renewal on all four black and gray tanks.

12.3. Replace sensors on black and grey tanks

12.4. Fuel day tank. Install access to clean or thorough flushing if access is not possible.

13. *FRESH WATER SYSTEM:*

13.1. Accumulator tank located in lower aft salon bilge is leaking. Replace.

13.2. Hot water circulation pump is not working. Replace.

13.3. Boilers: One element in crew boiler not working. Replace.

13.4. Boilers: Remove all elements and flush boilers. Fit covers in all electrical connections.

13.5. Fresh water pumps are different makes (one Grundfos & one G&R) and they are located below the deck plates. Install two identical pumps (Grundfoss). Relocate to a single tray, under galley.

13.6. For high latitudes: Install interior valve and drain point on shore inlet and fresh water deck outlets to prevent freezing.

14. *WATERMAKER:*

- 14.1. Junk entire current watermaker system.
- 14.2. Install two new identical 3-phase ac watermakers.
- 14.3. Install water heater/heat exchanger on 220vt watermaker for input water.

15. *GRAY and BLACK WATER SYSTEM:*

- 15.1. Locate vents for aft gray and black tanks.
- 15.2. Port forward gray tank has an inline charcoal filter in the vent line. Locate these filters in both black and gray tank vents. Replace filters.
- 15.3. The fridge and freezer drains currently run to a small bottle in the bilge. Reroute to galley grey water tank.

16. *COMPRESSED AIR SYSTEM:*

- 16.1. Owner does not like the compressed air door, in case the compressed air system should fail. So, if possible, we would like the existing door converted to manual operation, so that it can be opened and closed manually and latched in either position. If that should somehow prove impossible it should be replaced with a manual type sliding weather tight door of similar integrated one-piece door/hatch design, Freeman or equal.
- 16.2. The large and old and complex compressed air system should be eliminated, and we would then need a simple electric horn.
- 16.3. Dive compressor - service current unit and provide suction hose to deck.

17. *HYDRAULICS:*

- 17.1. Accumulator for port forward power pack. Oil leak at fitting. Repair.
- 17.2. There were originally two 180 amp hydraulic driven alternators. They have been removed. Reinstall - Electrodyne alternators or equivalent.
- 17.3. Oil leak in starboard guest overhead. Reportedly left over from replacement of hydraulic clutch hoses. Clean area again.
- 17.4. Port outboard motor on port DC hydraulic pack in engine room does not sound good. Investigate and repair as necessary.
- 17.5. At port master fan coil, hydraulic lines through the lazarette bulkhead are rusty. Clean up and paint.
- 17.6. The hydraulic plumbing throughout is hose. There are areas in the engine room, salon bilge, forepeak and lazarette where hoses should be run neater and more neatly secured. There will be areas where

chafe gear may be necessary. Replace the few corroded steel hydraulic fittings with stainless steel.

17.7. Install common manifold hydraulic so if one motor dies we can use one of the other. This should be quoted as a separate option.

17.8. Add low oil alarm for pto tank

18. *PLUMBING and PIPING:*

18.1. Piping for the fire system is aluminum with bronze valves. Not a good situation. Run completely new fire piping. From a safety standpoint metal piping is best.

18.2. All of the CPVC (plastic) plumbing is by George Fischer. There are dozens of elbows used throughout that have steel reinforcement rings. Most are rusted and in poor condition. Replace all with new fittings with stainless steel rings.

18.3. The tool to assemble the CPVC plumbing should be aboard.

18.4. Air conditioning condensation drains are plumbed into the bilges. Bilges of aluminum yachts should be kept as clean and dry as possible. Plumb condensate drains from air conditioning into proper sumps and discharge overboard, probably via the gray water system.

18.5. The air conditioning chill water plumbing is insulated with Armaflex insulation. It is in poor condition throughout the vessel. It is estimated that a large percentage of the insulation must be replaced. Plumbing should be secured with special clamps. Do not secure with plastic tie wraps and do not secure other plumbing or wiring to the insulation. This is a fairly major project as it runs throughout the vessel.

18.6. Toilet Plumbing: Flush all plumbing of scale build up. Suggest using TRAC or similar product and set up a circuit with continuous flushing.

19. *AIR CONDITIONING:*

19.1. The chiller has one compressor that is not operational. Both compressor cooling coils need replacing and both compressors are in very poor cosmetic condition. Replace all with new 220vt system with same capacity.

19.2. Three motorized valves for heating system (V1, V2 V3) forward of watermaker. One valve has missing actuator. Another has disconnected hanging wires. Put system back into service.

19.3. Originally the main engine could heat the chill water loop. Heat exchanger is still in place but pump has been removed. Put heating system back in service.

19.4. Fan coils all have flexible intake and discharge ducting. Ducting is all very dirty on the interior and all is due for replacement.

- 19.5. Starboard guest cabin and starboard master cabin fan coils. No return air filters. Install.
- 19.6. Return air filters on all other units have gone brittle. Replace all.
- 19.7. Three way valves on all fan coils are very rusty and in poor condition. Service or replace all.
- 19.8. In the main salon and pilothouse there are four fan coils controlled with one controller. Install new controllers so that there is a maximum of two fan coils on each controller.
- 19.9. The fan coils themselves, even though they are original do not appear to have had excessive use. Many are in fairly good condition. All are due to be accessed and have the fins cleaned. Anticipate the need to replace some of the units. These will include the two crew units and the galley unit.
- 19.10. Fan coils in guest and owner cabins are quite noisy on high speed. Install new more modern and slightly larger units running with frequency drives to reduce noise. Also increase duct size.
- 19.11. Existing fan coil heating system is to be augmented by diesel-fired hydronic heaters (two Espar Hydronic 30 or equal). The diesel heaters will be located in the engine room and/or lazarette, and be piped directly into radiators (roughly ten around the vessel - owner prefers Runtal model Spazio) and feed hydronic towel racks (owner prefers Runtal model Nettuno) in the owner's head, and bunk heating coils in the owner's, captain and guest staterooms, and potentially also heating coils under the sole with grills or along baseboards. The interior radiators will be flat panel radiators (slim line white radiators) like one would find in a modern European home or hotel, below the hull ports (just above the berths - outboard in owner's cabin) and in other flat expanse of space. S&S mock-up pictures with radiators: Owners cabin Saloon. Attention should be given to the esthetics of the exposed section of plumbing into and out of the radiators.

The owner likes radiators because they are quieter and use less electricity than fan coils and can be used to dry clothing.

We need to generate and distribute approximately 160,000btus of heat with this system. It must be carefully planned and extremely well executed.

- 19.12. This will be an independent system from the fan coils, but valve(s) need to be installed so the Espar can also (simultaneously) heat the fan coils.
- 19.13. Remove item
- 19.14. Provide details and quote on Olivier's ventilation design for air flow behind ceiling, down to bilge and then up.

20. VENTILATION:

- 20.1. Locate or provide waterproof caps for all dorade cowls.
- 20.2. Extraction fan in starboard lazarette is noisy in master cabin. Replace and place on isolation mounts.
- 20.3. Fan in starboard upper corner of engine room above hydraulic pack: Frozen and not operational. Replace.
- 20.4. Engine room fans have been replaced and it appears larger motors have been fitted. Because the motors are larger the shut down flaps are impeded by the motors. Flaps do not open all the way. The cowlings should be fitted with an extension to allow the fans to open all the way. The present engine room ventilation system is very noisy in the cockpit area. Need to add sound baffles.

