Garcia Exploration 45 # 23

Hybrid solution

Functional and Technical

Overall vision

To build a boat that do not have any geographic limitations, can be a safe home for our family without any connection to civilization for a period up to 3-4 month.

We'll like to avoid Gas/propane for normal gas stove and ordinary gasoline for outboards ect. To use renewable energy as much as possible.

Michael Holm, Garcia Yachting and OceanVolt have made an agreement for a hybrid propulsive solution on Michaels Garcia Exploration 45 hull #23 to be delivered not later than 30/06-2019.

1. Technical specifications of the Garcia Exploration 45:

Boat Description

- Fully loaded displacement (ISO) : 18310kg
- Lightship displacement (ISO) : 14612kg
- Length: 14.21 m Lwl : 12.57 m
- Bmax: 4.44 m
- Draft: 1.14/2.90 m
- Freeboard at bow : 1.65m
- Offshore category: 6/8 persons
- Onshore category: 6/8 persons
- Hybrid 30kw OceanVolt + Fisher panda Genset
- Water capacity: 500 L
- Diesel Capacity: 700L
- Architect: Berret Racoupeau Yacht Design on the dream from Jimmy Cornell

Key Specification Elements:

- Integral aluminum centerboard
- Deck salon with 270° visibility and inside steering position
- Watertight companionway door
- Watertight front bulkhead
- Watertight aft bulkhead with watertight hatches to access the stern compartments from the aft cabins
- All through-hull fittings made of welded aluminum - All valves positioned above sea level
- Double glazed salon windows, one opening above the galley

- Coachroof extends beyond the windows and acts as an awning to prevent the greenhouse effect due to the sun
- Thermal and acoustic insulation above waterline of automotive-grade polyethylene foam panels (77mm hull, 37mm deck)
- Insulated floor (thick foam core)
- Chain locker centrally positioned at the foot of the mast – Electric windlass located in locker below deck just ahead of the mast
- Centrally located large capacity tanks - Water and fuel tanks can be ballasted port / starboard
- Centrally located service battery set
- Generous stowage space available throughout the boat
- Forefoot chainplate for towing and ice breaking
- Integrated aft arch for electronics, wind generator, solar panels and use as davits
- 2 rudder configuration JEFA self-aligning bearings to ensure optimal control in heavy seas
- Large aft platform with easy access to / from the water
- Liferaft stowage in locker accessible for launch from aft platform
- Essential lines controlled from the cockpit

2. Functional Targets

- Targets running full electric, starting with engine batteries fully charged:

    - To run full electric for 2,5- 2,71 hours at 5.9kn, Wind 0kn Resistance flatwater.
    - To run full electric for 1,5 – 1,73 hours at 5.9kn, Wind 15 kn/ Resistance +wind
    - To run full electric for 50min - 1.06 hours at 5.9kn, Wind 30 kn/ Resistance + wind
    - To run full electric for 3,5 – 4,03 hours reducing speed to 4.8kn, Wind 0kn Resistance flatwater.
    - To be able to run full electric with max power for approximate 1 hour with full speed 7,5 – 8 knots.

- Targets running with the diesel genset, battery bank capacity not taken into account

    - To reach 4.8kn (cruising speed), Pdel is 3,75kW and Pbat is 5,17-6 kW (3,75/0,9 + 1). Genset diesel consumption is then nearly 2-2,5L/h.
      Genset will run less than half of the time means a silent boat at night time.
    - The maximum continues speed will be 6,5-7 kn at 14.4Kw Pbat at full power of the generator with a consumption of 5.9 L/h (Pmaxgenset (15,4)*0,35 + 10%)

- Targets regenerating power with hydrogeneration

    Due to the shape of the hull (centreboard boat and skeg protecting the propeller) There is no data predicting the efficiency of the regeneration when the boat is sailing.

    Regeneration efficiency will be tested by the 3 parts during test navigations.
    Target is to be able to produce minimum 800W at 7kn, which will cover much more than daily use when on a passage.

