

## ***Section VII. Technical Specifications***

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## **MULTI-PURPOSE ATTACK CRAFT (MPAC) TECHNICAL SPECIFICATIONS**

### **A. General Requirements for Design and Construction**

Item	Statement of Compliance
A.1 The vessels shall be of proven design and presently being used by the Armed Forces of the country of origin or presently being used by the Armed Forces of at least two (2) countries	
A.2 The ship and installed equipment shall be designed and built to provide maximum combat ready ship up-time over 25 years life after Government acceptance. The design and material used shall be such that the cost per ship per day shall be kept to a minimum (life cycle cost/over/ship combat ready days).	
A.3 Maintenance shall be accomplished at the lowest possible maintenance echelon with maximum self-sufficiency to maintain ship operational readiness between overhauls. Maximum dependency shall be upon in-house (Navy) support, with utilization of Contractor support limited to required training and interim supply and maintenance support until in-house support capability is achieved.	
A.4 Habitability areas shall be maintained in a pleasing appearance without compromising functional efficiency. Runs of piping and wirings shall be minimized in living spaces.	
A.5 The air-conditioning and ventilation systems capacity shall be designed based on Philippine conditions.	
A.6 Mast, superstructure, other structure and fittings shall be designed to withstand dynamic forces produced by motion of the ship in seaways.	
A.7 Equipment and machinery shall conform in type, size, pattern, and details with the requirements set forth herein.	
A.8 Systems, equipment, and components shall be installed to facilitate accessibility for operating efficiency, inspection, adjustment, maintenance repair, replacement, and removal. The Contractor shall establish and conduct an Equipment Maintenance, Removal and Handling Program to ensure that equipment can be removed from its place of installation and move to an onboard shop, or remove from off-ship repair with minimum disruption to other equipment and systems due to interference or secondary removals.	
A.9 Protection of personnel against operating hazards shall be provided. Personnel shall also be protected from being thrown against the equipment particularly under heavy sea conditions, and inadvertent damage to exposed component, resulting to maladjustment of exposed functional controls such as push buttons, knobs, and switches.	
A.10 The Contractor shall establish a preventive maintenance program and shall prepare a preventive maintenance plan for all	

machinery and equipment to be installed in the craft.	
A.11 Vital space boundaries shall be designed to the extent practicable to afford protection from fumes, fire, flooding, and to ensure continuous operation of equipment and protection of personnel.	
A.12 The craft and all components shall be free from excessive vibration. Vibration is excessive when it interferes, or threatens to interfere, with the proper operations of any component.	
A.13 All equipment installed on resilient mountings shall have sufficient stability to prevent excessive motion under shock, and all ship motion.	
A.14 The Contractor shall develop, implement, and maintain a comprehensive Reliability and Maintainability Program (R&M), which ensures that R&M are major consideration in the design, test, and production of ship systems and equipment including software	
A.15 Workmanship shall be of first class quality that is, exhibiting the quality in fabrication details and appearance typically produced by competent and conscientious workers.	
A.16 To prevent destructive electrolysis, direct contact of electronically dissimilar metals shall be avoided.	

**B. Capabilities and Performance Requirements**

Item	Statement of Compliance
B.1 The Multi-Purpose Attack Craft (MPAC) should have the ability to sustain speed of at least 30 knots to cover a minimum distance of 300 nautical miles of continuous operation, and a loiter speed of 10 knots.	
B.2 It should be able to operate day and night up to sea state 3 at head-on seas without systems degradation.	
B.3 It must have agile maneuverability and can operate in shallow salt or fresh water environment of less than one (1) fathom depth.	
B.4 It must have a low profile stealth design construction and low engine noise level both at loiter and at full speed operation.	
B.5 It must be able to carry at least sixteen (16) fully equipped troops or at least two (2) tons of payloads.	
B.6 It must be capable of forced amphibious landing on sandy and/or rocky beaches.	