21. REFRIGERATION:

- 21.1. Originally there was a hydraulic driven refrigeration system off the main engine. It has been discontinued. Remove all unused parts and plumbing.
- 21.2. The main front loading cold boxes in the galley were originally fitted with heat strips on the doors. They have all been removed. Put them back into service.
- 21.3. The AC refrigeration and freezers must be able to run with the gensets and engine off. Ensure all appropriate wires/controls to run off inverters as efficiently as possible.
- 21.4. Service fridge and freezer compressors and thermostats. Install drains from units to drain into grey water box.

22. MAIN ENGINE:

- 22.1. Complete a W6 service (complete re-build). We want the whole engine rebuilt/overhauled/serviced – including all components and attachments: pto, turbo, heat exchanger, air cooler, injector, fuel system, alternator, exhaust elbow, etc. Small note - repair MTU over speed switch and ZF temp probe.
- 22.2. Leaking sea water pipes port and starboard forward corners of engine. Replace piping. Plate cooler may have to be removed to do so.
- 22.3. Engine throttle linkage has been adjusted so the vessel cannot obtain maximum rpm. Properly re-adjust linkage.
- 22.4. Main engine alternator: Very dirty windings. Remove and send out for re-conditioning.
- 22.5. Analogue pyrometer in the engine room is not operational. Service or replace gauge as necessary.

- 22.6. Engine exhaust riser in lazarette: Seawater leak. Disassemble and repair. Replace hose and fittings if necessary. Also replace pumps in engine exhaust with new 24vt pumps. Confirm that the exhaust system meets the manufacturer's recommendations (back pressure, and water lift, etc). Back pressure should be specifically measured and recorded for both the rebuilt engine and the new generators after relaunching.
- 22.7. Fit battery disconnect switch.
- 22.8. Install diesel flow meter.
- 22.9. There is a 3 second delay in the engine controls – would be desirable if it could be reprogrammed to 2 seconds.

23. *ENGINE ROOM:*

- 23.1. The engine room has composite decking with carpet, neither of which is fire retardant. Replace with a more fire proof decking. Suggest aluminum deck plate with fire retardant carpet.
- 23.2. Install oil change pump(s) with hoses to reach ports on gensets and engine.

24. *GENERATORS:*

- 24.1. Replace both generators with new 3-phase units. Two Northern Lights 944T 32 kW 50 Hz, 1500 RPM. One of the generators should have a factory installed pto (with extended sound shield), as back-up power for the windless and winches. There is already a soft spot built into the deckhouse sole to ease generator removal.

One of the existing generators was flooded by sea water. The new generators must be carefully installed so the exhaust and water intake lines exactly meet manufacturers recommendations. Our observation suggests the exhaust loops should be higher, if it can be done and still meet the mfg's exhaust pressure requirement. Also vented loops must be properly installed in intake lines.

It should be possible to run the two generators together when there are unusually heavy electrical loads (such as heavy battery charging, AC and electric cooker all going at once). The new generators instrument panels should be moved out of the engine room to nav station to allow easier monitoring.

- 24.2. Fit manual battery disconnect switches.
- 24.3. Generator Exhausts: There are stainless steel water injected elbows on both units. There is a long stainless steel dry riser that is part of the water injected section. There have been pinholes in the water injected sections that have been repaired. They will re-occur. Redesign system so the long dry section is separate and flanged to the water injected section. Then when it is time to repair or replace the water

injected section it is an easier job. Note: recommend inconell or titanium is used.

25. *GENERAL ELECTRICAL:*

- 25.1. Generator exhaust pump contactor: Open in aft bilge. Secure and close.
- 25.2. Install a hull potential meter. (Electocatalytic)
- 25.3. Install red indicator light on switch for propane to stove.
- 25.4. Battery bank replaced with new 2vt Gel Cell mastervolt batteries – purchased only at the end of the refit. Need to add one start battery so each and main engine has its own dedicated start battery (currently only one start battery for the two generators)
- 25.5. Install manual battery switching for all battery banks so as to have a means of disconnect in case of an emergency.
- 25.6. Install manual selector switch for starting battery banks so that you can start the generators or main engine from a charged battery bank instead of paralleling to a bank that is already discharged. Currently there is a solenoid for parallel but cannot be selected to start from a charged battery bank.
- 25.7. Install new modern shore power box/system 3 phase (output) ASEA AC30-3 30kVA, 1 & 3 phase input.
- 25.8. For resale value, the wiring from lazarette to the main panel should be appropriate for 35-40 kW. (this is a desire but optional if it proves very difficult or expensive)
- 25.9. Move deck/nav light switch panels from helm station inside to main dc panel. Move all electrical meters/ tank gages and other monitors to deck house nav station so owner can easily monitor vessel's status. Note: every opportunity should be made to consolidate isolated and remote switch and gage panels to the main panel areas.
- 25.10. Replace as many contactors as possible with direct manual switches. Where contactors are necessary, install manual back-up switches. Specifically: (a) Add manual switchgear for all critical AC voltage systems that are currently electrically driven or on motor controls. This would be items such as pumps and motors that are remotely operated. (b) Add manual switchgear for the DC battery banks so that they can be operated in the event of remote controlled solenoid failure. This would permit usage of the hydraulic power packs and to parallel or select batteries for starting. (c) Install manual switchgear for the inverters so they can be connected manually to the distribution while maintaining the remote capability. This can be accomplished within the galley panel as it currently is. (d) Install bypass switches for the remote sail controls so that the winches can be operated in the event of a

solenoid failure. This would provide means of manual control to get winches functioning if only in an emergency. (e) Install manual switchgear for the engine room ventilation in the event of motor control failure so that ventilation could be maintained. (f) Replace the main switchboard power source contactors with motor driven circuit breakers so as to provide manual means of connecting power sources should remote functions fail.

25.11. Item eliminated

25.12. Item eliminated

25.13. Rework the starboard side AC distribution panel so that the breakers are accessible from the front with protection against accidental tripping of the breakers due to space constraints. Also eliminate all remote only motor controls for pumps and systems critical to the vessels operation so that they can manual operated as well.

25.14. Galley Panel: Replace the panel metering with accurate meters for the AC & DC systems so that the systems voltage and amperage can be properly monitored. The Imtech battery control system should be removed and replaced with readily available technology such as with a Mastervolt monitor system for the batteries and inverters.

25.15. Manual switches should be added to the inverters so that they can be manual connected to the distribution because they are currently controlled by contactors. Should the contactor fail you cannot connect the inverter to the distribution.

25.16. DC Battery Banks: Currently the 24VDC supply to items such as the hydraulic power packs, use solenoids for remote control. Because the hydraulic power packs are remotely operated with no means for manual control it is necessary to add switchgear that would allow the hydraulics to be utilized, if only for short duration. The switchgear will be located in an area that has easy access such as the bilge adjacent to the galley or engine room.

25.17. Replace all current interior lights in crew areas and galley with modern high efficiency LEDs (Frensch & I2 brands). Replace approximately half of current lights in saloon, deckhouse and guest cabin with LED (no LED in Owners cabin). Add approximately two dozen new interior lights (approximately a dozen LED and a dozen halogen). Owner will provide specifics about which lights to convert and where to place new ones. There are some small lights under the tread edge that should be converted to LED.