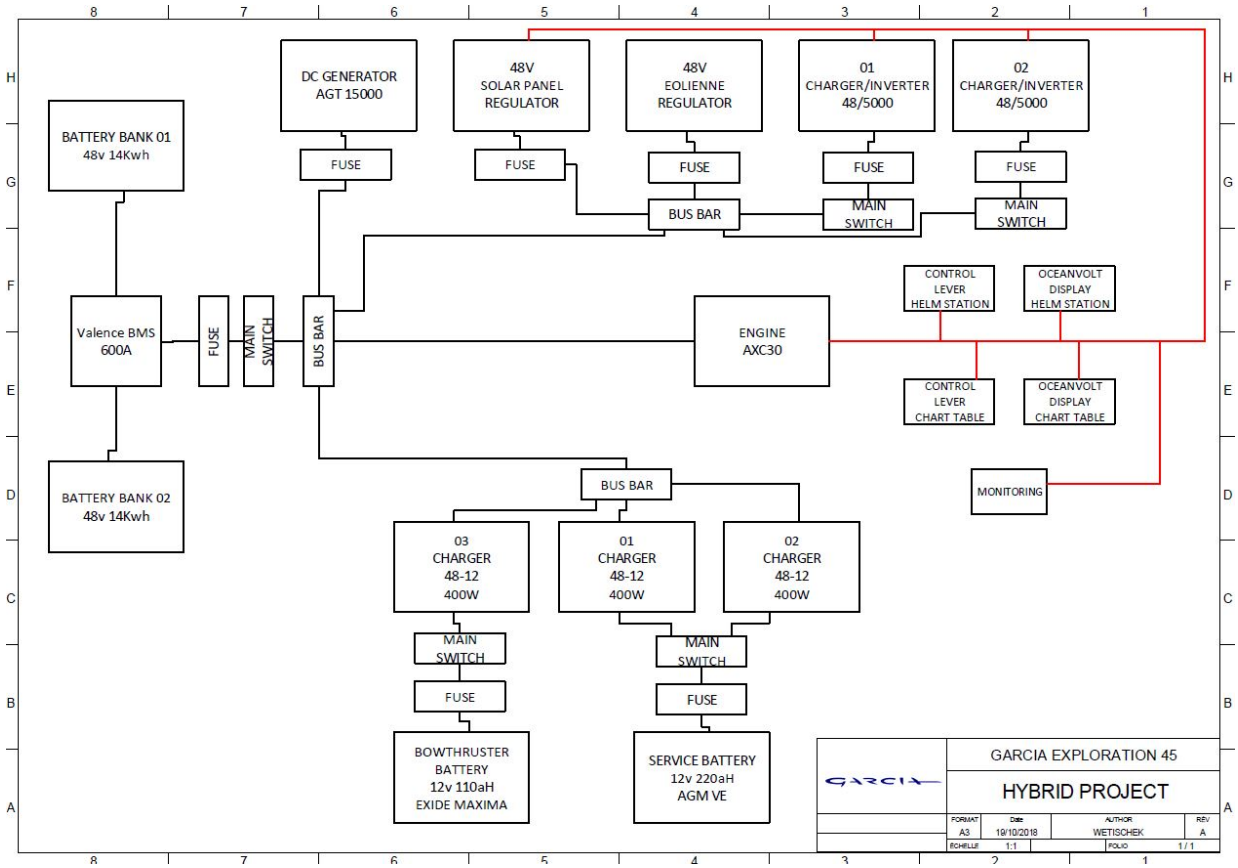
Diesel consumption and autonomy

- The sizing of the diesel capacity should provide more than 700Nm autonomy running cruising speed with the genset providing electricity to the electrical engine.
- Theoretical it will we more than 1300 Nm at 4,8kn but daily power needs for cooking, heating ect. have to be take into account as well.

3. Parts included.

- AGT 15000 Fisher Panda genset, modified by OceanVolt for use in this application. 15kW 48Vdc
- Valence single battery bank 28kWh package split in 2 sets @14kWh connected to one BMS system.
- OceanVolt AXC30 kW with 2 control levers and displays. Equal to a 75HP diesel
- Victron charger/inverter 2X5kW
- 48vdc/12vdc charger for service batteries. 3X400W.
- Solar panels 520W 4X12V=48Vdc
- Silentwind wind generator 500W 48Vdc
- Victron colour display for monitoring

4. Synoptic



5. Configuration in the boat