

Lessons Learned Building a Semi-Custom Trawler



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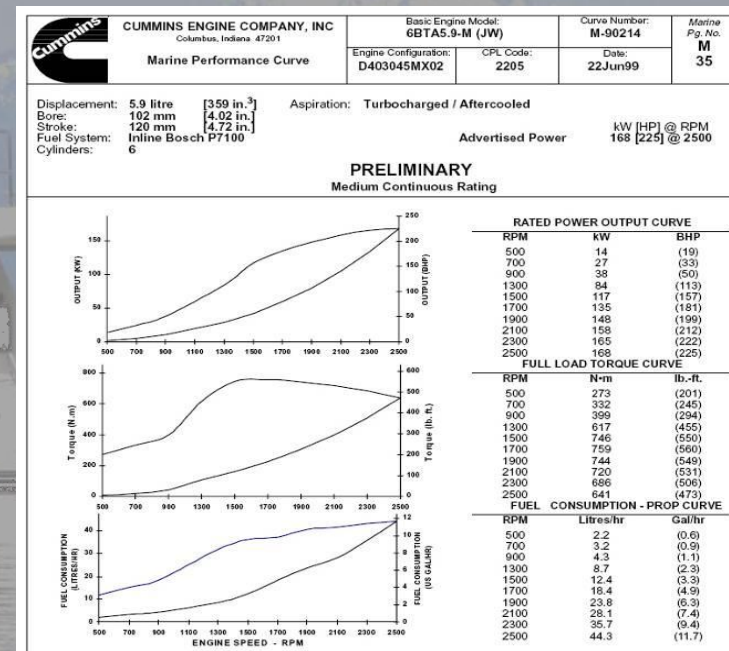
Agenda

- **Background and experiences**
- **Planning**
- **Customization**
- **Build & commissioning**
- **Lessons learned**



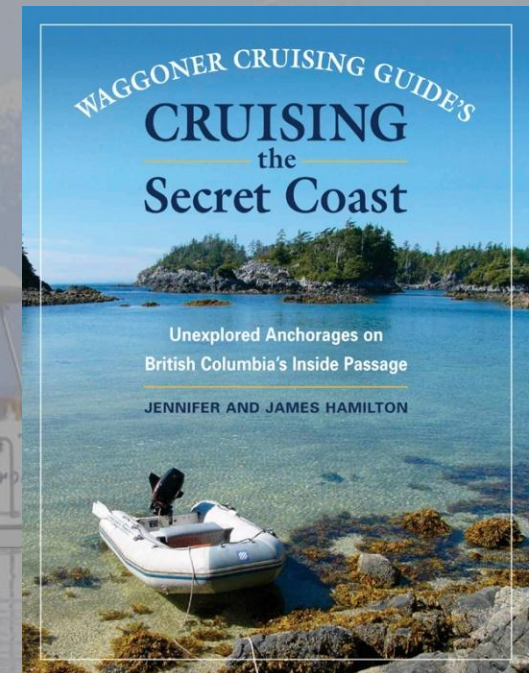
Previous boat

- Bayliner 4087
 - Cummins 270B Diesels
 - 4,100 trouble-free hours over 11 yrs
 - Solid coastal cruiser, but no passage-maker
- Specifications
 - 77 gallons water
 - +20 gal portable
 - No water maker
 - 220 gallons diesel
 - Cruise speed 15 knots
 - 17 GPH
 - Range: ~12 hours & 180 nm
 - Low cruise 7.75 knots
 - < 3 GPH
 - Range: 55 hours, 425 nm



Boating background

- Boat year-round in PNW
 - Summer: west & north of Vancouver Island
 - Winter: up to Broughtons
- Explore & document little-publicized destinations
- Want independence, flexibility & self-sufficiency



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Early planning



- Initial planned order of events
 1. Retire
 2. Order new boat
 3. Sell 4087
 4. Move aboard new boat on delivery
 5. Sell house
 6. Cruise full-time

TrawlerFest

MV Dirona Specifications and Features



Specifications

Length overall (LOA) 41'5" / 12.63m
Length rigged 43'7" / 13.29m
Beam 13'1" / 3.99m
Draft max 3'9" / 1.14m
Bridge clearance 12'4" / 3.76m
Bridge clearance max 15'5" / 4.70m

Fuel capacity 220 gal / 832L
Holding tank capacity 66 gal / 249L
Water capacity 77 gal / 291L plus 20 gal auxiliary

[Power Boat Television Review](#)



Stateroom layout

- Concern with buying after quit
 - Unsure cost of ownership
- Concern with buying before quit
 - Slower boat might impact restricted-time vacations
- The next boat would outlive us, so why not get it earlier and enjoy it?



Actual order of events

1. Order boat
2. Move aboard 4087 (Jan/09)
3. Sell house & car (May/09)
4. Move aboard 5263 (Feb/10)
5. Sell 4087 (Feb/10)
6. Future:
 - Retire
 - Cruise full-time

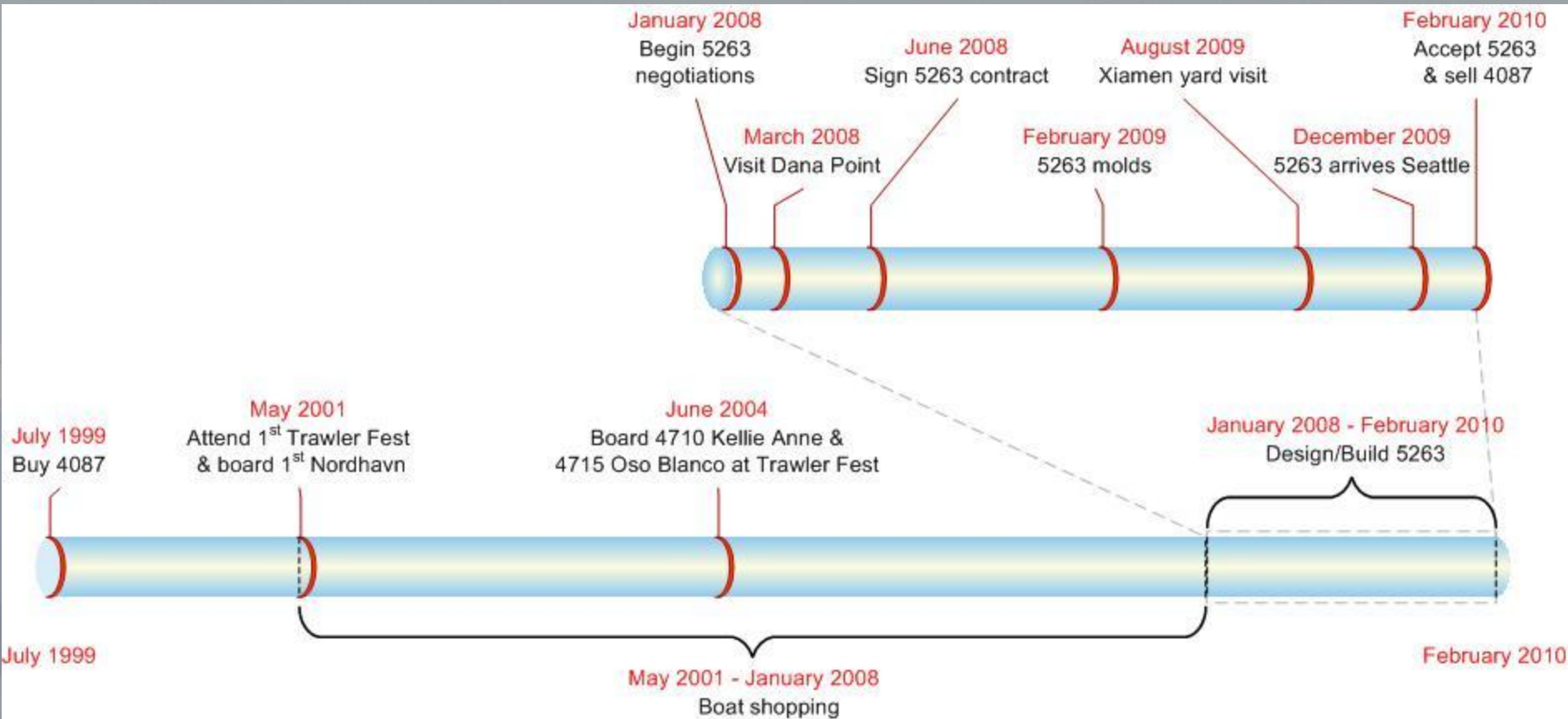
PURCHASE AGREEMENT NORDHAVN 52 #63

Buyer: James R. Hamilton and Jennifer Hamilton or Assigns
4509 Somerset Place SE
Bellevue, WA 98006

Seller: Pacific Asian Enterprises Inc.
P.O. Box 874
Dana Point, California 92629



Timeline



Early planning

- Built desired equipment list over time
 - Based on previous boat and things we saw/read about

New Boat Equipment List

Ground tackle

- Remote windlass control
- Dual anchor setup
- Stern anchor - self-deploying
- Stern tie
- Stern winch
- manual anchor winch
- spade anchors
- access to chain locker to flake chain

Electronics

- All systems connected to a bus ~~system~~ system so all data available on TC screens
- All systems switchable so can turn off and isolate them from rest of system
- Surge protection on all systems
- Concession block wiring
- Weather station - good one
- Weather fan
- Satellite access
- Lightning protection
- 120-volt charger for European systems
- Sinewave inverter
- ~~Autopilot~~ for radar - gives course, speed and closest point of approach in time & distance on any target
- HAD setup
- Depth Sounder at bow

Navigation

- Helm stations all over

Engine Room

- superquiet generator
- built-in gas, oil tanks, waste oil
- Multiple diesel tanks w/ fuel polishing system
- Alarms: bilge level, temp, coolant flow
- Remote camera to engine room and to stern
- Some way to test for or filter dirty fuel like bunker
- temp and turbo boost ~~gauge~~
- exhaust water flow sensor w/ alarm
- Deaerating system
- plastic tray under engines
- redundant ~~gauge~~ 12-2 oil pressure, coolant temp -]
- Excellent fire extinguisher system that shuts off engines and everything
 - 600 heat breaks you're toast
- Sink
- Work bench

Safety

- Halyards that can run ~~deckhouse~~ flags etc.
- Proper sea lights
- Emergency water pump 50 gals/min
- SOLAS-approved ~~ladder~~ and self-made equipment pack
- 2 THF per helm
- Safety lines so can attach to
- Sound signals
- Real ~~acquire~~
- All lights and ~~deckhouse~~
- Anchor lights: pair of separate lights or at least 2 bulbs
- Sams for sea lights
- Some warning system that one of the bulbs has burned out
- red light in pilot house
- emergency steering system
- firing mechanism for rescue line (easier to hit big ship than for it to hit us)
- core strong attachment point for bad weather rescue
- lifting harness to lift off boat
- marshall strobe
- 2nd radar for backup
- Chart table

Galleys

- Propane stove with full covered top and racks above like Princess 3174 or maybe separate range & oven
 - see if any have larger interior
- Vented cooking fan
- much better insulated refrigerator
- running raw water in galley
- hot water rescue so can run until have hot water
- large freezer
- princess oven w/ oven temp sensor
- Microwave
- dishwasher
- washer/dryer
- garbage compactor
- vacuum sealer
- pull-out floor covers to access bilge storage