25.18. Convert/install approximately 14 additional 220 vt outlets. Mostly convert all the dc plugs to 220vt (say 6 for quote purposes). Owner will specify exact locations

26. VICTRON INVERTERS

26.1. There are three Victron inverters mounted horizontally under the salon floor and should be mounted vertically because the ventilation is compromised.

26.2. There is an unused cable secured to the starboard outboard inverter labeled 10F70 that should be terminated in a junction box.

27. BATTERY CHARGERS:

27.1. Replace with modern 3-phase chargers and mount vertically for proper ventilation. Six Mastervolt 24/100-3 – 600 amps in total, with mastervolt battery monitor system. Could draw 21kw at peak load – so ensure new installation (wires and ventilation) is appropriate.

28. BILGE WIRING:

28.1. There are several wires secured to piping in the bilge area and there are cable bundles resting on piping and/or rubbing against equipment and are subject to chaffing. Properly secure and chafe protect.

28.2. There is a terminal block hanging from other wires that is not properly secured and should be inside of a junction box.

28.3. There is a junction box outboard to starboard next to the inverter that is secured by plastic ty-raps only and should be properly hard mounted to a frame.

29. DC BILGE PUMP CONTROL – ELECTRICAL:

29.1. There is a bilge pump control panel mounted on the inboard side of the port hydraulics panel that has an open junction box. Cover junction box.

29.2. The terminal block used in the open J box is not for use without ferrules on the wires because the compression screw damages the cable strands. Replace terminal block

29.3. The electrical cable outer jacket insulation is pulled outside of the cable gland. Fix and properly secure.

30. FOREPEAK AREA - ELECTRICAL:

30.1. The up/down motor for the bow thruster has a splice in the power cable and is insulated with electrical tape. This should be inside a junction box using a proper terminal strip or heat shrunk crimp connectors

30.2. The electrical connections and limit switch on the up/down motor for the bow thruster show signs of rust and corrosion. These need to be cleaned up.

30.3. There is a light in the forepeak overhead with the connections hanging in mid air, unsecured, and not properly routed to prevent chaffing. Also the power cable is not rated for use in the marine environment. Replace with properly installed marine line and cable.

30.4. The forepeak 220-volt socket cable gland has come out of the box and the socket is not GFI or differential protected at 30ma. The junction box is also corroded. Replace socket and junction box.

- 30.5. There are wires passing thru openings cut in the frames without chaff protection.
- 30.6. The wiring for the fan mounted in the overhead forward needs to have the supply cable secured leading up to it. The power cable is not rated for use in the marine environment. Replace cable with marine wire and properly secure.
- 30.7. Much of the cabling in the bilge has paint on it and is not permissible as it voids the cables capacity to be self-extinguishing. Replace all painted cable with proper marine wire.

31. CREW AREA - ELECTRICAL:

- 31.1. The cooling fan cable for the freezer compressor is spliced and there is sufficient length to connect directly to the fan if the cable was properly routed and secured leading up to the fan. Remove splice and route wire directly to fan.
- 31.2. Air handler port & starboard staterooms - The fan start capacitor and electrical supply cable should be inside a junction box.
- 31.3. Hot water heater. The end cover has been broken and is held in place with an elastic cord. The cables leading up to the heater cover should come from above the heater so as to reduce the stress on the cover. Replace and re-secure end cover and reroute cables.
- 31.4. The sockets in both crew heads are not 30ma GFI or differential protected. Replace sockets with GFI sockets.

32. CREW MESS - ELECTRICAL:

- 32.1. The mast load readout operates but does not provide any load data indicating this is not working properly. Replace (or fix).
- 32.2. Mast junction box - The cables leading up to the junction box needs to be better secured.
- 32.3. Refrigeration compressor - The wiring for the refrigeration compressor aft under the floor is poorly routed leading up to the controls and unsecured. The wiring has been spliced with only electrical tape insulation and is outside of a junction box. Re-route wire, properly secure it, properly connect it inside a junction box.
- 32.4. Gagganau oven – this is being replaced with gas oven - cabling (under the oven) should be removed or neatly secured so that it does not touch the floor causing possible abrasion to the outer jacket insulation.
- 32.5. The galley sockets are not GFI or differential protected at 30ma or less. Replace with GFI sockets.
- 32.6. Bilge wiring - There is a cable gland pulled out of the cable duct exposing the cable to possible chaffing issues due to the duct being

made out of aluminum. There is a cable under the sink area that is spliced with electrical tape insulation only and outside of a junction box. There are several cables that are not properly secured and /or routed to prevent possible chaffing. Fix all.

- 32.7. Upper electrical panel – replace digital battery amp meters
- 32.8. Lower electrical panel – replace Ricom battery monitor with modern unit.
- 32.9. Lower electrical panel –There are wires leading to the right side door that is poorly routed up to the circuit breakers and/or switches and should be inside the loom to protect against possible chaffing. Re-route inside loom.
- 32.10. Lower electrical panel – There is a control transformer laying in the bottom of the panel and should be secured to the din rail.
- 32.11. Lower electrical panel –There is a green/yellow ground wire being used on the timer labeled Q10F76 as part of a power circuit, this does not conform to proper electrical standards.

33. MAIN SALON – STARBOARD DC PANEL:

- 33.1. Eliminate item
- 33.2. The negative cable marked W10G20 was for the GAV 180A alternator that was hydraulically driven has been disconnected and is laying on the bottom of the panel. Properly connect and secure when the alternators are re-installed.
- 33.3. The fuse holder for the GAV 180A alternator positive cable has been removed. Reinstall when the alternators are reinstalled.

34. MAIN SALON – PORT DC PANEL:

- 34.1. There are three wires inside the enclosure that are not secured or insulated properly. Properly secure and insulate.
- 34.2. The small wires that are connected to the fuse holders marked F10EK6 & F10EK4 are paralleled conductors and not rated for the 32A rating of the fuse. Replace wires to match fuse rating.

35. DECKHOUSE - ELECTRICAL:

- 35.1. There are a few wires under the nav table that are not properly secured and the cable duct covers are missing in areas. Secure and replace covers.
- 35.2. The inverter under the desk below the Skanti SSB is missing the protective cover and was possibly removed for ventilation issues. Replace with new unit – mount for maximum ventilation.

- 35.3. The distribution panel behind the bookcase to starboard has a damaged circuit breaker on the inverter 4 section and it should be replaced.
- 35.4. The AC distribution panel behind the bookcase has a terminal block hanging free and it should be properly secured.
- 35.5. The color-coding was not followed with regards to terminations in the distribution panel behind the bookcase and has green/yellow wires combined with blue and brown and does not conform to electrical standards. Rewire to standard.
- 35.6. There is a relay labeled K07I39 that has a jumper wire across the control circuit to make it function and it should be replaced.
- 35.7. There is cable that has been added to the F10H40 circuit breaker that is not rated for the 25A capacity possible. Replace with 25 amp cable.
- 35.8. Some of the connections on the light dimmer circuit boards show signs of corrosion and are covered with dust. Clean, replace if corrosion cannot be completely cleaned off.
- 35.9. The boom lights are connected to the engine room light circuit and should be on an independent circuit.