**C. Principal Characteristics**

Item	Statement of Compliance
C.1 Length Waterline	-15 meters ± 10 %
C.2 Beam	-Function of design
C.3 Draught (Draft)	-Less than one (1) meter

C.4	Transit Speed	-At least 30 knots	
C.5	Maximum Speed	-At least 40 knots	
C.6	Range at transit speed	-300 Nautical Miles	
C.7	FO/LO/FW Capacity	-Function of Range	
C.8	Propulsion Plant	-Waterjet system	
C.9	Electric Plant	-7-10 Kilowatts (AC	
C.10	Hull Construction	- Welded aluminium (5083 base marine aluminium alloy)	
C.11	Complement	- At least 16 fully equipped troops plus 1-officer and 3-crew or at least two (2) tons payload	
C.12	Armaments	-Provisions for installation of following guns:  One (1) Cal 50 MG Two (2) units M60/7.62 MM LMG	
C.13	Ammunition Stowage	-Storage capacity of at least 4,000 rds for 7.62 MM LMG, and 2,000 rds of Cal 50 MG	
C.14	Operability	-The MPAC shall be operable in the Philippine territorial waters up to Sea State 3 without any system degradation	

## D. Detailed Requirements

### D.1. Hull and Structure

Item	Statement of Compliance
D.1.1	The MPAC shall be constructed in accordance with the International Classification Society Rules for shipbuilding, on areas, which does not require military functions.
D.1.2	The entire hull and superstructure shall be of all welded aluminum (5083 base aluminum alloy for plate and 6082 T6 for frames and extrusion) construction. Wherever possible, steel be either stainless or hot zinc coated.
D.1.3	The hull structure shall be developed with particular emphasis on survivability, structural integrity, logical arrangements, optimized speed-length ratio, beam-draft ratio and improved structural continuity, which could lead to vibration-free design.
D.1.4	There shall be a ballistic protection at the wheelhouse, accommodation and engine room to sustain at least 7.62MM bullets fired at a distance of 10 meters. The wheelhouse glass windshield and port holes shall be bullet proof capable to withstand 7.62 MM LMG.
D.1.5	All deck, shell, and bulkheads shall be suitably stiffened and strengthened for machinery, outfitting equipment and armament mountings.
D.1.6	The hull forward of the engine room shall be arranged with

double-bottom with corresponding watertight bulkhead.	
D.1.7 The hull shall be of low profile stealth design construction and shall consist of at least four (4) watertight bulkheads/compartments.	
D.1.8 The keel and bottom shell plating shall be heavily reinforced to withstand forceful landing on unprepared beaches to disembark personnel.	
D.1.9 The vessel shall have a forepeak central passage and bow ramp that can be opened and closed manually to facilitate embarkation and disembarkation on unprepared beaches. These opening should be watertight.	
D.1.10 The craft shall be fitted with four lifting pad-eyes for lifting the boat out of water and it shall be delivered with appropriate lifting sling.	
D.1.11 The hull shall be at even keel irrespective of the level of the fuel and water consumption. There shall be a compensating means to maintain trim.	
D.1.12 There shall be no objects protruding below the keel.	

## D.2 Propulsion Plant

Item	Statement of Compliance
D.2.1 The Multi-Purpose Attack Craft (MPAC) shall be powered by two (2) diesel driven water jet systems.	
D.2.2 The propulsion system shall be quick starting and requires a minimum time of less than one minute to speed up to maximum speed. Likewise, it shall be capable of providing various speed performances to meet requirements such as, but not limited to, maximum speed of at least 40 knots, transit/sustained speed of at least 30 knots, and loiter speed of 10 knots.	
D.2.3 The engines should be able to be started, regulated, engaged, disengaged and stopped from the wheelhouse; and started and stopped from the engine room.	
D.2.4 Steering of the water-jet systems shall be by means of steering wheel integrated in the hydraulic system.	
D.2.5 Engine control shall have separate starboard and port control levers, positioned to enable simultaneous operation with one hand mechanical control to the engine by means of cable.	
D.2.6 The reverse buckets of the water-jets shall be regulated by means of separate starboard and port controls, positioned to enable simultaneous handling with one hand.	
D.2.7 Exhaust lines shall be water-cooled from the engine outgoing cooling water. High raiser shall be fitted in the exhaust systems.	
D.2.8 Cooling-water pipes to be run via filters to raw waters pumps of the main engines.	
D.2.9 Fuel tank level indicator shall be fitted and adequate fuel filtering system to be incorporated in the fuel suction lines in	

addition to the engine's fuel filters.	
D.2.10 The engine room shall be adequately ventilated. Combustion air shall be taken directly thru air-filtering systems.	