Environmental Systems

- large grey water tanks
- ~~Wastewater~~ - self-pickling
- At least two separate water tanks
- Great quality heating & AC system
 - good ventilation so can have ports open underway so don't have to run
 - good insulation/drainage for AC (see ~~Boats~~ to ~~engine~~ book)
 - water will be a lot warmer, harder to cool AC
- Well-insulated vessel
- High-quality windows
- head vents on both side with 1.5" hose
- sewage treatment system

Other


- Windshield ~~debaggs~~
- Intermittent wipers
- Exercise room
- Outside power outlets in nonpainful places (eg. not just at bow)
- Exhaust for furnace vent's take on water and vent's burn boat/black inside it
- Anchor flapper stoppers
- Prop line cutters
- GreenLoop capable
- Bulbrite vacuum
- Bat wall for keeping crabs
- Separate washer/dryer with vent


General notes

- Parts available and at good price
- Everything accessible & labeled

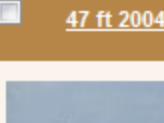
New vs Used

- **Used pros: Faster, easier, WYSIWYG**
 - **Cons: WYSIWYG, concerns on equipment/boat history & condition, choice limited to what's for sale, prices seemed high compared to new**
- **New pros: Customize on equipment & interior; greater choice of boats**
 - **Cons: More work, more time investment, longer to get boat, customization risk, financial risk**
- **Weren't in a huge rush, so building was fine**

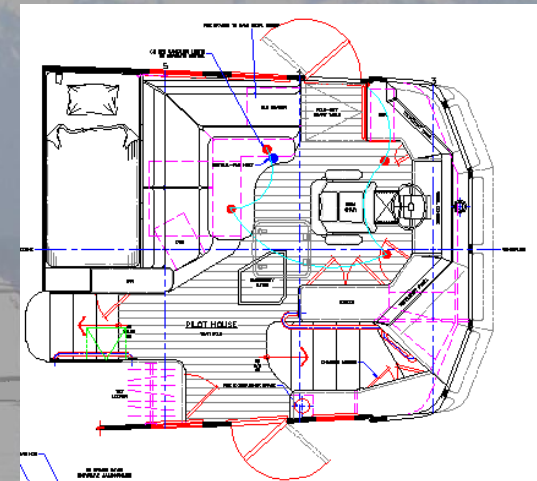
**47 ft 2003 Nordhavn Pilothouse**

[More Info/Photos](#)

Boat Type:	Flybridge, Pilothouse, Trawler
Location:	Palm Beach Gardens, FL, United States

[More Info/Photos](#)

Boat Type:	Flybridge, Pilothouse, Trawler
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Budget for new boat

- **Three major cost components:**
 - Base boat & standard equipment
 - Factory/dealer options
 - Post-delivery items
- **Extras were substantial portion of total price for us:**
 - Factory options: +10% over base
 - Post-delivery: +26% over base

Note: We have updated these figures to use the 52 base price. When we bought the boat, the 52 pricing hadn't yet been set so our contract pricing was based upon options on a 47 where the 52 package was just a big "option".



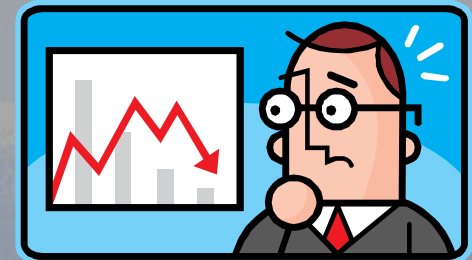
Comparison shopping

- Standard/optional equipment type & prices differs between builders
 - Difficult to compare on base price alone
- Request quotes on like configurations
 - Desired options plus major customizations
 - Learn what is post-delivery
- Also helps in comparing used & new



Financial Risk

- **Compare build & payment schedules**
 - Financial risk varies
 - We know people who ended up owning a partially-completed hull because yard failed
- **Nordhavn payment schedule:**
 - 10% on sign
 - 10% on start production
 - 75% before ship
 - Balance on delivery
- **Keep boat funds in cash or equivalent**
 - So market drop doesn't impact purchase ability
- **Insurance**
 - Add as additional insured to builder's policy when ships
 - You have insurable interest when make payments

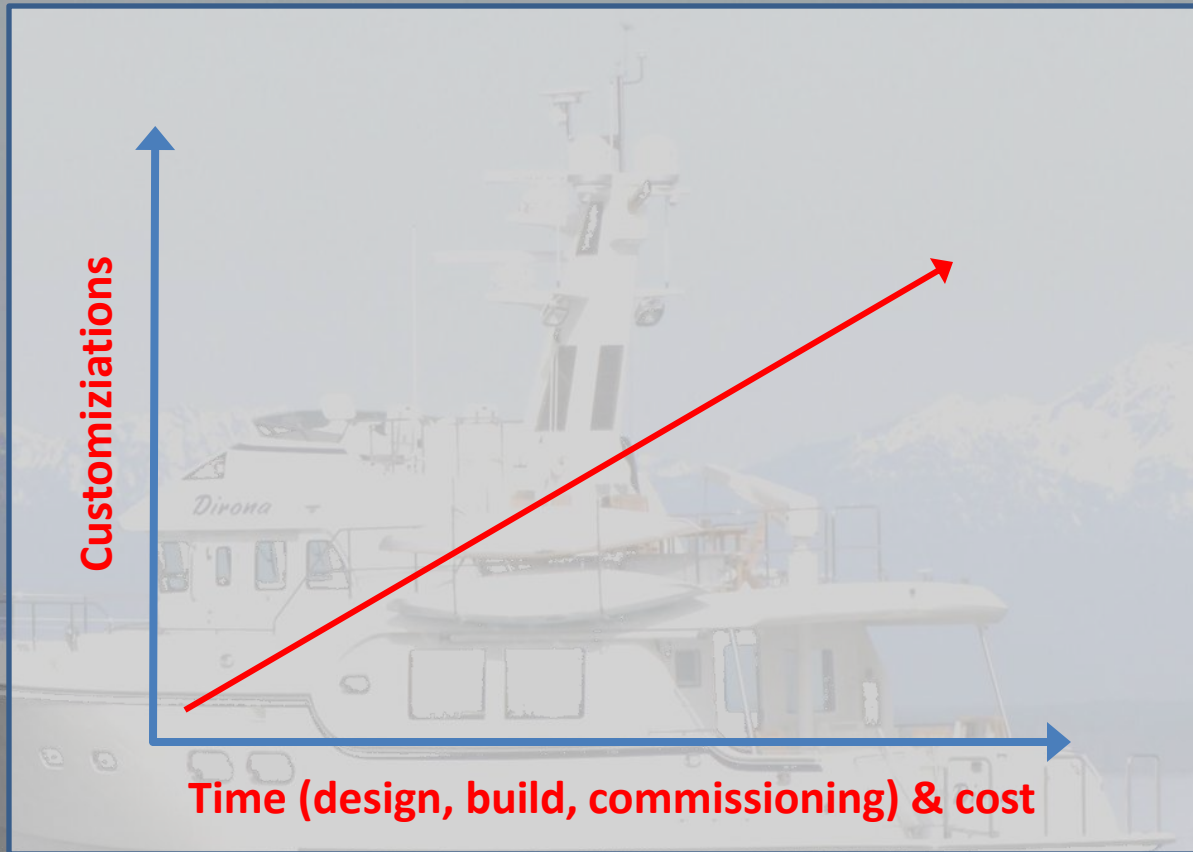


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Customization costs



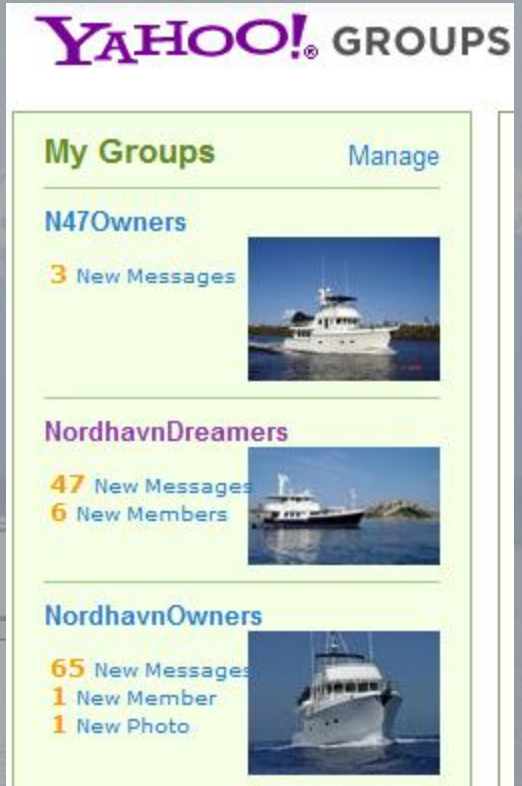
Customization & contract

- Try to make major decisions before signing the contract
 - Post-contract changes later can be difficult/costly
 - Understand change-order costs for post-contract decisions
- Reach agreement on important items before signing
- Be flexible on dates
 - Customization impacts schedule depending upon uniqueness of change and builder's experience with it



Community/Other Boats

- If possible, charter that or similar boat
 - Unavailable when we signed
- Talk to other owners, read forums
 - Likes/dislike & changes would make
 - Dreamers (unavailable when we signed) & Owners (unavailable until sign) forums helpful
 - We made several post-contract changes based on discussions in-person and on forums. eg. fridge handles & venting design
- Don't assume anything is standard
 - Ask if it matters
 - We found lockers etc that weren't standard, and added new ones



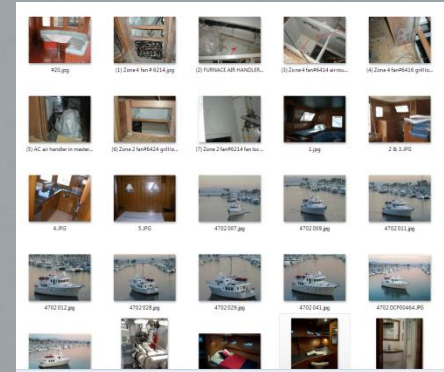
Salesperson

- If approach a company without choosing salesperson, one is assigned
 - Once assigned, can be difficult to change
- Salesperson can have major impact on project, particularly if customize
 - Get feedback from owners & explicitly choose salesperson to work with
 - Want someone you can work with long-term, who knows boat and can be your advocate with the builder
- Jeff Merrill deeply involved with the 5263 project from start to finish
 - We incorporated many of his suggestions that we'd otherwise have overlooked
 - Supplied extensive boat photo library



Pictures

- Take/get lots of pictures and dig through them. Often notice something on the 3rd or 4th look
 - Eg Salon table shape
- ~2,700 pics of Nordhavn 47s, mostly from Jeff Merrill
- Pictures of other boats, even different model, helpful in designing & decision-making
- Organized with Windows Live Photo Gallery so could jump around quickly



- N47: Boat deck
 - N47: Davit
 - N47: Gangway stowage
 - N47: Stack
- N47: Bow
 - N47: Portuguese bridge
 - N47: Carpet
- N47: Cockpit
 - N47: Barbecue
 - N47: Bimini
 - N47: Swimstep
- N47: Engine Room
 - N47: Fuel line runs
- N47: Exterior
 - N47: Port
 - N47: Railings
 - N47: Running lights
 - N47: Starboard walkway
- N47: Flybridge
 - N47: Design of
 - N47: Hatch
 - N47: Table
 - N47: Footstool
 - N47: Furnace
- N47: Galley
 - N47: Cupboards above mai
 - N47: Cupboards on port sic
 - N47: Fridge
 - N47: Pantry
 - N47: Sink area
 - N47: Stove area
 - N47: Guest Stateroom
 - N47: Desk and area
 - N47: Head
 - N47: Horn
 - N47: Laundry
- N47: Lazarette
 - N47: Dimensions
 - N47: Magnetic closure
- N47: Master Stateroom
 - N47: Hanging locker
 - N47: Head
 - N47: Mirror
- N47: Pilothouse
 - N47: Computer
 - N47: Hanging locker and ai
- N47: Helm
 - N47: Overhead
 - N47: Wheel
 - N47: Settee and area
 - N47: Stairwell to salon
 - N47: Stairwell to stateroom

Arrange by name Ascending

Filter by ☆☆☆☆☆ and higher Find a photo

All photos and videos (2720 items, 1 selected)

All photos and videos



#20.jpg



(1) Zone 4 fan # 6214.jpg



(2) FURNACE AIR HANDLER...