36. AFT COMPANIONWAY- ELECTRICAL:

- 36.1. There is a Jun-air air compressor mounted under the floor that is connected to a 220- volt socket that is not properly secured in place and the cable for the compressor is not secured leading up to the socket. Properly secure.
- 36.2. The aft exhaust muffler pump control box cable is not properly secured and lying on top of the pump and exhaust hose. Properly route and secure.
- 36.3. The forward exhaust pump control box for the main engine and port generator is not secured and lying on top of the exhaust hose. Properly route and secure.
- 36.4. The pump control box is not properly closed and the contactors are exposed. The supply and control cabling is poorly routed and unsecured leading up to the box. Close control box, properly route and secure cables.

37. GUEST STATEROOMS – ELECTRICAL:

- 37.1. The air handler fan capacitors and power connections are not inside junction boxes. Install in junction boxes.
- 37.2. There are wires in the closet overhead that are not properly secured and hanging loose. Properly secure.

- 37.3. There is an audio/visual junction box lying loose next to the air handler. Secure, or remove when whole a/v system is replaced.
- 37.4. The air handler supply cables are not properly secured leading up to the connection boxes. Properly secure.
- 37.5. Wiring in the closet overhead on the starboard side is poorly organized and not secured against possible chaffing. Secure and organize.
- 37.6. The head 220-volt sockets are not 30ma GFI or differential protected. Replace with GFI.
- 37.7. The starboard guest inboard bedside reading lamp does not illuminate properly and flickers on and off. Replace.

38. MASTER STATEROOM – ELECTRICAL:

- 38.1. The vanity lamp in not operational. Replace
- 38.2. The port side reading lamp in not operational. Replace.
- 38.3. There is a light switch at the entry that does not function. Replace.
- 38.4. The port and starboard air handler fan capacitors and connections are not in a junction box. Install a proper junction box.
- 38.5. The wiring leading up to both air handlers are not properly secured and hanging free. Properly secure.
- 38.6. The air handler connection boxes are rusted & corroded on both units. Replace.
- 38.7. The wiring in the overhead above the air handlers is laying on the piping and should be secured up so that is does not chaff.
- 38.8. There are loose wires lying in the bilge on the starboard side under the floor by the bed. Secure.
- 38.9. The step lights at the entry have splices in the cables where they are connected to the supply power. They should be in junction boxes.
- 38.10. There is a terminal block mounted to the wood panel inside the closet hatch and should be inside a junction box.
- 38.11. There are storage boxes in the bilge under the floor on either side of the bunk that are on top of the cable bundles, this is not recommended due to chaffing possibilities. Protect cables.

39. LAZARETTE – ELECTRICAL:

The entire shore power and isolation transformer system will be replaced – see 25.7

- 39.1. Install input and output over current protection for the shore power transformer with circuit breakers instead of fuses.

- 39.2. Install a galvanic isolator to protect the hull against differences in potential of the hull and the dockside ground system to prevent galvanic current flow, which can damage the aluminum. (Protection of the hull & underwater metals)
- 39.3. There is a 220-volt socket strip secured to the overhead frame by means of plastic tyrap and not chaff protection for the cable and is not 30ma GFI or differential protected. Replace with GFI and properly install.
- 39.4. The deck switch wiring is not properly secured to prevent the cable from hanging from the contact block on the back of the switch. Properly secure.
- 39.5. There is no chaff protection for the deck switch cables where it passes thru the openings cut in the frames. Install chafe protection,
- 39.6. The port side deck switch is badly rusted and corroded. Replace.
- 39.7. The hydraulic pack fluid level switch wiring is hanging loose and should have the connections inside a junction box.
- 39.8. The wiring for the hydraulic pack that is coming from the vertical pipe should have chaff protection where the cables exit the pipe.

40. MAIN DECK AREA - ELECTRICAL:

- 40.1. The propane tank storage has a cable splice with electrical tape insulation in the gas detector circuit and should be inside an IP65 junction box.

41. HELM STATION – ELECTRICAL:

- 41.1. The panel for the fore, head, and back stays shows signs of corrosion on all of the circuit boards for the digital readouts. Clean, and if corrosion does not entirely remove, replace.
- 41.2. There are unused wires under the helm that should be secured and insulated.
- 41.3. The wire connections for the B&G units on the starboard side are poorly made between junction boxes and the wiring is hanging loose to the head display. Redo connections and secure.
- 41.4. The wiring leading up to the apparent wind indicator is hanging from the connections on the back of the unit and should be secured as to not damage the gauge.
- 41.5. Some of the switches on the engine instrument panels show signs of water intrusion and are corroded. Replace these switches.
- 41.6. Inspect seals on all helm switches & panels and replace any suspect ones – waterproof test helm stations after new steering and instruments are installed.

42. OVERHEAD WIRING:

- 42.1. The deck winch switch wires are not secured and hanging from the contact block on the back of the switch. Properly secure.
- 42.2. There are several wires in the overhead that are not properly secured and wrapped around hoses or frames. Properly secure and chafe protect.

43. STARBOARD HYDRAULIC PACK - ELECTRICAL:

- 43.1. There are two unused solenoid coil connectors (boom vang & outboard back stay) lying loose on top of the other valves. Remove.
- 43.2. The DC motors do not have covers over the electrical connections. Cover connections.
- 43.3. The three cooling fan motors for each motor have connections hanging loose, are not properly terminated, and the wiring leading up to the motors is not well secured or secured to piping. Properly terminate, and secure.

44. PORT HYDRAULIC PACK - ELECTRICAL:

- 44.1. The motor cooling fan wiring is poorly terminated and not properly secured. Reterminate and secure.
- 44.2. The inboard motor is missing a screw on the flange. Replace screw.
- 44.3. The A motor has a much different pitch when it operates than any of the other four motors on the hydraulic packs, this warrants further investigation. Rebuild all motors.

45. HYDRAULIC SOLENOID – ELECTRICAL:

- 45.1. There is a hydraulic solenoid valve coil wire under the deck plate in front of the hydraulic panel that is not properly secured and has excess length of cable lying loose. Properly secure.

46. HYDRAULIC CONTROL PANEL FORWARD STARBOARD BULKHEAD:

- 46.1. The panel has a hole cut in the side of the enclosure for the piping and could be a hazard due to fire or electrical short circuit should a leak develop. Properly route piping.
- 46.2. There are wires that penetrate the opening cut for the piping that are not properly secured and do not have chaff protection. Properly secure and protect.
- 46.3. There are several unused wires that are not insulated inside the enclosure. Insulate and secure and label as 'unused' these wires.
- 46.4. There is a terminal block that is hanging free inside the cable duct and should be secured in place.

- 46.5. The R2 brown cable connected to the contactor in the left side of the enclosure shows signs of overheating. Replace with new cable.
- 46.6. Documentation is also being stored inside the panel and should not be. Move to documentation folders.

47. STARBOARD AFT OUTBOARD (EL) ELECTRICAL PANEL:

- 47.1. The Q08A12 contactor has a green/yellow ground wire connected as part of the power circuit; this does not conform to electrical standards. Rewire to standards.
- 47.2. The wiring in the bottom of the panel is poorly organized and several unused wires are not insulated. Clean up and secure and insulate and label.