### D.3 Electrical Plant

Item	Statement of Compliance
D.3.1 A 7-10 KW diesel driven generator - providing 220VAC, 60 Hz shall be installed to provide the required electrical power requirements. Its fuel system shall be connected to the main fuel system. The exhaust system shall be fitted with muffler.	
D.3.2 A battery powered emergency lighting system shall be fitted, one in the wheelhouse, one in the accommodation, and one in the engine room, which will automatically activate itself in case of power lost.	
D.3.3 A 12/24VDC Storage Battery (marine type) system shall be installed for starting and serves Direct Current powered equipment. Converter with integrated powered battery charger shall also be provided. Engine driven battery chargers (one for the starting battery and the other one for the battery set that serves the DC equipment) shall be installed as back up in case of generator failure.	
D.3.4 Full instrumentation both electrical and mechanical shall be provided on the propulsion plant, electrical plant and auxiliary machineries, installed at the engine room and pilothouse.	
D.3.5 Provisions for darken ship and dim controls of all lightings throughout the craft shall be installed for night operations.	
D.3.6 Provision for deck lights, navigational lights, searchlights and floodlights shall be installed.	
D.3.7 All fittings and lightings at the weather deck shall be watertight and corrosion proof.	
D.3.8 Extra spare socket for 24 VDC and 230 VAC shall be installed at the wheelhouse, accommodation and engine room.	
D.3.9 A shore power connection box with at least 35 meters of shore power cable shall be made available.	

### D.4 Command and Surveillance

#### D.4.1 Following navigation equipment/sub-system shall be built and integrated:

Item	Statement of Compliance
NAVIGATIONAL/SENSOR: (All equipment must integrate with each other and /or having only one display unit)	
A) RADAR	
i. Power Output: 4 KW – 6 KW	

<ul style="list-style-type: none"> <li>ii. Frequency of Operation: X- Band</li> <li>iii. Can be interfaced with Satellite Compass, Fathometer</li> <li>iv. Preferably with BITE</li> <li>v. With ATA/ARPA</li> <li>vi. Can track at least 10 targets</li> <li>vii. With alarm for potential danger</li> <li>viii. With echo trail showing an after glow of moving target</li> <li>ix. Can give distance and bearing to targets</li> <li>x. With customize color presentation for night time operation</li> <li>xi. Antenna radiator (Radome type/thermodynamics) can withstand wind velocity of more than 100 knots.</li> <li>xii. Display Unit must be LCD PLASMA</li> <li>xiii. Power Requirement: 220V AC, 60Hz</li> <li>xiv. With protection from power fluctuation/ AVR</li> <li>xv. With electronic Phil. ROM Chart</li> <li>xvi. Range Scale: 0.125 – 64 nm</li> </ul>	
<p>B) SATELITE COMPASS</p> <ul style="list-style-type: none"> <li>1. Heading Accuracy: 0.6 deg</li> <li>2. Tri-GPS System (Two-axis system)</li> <li>3. No Settling time</li> <li>4. Can be integrated with RADAR</li> <li>5. Display Unit : LCD</li> <li>6. Preferably with Wide Area Augmentation System Chart plotter</li> <li>7. Power Requirement: 220 V AC, 60 Hz</li> <li>8. With GPS function</li> </ul>	
<p>C) FLUXGATE COMPASS (or MAGNETIC COMPASS)</p> <ul style="list-style-type: none"> <li>1. Accuracy - + 1.0 deg (excluding magnetic anomalies)</li> <li>2. Correction:     Deviation : Auto by running the boat- 360 deg     Variation : Auto through GPS</li> <li>3. Roll &amp; Pitch - <math>\pm 35</math> deg</li> <li>4. Follow-up - 6 deg/ S Max</li> <li>5. Temperature - - 15 deg to + 55 deg C</li> <li>6. Power Supply - 12 – 35 Vdc, 2W</li> </ul>	
<p>D) Fathometer</p> <ul style="list-style-type: none"> <li>1. Dual Frequency Mode</li> <li>2. Can be integrated with RADAR</li> <li>3. With visual and audible alarm</li> <li>4. Power Requirement: 220V AC, 60 Hz</li> <li>5. LCD display</li> <li>6. With user selectable operating frequencies</li> <li>7. With background color for optimum viewing at day and night</li> </ul>	
<p>E) SART (Search and Rescue Radar Transponder)</p> <ul style="list-style-type: none"> <li>1. Frequency Range - 9,200 to 9,500 MHZ</li> </ul>	