(3) Zone 4 fan#6414 airrou...



(4) Zone 4 fan#6416 grill lo...



(5) AC air handler in master...



(6) Zone 2 fan#6424 grill lo...



(7) Zone 2 fan#6214 fan loc...



1.jpg



2 & 3.JPG



4.JPG



5.JPG



4702 007.jpg



4702 009.jpg



4702 011.jpg



4702 012.jpg



4702 028.jpg



4702 029.jpg



4702 041.jpg



4702 DCP00464.JPG



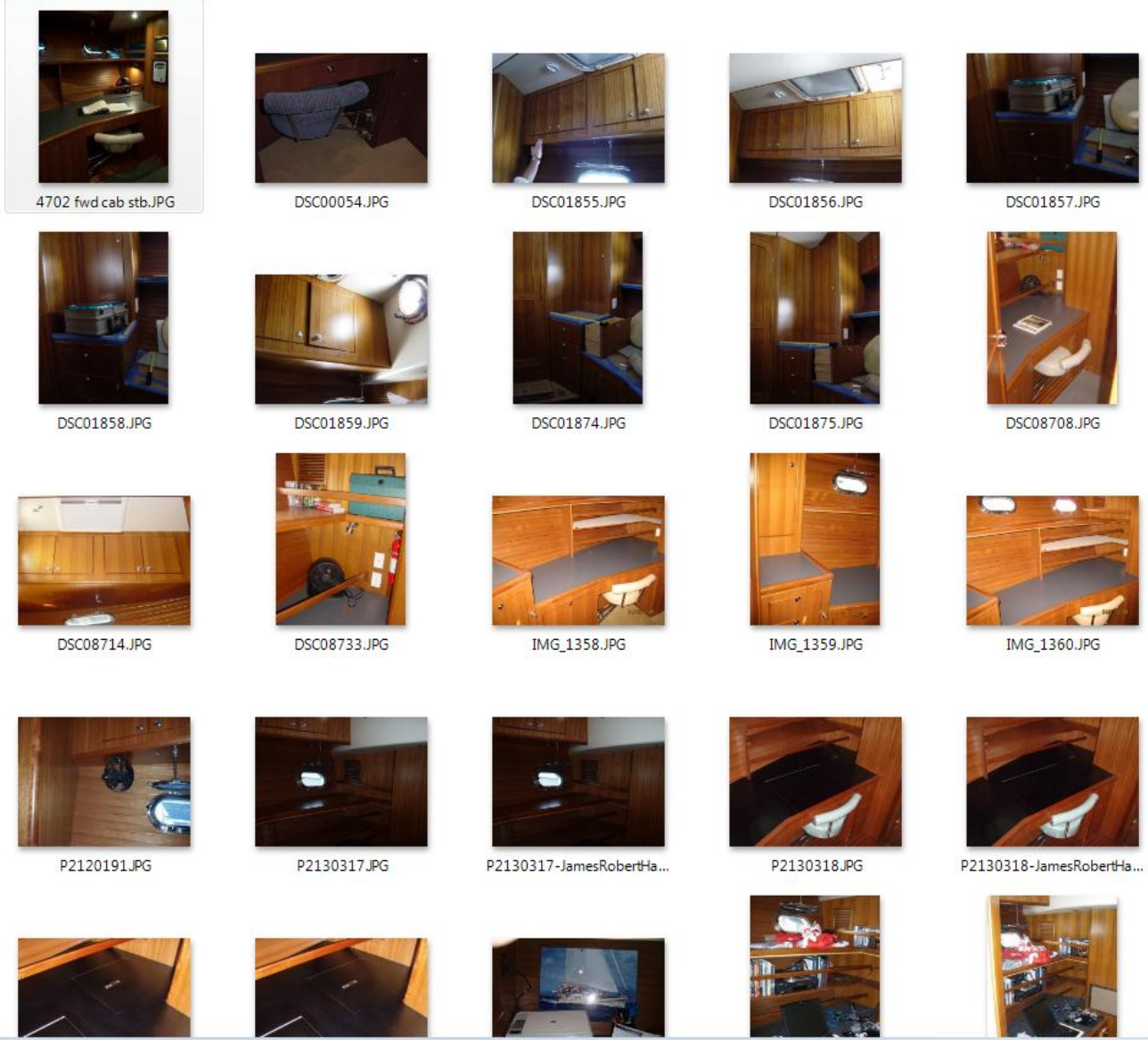
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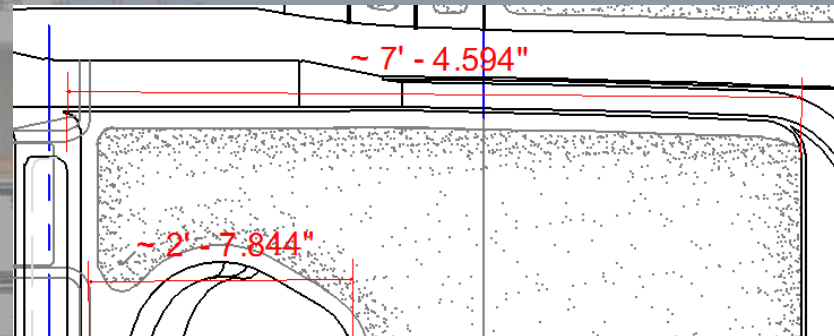
All photos and videos (28 items, 1 selected)

All photos and videos



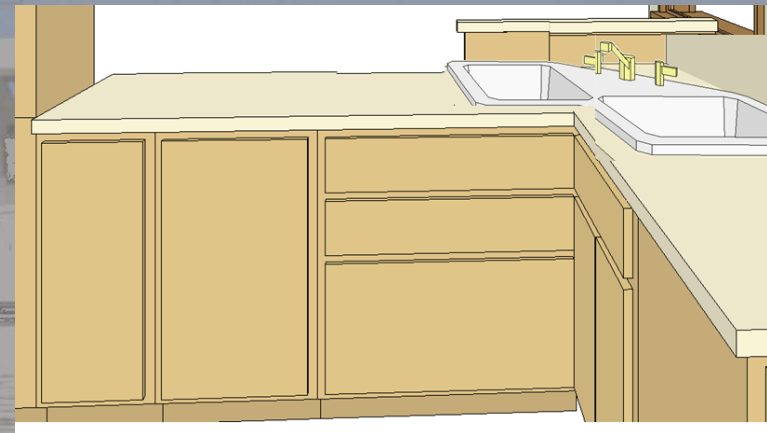
Drawings

- Drawing dimensions are more guidelines than specifications 😊
 - Mostly not a problem for us
 - Call out if specific tolerances required
 - Ask for measurements from yard as built
- AutoCAD (.dwf/.dwg) format helpful
 - Can zoom in better, measure, & experiment
 - Free viewers available autodesk.com



Layout customizations

- Tape mock-up with dark sheet plastic
 - Day head
- For big changes, pictures/diagrams help
 - Same as with house reno
 - Use photographs, mock up in Photoshop, ...
 - We used 3D home-design tool from house reno



Major Equipment Changes & Upgrades



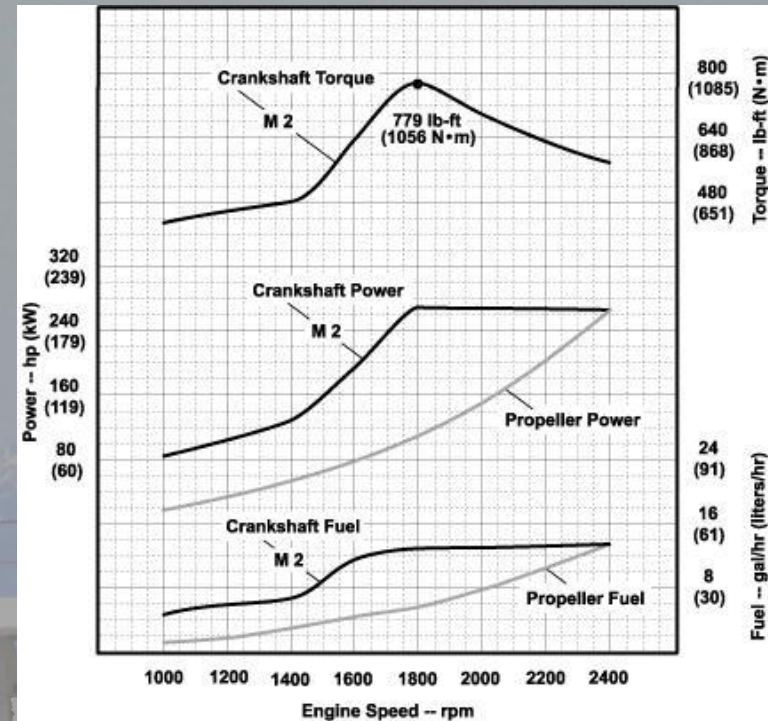
Engine Choice Criteria

- Some N47 owners I respect say “Great boat but I wish it was little faster”
- Looking at HP/1,000 lbs:
 - N43: 1.94
 - N47: 1.94
 - N50: 3.75
 - N55: 2.66
 - N57: 2.66
- Most N50, N55, & N57 owners happy with performance
- N52 with standard engine less power than above fleet
- Goal: at least 2.66 hp/1,000 lbs (266 hp)