48. STARBOARD AFT INBOARD (EL) ELECTRICAL PANEL:

- 48.1. The freshwater pump contactor in the lower left side of the panel is not secured on the din rail. The contactor wiring is poorly terminated with the copper strands visible outside of the crimped terminal. There is a green/yellow ground wire being used as a power conductor and does not conform to electrical standards. Rewire to standard and properly terminate.
- 48.2. There are three contactors labeled Q07M10, Q07M20, and Q07M30 for the DC engine room ventilation fans that have burnt connections and were extremely hot with recorded temperatures up to 80 degrees C (176F). There are also wire jumpers across the overload to force the closure of the contactor coil to make these operate when power is applied. Replace and rewire.
- 48.3. There is a DC/DC converter mounted in the bottom of the panel that has poorly terminated wiring on both the input and output of this unit. Re-terminate wires.
- 48.4. The 24VDC positive bus bars (X10ES1 & X10ES2) should have protective covers over them.
- 48.5. There are three Cromos PM2 control modules mounted in the top of the panel that are not being used. The terminations were recorded above 40 degrees C (103F) at the battery terminations and show signs of overheating. The white connector plugs were all removed as well. Remove.

49. PORT AFT (EL) ELECTRICAL PANEL:

- 49.1. There is a terminal block on the left side that is not properly secured. Secure.
- 49.2. The power source cables from the generators and shore power do not have a neutral wire so the green/yellow ground wire is utilized for

neutral, this does not conform to electrical standards. Rewire to standard.

49.3. There is a junction box lying in the bottom of the panel on the right side that should be secured.

49.4. There are unused cables that are not insulated, identified, or secured in the bottom of the panel. Clean up.

50. HOT WATER HEATERS - ELECTRICAL:

50.1. The protective covers were missing for the electrical connections on the bottom of both tanks. Replace covers.

51. FUEL TRANSFER PUMP - ELECTRICAL:

51.1. The electrical supply cable leading up to the pump is not properly routed or secured. Reroute and secure.

52. BLACK WATER PUMP – ELECTRICAL:

52.1. The pump does not have a cable gland securing the cable into the motor. Properly secure cable.

53. GREY WATER PUMP – ELECTRICAL:

53.1. There is not a cable gland for the electrical supply cable and the inner conductors can be seen outside the pump housing. Properly secure and insulate.

54. FIRE/DECK WASH PUMP - ELECTRICAL:

54.1. Pump is being replaced see 9.6 – install proper marine wiring, and properly secure.

55. FRESH WATER PUMP FORWARD - ELECTRICAL:

55.1. The pump electrical supply cable is a paralleled conductor for positive and negative and the green/yellow ground wire is being used for the negative and does not meet electrical standards. Rewire to standard.

55.2. The motor cover has been modified so that the cables could be terminated and has exposed the terminations to water ingress. Replace pump and properly terminate without modifying cover.

56. FRESHWATER PUMP AFT - ELECTRICAL:

56.1. The pump has a slave solenoid lying on the deck next to the pump and is unsecured. Secure.

56.2. The electrical supply cable is poorly routed leading up to the pump and unsecured. Reroute and secure.

56.3. The pressure switch electrical connections are very poorly made, outside of the protective cover, and do not meet electrical standards. Redo.

57. A/C COMPRESSOR AND CONTROLS – ELECTRICAL:

57.1. Only one of the two A/C compressors was operational at time of survey. The nonworking unit was deemed non repairable. Replace whole system with 220vt system (mentioned 19.1).

58. A/C HEATING SYSTEM - ELECTRICAL:

58.1. The end cover could not be removed to gain access to the heating element connections to verify the condition. The unit did operate at capacity. Free end cover.

59. A/C CHILL WATER PUMP – ELECTRICAL:

59.1. Replace – Grundfos UPC-40-120 model A – 220vt

60. A/C SEAWATER PUMP – ELECTRICAL:

60.1. The electrical supply cable outer jacket insulation is pulled out of the cable gland subjecting the motor to possible water intrusion. Fix.

61. A/C HEATING VALVES – ELECTRICAL:

61.1. One of the three valves has been removed. Replace.

61.2. The forward valve has an unused wire secured to it that should be properly insulated and currently has electrical tape insulating it. The wiring leading up to the electric valves is poorly routed and unsecured. Properly secure and route and insulate.

62. STARBOARD VENTILATION FAN FORWARD – ELECTRICAL:

62.1. The 24VDC fan does not operate and the fan blade does not turn freely. It could not be determined what this fan was for. Remove.

63. REFRIGERATION COMPRESSORS – ELECTRICAL::

63.1. The ground wires inside the motor connection box are not terminated properly or insulated. Terminate and insulate.

63.2. The solenoid valves are missing the retaining clips for the coils. The cooling fan on the aft unit has a broken fan grill. Replace clips and grill.

63.3. The external case ground wires are terminated with a screw on top of paint and are corroded. Make clean connection.

64. MAIN ENGINE – ELECTRICAL:

64.1. The positive cable is poorly secured going back to the main panel. Properly secure.

64.2. The starter positive connection does not have a protective cover. Install cover.

64.3. The temperature and pressure senders on the main engine are corroded and in poor condition. Replace in rebuild.

65. ENGINE ROOM VENTILATION FANS - ELECTRICAL:

65.1. The fan housing on the port and starboard side of the engine room are not properly supported. Properly support.

65.2. The speed control for the fans does not work in the panel over the main engine. Replace.

66. MAIN ENGINE THRUST BEARING PUMP – ELECTRICAL:

66.1. The second cable for this device is improperly spliced outside of a junction box and secured to piping. Install proper junction box and properly secure.

67. ENGINE ROOM EQUIPMENT – REFRIGERATION SEAWATER PUMP:

67.1. The pump is not properly grounded. Properly ground.

68. ENGINE ROOM CABLING – ELECTRICAL:

68.1. Generally a mess. There are unused cables in many areas of the engine room that are not properly insulated, identified, or secured. There are many splices made in different cables throughout the engine room that are made outside of a junction box and/or only have electrical tape insulation. There are cables of one cable wire size connected to another of lesser size where the conductors are paralleled to obtain more capacity and does not conform to electrical standards. There are many cables that are secured to piping and that is not a proper or accepted method of securing cables. Rewire properly during engine rebuild and generator replacement

69. MAIN ENGINE FORWARD BILGE AREA – ELECTRICAL:

69.1. There are several wires in this area that are unused, improperly secured, uninsulated, and unidentified as to past use. Remove.

69.2. Some of the wires are secured to piping which is not a proper method of securing wire. Properly secure.

69.3. There is a 220V socket hanging from the wire duct and should be permanently mounted in a junction box and secured to the bulkhead.

70. ENGINE ROOM 220v SOCKETS:

70.1. There are two 220V sockets in the engine room and not protected by 30ma GFCI or differential protection. Replace with GFI sockets.

70.2. The port side unit next to the A/C compressors has the electrical cable outer jacket insulation pulled out of the cable gland exposing the inner conductors. Fix.

