SPECIFICATION FOR 40.37 METRE
70 PAX - CREW UTILITY VESSEL

VESSEL DETAILS

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOA</td>
<td>40.37 Metres</td>
</tr>
<tr>
<td>BEAM</td>
<td>7.50 Metres</td>
</tr>
<tr>
<td>DRAFT LOADED (At bottom of prop)</td>
<td>2.35 Metres</td>
</tr>
<tr>
<td>GRT (approx.)</td>
<td>280 Tonnes</td>
</tr>
<tr>
<td>NT (approx.)</td>
<td>71 Tonnes</td>
</tr>
<tr>
<td>DIESEL FUEL CAPACITY</td>
<td>65,600 Litres</td>
</tr>
<tr>
<td>FRESH WATER CAPACITY</td>
<td>28,800 Litres</td>
</tr>
<tr>
<td>HYDRAULIC OIL CAPACITY</td>
<td>200 Litres</td>
</tr>
<tr>
<td>SEWAGE SYSTEM CAPACITY</td>
<td>500 Litres</td>
</tr>
<tr>
<td>PASSENGERS</td>
<td>70</td>
</tr>
<tr>
<td>CREW</td>
<td>10</td>
</tr>
</tbody>
</table>

REVISION   1
DATE       29-October-2013
1.0 Design

The vessel will be designed to comply with the chosen classification society crewboat rules and OSV code for statutory matters. The design will incorporate a central deck house with seating for 70 rig crew, with the bridge situated on the upper level incorporating two control stations. All fuel oil and freshwater tanks will be constructed integrally to the hull. The vessels speed will be measured by GPS during sea trials. The following speeds and load conditions will form the contract speeds.

Sea Trial Speed Requirements

<table>
<thead>
<tr>
<th>Speed</th>
<th>Load Condition</th>
<th>Engine Power Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 kns</td>
<td>50 DWT</td>
<td>85%</td>
</tr>
<tr>
<td>24 kns</td>
<td>40 DWT</td>
<td>85%</td>
</tr>
<tr>
<td>25 kns</td>
<td>30 DWT</td>
<td>85%</td>
</tr>
</tbody>
</table>

Conditions
Up to Sea State 3 (Beaufort Scale)
GPS speed will be recorded during trial.
Vessel DWT to be confirmed by Client prior to sea trial
4 runs in total - two in each direction
Wind speed and direction, sea condition, current direction and weather conditions will be recorded during the trial.

Endurance
4 hour endurance trial at 100% MCR

Personal
Shipyard to supply all necessary personal for the trials.

Deck loading
2 tonnes per m2

Deck Cargo Capacity
40 tonnes (approximate)

Clear Deck Area
109m2

Noise Levels
Noise levels in the bridge and main passenger deck cabin not to exceed 75 DbA in general at 85% MCR

1.1 Construction Class

The vessel will be constructed in accordance to Lloyd’s Register of Shipping - Rules and Regulations for the Classification of Special Service Craft, 2013. Plan approval, survey during construction, and attendance at sea trials will be completed by LR. Stability will be designed in accordance to OSV code for vessels below 500 GT and without double bottoms. A letter will be obtained by the owner from flag authority to authorise Class to carry out stability review according to OSV code for vessels below 500 GT without double bottoms and Life Saving Equipment according to IACS Rec.99 (Recommendations for the Safety of Cargo Vessels of less than Convention Size): Owner will provide exemption letter from flag authority for an exemption to use only single shot C02 system. Safety plan will be approved by flag authority (At Owner's arrangement)

Notation:
+100AI SSC WORKBOAT MONO G4 ‘service area’, +LMC

Plan Approval
Completed by Class

Class Survey Costs
Included for above notation.

Inclining Experiment / Stability
Included

Loadline Calculation / Certificate
Included

Class Certificate of Survey
Included for above notation.

Safety Certificate
Flag Authority (Owner's arrangement)

Cargo Ship Radiotelephony Certificate
Included

Ship Sanitation Exemption certificate
Included

Flag State and Registration
TBA - owners arrangement
1.2 Compass Survey
The vessels compass will be swung, and a deviation certificate issued prior to delivery of the vessel. The certificate will be valid for 12 months.

1.3 Stability Report
The Designer will prepare a preliminary stability report which will be issued to the Classification Society for review within two months of commencement of construction. During sea trials, a full inclination experiment (or if acceptable a lightship calculation) will be undertaken, and the stability report will be updated to include actual information. The booklet will be approved by the Classification Society.

1.4 Insurance
The builder will provide comprehensive Builders Risk insurance throughout construction and trials of the vessels. A copy of the insurance policy will be made available to the client and or his representative.

1.5 Warranty
The warranty will be for a period of 12 months from delivery of the vessel. Warranty on all machinery and equipment shall be supplied by the component manufacturers on a back to back basis.

1.6 Documentation
Two (2) complete sets of Operation and Maintenance, Manufacturer supplied Spare Parts Manuals and Class Approved drawings as listed below, including all manuals provided with machinery and equipment that is procured for the vessel.

Drawing to be provided include:
- General Arrangement
- Stability report with hydrostatic table
- Construction Arrangement - Main Deck
- Construction Arrangement - Hull Plan
- Construction Arrangement - Bridge Deck
- Construction Arrangement - Bridge Top
- Construction Arrangement - Profile
- Typical Construction Sections
- Plate Expansions - Hull
- Plate Expansions - Superstructure
- Engine Beds
- Engine Room Arrangement
- Shafting Details
- Tank Plan
- Shaft Bracket Details
- Stern Tube Details
- Rudder Details
- Air Conditioning / Ventilation Arrangement
- Freeboard Plan
- Draft Marks
- Steering System Schematic
- Fire System Schematic
- Structural Fire Protection Arrangement
- Bilge System Schematic
- Salt Water Services Schematic
- Fresh Water Services Schematic
- Fuel Oil System Schematic
- Equipment Number
- Evacuation Plan
- LSA Plan
- Docking Plan
- Propeller details/dimensions and makers details
2.0 Aluminium Construction Labour

All construction labour will be supplied by the yard, using tradesmen qualified and experienced in aluminium fabrication. Stringent quality inspection systems are utilised as part of the yards normal operation.