2.	Polarization - Horizontal	
3.	Pulse Emission - 100 MS	
4.	Effective Receiver Sensitivity - 50 dbm or better	
5.	Duration of Operation - 96 hours in stand-by state followed by more than 8 hours of transponder transmissions being continuously interrogated with a pulse repetition frequency of 1 KHZ	
6.	Temperature Range - Operating - 20 deg C to +55 deg C Ambient - 30 deg C to + 65 deg C	
7.	Fully compliant with GMDSS requirement	

**D.4.2 Other Navigational Equipment shall be provided as follows:**

Item	Statement of Compliance
D.4.2.1 Chart table and Navigation instrument stowage	
D.4.2.2 Navigational Lights	
D.4.2.3 Search light with remote control	
D.4.2.4 Barometer	
D.4.2.5 Three (3) binoculars	
D.4.2.6 Two (2) portable night vision devices	
D.4.2.7 Bell	
D.4.2.8 Ship's clock	

**D.4.3 External Communication Equipment (Shock Mounted)**

Item	Statement of Compliance
A) ONE (1) HF RADIO TRANSCEIVER	
1. Approved marine type radio	
2. Capable of handling data communication	
3. Preferably with BITE	
4. Frequency Range TX: 1.6 to 28 MHZ RX: 0.1 to 30 MHZ	
5. Power Output: not less than 150W	
6. Antenna Height : 7m or less (Whip that can be swing down)	
7. Power Requirement: 220VAC 60 Hz	
B) ONE (1) VHF/FM MARINE BAND	
1. Approved marine type radio	
2. Antenna: Whip that can be swing down	
3. Output Power : 25W	
4. Power Requirement: 220VAC 60 Hz	

<p>C) TWO (2) MULTI BAND RADIOS (include lowband &amp; Airband)</p> <ol style="list-style-type: none"> <li>1. Frequency Range: VHF: 115MHZ to 149.98 MHZ (AM) VHF: 115MHZ to 174 MHZ (FM) UHF: 225 to 400 MHZ</li> <li>2. Frequency Enhancement VHF (Low-band) - 30 – 90 MHZ VHF - 400 – 420 MHZ</li> <li>3. Modulation: AM and FM</li> <li>4. Approved marine type radio</li> <li>5. Reliability - Over 7200 hours MTBF</li> <li>6. Power Output - 0.1 Watts to 10 Watts</li> <li>7. Power Requirement: 220V AC 60 Hz</li> <li>8. Antenna : Whip that can be swing down</li> </ol>	
<p>Survival windload capacity of Antenna for HF, VHF/MB and Multiband is from 100 knots to 130 knots</p>	

#### D.4.4 Internal Communication System

Item	Statement of Compliance
D.4.3.1 One (1) set Loud hailer	
<p>D.4.3.2 Three (3) sets Handheld Radio</p> <ol style="list-style-type: none"> <li>1. Approved marine type radio</li> <li>2. Frequency Requirement: Low Band</li> <li>3. Power Output: 1W or more</li> <li>4. Antenna: Flexible</li> <li>5. With headset w/ boom swivel microphone</li> <li>6. With VOX capability</li> <li>7. Water Proof and Submersible</li> </ol>	

#### D.5 Auxiliary Machinery

Item	Statement of Compliance
D.5.1 The MPAC shall be provided with electro-hydraulic anchoring system. Hydraulic anchor windlass with chain/rope bin and self-towing anchor shall be fitted on appropriate location	
D.5.2 The primary steering system shall be of electro-hydraulic type with provision for emergency manual steering as secondary in case of failure on the primary steering system. The system shall be integrated in the water jet system, which enable the craft to maneuver laterally, pivot, swing with less than 100 meters tactical diameter at full speed and stop at emergency dead halt within 2-	

boat length from full speed motion.	
D.5.3 Fire flushing, bilge, sewage and fresh water pumps shall be installed aboard the MPAC. The sewage and bilge pumps shall automatically operate at a preset level. In addition, all compartments shall be fitted with manual membrane type bilge pumps.	
D.5.4 Bilge and sewage system shall be provided for in compliance with international regulatory standards. A sewage tank with fittings for draining overboard and to shore suction shall be provided.	
D.5.5 All piping system shall be sea-water resistant. Piping for cooling systems and hull valves shall be stainless steel. Ball valves shall be used wherever possible. Pressurized fresh water piping systems to be fitted to toilet and pantry.	
D.5.6 The command and control, living spaces and electrical/electronic equipment spaces shall be equipped with an air-conditioning system appropriate for the Philippine tropical environment. Provision for natural ventilation of these spaces shall be provided for use in the event of forced ventilation/air-conditioning failure.	
D.5.7 Hydraulic trim planes shall be fitted port and starboard.	