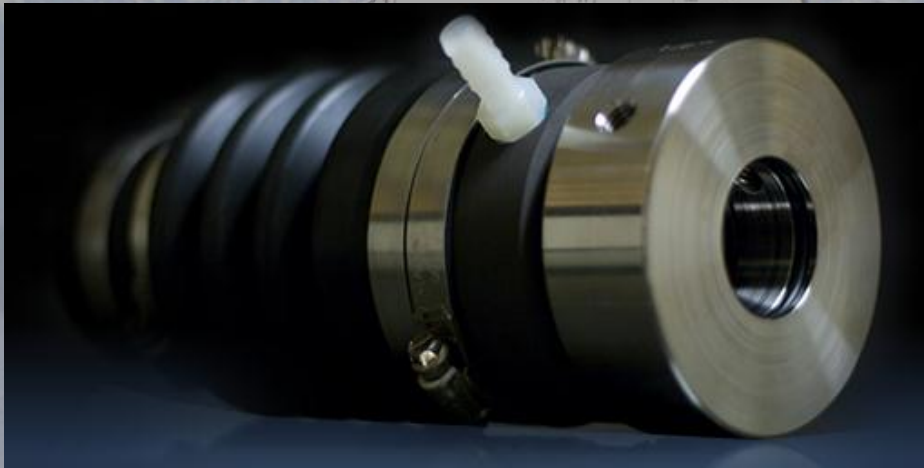
John Deere 6068AFM75

- John Deere 6068AFM75 main
 - 265 hp @ 2400 RPM
 - 231 hp continuous
- N52 standard engine is 165 HP intermittent duty
- Myth: Higher HP rating implies greater fuel consumption
 - 150 hp from 175 HP consumes roughly the same as 150 hp from a 265 hp engine
- Requirement: Engine must be at operating temp

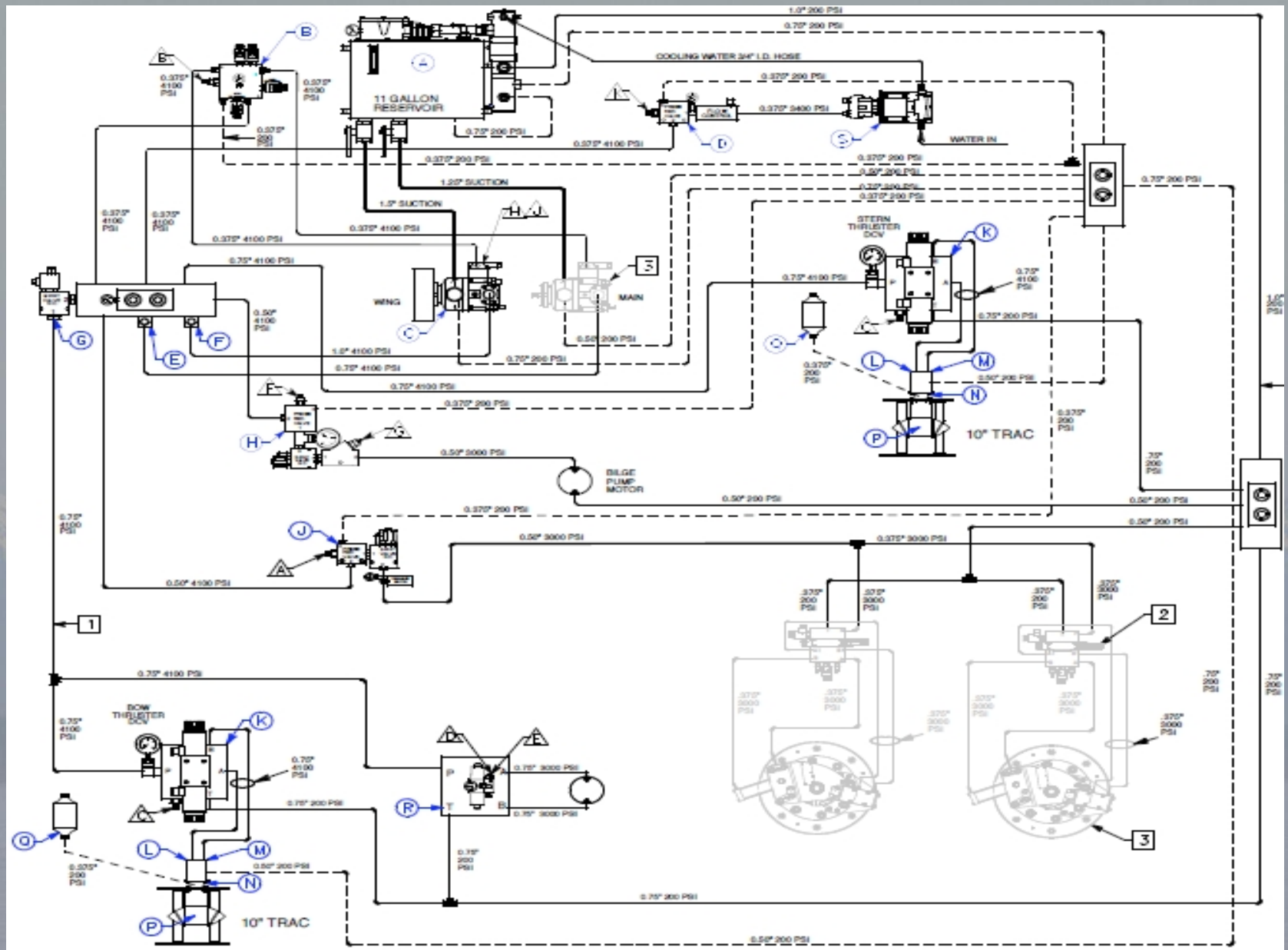


Machinery

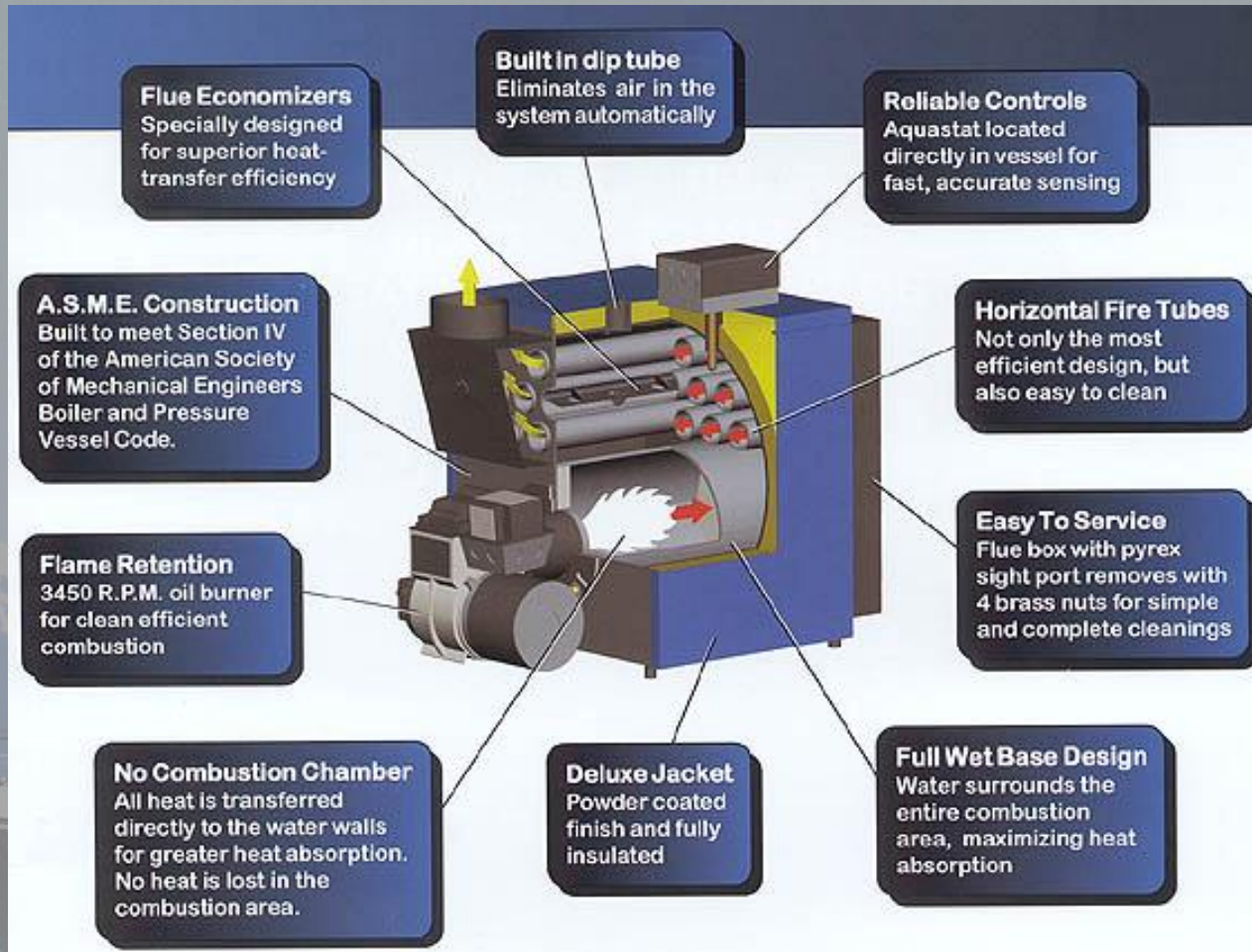
- **ZF305-2 Transmissions**
 - 2.917:1
- **Efficient 5-blade prop**
 - 32" x 24" x 5
- **Packless Shaft Seal**



ABT hydraulic thrusters, windlass & bilge pump



Olympia 105,000 BTU Diesel-Fired Boiler



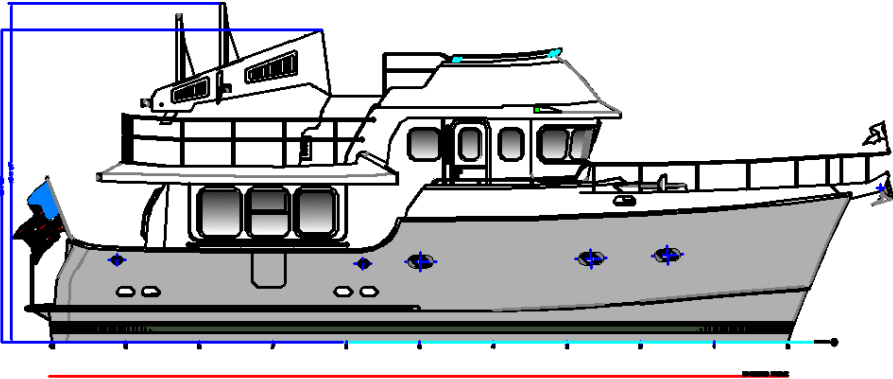
Sure Marine Service Inc.