2.1 Aluminium - Main Construction

Marine grade aluminium - 5083 plate and 6061 /6082 extrusions in accordance to the Classification Authorities Rules will be used for construction. The structural integrity of the vessel is designed to comply with Survey Authorities regulations.

2.2 Fendering

Used aircraft tyres will be utilised around the vessel for fendering allowing the vessel to be protected during berthing operations or alongside other vessels. All side tyres will be fitted with stainless steel wire and welded aluminium lugs. Wire lugs will be fitted between each tyre to stop loss of multiple tyres in case of wire being severed. Transom and stern corner tyres will be installed with a welded aluminium socket and bolted flange.

The number and size of tyres as follows:

- Approx. 5 units of approx. 1150mm diameter across transom mounted with top of tyre exposed above deck to allow helmsman to see tyre
- 1 unit of approx. 1250mm diameter on each stern corner
- 2 units approx. 1150mm diameter immediately fwd of the stern corners.
- Approx. 27 units of approx. 685mm diameter along each ships.

2.2.1 Lashing Lugs

Approx. total 16 units 3 tonne SWL lashing lugs will be installed on port and starboard sides of the work deck approx. 2m apart as close as possible to the crash rails. Each lug will be load tested to 1.2 times SWL and a statement of fact will be provided by the class society witnessing the load and NDT testing.

2.3 Welding

All aluminium and stainless steel welding throughout the construction and outfitting of the vessel will be carried out in accordance to welding procedures currently utilised by the Builder and approved by the Classification Society.

The Builders welding procedures will comply with international regulations and standards, and take into consideration alignment, fairness, edge preparation and gap widths. Only Classification Society qualified and tested personnel will be utilised for hull and structural welding.

Following the completion of the welding of the hull the Builder shall arrange for X-rays to be taken at locations indicated by the Classification Society.

2.4 Consumable Items

All consumable items required for the construction and outfitting of the vessel will be supplied by the yard. Consumable items will be of a quality that they have no undesirable effect on non ferrous parts of the vessel. Filler wire shall be certified for use by the Classification Society.

2.5 Ancillaries

Ancillary items such as fasteners, brackets etc. that are required for the normal completion of the vessel will be provided by the yard.
2.6 Surface Protection

2.6.1 Preparation

All painted surfaces will be cleaned and free from oil and grease. All painted external aluminium surfaces will be either grit blasted, mechanically abraded or acid washed to remove oxidation residues prior to the immediate application of a protective primer which will be compatible with the next coats of the paint system.

All unpainted surfaces will be cleaned and acid washed

2.6.2 External Surfaces

The topsides above waterline and the superstructure will be left unpainted. These surfaces will be cleaned and acid washed.

The window areas will be painted black as per the general arrangement plan

Non-Skid deck paint will be applied to decks that are not covered with timber. All paint will be tin free.

All underwater areas will be coated with an approved tin free antifouling coating system providing 24 months protection. The paint makers two year warranty for underwater area will be passed on to the client.

2.6.2.1 Hull Markings

Vessel name will be welded on using 4mm plate to bow and stern. Flag state welded to stern

Client Logo will be installed using vinyl sticker

Draft Marks will be welded plate 6mm

IMO number will be punched and painted onto superstructure sides and roof

Thruster marking punched and painted

Muster station painted on aft deck

Basket landing area painted on aft deck

Carving note engraved onto 4mm plate and welded to main deck beam

Rescue Zone painted in bright yellow with diagonal black stripes. The area will be 2m wide and extend from the main deck to the waterline located at the forward part of the main deck

2.6.3 Internal Surfaces of Hull

All surfaces will be cleaned and free from oil and grease. No coatings will be applied to internal spaces, tanks or compartments.

2.6.4 Freshwater and Fuel Oil Tanks

All integral aluminium potable fresh and Fuel oil water tanks will be cleaned and free from foreign objects. No coatings will be applied to tanks.

2.6.5 Pipe work Colour Codes

Pipe work will be colour coded by way of internationally recognised identification stickers. Stickers will be placed approx. every one metre or where they are most visible. The following schedule of colours for liquid identification will be utilised where applicable.

<table>
<thead>
<tr>
<th>Location</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilge</td>
<td>Black</td>
</tr>
<tr>
<td>Fire Main</td>
<td>Bright Red</td>
</tr>
<tr>
<td>Fresh Water System - Cold</td>
<td>Blue</td>
</tr>
<tr>
<td>Fresh Water System - Hot</td>
<td>Blue with red bands</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>Yellow</td>
</tr>
<tr>
<td>Lube Oil</td>
<td>Brown</td>
</tr>
<tr>
<td>Hydraulic Oil</td>
<td>Purple</td>
</tr>
<tr>
<td>Sea Suction</td>
<td>Green</td>
</tr>
<tr>
<td>Sea Water Cooling</td>
<td>Light Green</td>
</tr>
<tr>
<td>Compressed Air</td>
<td>White</td>
</tr>
</tbody>
</table>

2.7 Decking

The work deck will be timber sheathed. The sheeting will be held in position by use of angle bars and tee bars welded to the main deck with planking prepared to allow for expansion and swelling of wet timber under normal operating conditions. Care will be taken to keep all timber flush and minimise gaps. Timber details as follows:

<table>
<thead>
<tr>
<th>Timber</th>
<th>Treated Pine or similar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrangement</td>
<td>As per general arrangement drawing</td>
</tr>
<tr>
<td>Thickness</td>
<td>Approximately 35mm</td>
</tr>
</tbody>
</table>

3.0 Mechanical Engineering Labour

All engineering labour will be supplied by the yard, using tradesmen qualified and experienced in the outfitting of aluminium vessels. Stringent quality control systems are utilised as part of the yards normal operation.