### D.6 Outfit and Furnishing

Item	Statement of Compliance
D.6.1 The MPAC shall be provided with fire detection (with alarm installed at the wheelhouse) and adequate fire fighting and life saving equipment particularly life raft, lifejackets, life-rings and first aid kit.	
D.6.2 The wheelhouse arrangement shall allow seats for the Officer-In-Charge and helmsman plus additional seat beside the OIC, and shall be provided with 4-point safety belts.	
D.6.3 Collapsible mast shall be of aluminum construction and fitted with adequate fastening for lights and antennas. A flagstaff shall be fitted aft.	
D.6.4 The diving platform shall be hinged at boat transom and stowed in vertical position.	
D.6.5 A rung ladder shall be installed at the stern beside the diving platform.	
D.6.6 The bitts, chocks, cleats, railings, and lifting pad eyes shall be installed for mooring, hoisting, and towing	
D.6.7 The craft shall be fitted with a fender system for protection during and after berthing and for boarding or re-fueling/re-watering operation alongside other vessels	
D.6.8 The entire hull shall be treated with appropriate cathodic protection and painted with internationally accepted painting scheme for aluminum boat. Valves, vents and deck fittings to be marked stating their specific functions.	
D.6.9 Rails, lifelines and handrails shall be provided for throughout the craft as necessary. Railings and handrails are to	

be of aluminum tubing.	
D.6.10 Ammunition, small arms and boat gear stowage/lockers shall be provided.	
D.6.11 The main deck shall be covered/applied with non-skid paint.	
D.6.12 Plotting table shall be provided at the wheelhouse for navigational charts plotting and stowage.	
D.6.13 Appropriate number of bulletproof portholes at berthing space shall be provided for natural ventilation.	
D.6.14 Clear view wipers shall be installed at the three (3) front windshield of the wheelhouse.	
D.6.15 Windows at the wheelhouse shall have defroster/demister system to keep good visibility under all circumstances.	
D.6.16 Gauges of fuel oil and fresh tanks shall be installed at the wheelhouse.	

### **D.7 Habitability**

Item	Statement of Compliance
D.7.1 A toilet room with sanitary bowl and washbasins shall be provided.	
D.7.2 A small pantry fitted with two (2) hot plates, microwave oven, sink, refrigerator, lockers and drawers shall be arranged at the accommodation compartment.	
D.7.3 The accommodation shall be arranged with four (4) convertible Pullman type sofas seating sixteen (16) passengers and providing eight (8) berths when converted. The seats shall be provided with 2-point safety belts.	
D.7.4 Seats at the wheelhouse shall be provided with 4-point safety belts	

### **D.8 Firefighting Equipment System**

Item	Statement of Compliance
D.8.1 Standard fire warning and fire extinguishing equipment (including chemical) shall be installed. Two (2) fire hose stations shall be provided, one (1) at engine room and one (1) at main deck with appropriate applicators, nozzles, hoses, spanners and racks in accordance with USCG regulations	

**D.9 Life Saving Equipment**

Item	Statement of Compliance
Appropriate Personal Flotation Device (PFD) to all crew and passengers, inflatable life raft and other life saving equipment shall be provided.	

**D.10 Armaments (foundation/fitting) to be provided for but not fitted with:**

Item	Statement of Compliance
D.10.1 One (1) unit Cal 50 MG/40 MM AGL	
D.10.2 Two (2) units M60/7.62 mm LMG	

Item	Statement of Compliance
<b>D.11</b> One of the gun foundation shall be fitted at the deck aft of the wheelhouse with ring mount having a pintle that can accommodate Cal 50 MG with soft recoil arrangement or a 40 MM automatic grenade launcher (AGL). The pintle shall be provided with suitable adaptor that can be fitted with 7.62 MM LMG.	

Item	Statement of Compliance
<b>D.12</b> Pedestal mounting for twin 7.62 MM LMG shall be fitted on deck starboard side forward of the wheelhouse. The mount shall be arranged allowing the guns to be fired at least within 90-degree radius.	