www.suremarine.com

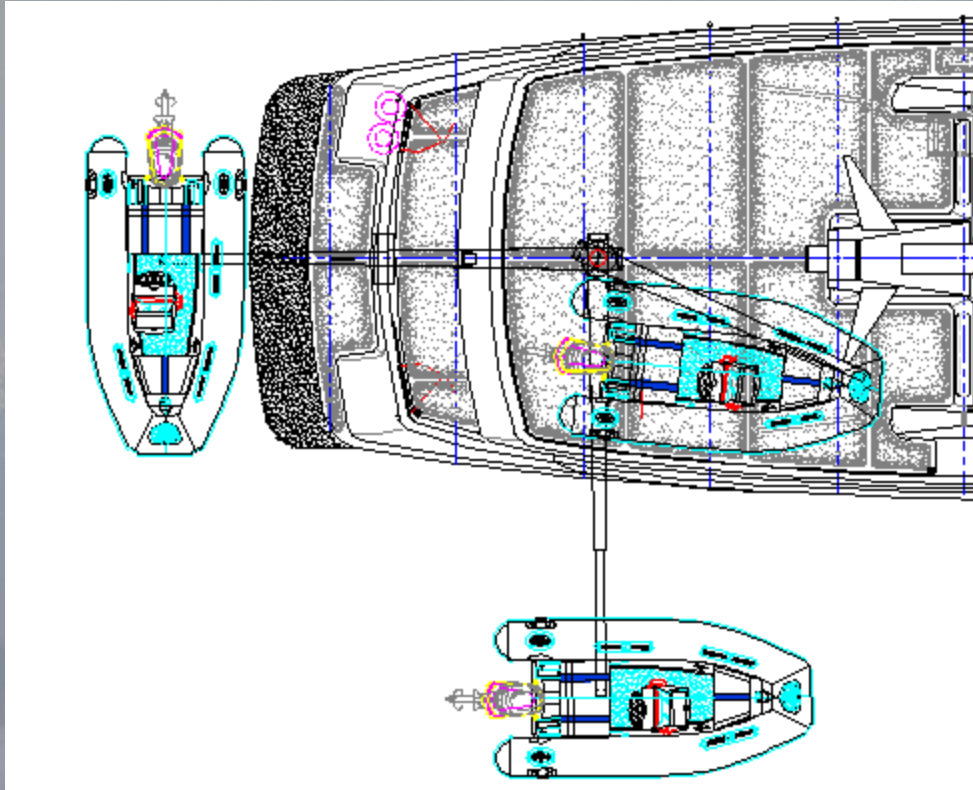
Village Marine STW600 water maker and media filter



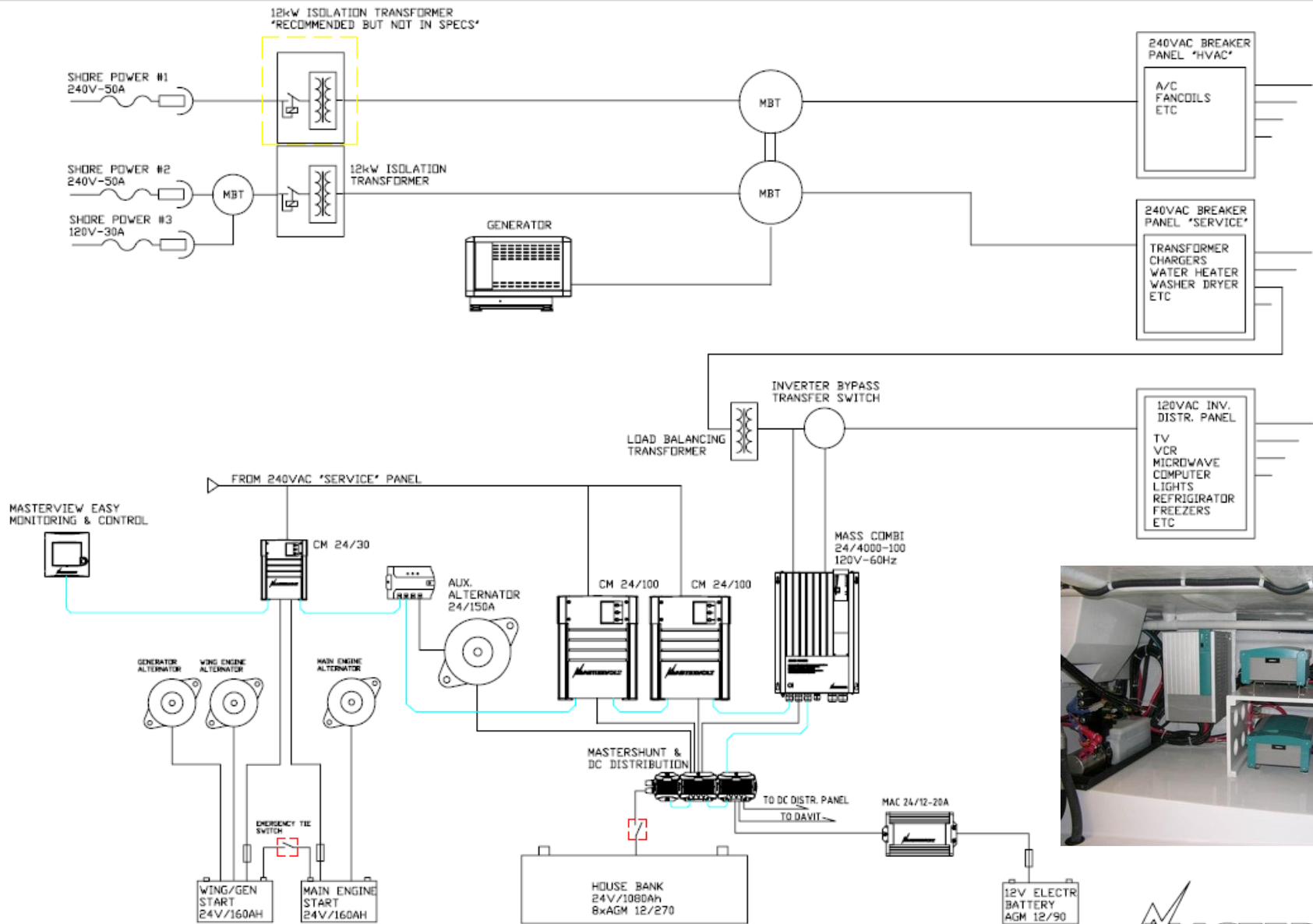
Hinged stack



Custom Steelhead ES1100 Davit with 16' reach



Mastervolt Inverting/Charging



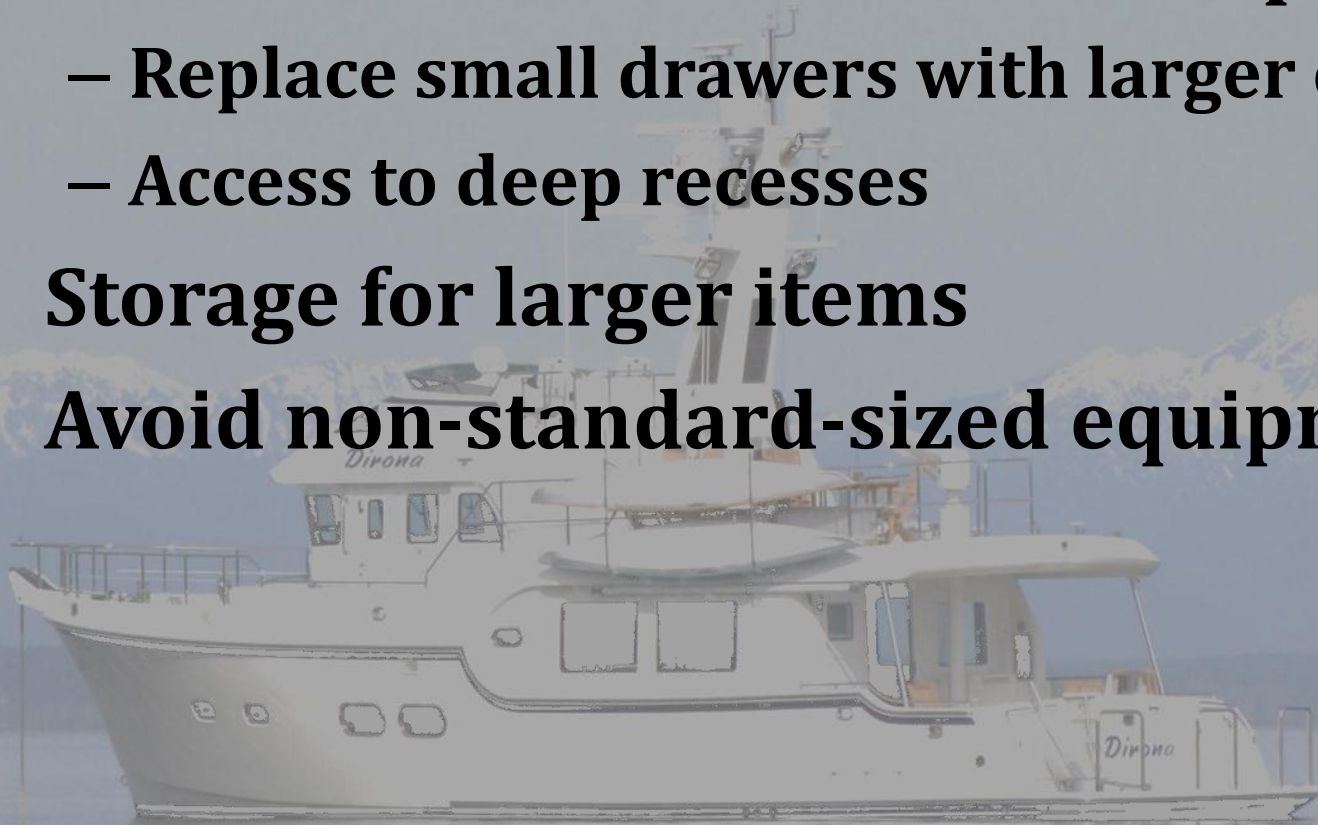
MASTERVOLT

Other Major Factory Order Items



Designing galley

- **Maximize use of and access to space**
 - Replace small drawers with larger ones
 - Access to deep recesses
- **Storage for larger items**
- **Avoid non-standard-sized equipment**