3.1 Sub Contract Labour

When deemed necessary, the yard may utilise sub-contract labour for such items as stainless steel pipe spooling etc. Such labour will be drawn from approved contractors, and will be subject to direct supervision from the yards management. The sub-contractors will also be subject to the yards quality control systems.
3.2 Main Propulsion Engine and Gearbox - Option 1

The vessel will be fitted with Triple marine diesel main propulsion engines. The main engines will be equivalent to the following specification.

| Engine Make | Cat               |
| Engine Model | C32               |
| Rating       | 1300HP @ 1800RPM  |
| Gearbox Make | Twin Disc         |
| Gearbox Model| MGX 6690 SC Quickshift |
| Reduction Ratio | 2.47:1 |
| Trailing Pump | Fitted |

**Engine Rating as nominated by Manufacturer**

For vessels operating at rated load and rated speed upto 50% of the time, or 6 hours out of 12, with cyclical load and speed (20% to 80% load factor).

**Main Engine Instruments**

Caterpillar factory standard local operating panel plus Fwd station and aft station as below.

**Aft Station**
- tacho
- engine temp
- off/on/start switch
- stop pushbutton
- panel light dimmer
3.2.1 Main Propulsion Engine and Gearbox - Option 2

The vessel will be fitted with Triple marine diesel main propulsion engines. The main engines will be equivalent to the following:

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Make</td>
<td>Cummins</td>
</tr>
<tr>
<td>Engine Model</td>
<td>KTA 38 M2 Tier 2 with Electronic Governor</td>
</tr>
<tr>
<td>Rating</td>
<td>1350 BHP @ 1900RPM</td>
</tr>
<tr>
<td>Gearbox Make</td>
<td>Twin Disc</td>
</tr>
<tr>
<td>Gearbox Model</td>
<td>MGX 6690 SC - Stand Alone Mount</td>
</tr>
<tr>
<td>Reduction Ratio</td>
<td>2.47:1</td>
</tr>
<tr>
<td>Trailing Pump</td>
<td>Installed</td>
</tr>
</tbody>
</table>

Engine Rating as nominated by Manufacturer

Heavy Duty (HD)

Intended for continuous use in variable load applications where full power is limited to eight hours out of every ten hours of operation. Also, reduced power operations must be at or below 200 rpm of the maximum rated rpm. This rating is an ISO 3046 fuel stop power rating and is for applications that operate less than 5,000 hours per year.

Main Engine Instruments

Cummins factory standard local operating panel plus Fwd and Aft station as per below:

Local Operating Panel (LOP)
- tacho/hour meter
- water temp
- crank case press
- gear oil press
- engine oil press
- exhaust temp
- common warning lamp
- system power lamp
- start & stop pushbutton
- remote/off/local toggle switch

Fwd Station
- tacho
- water temp gear
- oil press engine
- oil press
- high water temp warning lamp low
- gear oil press warning lamp low
- engine oil press warning lamp
- audible alarm
- start key & stop pushbutton
- panel light dimmer
- Low oil pressure shutdown
- Overspeed shutdown
- High coolant temperature shutdown
- Low water level alarm

Aft Station
- tacho
- engine temp
- off/on/start switch
- stop pushbutton
- panel light dimmer
3.3 Engine Control

The engine and gearbox control will be an electronic system Twin Disc EC300 or equal. Installation and commissioning will be completed by the yard in conjunction with the engine and gear box supplier. The vessel will be equipped with two control stations. One control station located starboard forward on the bridge and one facing aft in the rear of the bridge / wheelhouse. The engines may be paired (port & Starboard) depending on final configuration and interfacing by the control system.

3.4 Shafting

The propulsion shafts will be machined from Aquamet 17 or similar stainless steel of suitable strength. Each shaft will be machined with a 1:12 taper and be reversible. The propellers and couplings will be designed in accordance to Classification Society guidelines.

<table>
<thead>
<tr>
<th>Shaft Material:</th>
<th>Aquamet 17/4ph or similar Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Diameter:</td>
<td>TBA - To meet Class</td>
</tr>
<tr>
<td>Taper:</td>
<td>1:12</td>
</tr>
<tr>
<td>Stern Tubes:</td>
<td>Aluminium, water cooled bearings.</td>
</tr>
<tr>
<td>Shaft Brackets:</td>
<td>Cast Steel P brackets choc fast and bolted into hull pockets</td>
</tr>
</tbody>
</table>

3.5 Rudders and Ancillary Equipment

The twin (2) rudders will be fabricated from Marine Grade stainless steel. They will be of faired construction. The rudder shafts will be of marine grade stainless steel shafting of a diameter which will comply with load calculations and approved by Class. The rudders will be operated by hydraulically powered cylinders, and be equipped with steel tiller arms and painted steel tie bar.

3.6 Shaft and Rudder Bearings

The propulsion shafts will be fitted with Orkot or equal composite bearings. The bearings will be water cooled and lubricated. The stern tubes will be constructed of heavy walled aluminium pipe. Bearings will be choocast in Bronze or 316 stainless steel housings to ensure precision alignment. Each Propulsion shaft will be fitted with an earthing device. Shafts seals will be Eagle mechanical type.

The rudder bearings will be machined from Orkot or equal bearing material, the rudder tube will be fitted with a gland packing seal.

3.7 Propellers

The vessel will be fitted with Triple nickel aluminium bronze FIVE bladed propellers. The diameter will be as calculated by the Designer to attain the required performance and the taper of the shaft boss will be 1 : 12. An approved locking system will be fitted to ensure propeller security.
3.8 Auxiliary Gensets - Option 1

The vessel will be fitted with two marine generators with approximately 86 ekw capacity each. Local operating panels will be supplied by the manufacturer, there will be no controls on the bridge. Specification as follows:

- **Engine Make**: Cat
  - **Output**: 86kw
  - **Engine Model**: C4.4

3.8.1 Auxiliary Gensets - Option 2

The vessel will be fitted with two marine generators with approximately 80 ekw capacity each. Local operating panels will be supplied

- **Engine Make**: Cummins
  - **Output**: 80 ekw 50 hr 3 ph 415v
  - **Engine Model**: 6BT 5.9M Type approved
    - 134 bhp @ 1500rpm – Prime power rating
    - Engine mounted heat exchanger cooling system
    - SAE 3 Flywheel & Housing
    - Electronic governing
    - 24 v DC electrics
  - **Alternator**: UCM274E Single Bearing build
    - Voltage Connection – 415V
    - IP23 enclosure
    - 3 Phase 4 Wire
    - Control System – MX341 AVR + PMG
    - SAE 3
    - No of poles (4)
    - Anti condensation heater (220-260V AC)
- **Generator Instrument Panel**: Engine Room Panel - Remote Mounted
  - **Unclassed**: LCD graphic display shows icons, symbols and bar graphs for intuitive operation.
3.9 Engine Mounting Systems

The main propulsion engines and auxiliary engines will be mounted on flexible mounts over aluminium engine beds.