**E. Shipbuilding Standard**

Item	Statement of Compliance
The MPAC shall be constructed in accordance with the International Ship Classification Society (ABS, NKK, Lloyds of London, etc.) Class + 100A1 to be agreed upon by the PN and the Contractor.	

**F. Environmental Equipment**

Item	Statement of Compliance
Prevention of pollution from the craft shall be in compliance with IMO regulation.	

**G. Integrated Logistics Support Package**

**G.1 Spares and Supply Requirements**

Item	Statement of Compliance																					
G.1.1 Spares and supply requirements for two (2) years shall be identified (itemized) and provided by the <b>Contractor</b> in each maintenance level (organizational, intermediate, depot level) to include but not limited to the items listed in the table below:																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ORGANIZATIONAL LEVEL (ABOARDSHIP)</th> <th style="text-align: center;">INTERMEDIATE LEVEL (PHILFLT)</th> <th style="text-align: center;">DEPOT LEVEL (NASSCOM)</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;"><b>For Main Engines/Waterjets Generator</b></td> </tr> <tr> <td>Filters</td> <td>Anodes Plugs Screws and Nuts Coolant Belts Impellers Gauges Sealant V-belts Gaskets Air cleaner elements Clamps Hose</td> <td>Anodes Injectors Impellers Plugs Screws and Nuts Belts Gauges Sealant V-belts Gaskets Fuel lines</td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>For Electrical System</b></td> </tr> <tr> <td>Fuses Inspection Lamp</td> <td>Circuit breakers</td> <td></td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>For Navigational System</b></td> </tr> <tr> <td>Fuses</td> <td>Cables Antennas for radios Light emitting diode (LED)</td> <td>Printed Circuit Boards Magnetron Transformer</td> </tr> </tbody> </table>	ORGANIZATIONAL LEVEL (ABOARDSHIP)	INTERMEDIATE LEVEL (PHILFLT)	DEPOT LEVEL (NASSCOM)	<b>For Main Engines/Waterjets Generator</b>			Filters	Anodes Plugs Screws and Nuts Coolant Belts Impellers Gauges Sealant V-belts Gaskets Air cleaner elements Clamps Hose	Anodes Injectors Impellers Plugs Screws and Nuts Belts Gauges Sealant V-belts Gaskets Fuel lines	<b>For Electrical System</b>			Fuses Inspection Lamp	Circuit breakers		<b>For Navigational System</b>			Fuses	Cables Antennas for radios Light emitting diode (LED)	Printed Circuit Boards Magnetron Transformer	
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Fuses	Cables Antennas for radios Light emitting diode (LED)	Printed Circuit Boards Magnetron Transformer																				
G.1.2 The itemized spares and supply lists shall be submitted by the bidder as part of the Technical Bid / Proposal.																						

## G.2 Special Tools and Test Equipment

Item	Statement of Compliance
G.2.1 The Contractor shall identify, supply and deliver (Itemize) the <b>special tools and test equipment</b> to include but not limited to the items listed below:	
G.2.1.1 Set of Tools for Engines and Waterjets	
G.2.1.5 Set of tools for Communications and Electronics Equipment	

## G.3 Manuals, Handbooks and Plans/Drawings

Item	Statement of Compliance
G.3.1 Complete and adequate manuals and documents shall be supplied covering all levels of operation and maintenance procedures.	
G.3.1.1 The Contractor shall supply and deliver five (5) printed and one (1) electronic sets of the following documentations in English Language:	
G.3.1.1.1 Boat Information Handbook	
G.3.1.1.2 Combat System Operating Handbook/Manual	
G.3.1.1.3 Communication and Electronics Equipment Handbook	
G.3.1.1.4 Navigational Sensors Handbook	
G.3.1.1.5 Equipment Manufacturers Technical Manual	
G.3.1.1.6 Manufacturers Parts Manual	
G.3.1.1.7 Operators Handbook	
G.3.1.1.8 Illustrated Parts Catalogues	
G.3.1.1.9 Maintenance Required Card (MRC) or its equivalent	
G.3.1.1.10 Consolidated Ship Allowance List	
G.3.1.1.11 Damage Control Book	
G.3.1.1.12 Ship Construction Plans/Drawings	
G.3.1.2 The Contractor shall provide built-in bookshelves / cabinets for the above listed documents and be installed inside pilothouse of the 2 MPACs.	

