e-ship-build-components

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Electric Ship

Electric Ship Build Modules

This webpage QR code

Structured Data


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Here are a group of selected articles on building the Electric Ship.

PDF Version of the webpage (first pages)

Hydroponics and other Grow Methods

Fresh nutrition can be grown on-board using micro greens or sprouts. For vegetables, compact and energy efficient options include hydroponics and AeroPonics. Harvesting plants for food daily does not require the use of refrigeration.

Solar Oven

Solar ovens provide a power-free cooking choice. Limited to midday (sunshine) hours, you can extend cooking time by putting in solar thermal heat absorbers, such as lava rock, dark colored bricks, or a new innovative technology called Zeolite pellets. Pellets are heated, and then when water is applied, the heat is released (water boils). Harvesting plants for food daily does not require the use of refrigeration.

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Solar Water Maker

Solar water maker.

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Refrigeration

Newer and more refined compressor based portable chest refrigeration technologies provide a cost-effective method to provide refrigeration and freezer storage. Separate out ice making and storage to provide a comprehensive strategy for storing perishable foods and beverages.

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Propulsion Options
Renewable energy powered prime mover

Traditional **screw propeller propulsion** has been around for more than one hundred years. In it various forms, it has been proven to be reliable, and has morphed into the most modern evolution of electric pods (tractor and tug). Personal watercraft slow speed options include very efficient fins. All have the inherent issues of grounding, and line fouling. Providing planing hull propulsion requires a great deal of horsepower, while foiling devices require clean water due to fouling.

Overall Constraints: Multiple power drive options. Reliability. Resistant to underwater hazards (grounding, line fouling). Repairability. Low maintenance. Ease of access. Sub-planing speeds for sustainable fuel efficient power (less than 15 knots).

Final Choice: Look forward by looking back. Recent trips to Switzerland have shown paddlewheels are still being used, to great effect. While maybe not the most efficient option, they are extremely reliable, and great for overall propulsion. Relatively maintenance free, they are less prone to grounding issues, and easy to fix. This is our option for propulsion. Using a top mounted magnetic gear powered wash-down stainless steel motor, you can run at most efficient RPM while adjusting blade depth and profile (angle of attack). You can even attach a wind turbine axis output to direct drive the paddle wheel from the top diameter of the unit.

Design Characteristics:

Electric Drive: An electric drive option gives the user the option of multiple ways to produce power, including fuel engine, wind, thermal, and solar electric.

Using AC Motor with DC: While contradictory to common knowledge, a AC motor can run on DC. The advantages of a AC motor are longer running life, and less acquisition cost. On smaller AC motors in commercial appliances, you'll need to replace the switch, which will burn out quickly. This gives two options.

Multiple Paddlewheel Drives: The paddlewheel drive mechanism will be mounted forward inboard of each outboard hull. This gives a tug-oriented pull format, with independent reversible propulsion that can act as bow thrusters for maneuvering during docking and anchor. A third paddle wheel will be mounted center hull aft for long range drive.

Functionality: Each drive will have a vertical raising and lowering track for paddlewheel maintenance or lifting from the water. Underway, the vertical axis movement can be used to increase waterplane and more bite (thrust). Blades are flow engineered and tested for fluid dynamics and optimized for depth.

Summary: There are multiple legacy options for marine propulsion. While screws have dominated the past 100 years, the most reliable and consistent drive is the paddlewheel. Using higher RPM electric motors with a magnetic gearbox to a lower RPM wheel will provide the best option for durability and less maintenance. Three drives not only provides redundancy, but also provides highly maneuverable directional control.

Eco Ship

Goal: Develop a low cost, easy-to-build, modular multi-hull, that is efficient with a low water plane, low induced drag, lightweight, and can utilize standard formats for low cost outfitting

Organize: Use Filemaker (both computer and iPhone version) to establish data points, plans, supplies, parts, and deployment. That keeps the project organized, and allows you to keep track of flow and identify choke points. Keep a daily log of what gets done, including how goals are being completed, and upcoming strategy. Organizing thoughts streamlines the process, and allows feedback to improve the build. Watch and learn. Review YouTube videos on products and procedures (everything from unboxing to how to glass carbon fiber). The resources available to you prior purchase, or using your valuable time are now available on YouTube for free.

Examples:
- Standard house grade fuse boxes (tempered for marine environment)
- Standard bathoom shower, tub, fixtures (reduce cost)
- Standard 2 x 4 ft and 4 x 8 ft plywood (no or low cuts to square off)
- Cart mounted modules for kitchen, bedroom, bathroom, workshop, power

Deploy:
- Power Cart Station (first item to start since you need power to build) Roll aboard so you can use prior build, during, and after. Mounted on a hand cart for mobility. Charge station tray for digital devices. Extendable mounted LED lights (also use for YouTube). 5 kW inverter (Pure sine wave). Flip up tool caddy. Battery Pack charging station.
- Tools Cart: Store, charge, and organize tools. Clear view. Foam lid, rubber band compression hold down. Focus on carbon fiber tool grips to save weight.
- Fasteners Cart: Store, categorize, and organize fasteners. Establish Imperial or metric standard. Clear view. Foam lid, rubber band compression hold down.
- Laser Cutter Cart: To mark and cut acylic, and wood.
- Infrastructure Priority (all build items portable and modular to use land and marine based)
(c) Workshop, Power, and Tool Carts (to build modules)
(a) Solar Panels and Wind Turbine
(d) Square Cut Station
(e) Vacuum bagging Station
(f) Laser Cutter Cart Station
(b) Plumbing
(e) Greenhouse Cart Modules (nutrition and sprouts).
- Power: 240V AC, 48V DC, 12V DC. All infrastructure and power is high above water level. There is no power or wiring near the water.
- Positive Floatation Hull Modular Platform: Won't sink. No bilge issues (and parasitic loads from removing water). Easier to maintain, no seacocks or through hull fittings. Strategy is to move everything above waterline.
- Power Strategy: Power Pacs (Power Cart Station). Multiple modular cart mounted solutions for areas of the boat, instead of one central location. Redundancy. Mobile. Substitutable. Upgradable. Keeping PCS smaller allows easy integration, upgrading, and innovation. Might be more expensive initially, but over time, provides a better solution.

Details:

1. Overall Concept: Strategy, objective, goals, and delivery.

Cost effective trimaran. Emphasis is on modular, low cost, high performance, renewable energy, lightweight utilitarian

Outfitting and workboat. The modular aspects allow a quick-change mission reconfiguration. Since parts are modular