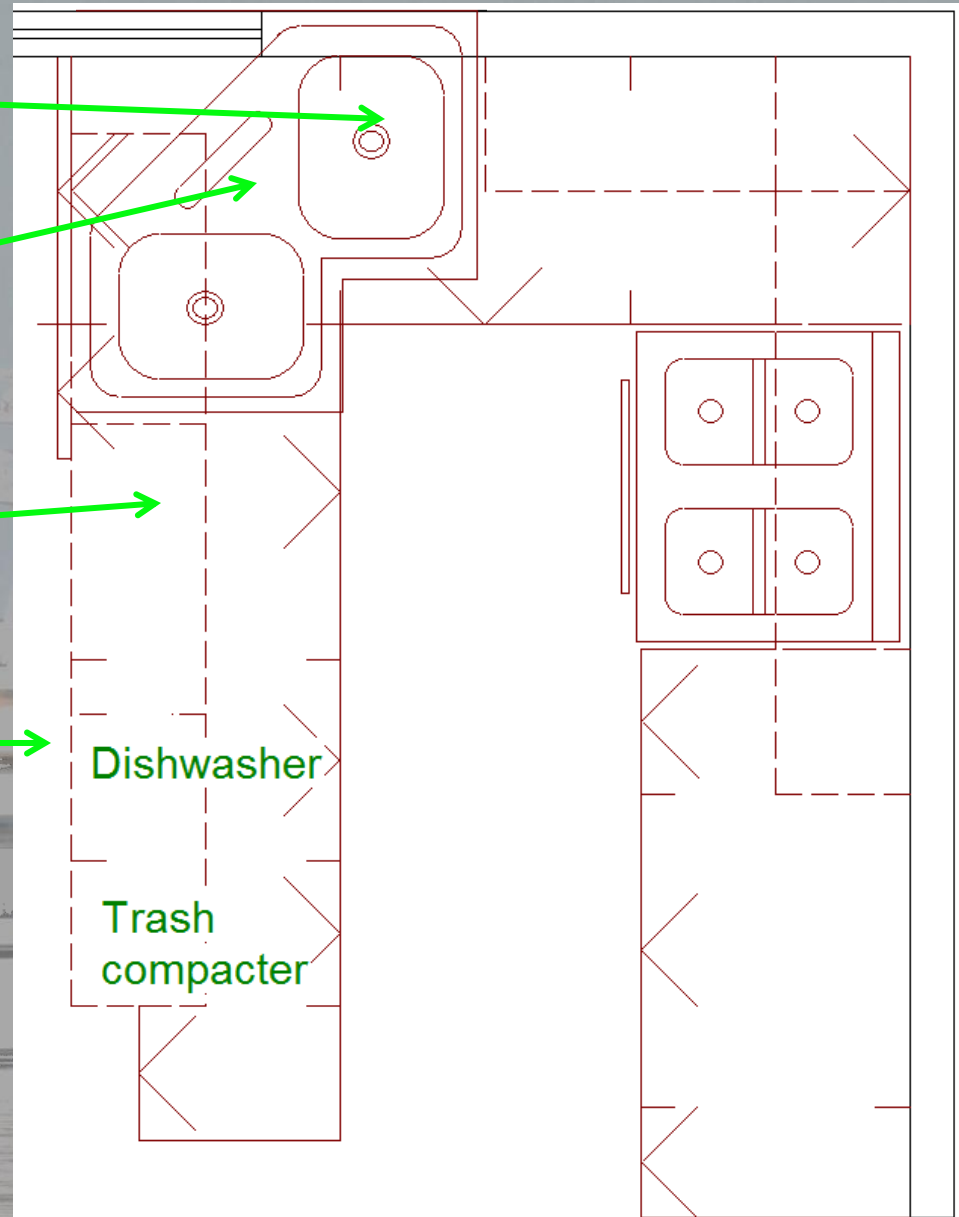
Galley modifications

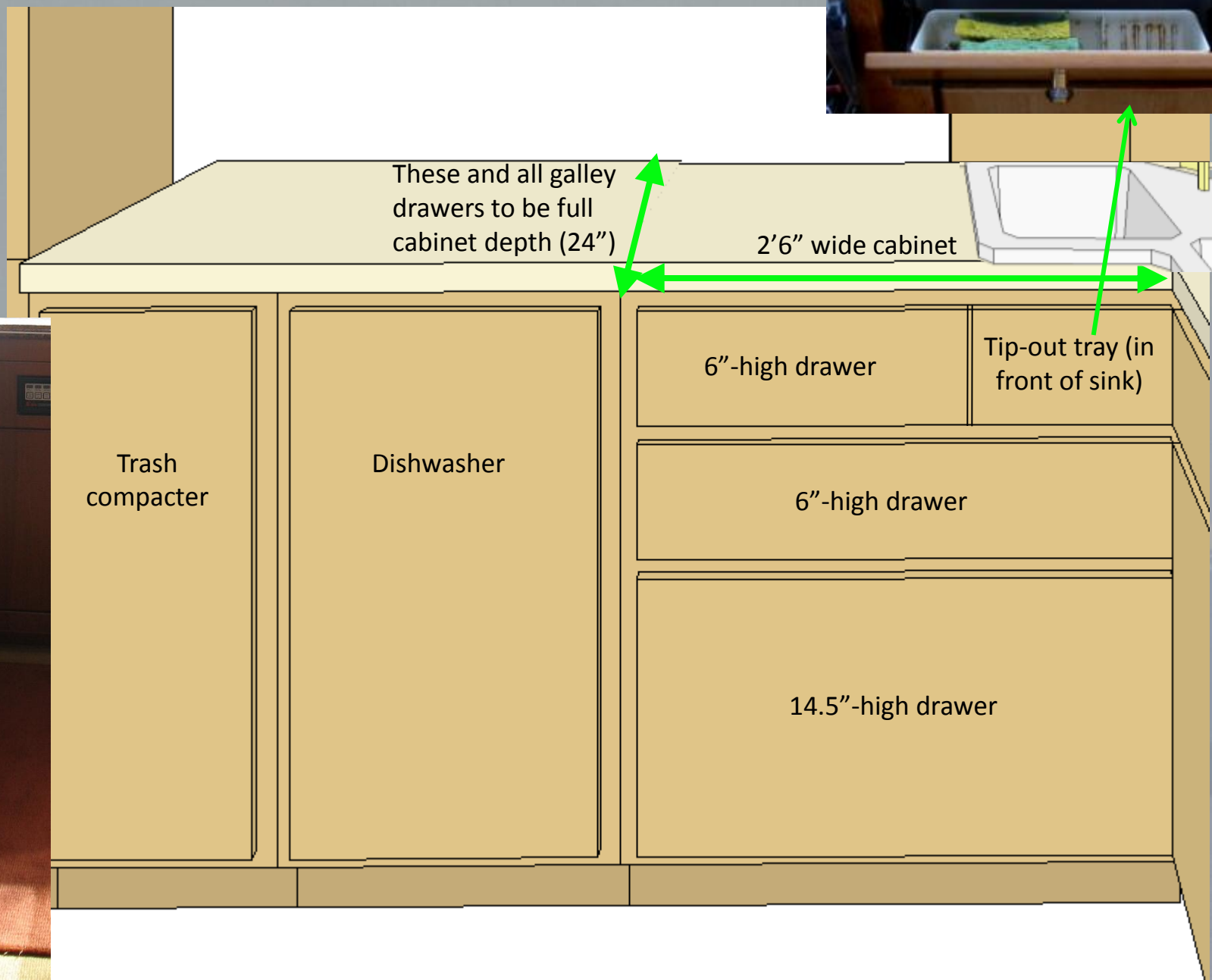
Add garbage disposal in right-side sink ([GE® 1/2 Horsepower Continuous Feed Disposer Model#: GFC525F](#)) with on/off switch

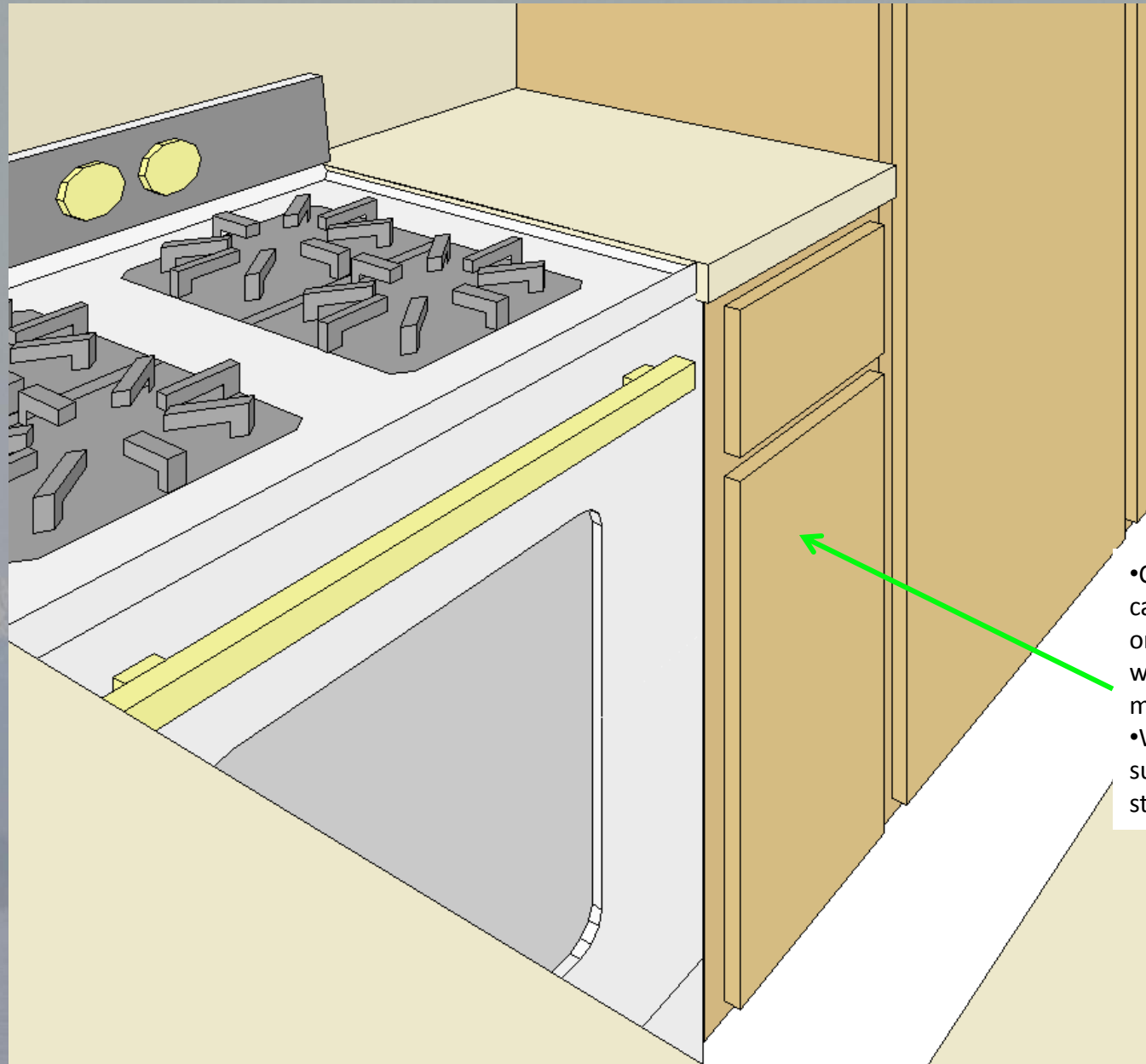
Install Y-valve in grey-water pipe from sinks to go over side or into grey-water tank

Combine drawers cabinet next to dishwasher with one under sink to produce 3-drawer cabinet about 2' 6" wide. Details on next slide.