## G.4 Human Engineering / Training

Item	Statement of Compliance
G.4.1 The Contractor shall undertake training for the operation and maintenance of the MPACs, to include operation and maintenance training for <b>special tools and test equipment</b> as provided in <b>sub-clause G.2.1</b> , in the Philippines or in the Contractor's shipbuilding facility prior to the conduct of the final	

acceptance tests and sea trials.	
G.4.2 The Philippine Fleet as the end-user of the MPAC shall provide thirty (30) knowledgeable personnel on combat patrol operations, navigation as well as on deck and machinery maintenance.	
G.4.3 The <b>Contractor</b> shall identify and provide essential training devices, equipment and materials such as manuals and visual aides.	
G.4.4 Details of the <b>training package</b> shall be provided by the Contractor as part of the Technical Bid / Proposal.	

## H. Manpower Requirement / Project Management

Item	Statement of Compliance
H.1 The Contractor shall submit its proposed project management organization and staffing. It shall designate a qualified full-time Project Manager (PM) as head who shall have complete responsibility for the planning, and later on, for the execution and control of the program. In accordance with the Contractor's established practice, the PM shall be provided with the necessary authority to ensure that the program is accomplished on schedule and meets all technical requirements. The PM shall be designated as the point of contact with the DND-PROCURING ENTITY on all matters pertaining to the project.	
H.2 The Contractor shall develop and provide a Program Master Schedule showing all major program milestones and deliverable items. The format shall also include itemized costs and the total system cost payable under a financial scheme.	
H.3 The Contractor shall provide a list of all intended Sub Contractors with their company profiles and partnership agreements. In any case, the prime Contractor shall be responsible for the Sub Contractors and may be required to directly oversee the Sub Contractor's performance.	
H.4 The Contractor shall submit an effective product assurance program in accordance with internationally accepted standards, policies and procedures.	
H.5 A team from the Philippine Navy composed of five (5) personnel will be formed to oversee the project implementation. Utilization of the team as the Technical and Acceptance Committee to monitor progress and prepare documentation for acceptance. The Contractor shall provide accommodations and support services for the team.	

**I. Quality Assurance**

Item	Statement of Compliance
I.1 The Contractor shall have an organization for quality assurance (QA) to monitor production in accordance with internationally accepted standards and to perform test and trials.	
I.2 The Contractor's management with executive responsibilities shall review the quality system at defined interval sufficient to ensure its continuing suitability and effectiveness in satisfying the requirements and the Contractor's stated quality policy and objectives. Records of such reviews shall be maintained.	
I.3 The QA department shall be responsible for the release of production drawings, documentation and test reports.	
I.4 The builder shall recognize the participation of the Classification Society at the Owner's choice.	
I.5 The equipment and elements from the combat system shall be delivered with factory acceptance test reports. The factory acceptance test shall be performed under the supervision of the Contractor's QA department.	

**J. Test and Trials**

Item	Statement of Compliance
J.1 The quality of the craft and proof of performance shall be established by test and trials. The craft shall undergo functional test to verify correct installation of equipment and safe functions of systems.	
J.2 The test for hull structures, machinery, outfitting and equipment mentioned in these specifications shall be conducted under the presence of the PN PMT.	
J.3 The endurance test shall be the actual transit from Naval Shipyard to any Port of the Philippines with a distance of at least 300 NM to be manned jointly by the PN crew and builder shipyard representatives.	
J.4 Following test and trials shall be conducted in the following stages:	
J.4.1 Stage 1 – Material Receipt Inspection and Shop Test	
J.4.2 Stage 2 – Shipboard Installation Inspection and Test	
J.4.3 Stage 3 – Equipment Level Operational tests	
J.4.4 Stage 4 – Intra-system Test	
J.4.5 Stage 5 – Inter-system Test	
J.4.6 Stage 6 – Special Test	
J.4.7 Stage 7 – Dock Trial and Sea Trials	
J.4.7.1 Builder’s Trial	
J.4.7.1.1. Dock Trial	
J.4.7.1. 2. Sea Trial	
J.4.7.2 Acceptance Trial	
J.4.7.3 Final Acceptance/Endurance Trial	

**K. Acceptance**

Item	Statement of Compliance
The final acceptance shall be done in port at Headquarters Philippine Navy, Manila, Commodore Divino Pier 2335 Roxas Blvd., Manila	

**- - - END OF TECHNICAL SPECIFICATIONS - - -**