<table>
<thead>
<tr>
<th>Engine Mounts</th>
<th>Resilient mounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gearbox Mounts</td>
<td>Hard Mounted</td>
</tr>
<tr>
<td>Genset Mounts</td>
<td>Manufacturers Standard supply soft mounts</td>
</tr>
</tbody>
</table>

3.10 Steering System

The steering system will be an electrically powered hydraulic system with single electric motor Scandia brand from Norway or equal

<table>
<thead>
<tr>
<th>Pump</th>
<th>Single Hydraulic pump driven by 3 phase electric motor.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiller Arms</td>
<td>Steel class approved</td>
</tr>
<tr>
<td>Steering Rams</td>
<td>Twin Class approved</td>
</tr>
<tr>
<td>Helm Unit</td>
<td>Electric non follow up joy stick, one fwd station and one aft station</td>
</tr>
<tr>
<td>Emergency Steering</td>
<td>Steering wheel located in Tiller Flat with intercom headset for bridge communications</td>
</tr>
</tbody>
</table>

3.12 Anchor Winch

An electric/hydraulic drum type anchor winch model Hypac or equivalent will be installed to the forward deck. The winch will have a drum suitable for wire anchor cable and a brake. Control will be suitable weather tight local panel. The winch will be covered with a UV resistant canvas cover and draw string.

3.13 E/R Ventilation

The engine room air intake system will utilise two fans which will be driven by 415/3/50 electric motors, and may be run from either generator. Air flow will be sufficient to keep the engine room temperature within tolerable limits for the machinery in tropical conditions and supply the air required by the main engines and the generator sets.

The engine room air exhaust will be natural ventilation

Both the air in and the air out ventilators will be fitted with remotely operated fire flaps that can be operated from outside the engine room.

The fan inlets and outlets will be positioned at the fwd and aft ends of the engine room to provide maximum air flow.

3.14 Piping - General

All piping will be arranged according to good marine practice and be sized for the purpose intended. The pipes will be securely clamped to the vessels structure, fittings and bends will be of approved type and kept to a minimum. All piping will be colour coded in accordance to Internationally recognized standards.

All sea water piping will have flanged connections and be spooled to avoid possible leakage onto electrical switchboards or electrical components

All pressure pipes will be fitted with a suitable pressure gauge

3.15 Exhaust Systems

The main and auxiliary engines will be fitted with fabricated steel exhaust systems. The systems will be insulated with suitable lagging in hot areas between the expansion bellows and the water injection point. Water injection will be stainless steel and be prior to the connection at the ship side, which will eliminate sparks and ensure the hull penetration is cooled.
3.16  Fresh Water System

The fresh water supply will be stored in aluminium double bottom tanks, constructed integrally to the hull. The system will be fitted with a single phase constant pressure pump to service the domestic area. Details of the fresh water system are as follows:

**Capacity:**
Total approximate Capacity : 28,600 Litres

**Cargo Transfer Pump:**
Varisco JP06-220-TW/GMC, (or equivalent) 13.5cub m/hr @ 55m head, 415V, 50Hz c/w Viton sealing system. The inlet and outlet will be flanged connection and fitted with pressure gauges

**Cargo Transfer Flow Meter:**
2” Liquid Control or equivalent come with resettable counter and non resettable totalizer and plumbed in line to transfer system. Come with calibration certificate.

**Transfer Hose:**
One 30m x 2” transfer delivery hose with suitable quick release couplings each end.

**Cargo Piping:**
Aluminium / ABS plastic to cam lock fitting on deck.

**Domestic Fresh Water Pump:**
One set Domestic fresh water pressure set 70LPM x 20mtr head

**Hot Water System:**
Approx. 80 Litre 240/1/50 - Rheem Domestic System (or equivalent)

**Domestic Piping:**
PVC and aluminium

**Deck Outlets**
1 x Outlet forward and 1 x outlet amidships will be installed for fresh water wash down.

**Monitoring**
Sounding pipe will be provided for manual monitoring of fresh water tank level.

3.17  Raw Water Systems

Sea chests will be installed for the provision of salt water to fire pumps, main and auxiliary engine heat exchangers and air conditioning condensers. The opening area of grating will be at least four (4) times the area of the suction valves provided at the sea inlet box. Anodes will be installed to the inside of the sea strainers and sea chests. The surface treatment inside the sea chests and the grating will be the same as the underwater area of the vessel. All sea strainers will have flanged connections.

The following sea strainers will be provided:
- 3 x Main engine
- 2 x Genset
- 1 x General service pump

3.18  Wet Areas - Domestic Plumbing

The vessel will have three marine style toilets. Two installed on the rig crew deck and one at the lower accommodation deck, one in a single compartment for rig crew use, and two in a compartment combined with the shower for crews use. The toilet systems will flush with fresh water by using a 230 volt pump with pressure set. A laundry room will be situated on the main deck aft of the rig crew area. Details as follows:

**Toilets:**
- 3 Units - Domestic type - Western style

**Black Water Discharge:**
PVC / Aluminium piping - sized to suit, plumbed to the 500 litre holding tank. A bypass line will be installed to allow the waste to discharge directly overboard if required.

**Main Holding Tank:**
The 500 litre sullage tank will be constructed of Aluminium and painted internally. A pipe will be fitted to allow for waste to be sucked from the main deck level. Valves will be installed to allow for future sewage treatment plant

**Piping and Valves:**
PVC / Aluminium - Sized to suit

**Flushing System:**
Toilets - Fresh water flushing gravity fed to sewage tank.

**Washing Machine:**
Samsung 7 kg - front loading. (or equivalent)

**Clothes Dryer:**
Samsung 7 kg - front loading. (or equivalent)

**Shower:**
Hot and cold water plumbed to showers.

**Galley Sink:**
Hot and cold water plumbed to galley.

**Grey Water Discharge:**
PVC / Aluminium piping - sized to suit, all grey water plumbed directly overboard.
3.19 Bilge Pumping System

The bilge system will be a manifold system as follows:

**Bilge Manifold and piping**
The bilge manifold will be mounted in the compartment immediately forward of the engine room and constructed from grade 316 stainless steel. The bilge pickups will be mounted at the lowest point in each compartment and plumbed to the bilge manifold. The forepeak bilge suction will be by suitably sized hand operated pump mounted on the foredeck. Each suction point will have a removable filter.