71. HUNDESTED ACTUATOR FOR PROPELLER PITCH – ELECTRICAL:

71.1. The cable gland is outside of the opening in the actuator and should be reconnected.

72. *GROUND TACKLE:*

- 72.1. The windlass currently receives power from the engine drive hydraulic pump only. Install appropriate system to run the windlass off factory installed PTO on new generator as a backup. See 24.1
- 72.2. Modify the location and size of the anchor roller to fit one size larger CQR (182kg) in such a way to least affect the bow esthetics. Anchor should be galvanized (not SS). Manson Plough is preferred design but other reputable CQR's types are acceptable.
- 72.3. Remove item
- 72.4. Second anchor system to be installed. Strong chocks and mounts need to be constructed to also stow the current 300lb CQR in the forepeak (or stb side deck locker). Need mesh bag with wire hoop opening for 150m of 16mm spectra line (16mm Samson Neutron8 or equivalent – min 35,000lb breaking strength) with shackles to fit chain. Note three additional identical bags/lines will be needed as shore lines
- 72.5. Bow fairlead for second anchor needs to be installed –rollers on bottom & sides. Strong closable/openable top bar to create panama lead and absolutely ensure structural integrity. Picture on refit website shows location. Construct in such a way to minimize affect of bow esthetics.
- 72.6. Anchor control buttons are on deck. Label “up” and “down” solenoids and have solenoid control method fitted in the event of deck button failure. Note: This has been suggested as frozen rubber buttons may not be reliable in high latitudes.
- 72.7. Add a wireless remote control box for the windless, so windless can be operated while watching the anchor and/or cutting kelp from the chain. (or if deck buttons fail)
- 72.8. The anchor chain box needs to be rebuilt (taller) in order that the chain will stack into it without jamming. While this is being done, we should take any convenient way to strengthen the bow against ice collision - perhaps a crash box or extra frames or partial bulkhead.
- 72.9. Build removable chain roller for aft end of bow locker (under which the chain runs to the windless, which will lead the chain up to the deck, to be pulled by a deck winch in case windless breaks

73. *COMMUNICATION and NAVIGATION EQUIPMENT:*

We need essentially a whole new communication and electronics package. The B&G system is the only system worth keeping. Our number one priority is reliability. We want serious commercial gear than works reliably and not small boat yachting toys. We desire to have as few brands and as few interfaces between different brands of equipment as possible. Finally, we need to maximize electrical efficiency, since this will be a battery boat,

operating with the generators off for long periods. The general mindset should be as in outfitting an offshore commercial working boat (like a tug or trawler).

- 73.1. Mount two magnetic compass - one at each helm station. Swing and obtain deviation cards.
- 73.2. Replace gyro compass system with B&G/kvh rate gyro – dedicated display in Nav station. The rate gyro should be directly connected to the B&G APC (rather than via the B&G network) to maximize data rate and allow heel information to drive APC.
- 73.3. Replace autopilot electronics with latest B&G APC that can read the rate gyro, and carry a spare (in the box, not installed) autopilot computer and control head. As is normal, the autopilot will need to network with the instruments (to steer by wind angle) and with the gps (to steer to waypoint). Autopilot needs a steering knob (preferred to joystick) control at each helm.
- 73.4. Replace B&G repeater in owners cabin – buttons don't work (there is already one in captain's cabin)
- 73.5. Update software in all existing B&G hardware, replace B&G main processor with latest hydra model
- 73.6. Replace VHF in cockpit and nav station (with icom 504 or similar Sailor). We want a simple waterproof remote hand mic in the cockpit and not the 'phone handset' style.
- 73.7. Chuck out mini-m system and weather fax machine
- 73.8. Replace SSB (with icom 802 or Sailor equivalent)
- 73.9. Toss the old fixed gps and install two duplicate gps black boxes/antennae (GP-320B) that match the chart plotter (Furuno GP1920BB). These will feed the chart plotters, PCs and instrument nema network. Either should be selectable as the source (in case one breaks) for both plotters, pc and instruments.
- 73.10. Install new radar with displays at nav station and cockpit. Furuno 2117BB/DC (black box configuration) with 48" antennae (in a cage to prevent halyard wraps) mounted on front of mast.
- 73.11. Install furuno CH-270BB sonar (black box configuration) – used to identify rocks in uncharted coves. The transducer for the sonar is vulnerable to ice damage and need to be designed and installed so it can be relatively easily replaced. It also needs to be electrically insulated from aluminum hull. Viewable at the helm screens.
- 73.12. Remove item
- 73.13. The tops (and perhaps sides) of the pedestals will have to be pretty thoroughly reworked to accommodate the new screens, magnetic compasses, gyro compass displays, B&G autopilot control and other equipment changes. While doing this we should take the opportunity

to also replace the various panels that have cracks and other defects (for example port runners and engine control), and ensure panels are watertight.. The same general solid construction quality should be maintained and protective covers should be made for the screens, as over the current radar.

There are two wheel & pedestal's. We will have one primary screen at each pedestal and be able to toggle the screens to show Furuno radar, plotter, or sonar (and if possible the web cam). We definitely do not need tv or film capability on the helm or nav screens.

73.14. Install Furuno chart plotters (with ais) at nav station and owners cabin, with repeater capability at helm screens. Furuno GP1920BB (black box configuration). Our preference is for dedicated (rather than pc based) chart plotter systems. In our experience, the dedicated systems tend to be more reliable and electrically efficient. As mentioned above these should each have their own black box gps. (note: Skipper likes Furuno products but specifically does not want Furuno navnet 3d because of chart limitations and software bugs.)

73.15. The nav and owners computers should also have pc chart plotting software installed. The Captain is familiar with MaxSea but would consider an easier to use system. For both the plotters and pc software, we need to be able to carry complete world charts, including extreme locations like the Antarctic & Spitsbergen to 80N, all charts on board and access to them all without having to visit a dealer.

73.16. The Nav (for comms and maxsea) and Owner's (for work) computers will be pc systems (Owner will supply). The lower saloon will be an Apple (I-Mac – owner supplied). The Owner has two computer employees who will be involved in specifying the exact models and setting up the computers and communication systems.

All three computers should be networked to the comms system. The Nav and Owners computers need to be networked to the instrument system. The saloon computer needs to be networked to the mast web cam. Installation should ensure access to back of computers.

In the Nav station there should be three screens for separate full screen radar, plotter, and sonar displays (plus the pc screen). Each screen should be able to toggle between the Furuno radar, plotter and sonar.

In the Owners cabin we would only want one nav screen (plus the pc screen). It will primarily be used as the display for the second chart plotter. This screen and plotter should be able to be easily turned off (without any complex rebooting process) to save electricity when it's not being used.

It is not a requirement that the saloon computer ("photo computer") be able to display any of the nav/instrument/radar/plotter information.

So, total number of screens: Nav station (3 plotter/radar/sonar + 1 computer -20"), Owner's stateroom (1 plotter + one computer 20"), Lower Saloon (1 i-max 30"), Helm (2 toggling radar/plotter/sonar).

73.17. Calibrate the speed log.

73.18. Calibrate the depth sounder to read depth below the keel.

73.19. Install gsm, iridium, wifi booster , fleet 77 and Vsat (fleet antenna will go on stern pole and vsat on spreader, and new radar to front of mast). Handsets in nav station and owner's cabin, and also data connections to all three computers.

Telephone distribution details: Need a solution to dial in and out from the navcom station and from the owner's cabin with a choice for the external line (fleet, gsm, iridium). Solution must be power efficient.