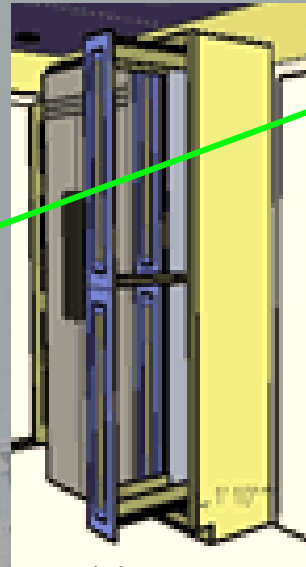
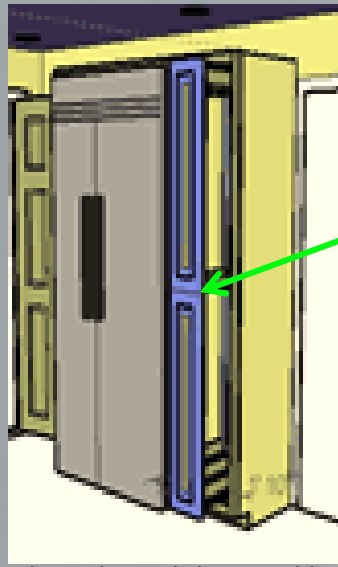
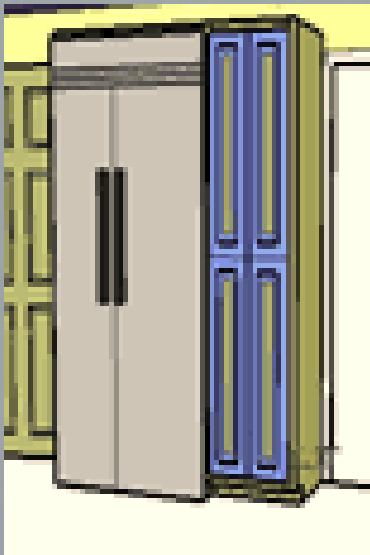
Switch dishwasher to [GE Profile PDW1860NSS 18" built-in dishwasher, stainless steel](#) and install dishwasher beside compacter



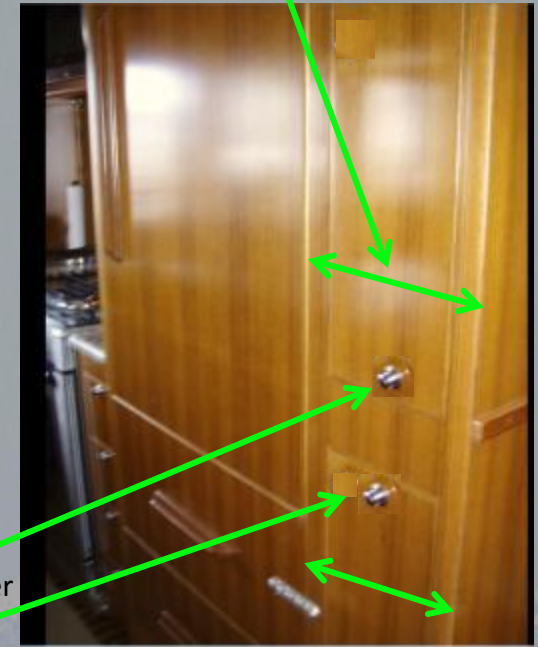




- Change bottom three drawers of cabinet between stove and fridge into one cabinet door, hinged on the right, with a single vertical divider down the middle
- Will use for storing large flat items such as baking trays, cutting boards etc. standing up



Widen both pantry doors to full cabinet width as on existing Sub Zero fridge (ie. no outer frame around door) to not waste any interior space



•Change existing two pantry cupboards to slide-outs like above and this:

<http://www.ronhazelton.com/howto/Refrigerator and Pantry.htm>

•Instead of two side-by-side full-height as in example design, have two stacked half height (following current N52 layout)

Move latch to bottom center of top cupboard and top center of bottom cupboard

Fixed bottom and three adjustable shelves, all with 2"-high side railings on both sides (eg. narrow wood slats or wire chrome)



Slide-out is full cabinet depth (24")

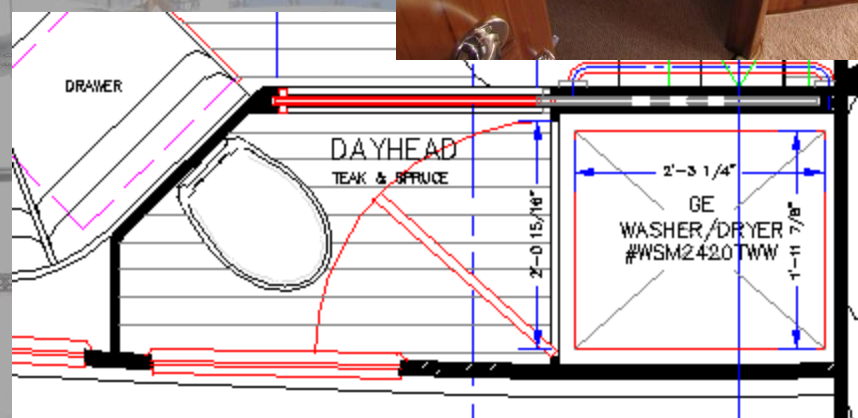
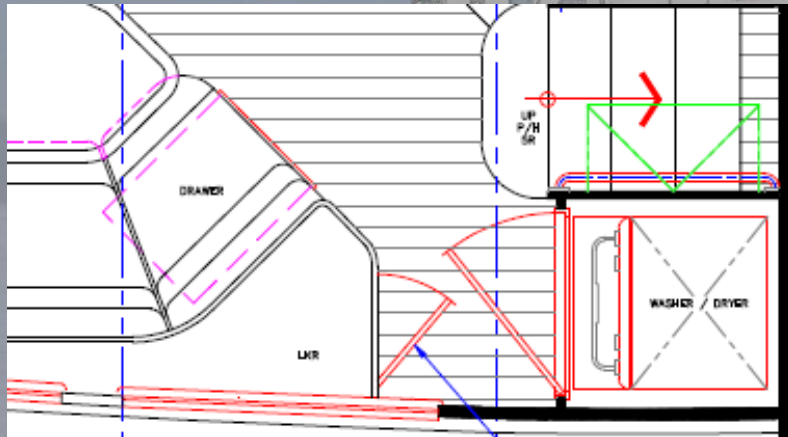


Glides top and bottom for added support

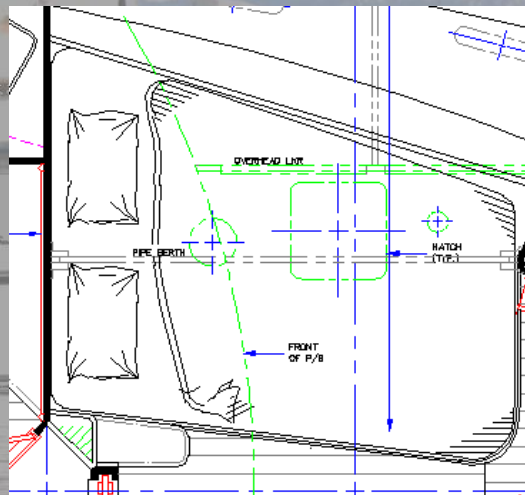
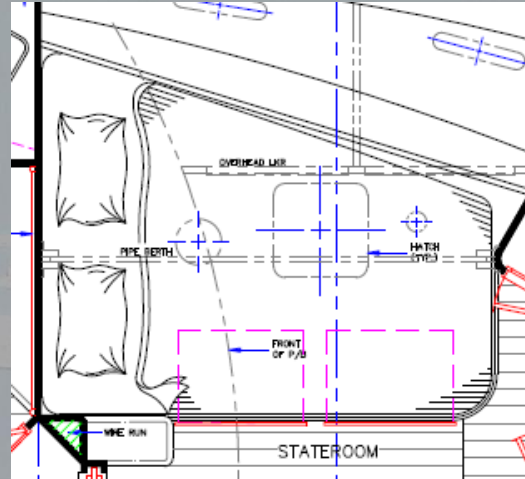
Galley result