**Piping**
316 Stainless Steel. All connections will be flanged type

**Valves**
Bronze flange type SDNR and SD screw type valves

**General bilge/service pump**
1 x DESMI (or equivalent) capacity 30cum/hr, 54m head, suction 70dia, discharge 50dia. To Double as ships fire pump and backup air/con pump. Inlet and outlets will be flanged connections and have pressure gauges fitted.

**Backup GS pump**
Additional standby pump for general service pump and plumbing (same model as above)

**Bilge Alarms**
Approved bilge alarms to each compartment.

3.20 Fuel Oil System

The fuel oil tanks will be constructed integrally to the vessels structure with the pickups 300mm from the bottom of the tanks. The total capacity will be approximately 65,600 in four main tanks plus two day tanks. The fuel purifier will feed the day tanks. Details as follows:

**Day tank**
High and low level alarms fitted as per class requirement

**Piping**
Grade 304 Stainless steel. All transfer piping will be flanged type. All fuel pipe fittings will be flanged or steel JIC type fittings

**Valves**
Brass

**Manifold**
Grade 304 or 316 Stainless Steel

**Fuel Filters**
Racor 1000FG duplex or equivalent primary filters to mains and 500FG for auxiliaries.

**Cargo Transfer Pump:**
Azcue (or equivalent) approx. 13.5cum/hr @ 50m head, 415V, 50Hz c/w Viton sealing system. The inlet and outlet will be flanged connection and fitted with pressure gauges. Pump will be connected to a manifold for transfer overboard or between the ships fuel tanks

**Cargo Transfer Flow Meter:**
2" Liquid Control or equivalent come with resettable counter and non resettable totalizer and plumbed in line to transfer system. Come with calibration certificate. Flow meter will have a ticket printer. Come with calibration certificate.

**Fuel Purifier**
1 x Westfalia or equivalent sized to suit fuel consumption.
A portable aluminium tank of approx. 50 litres will be installed for waste
An overflow alarm will be fitted and wired to the main alarm panel

**Fuel Emergency Shut off System**
Via water tight Morse cable to main deck alongside CO2 release

**Monitoring**
Sounding pipe will be provided for manual monitoring of Fuel tank levels.
3.21 Battery Boxes

Batteries will be housed in aluminium or GRP storage containers with lids and battery chocks will be fitted. Vents will be fitted in accordance with the Classification Societies requirements.

3.22 Cathodic Protection

Zinc anodes will be fitted to the hull, sea inlets and internal pipe work to reduce Cathodic corrosion. The hull anodes will be bolted to brackets recessed into the hull and to brackets across the aft of the transom, and the internal anodes will be pencil type anodes fitted to sockets welded into the pipe work, a large anode will be bolted inside each of the sea inlet boxes. Hull protection will be designed to last for 2 years.

3.23 Insulation

Thermal insulation will be installed into the passenger and bridge decks.
A-60 Fire protection insulation will be installed within the engine room, galley and at areas determined by the class society. The galley and bridge will have A-60 rated fire doors.

3.25 Fire Protection System

The vessels fire protection and control and monitoring systems will be in accordance to current regulations. System details will be as follows:

Machinery Space System
Single Shot CO2 with manual release mechanism outside the E/R. When activating the CO2 system, the fire alarm will sound approximately 25 seconds before CO2 is released into the engine room. The emergency manual release will be located in the CO2 room inside a control box to allow the Co2 room door to open without sounding an alarm.

Monitoring
Heat and smoke detectors will be installed throughout necessary compartments as required. The main alarm monitoring panel will be mounted at the bridge and will be an Tetra brand or equivalent.

Fire Pump - Main
1 x DESMI (or equivalent) capacity 30cu$h/hr, 54m head, suction 70dia, discharge 50dia. To Double as ships fire pump and backup air/con pump. Inlet and outlet will be flanged connections and have pressure gauges fitted.
The main fire pump will be plumbed into the fire fighting system using gate valves and non return valves for choosing between bilge suction or emergency fire fighting.
4 x Fire Hoses and Nozzles will be installed around the vessel.

Fire Extinguishers
Listed in Survey and Safety Equipment Section Below
4.0 Interior Outfitting Labour

All interior outfitting labour will be supplied by the yard using tradesmen qualified and experienced in the outfitting of aluminium vessels. Stringent quality checking systems are utilised as part of the yards normal operation.

4.1 Structural Doors and Hatches

Suitable marine water tight and weather tight doors and hatches will be installed as per the General Arrangement drawing as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Door Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Deck</td>
<td>Single lever action Weather tight door</td>
</tr>
<tr>
<td>Main passenger deck</td>
<td>Single lever action Weather tight doors installed to fwd and aft bulkheads. Single Weather tight door Windows West or equal installed to stair case leading to lower deck. Single A30 fire door installed to staircase leading to bridge deck</td>
</tr>
<tr>
<td>Lower Deck</td>
<td>Single lever action aluminium water tight doors installed to bulkheads 14,20 and 37. Single lever action steel A60 water tight doors installed to bulkheads 25 and 33 (engine room)</td>
</tr>
<tr>
<td>Hatches main deck</td>
<td>Aluminium single lever action water tight raised hatches installed to tiller flat and collision bulkhead. One single lever action raised steel A60 hatch for engine room escape. One aluminium flush hatch installed in fwd main deck passenger area for lower accommodation escape</td>
</tr>
</tbody>
</table>

4.2 Windows - Wipers

Toughened safety glass windows in accordance to Survey Authorities regulations will be attached to the vessel using a class approved gluing procedure, they will be arranged as per the General Arrangement plans.

Four Hepworth (or equivalent) 24 Volt marine windshield wipers will be installed to the forward screen and one will be fitted to the aft control station. Fresh Water Washers will be installed to both forward and aft screens. The control panel will have speed control.