73.20. Build/install stern pole for fleet 77 (will likely need a pair of side guys)

73.21. Install new modern Inmarsat sat C transceiver.

73.22. Install 'skyeeye' system (very simple two-wire real time satellite picture receiver)

74. AUDIO VISUAL EQUIPMENT:

74.1. Replace entire system – We want an A/V system only for the lower saloon, based around computer the 'photo computer' in the lower Saloon. It needs a multi-region dvd capability. If people want movies or music elsewhere they will use laptops (movies) or Ipods (music). System based around an apple i-mac (with 30" screen) computer (the 'lower saloon photo computer'). Use current ceiling speakers if they work or install smallish speakers (something like the Bose Acoustimass® 5) in same place, and a multi-region dvd player. Set it up so it can be watched from the dining table seats. The cabling should be very simple. The speakers should be relatively close. It needs an Ethernet connection to the comm. system. It does not need to be connected to the instrument/nav/radar network. But it should be connected to the mast web cam.

74.2. Eliminate item

74.3. The boat Ethernet should be wired, with all installed equipment (eg the three computers) hard wired, plus 4 hard wired plugs (nav station, deck house table, lower saloon table and lower saloon seating area) plus a wifi capability for guests laptops.

75. GALLEY APPLIANCES:

75.1. Replace galley trash compactor - ISE 8251.

75.2. Replace the icemaker (with new, the same - U-line BI-95) and the under counter fridge (U-line 29R) - these are in lower saloon

- 75.3. Replace microwave oven - Panasonic, dimension 4, turbo bake
- 75.4. Replace electric oven with Aples Inox brand, model FG/AM. Replace the cooktop (4-burner gimbaled Gaggenau propane cooktop) with Aples Inox top (hob) model 5068/5 G. Custom stainless box and gimbals will have to be built – the balance should be adjustable (for different pots and seaway conditions).
- 75.5. Install extractor fan over Inox hobs – Inox model CFE A 80/2 directly over Inox hobs.
- 75.6. Remove item
- 75.7. Overhead exhaust fan and light in the galley: Rewire and re-locate light switch so it is easily operated.
- 75.8. New dishwasher to replace current - Bosch SR145T35EU
- 75.9. Replace galley countertops with something new which ages better than Corian (Marble?) and rebuild lockers. That means fix up the current lockers to look and work perfectly: Fix/replace all sliders and adjust/replace hinges and latches and make all work flawless. Repaint all. Then adjust the interior arrangement of a few lockers: (a) Remove potato shelves in locker under sink to make larger locker. (b) Add handle on panel behind sink, to allow for easy access to locker. (c) Add shelf in corner cupboard behind aft crew settee. (d) Remove carousel and add normal shelves to aft outboard corner locker, (e) Remove shelves under sink to open space for large pot.

76. *DECK GEAR and EQUIPMENT:*

- 76.1. The master cabin and lower saloon overhead hatches are operated by DC electric actuators. If the DC circuit fails, it is not currently possible to open these hatches. Create possibility manual closing and dogs, to current hatches rather than new hatches.
- 76.2. Test all hatch gas rams and replace faulty ones – for quote purposes assume half are replaced.
- 76.3. Aft deck house, sheet lockers 33 and 34 drain into backstay captive winch lockers, but just drip into the lockers. The drain lines should connect properly to the drains of the lower lockers, to keep the lower lockers dry.
- 76.4. Most locks/dogs on Rondal hatches have leaking O rings, as well as some seals to be replaced. All hatches must be completely water tested.
- 76.5. Big hatch in owners cabin leaks badly when the boats is being washed, needs to be serviced/new seals.
- 76.6. Replace lifelines. Use same size plastic cover wire as now.

- 76.7. Build one new carbon passerelle which can act both as side steps and stern plank (as seen on some wallys). Build swim ladder for transom platform, when it is down.
- 76.8. Add two stainless side boarding ladders, which will fold up into the life lines and go down to near top of dinghy (not water surface).
- 76.9. Owner will buy new tenders (one big and one small). New foredeck chocks will have to be built for the big tender.
- 76.10. Replace galley hatch dodger. and all hatch screens (Fly and dark). Replace screens (fly & dark screen) on all hatches.
- 76.11. There are 2 deck prisms both are crazed, the prisms should be replaced.

77. TEAK DECK & CLEATS/BOLLARDS & HAND GRIPS:

- 77.1. We will keep current teak decks for now. We would simply like them sanded & local seam repair to about 6m of seams, and pull up and replace planking and probably plywood in two areas (each about a sq m). While redoing the decks we need to install 8 much bigger cleats to replace the current bow and stern cleats. Deck cleats should be Rondal 20" cleats. The old bow/stern cleats will be used to replace the smaller cleats around the mast winches.
- 77.2. Construct 6 strong stainless open fairleads with side rollers and swing tops (as seen on some swans). Two go to replace current aft closed bolt-on fairleads, two go aft on top of toerail just forward of current stern closed fairleads and two forward on the toerail just aft of current closed bow fairleads.
- 77.3. Item included in 77.2
- 77.4. Install 3m of railing each side of deckhouse – Stainless steel to match design of hand grips that are already just outboard of helm stations.
- 77.5. Repair any aluminum corrosion damage under teak
- 77.6. The stainless anti chaff strips used between on deck winches by the mast & midship cleats & fair leads are too short and should be lengthened (about double current length).
- 77.7. The toerail needs to be varnished (3 coats) and there are two places where water has gotten into joints - One forward starboard, and another area under the stowed boarding ladder also on starboard side
- 77.8. Repaint white decks and cabin tops and deckhouse.

78. TOPSIDES & PAINT:

- 78.1. Topsides need to be repainted flag blue and the boat renamed *Billy Budd*. Maintain current hull stripes design

- 78.2. Remove name from the boom.
- 78.3. Paint two blue bands near the top of the mast.

79. SPARS and RIGGING:

- 79.1. Spar is due to be removed, stripped of all fittings and all rod and fittings NDT tested. Anticipate cost of replacement of all or the majority of the rigging and fittings. Note: the line and rigging should be quoted as a separate item because the owner may be able to source inexpensively.
- 79.2. Rewire entire mast. All circuits should be megger tested and carefully chafe and uv protected where they pass out of the mast.
- 79.3. Replace all mast lighting with LED.
- 79.4. Windex light is not working. Replace.
- 79.5. Boom lights are not working. Replace with LED.
- 79.6. Replacement all running lights with LED (LOPO).
- 79.7. Load cell readout at mast base not operational. Service or replace.
- 79.8. The search light on the starboard spreader does not rotate to port. Service or replace as necessary.
- 79.9. Mount steerable web cam in waterproof enclosure on first spreaders – connected to saloon computer and also, if not too hard, the Nav computer and helm screens.
- 79.10. Install mast steps to the first spreader – Owner will supply steps - these are custom built to the owners specification.
- 79.11. Install fittings on boom and mast to rig lazy jacks – in case the furling boom fails.
- 79.12. The vessel was originally fitted with a spinnaker pole that was used to launch the tender. It is no longer on board. Get new pole.
- 79.13. Manual furling system for boom. Install a line driver system that can be rigged to a winch.
- 79.14. Backstay, forestay and headstay load cell readouts in the cockpit are not operational. Service and prove.
- 79.15. Small yellow cylinder at mast base - Determine function and label.
- 79.16. Mast is due for repainting. Prior to repainting all fairing cracks to be ground out and further assessed. We don't need whole mast repainted, only the areas where the paint is being ground off to examine the cracks Note that none of these are to be considered structural. These include:
 - 79.16.1. 4 places at backstay crane