Day head design



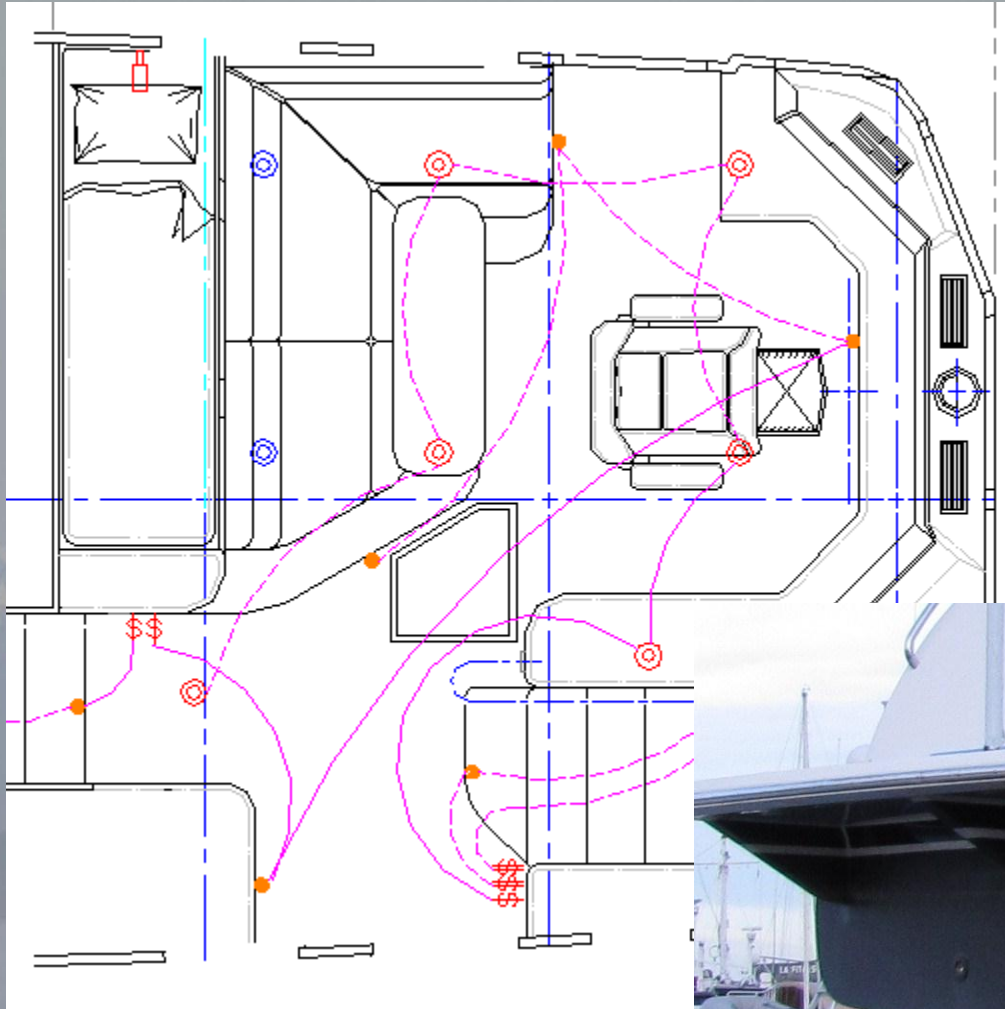
Forward stateroom changes



BBQ/aft helm station



LED lights & underwater lights



Swimstep

- 2-foot extension
- Larger staples
- Pop-up cleats
- Upgraded ladder for fins



Gangway and Sockets



Minor Factory Items

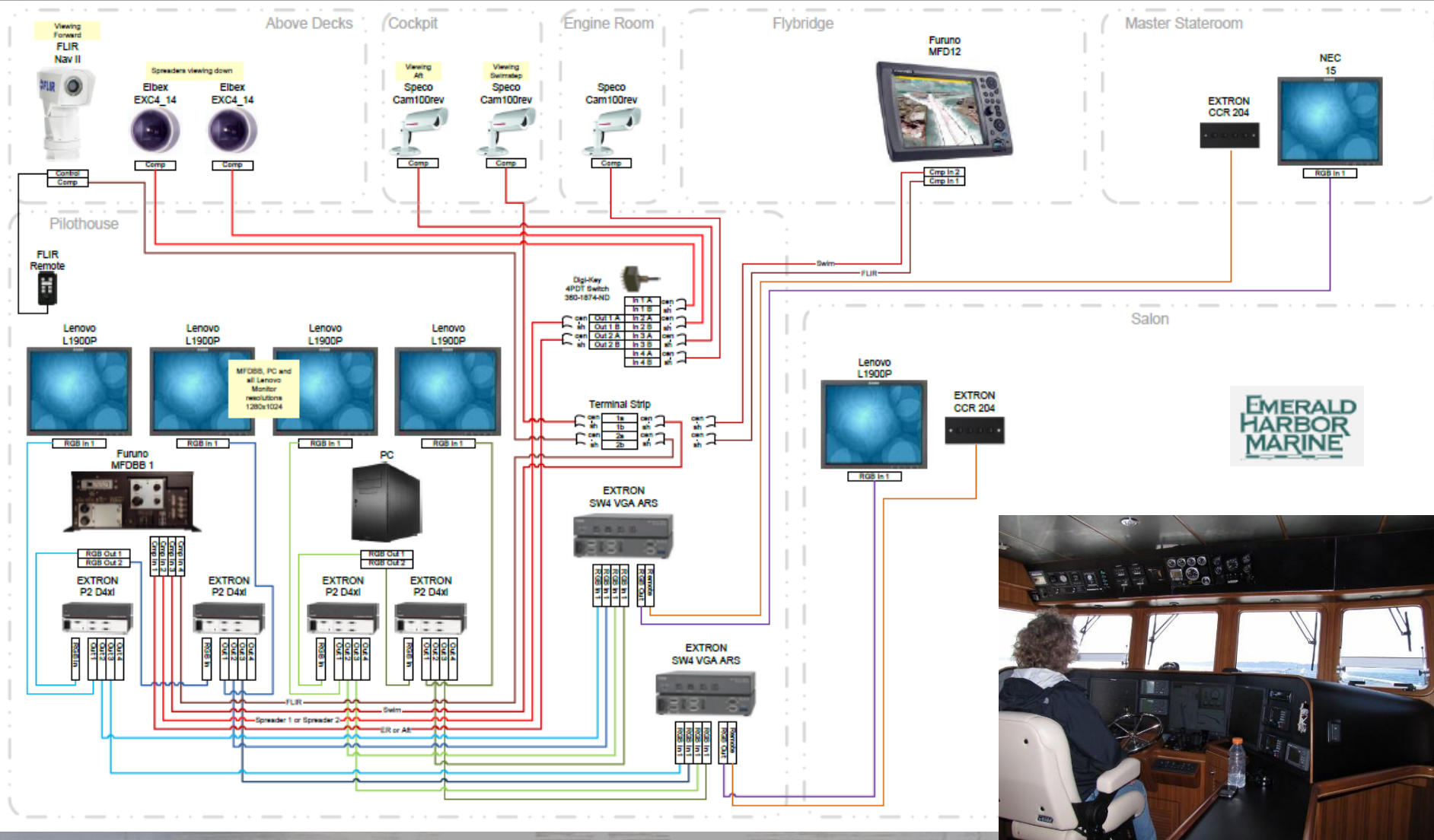
- All readouts in PH
- Glendinning cord retractor
- Engine room & lazarette fire-suppression
- Oil-change system
- Heads switchable to saltwater
- Backup freshwater pump
- 20 gallon hot water heater
- Grey water deck pump-out
- Bow & stern fresh/saltwater deck wash-down
- Red lights in pilot house & galley
- Additional handrails
- Kahlenberg horn, air compressor outlet in cockpit
- Locker configurations
- OceanAir screens on overhead hatches



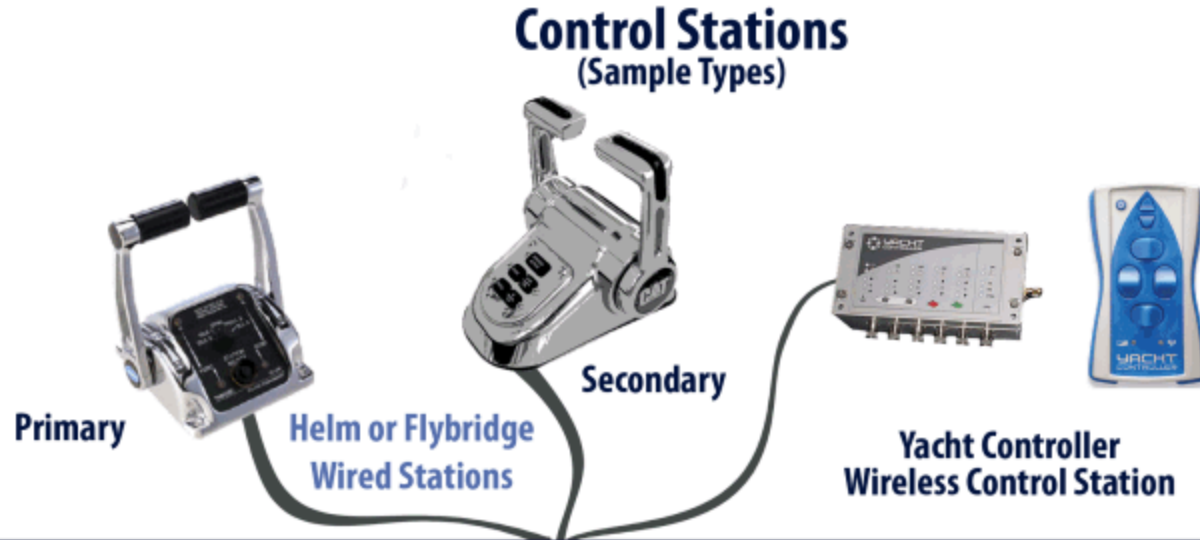
Major Post-Delivery Items



Electronics (predominately Furuno)



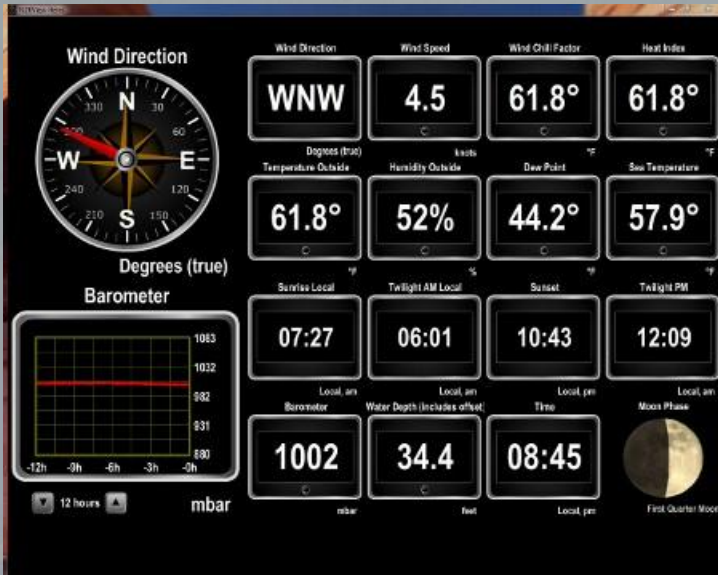
Yacht Controller Wireless Control Station



Control stations connect to transmissions via sophisticated highly engineered OEM control system's CPU computer such as these to ensure the safety and integrity of the system using digital CAN BUS technology.



Maretron Instrumentation



AV System



Fluids storage

- Minimize weight aloft
- Avoid gasoline fume risks



Ground Tackle

- **Main:**
 - 154-lb Rocna with 500' 7/16" chain
- **Stern & backup:**
 - 42-lb Guardian
 - Mounted on bow & stern



Other post-delivery items

- Stainless work (WhiteFab)
 - Kayak and gangway storage, stern-tie reel, flag staffs, anchor mounts, etc
- Switlik SAR-6 liferaft
- Eddyline Equinox kayaks
- Ekornes Tampa/Reno chairs (6 months to build)
- Honda WH15X emergency bilge & fire pump
- MaxAir 35LS-E1/220 scuba air compressor
- Dometic RSF115 3.9cu lazarette freezer
- Westminster Teak outdoor furniture
- Floor covering (Canvas Supply Co.)
 - Karastan Smartstrand carpet & Bolon woven vinyl
- Bimini, canvas, PH mesh window covers (Canvas Supply Co.)
- Hunter Douglas blinds (Blind Alley)
- Graphics (Margaux Marine Graphics)



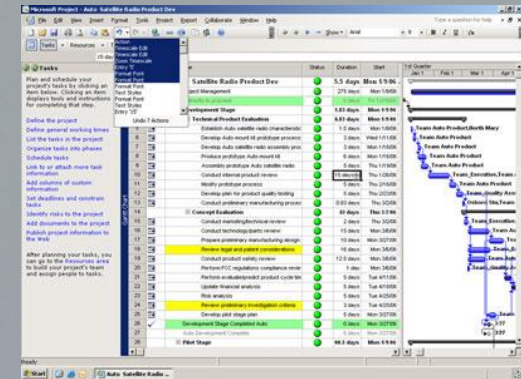
Agenda

- Background and experiences
- Planning
- Customization
- Build & commissioning
- Lessons learned



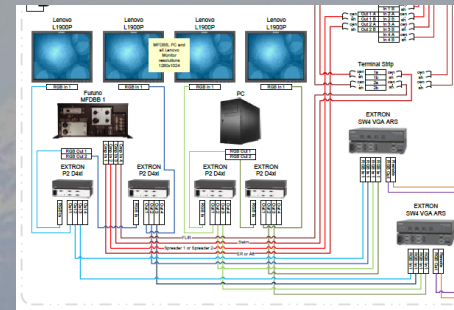
Project Management

- Expect to be very involved in design if doing many customizations
- Depending on builder, also may need to manage project
 - Nordhavn has excellent project mgmt
 - With other builders, we know people who have had to manage project themselves
- Talk to owners who have gone through new build process
 - Many describe as one of hardest things they've ever done
- Keep good written notes
 - There are 1,000s of decisions
- Jeremy Henderson (PAE) & Josh Lu (South Coast) did great work



Project Management

- Get MANY pictures throughout the build
 - Spot problems early when cheap to correct
- Research and make decisions & choices early. Often ends up being not early at all
 - Electronics, scuba air compressor
- Don't have to do everything up front.
 - We didn't install satellite data



Yard Visit

- Highly recommend—part of the adventure and helpful too
- Huge efficiency/comprehension gain for complex issues
- Go through list of items ordered
- Machinery placement
- Look for void spaces
- Some issues we decided at yard
 - Fridge ventilation design
 - Shelving changes
 - Upper helm chair placement
 - Day head positioning
 - Hydraulics equipment placement
 - Charging system placement



Delivery/commissioning

- Watching shipping arrival part of the adventure
- Agree on how boat will be managed during commissioning—who can be on board etc.
- Be on-site as much as can
- Greater the customization/new things—more likelihood of teething issues
 - Be prepared and flexible, these boats are not turn-key
 - Allocate time for multiple sea trials to find/fix issues



Lessons learned

- Get pictures
- Talk to other owners
- Know what you want
- Price like configurations
- Confirm what is standard
- Explicitly specify important tolerances etc
- Stay organized
- Research well in advance
- Budget on money and time
 - Allow for overruns
- Be available: email, phone, IM
- Use the boat a lot early on