4.3 Upper Deck and Bridge Outfit - General

The linings and furniture for the upper deck and bridge will comprise a simple but aesthetically pleasing layout. The main helm position will be to starboard, and the console layout will be designed ergonomically to enable the Master to operate the vessel and ships electronics from the helm position. The aft console shall duplicate all necessary controls for manoeuvring the vessel and shall be finished in the same manner as the forward console.

All instrumentation will have a dimmer switch or protection cover for night navigation.

All shutdown switches will have protection to avoid accidental shutdown.

The main helm and engineer's seats will be free standing and adjustable. A suitable chart table will be provided.

A curtain will be installed around the chart table for night navigation. A suitable chart light will be provided.

The forward console will house all engine controls, electrical switchboards, alarm panels and equipment as included in equipment schedules, defined elsewhere in this specification.

4.4 Main Deck

The main crew deck will be designed to accommodate seating for 70 Rig personnel. Two toilets are included on this level. The main exit will be from the aft deck, and the emergency exit will be from the foredeck. There will be a deck store area opening onto the aft deck. Marine non - skid vinyl floor covering will be installed.

The general layout will be as per the General Arrangement plans provided.

Passenger Seating: 70 Beautesaux or equal economy class fixed back marine seats with vinyl coverings, shared armrests, life jacket holder and seat belts to fwd seats.

The following amenities will be provided for Rig personnel:

- **Television**: 2 unit wall mounted 40" LED. Four additional TV speakers will be installed in the main passenger area for safety video presentation
- **DVD**: 1 x Unit DVD wired into both main deck TV's
- **Hi Fi Stereo System**: AM / FM / CD Portable Hi Fi System will be installed.
- **Drinking Fountain**: Hot and cold water fountain.
- **Dimmer switch**: A dimmer switch will be installed for all main deck cabin lights
- **Lights**: All lighting will have individual labelled switches
- **First Aid Room**: A single cabin will be installed as per the general arrangement plan. The cabin will have a single bed with removable rails and storage under with drawers and locker. A single desk will be installed with drawers, desk lamp and suitable office chair. A curtain will be installed on the window. Medical kit and stretchers will be installed in this cabin
4.5 Crews Quarters

The lower accommodation will contain four twin berth cabins and two single berth cabins. Each berth will have a reading light and one single phase GPO. Outfit will include basic wall panelling and head linings. Hanging space and robe type shelves will be installed for stowage of personal effects. Floors will be aluminium with suitable marine vinyl non skid covering.

4.6 Galley

The galley will be designed to cater for ten crew and will be enclosed with A-60 insulation and fire door. The following domestic equipment will be installed.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stove</td>
<td>Electric 4 burner Cook top with fiddle rack</td>
</tr>
<tr>
<td>Oven</td>
<td>1 domestic type</td>
</tr>
<tr>
<td>Range hood</td>
<td>Custom SS with extractor fan</td>
</tr>
<tr>
<td>Microwave</td>
<td>Medium capacity domestic type</td>
</tr>
<tr>
<td>Sink</td>
<td>Deep double sink with spill rails around sink</td>
</tr>
<tr>
<td>Waste food grinder</td>
<td>Insinkerator waste food grinder installed to galley sink</td>
</tr>
<tr>
<td>Fire Blanket</td>
<td>A fire blanket will be installed in the galley.</td>
</tr>
<tr>
<td>Chiller / freezer</td>
<td>1 domestic chiller / freezer will be located in lower deck store compartment beside galley. Capacity : 700L + 700L</td>
</tr>
</tbody>
</table>

Dining arrangements will be as shown on the General Arrangement plans. Seating will be upholstered with standard vinyl coverings. Floor coverings in the galley and dining area will be easily cleanable vinyl and a Stainless Steel splash guard will be fitted around the stove.

The following equipment will be installed for crew use

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Television</td>
<td>1 x 32&quot; LED Television.</td>
</tr>
<tr>
<td>DVD</td>
<td>1 x Unit DVD.</td>
</tr>
<tr>
<td>Hi Fi Stereo System</td>
<td>AM / FM / CD Portable Hi Fi System will be installed.</td>
</tr>
</tbody>
</table>
4.7 Deck Coverings

Industrial vinyl and/or rubber flooring will be installed throughout internal accommodation decks and bridge deck. The following schedule is provided as a guide.

- **Mess, Lounge, Crews Cabins:** Vinyl or PVC fire retarding tiles or sheets.
- **Wet Areas and Galley:** Epoxy two pack paint and Pirelli studded rubber flooring
- **Bridge Deck:** Pirelli studded rubber flooring
- **All stores:** Aluminium decks fitted with timber gratings where required.

4.8 Air Conditioning

Air conditioning will be installed to the main deck, bridge and crew accommodation. Gas will be R404. Details as follows:

- **Compressor / Condenser:** Twin sea water cooled units each serving separate compartments with approximately 75% capacity per unit in case of one compressor failure the vessel will have approx 75% backup cooling capacity.
- **Bridge:** 2 x 13kw Ceiling mounted cassette plumbed to separate systems
- **Main Deck:** 2 x 13kw Ceiling mounted cassette plumbed to separate systems.
- **Charter Cabins and hospital:** Wall mount AHU or ducted from concealed AHU
- **Crew Accommodation:** Distributed by ducting from port and starboard AHU behind side lining. Port system will be plumbed to separate system than sdbd AHU. Four units approx 4kw

**Raw water pump**

Single raw water pump will be provided and plumbed into both systems. The general service pump will be plumbed into both condensers as a backup sea water pump

4.9 Wet Areas

Three toilet compartments will be positioned as per the general arrangement drawing. Two compartments will have a shower installed. Included in the compartments will be a domestic style toilet, and or hot/cold water shower, a hand basin, soap tray, toilet roll holder, mirror and stainless steel grip rails. All toilet doors will have suitable signage. Only good quality shower fitting used. The shower compartment floor will be shaped for good water drainage. Separate tap with short hose/nozzle will be provided beside each toilet

4.10 Timber and Laminates - General

The interior finishing of the vessel will be ergonomically designed for ease of maintenance, and pleasant appearance. Simple materials that are easily cleaned and robust will be used throughout. Linings will be 3mm LamiPanel, Hexacore aluminium honeycomb panel on the bulkheads and side panels and dampa ceiling system.
5.0 Electrical Installation - General

All electrical equipment, cables, cable trays and fittings that are required to complete the installation of the electrical fitout for the vessel, as described below, will be supplied by the Builder. A full set of design drawings will be made available to the Builders Electricians.