- 79.16.2. Genoa stay tang
- 79.16.3. Staysail stay tang
- 79.16.4. Spider cracking at most spreader roots
- 79.16.5. Cracking at D2 and D tangs

80. *WINCHES and SAILING GEAR:*

- 80.1. Blade (genoa) foil is pulled out of furler. And also on staysail furler correct while furlers are being serviced by Rondal (80.2).
- 80.2. Send aft two furlers to Rondal for re-conditioning. We are going to simply remove the forward most reacher stay from the sail plan. We will leave the reacher hydraulic components in place for now in case we decide to reinstall the forward furler - we need to cap the hydraulic hoses, disconnect the deck switches (but leave in place) and leave the halyard ram in the captive winch locker but also disconnect.
- 80.3. Eliminate item – leave traveler as is.
- 80.4. Aft Lewmar winches: We will keep these winches and just use as non-self tailing. So, we just need to remove self-tailing arms and construct new top plates.
- 80.5. Eliminate item – keep current winches.
- 80.6. Remove boat name from top of 5 Rondal winches.
- 80.7. Completely remove, strip and recondition all winches and windless.
- 80.8. Rondal captive winches are not fitted with a laser which stops the winch in the event of an override. Fit these to the captive winches.
- 80.9. Eliminate item
- 80.10. Deck buttons for all winches should be accessed from the underside, inspected and connections cleaned.
- 80.11. Boom angle indication is necessary. Install a simple fiberglass rod indicator secured to the vang indicating how much piston is showing when boom is level.
- 80.12. The staysail halyard ram (in main halyard locker) needs to be rebuilt (bad seals).
- 80.13. Realign block for main halyard (in captive winch locker to make lead thru deck fair and stop current chafe
- 80.14. Replace all clutches (5) on mast with new spinlock clutches
- 80.15. Check with southern spars for latest/best mainsail track ramp design
- 80.16. Create simple removable (hard plastic) collar for vang to prevent boom hitting dodger top in seaway
- 80.17. Install very simple holder for the Dan bouy (on backstay or pushpit)

81. INTERIOR:

- 81.1. Insulation: (a) pull down the ceiling panels and add insulation and a continuous vapor barrier under the deck, where in any case it is most needed. And (b) we would double pane all the windows, hatches and ports. And (c) Spray any uninsulated aluminum (for instance in the bilge on any aluminum bare surfaces, on forepeak, lazarette and owners cabin hatch where there is no insulation, and around the bare aluminum in the lazarette) with Mascoat's Delta T. And generally take any opportunity where insulation can be added without major interior removal.
- 81.2. All existing superstructure glazing, ports and hatches will be fitted with an additional glass (or acrylic) pane affixed to its interior side, thereby trapping a layer of insulating air between the panes.
- 81.3. Existing hanging locker to port of pilothouse companionway shall be lined with an Owner selected Formica, drain installed, hooks near top for foul weather gear.
- 81.4. The navigation station needs to be slightly modified with a secure helm seat so that a proper watch can be kept from there. Owner does not like the typical 'captains chair' so a folding 'saddle' style chair mounted high enough to have decent watch keeping visibility is proposed but we are open to suggestions/solutions for a good seating position here. An autopilot control, engine controls (throttle & pitch), and engine control panel should be located there. The control panel will be one of the control panels from the helm, moved here.
- 81.5. Install 'photo computer' in the existing locker in the corner of the lower saloon. Small sliding shelf is needed for keyboard and fiddle needs to be removed/adjusted in the area. The bottle locker under this area should be converted with simple shelves to general stowage. We want to keep the current locker behind the forward/stb sofa but just extend the locker out (aft) about 10cm to the edge of the walls (and remove the speakers that are in the locker and convert those spaces to locker). And this is one of the TV's to be removed - on wall above locker. For L shaped fixed sofa in lower saloon – Install 10cm of additional height – wood covered with fabric (owner supplied). So the locker underneath is 10cm bigger and the cushions sit 10cm higher.

The present style of furniture, cabinetry, and wood/finish should be maintained.
- 81.6. Create folding pipe birth for captain cabin (to replace current plywood folding bunk – which has been removed)
- 81.7. Overhead panels throughout have been removed many times over the year. Clean leather ceiling panels throughout the boat. Replace individual panels only if they will not clean up – perhaps replacement

will be necessary in the guest areas (with nice vinyl that matches the current leather panel covering color).

- 81.8. There are nicks and dings in the joiner work. The ebony trim has been painted black in some areas. Touch up these minor flaws. Improve all interior varnish (bulkheads, wood trim, tables, deckhouse floors). Repaint all painted walls.
- 81.9. Change position of mirrors in guest cabins. Replace mirrors in Captain and crew heads.
- 81.10. An update to interior and exterior cushion upholstery is foreseen. The update shall be completed using materials and specifications provided by the Owner.
- 81.11. Remove item.
- 81.12. Add one 'pullman' bed to each of the two guest cabins ('adult size' as much as possible). Leave the 3rd bunk that is already in these cabins in place. (so there will be 4 bunks in total in these cabins) The new Pullman bunks should just fold up into the existing wall recess.
- 81.13. Install computer work station in the existing owner's cabin table space. Remove both the footrest and folding chair under the table (owner will provide/use typical office chair). New locker to replace the sofa should essentially match the locker on the on the other side of the cabin. Added book shelves (Two) should be added above bunk (aft bulkhead). In the centerline mounted locker forward of the bunk – the black plastic tv mount should be removed and a couple shelves installed.
- 81.14. Area in owners cabin locker where there is currently hanging clothing should be entirely converted to shelves and move the hanging bar to the aft part of the locker. In the saloon we need to move the dishes to another locker (probably foreword) and convert that and the bottles locker to general stowage.
- 81.15. Rough mock-up's of all the interior alterations to the S&S plans should be made in cardboard or pressboard for owner approval prior to constructing real interior.
- 81.16. Replace TV in galley with flat screen model, and build cupboard behind. This tv is apparently connected to a sony playstation which should remain. Remove all other tv's
- 81.17. Remove sink from the saloon (and replace fridge and icemaker per 75.2)
- 81.18. Install many new bookshelves through-out the guest, owners and crew cabins. For quotation purposes assume roughly 10m of new book shelves.
- 81.19. Remove item.

- 81.20. Build properly secured stowage trays in empty bilge areas (where stuff is currently stowed loose or with bungee cords).
- 81.21. Install one gun safe for stowing two long guns
- 81.22. Install two valuable safes
- 81.23. Install 8 folding coat hooks in each cabin
- 81.24. Remove item
- 81.25. All heads should be completely serviced
- 81.26. The clear screens at the owner's bath needs a lock (to prevent it from sliding back and forth when sailing. And shower latch needs to be fixed/replaced in Captain's shower
- 81.27. Both faucets in guests cabins drip and need to be serviced/new washers
- 81.28. New hand grips on outboard wall of nav station (2m) & removable 'subway straps' using the same system as the lee cloths in guest cabins two at forward end of owners cabin and three in lower saloon forward of steps.