All electrical installation labour will be sub contract labour organised and supplied by the Builder. The tradesmen will be qualified and experienced in the outfitting of aluminium vessels. Stringent quality checking systems are utilised as part of the Builders operation.

Electrical apparatus and wiring systems will comply with the relevant rules and regulations of the Classification Society. All fittings used will be of a good standard, and suitable for tropical and marine environment. Power supplies will be as follows:

1) 12V / 24V DC - for alarms, radio, navigational aids, emergency lighting, navigation lights and other emergency loads.
2) 230V , 1 phase, 50Hz - for general lighting and power less than 3kW, and communication and navigation equipment.
3) 415V , 3 phase, 50Hz - for ships power.

5.1 DC System (12V / 24V)

The extra low voltage system (12V / 24V DC) will be a marine system designed and installed in accordance to the Classification Society regulations. The extra low voltage supply for emergency supply for lighting and navigation aids will be obtained from two (2) banks of 24V, 250 AH batteries. A dedicated supply for radio communications will be obtained from two (2) banks of 24V, 120 AH batteries. One static battery charger, 60 amp, 24V D.C. automatically regulated output will be installed for charging the above batteries.

5.2 AC System (230V - 1ph)

The single phase low voltage system (230V AC) will be a marine system designed and installed in accordance to the Classification Society regulations. This system will be tapped from the 415V 3 phase system.

5.3 AC System (415V - 3ph)

The three phase system (415V AC) will be a marine system designed and installed in accordance to the Classification Society regulations.

5.3.1 Switchboard

The main switchboard will be dust and drip proof and dead front type with sheet Steel construction and self supporting framework, complete with handrail and ventilation louvres suitable for marine duty to be installed in the auxiliary engine room. The switchboard will be designed for the control of the Two diesel generators and feeder distribution with all indicators, knobs and handles clearly marked by name plates. The generators will be controlled by auto synchronization and load sharing on the main switchboard. There will be no Auto start system for the generators.

5.4 Shore Power Connection

The shore supply cannot be synchronized with the generators. A 415V AC 50Hz 50amp three phase and neutral shore supply system is offered as follows:

a) Shore supply inlet box complete with circuit breaker protection
b) Protection and monitoring at the main switchboard with interlocks so as to protect the system from inadvertent connection.
c) Monitoring to class requirements

5.5 Reefer Connections

4 x International 32 Amp reefer connections (415V AC/50Hz) will be provided as per class requirements at the main deck.

5.6 Ships Batteries

Ships batteries will be sized appropriately for the machinery installed and Classification Society regulations. Battery banks will include the following:

Bank 1: Main engine - Starboard (able to parallel with other main engines)
Bank 2: Main engine - port (able to parallel with other main engines)
Bank 3: Main engine - centre (able to parallel with other main engines)
Bank 4: Generators and thruster engines
Bank 5: Ships general supply
Bank 6: Emergency communications supply
Bank 7: Emergency Supply

5.7 Lighting

12V / 24V DC lighting will be installed for navigation and emergency purposes. The vessels navigation lights will comply to international regulations. Florescent lighting will be installed throughout the vessel for normal operations. Two Water proof 400 W flood lights will be fitted on decks as appropriate. All florescent lighting will be fitted with metal steel casing to avoid damage.
6.0 Navigation Equipment

The following navigation and communication equipment will be installed. Client preference for alternative equipment of similar value will be considered. The navigation and communication equipment will generally be compliant to regulations for vessels below 500Grt - Sea Area 2. The package is not fully IMO HSC code compliant, and as such an exemption for some units may be required by flag. An upgraded package is available by way of contract variation.

Note: Electronic models may change due to some models becoming obsolete prior to ordering. Replacement models will be equal to the specified model.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar</td>
<td>1 x IRC IMA-5212-4BB Marine X-Band Radar IRC IMA-5212-4BB 10kW UP-version / 4 open scanner,</td>
</tr>
<tr>
<td>Echo Sounder</td>
<td>DMC V-6810P 6.4&quot; LCD, Track plotter / Fish Finder</td>
</tr>
<tr>
<td>GPS</td>
<td>Furuno Model GP-150 6 inch LCD Alpha/ Numeric IMO approved GPS Navigator</td>
</tr>
<tr>
<td>Satellite Compass</td>
<td>Vector G2 GPS Compass with additional aft station mono display and fluxgate compass</td>
</tr>
<tr>
<td>Auto Pilot</td>
<td>Anschütz NautoPilot NP 60 with additional fluxgate compass</td>
</tr>
</tbody>
</table>

### GMDSS Radio Communication for Sea Area 2

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Model/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/F/HF SSB Radio</td>
<td>1 unit Furuno FS-2575</td>
</tr>
<tr>
<td>VHF DSC Radio</td>
<td>1 unit Furuno FM-8900S</td>
</tr>
<tr>
<td>Navtex Receiver</td>
<td>Furuno NX-700A Navtex Receiver (printer built in)</td>
</tr>
<tr>
<td>GMDSS EPIRB</td>
<td>1 unit McMurdø E5 Smartfind 406mgz fully automatic “wheelmark” &amp; SOLAS approved</td>
</tr>
<tr>
<td>GMDSS SART</td>
<td>1 unit McMurdø Sart Radar Transponder Model 84, 9 Ghz</td>
</tr>
<tr>
<td>GMDSS 2 Way Hand Held VHF Radio</td>
<td>2 x McMurdø VHF / Walkie Talkie Model R5 Including 84-210 Lithium Battery Pack and 84-211 Nicad Battery, R2 12VDC Trickle charger</td>
</tr>
<tr>
<td>Spare Batteries for GMDSS 2 Way Hand Held VHF Radio</td>
<td>2 units McMurdø Lithium Battery for Model R5</td>
</tr>
<tr>
<td>SSAS</td>
<td>Furuno SSAS PR-240L</td>
</tr>
<tr>
<td>Talkback / PA / General Alarm</td>
<td>&quot;Vingtor&quot; or equal Talkback / Public Address System / General Alarm system</td>
</tr>
<tr>
<td>Sound Powered Telephone System</td>
<td>CMR or Hanshin SPT system; 1 x SSB-401D Flush mount wheelhouse; 2 x SSW-301B wall mount, 1 in engine room and steering room</td>
</tr>
<tr>
<td>CCTV</td>
<td>6 Channel with UPS and two 500 GB external hard drive recording and colour LCD monitor installed to bridge console; two camera in engine room, one camera in pump compartment, two outdoor Weather proof vari focus Iris CCD Camera B illumination to 50 mtr installed at sides of vessel facing the aft deck area.</td>
</tr>
<tr>
<td>TV antenna</td>
<td>TV350 Bantam</td>
</tr>
<tr>
<td>Search Light</td>
<td>1 unit 1000W Sanshin or equal manual cabin control Searchlights with 360 deg rotation.</td>
</tr>
<tr>
<td>Horn</td>
<td>Mares Pneumatic PW-3-BB</td>
</tr>
<tr>
<td>Magnetic Compass</td>
<td>1 unit Autonamic CHE-0071Flush mount magnetic compass.</td>
</tr>
<tr>
<td>AIS System</td>
<td>Furuno FA-150 AIS</td>
</tr>
<tr>
<td>BNWAS</td>
<td>Le Guardian 2025</td>
</tr>
<tr>
<td>Night Vision Device</td>
<td>1 x set “Yukon” Tracker’ or equal night vision binoculars, including in built illuminator; 2 x 24mm, waterproof, to IP-65.</td>
</tr>
</tbody>
</table>
## 7.0 Safety Equipment

The following life saving equipment will be installed.  Equipment will be in accordance to current regulations.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Raft</td>
<td>5 units 25 man CSM (China made) SOLAS approved A Pack</td>
</tr>
<tr>
<td>Life Rings/Light/Lanyard</td>
<td>2 x SOLAS approved</td>
</tr>
<tr>
<td>Life Rings with Light &amp; Smoke</td>
<td>2 x SOLAS approved</td>
</tr>
<tr>
<td>Life Jackets</td>
<td>88 x Adult SOLAS approved</td>
</tr>
<tr>
<td>Scramble Nets</td>
<td>2 x Polypropylene Nets weighted at the outboard end approx. 2m wide, made of 12mm diameter nylon, the hole to be 200mm x 200mm</td>
</tr>
<tr>
<td>Lane Throwing Apparatus</td>
<td>4 shot Schermully type</td>
</tr>
<tr>
<td>Fire Extinguishers</td>
<td>Throughout vessel as required.</td>
</tr>
<tr>
<td>Fire Buckets</td>
<td>Galvanised fire bucket supplied.</td>
</tr>
<tr>
<td>Fire axe</td>
<td>1 x fire axe installed with suitable holder and location</td>
</tr>
<tr>
<td>Anchors</td>
<td>1 HHP class approved Anchor</td>
</tr>
<tr>
<td>Chains, Ropes Etc</td>
<td>12.5m x 19mm G1 Stud link chain + 206m x 16mm wire rope</td>
</tr>
<tr>
<td>Mooring Lines</td>
<td>4 x 25 Metre x 98 kn breaking strength</td>
</tr>
<tr>
<td>Barometer and thermometer</td>
<td>1 x 150 mm</td>
</tr>
<tr>
<td>Clocks</td>
<td>1 x 150 mm Quartz</td>
</tr>
<tr>
<td>Ship's Bell</td>
<td>1 x 300 mm Diameter Brass</td>
</tr>
<tr>
<td>W/T Container</td>
<td>To house pyrotechnics.</td>
</tr>
<tr>
<td>Pyrotechnics</td>
<td>As required for survey.</td>
</tr>
<tr>
<td>Flags/Marker Dye etc</td>
<td>As required for survey.</td>
</tr>
<tr>
<td>Day light signal lamp</td>
<td>Francis MKV or equivalent</td>
</tr>
<tr>
<td>Torch</td>
<td>As required for survey.</td>
</tr>
<tr>
<td>First Aid Kit</td>
<td>50 Person Cabinet with standard supply</td>
</tr>
<tr>
<td>Stretcher</td>
<td>2 x FWELS Neil Robertson type stretcher</td>
</tr>
<tr>
<td>Signage</td>
<td>All switches, valves, pumps and machinery will be labelled.</td>
</tr>
<tr>
<td>Labelling</td>
<td>IMO approved labels</td>
</tr>
<tr>
<td>Fireman Outfit</td>
<td>1 x Proximity Suit Flame stop</td>
</tr>
<tr>
<td>Breathing Apparatus</td>
<td>2 x Scottish RNA TR2002 SCBA W6L x 200bar Breathing Apparatus or equivalent</td>
</tr>
<tr>
<td>Portable bilge/fire pump</td>
<td>One unit portable diesel driven pump to suit flag requirement</td>
</tr>
<tr>
<td>Eyewash Station</td>
<td>Two units, One unit come with shower at back deck with fresh water pipe plumbed to station and one at engine room.</td>
</tr>
</tbody>
</table>
8.0 Launching

The vessel will be launched via suitable means at the construction facility. The yard will take full responsibility for launching arrangements.

8.1 Equipment Hire

In the event that equipment is required to be hired for lifting or other purposes during construction of the vessel, the yard will take full responsibility for arrangements and costs incurred.

8.2 Freight

Freight costs for delivery of components and equipment for the completion of the vessel will be borne by the yard.

8.3 Fuel & Lubricants

All fuel and lubricants required for commissioning and sea trials of the vessel will be provided by the shipyard.

8.4 Sea Trials

A comprehensive sea trial will be conducted in accordance to the yards strict sea trials plan, to satisfy the client and Classification Society representative of the functionality of the vessel, and conformance to plans and specifications.

9.0 Delivery

The owner is to take delivery at Facility at the successful completion of sea trials, and receipt of final payment.