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## **LETTER OF INTENT TO BID – SUMMARY TECHNICAL REQUIREMENTS FOR FRC-B**

### **Introduction**

Integrated Coast Guard Systems (ICGS) has directed and Northrop Grumman Ship Systems, Incorporated (NGSS) is seeking interest for Contract Design of a United States Coast Guard (USCG) Fast Response Cutter B-Class (FRC-B) based on a service-proven Parent Craft design that has been built in the United States (US) or can be built in the US. The USCG FRC-B acquisition addresses the need for patrol boat capability with minimal developmental and programmatic risk. The USCG FRC-B missions will generally occur in both littoral (coastal) and deep water (beyond 50 nautical miles from shore) and typically entail near-shore fisheries protection, choke-point interdiction, barrier patrols, search and rescue operations and command presence in areas of distress. When deployed, operations will generally take place within 300 nautical miles of homeport or advance shore base.

### **Background**

ICGS is a joint venture of NGSS and Lockheed Martin Corporation. ICGS is under contract with the USCG to provide and support the Coast Guard's Integrated Deepwater System (IDS). IDS, also known as Deepwater, includes the recapitalization of the Coast Guard's fleet of offshore assets. As the principal partners in ICGS, NGSS is the primary design agent for Hull, Mechanical and Electrical systems and Lockheed Martin is the primary design agent for Command, Control, Communications and Computers, Intelligence, Surveillance and Reconnaissance systems (C4ISR).

### **Intent**

NGSS or its designated subcontractor intends to select a parent craft design that best satisfies the USCG Top Level Requirements Document (TLRD) within the constraints of the Modification Limitations Envelope. Evaluation of the submittals and selection of the parent craft design will be made by NGSS or its designated subcontractor and then presented to the USCG. NGSS or its designated subcontractor will then award a contract to conduct Contract Design, which includes the engineering required to adapt the as-built parent craft design to fully satisfy the TLRD. The definition of the Contract Design is to demonstrate that the proposed design is technically and functionally feasible and capable of meeting performance requirements and specifications with minimal risk and can be constructed in a US shipyard. The key attribute is to preserve the as-built design to the maximum extent practicable by minimizing the modifications necessary to meet performance objectives.

### **Definition of Parent Craft**

The USCG FRC-B design shall be based on a Parent Craft, which is to be selected based on the requirements contained in the TLRD. The selected Parent Craft shall be an existing

design, meeting requirements for number of vessels built, and type and time in service. Patrol boat service is defined as either: Search and Rescue, Enforcement of Laws and Treaties, or Naval service. A Parent Craft design may be selected from either a design that has no less than two (2) craft previously constructed, at least one of which shall have been in patrol boat service for a minimum of two (2) years, or from a design that has one (1) craft previously constructed and has been in patrol boat service for at least six (6) years.

### **Permissible Extent of Modifications to the Parent Craft**

In the Contract Design of the FRC-B, the following restrictions on modifications to the design are established:

- (a) The hull form of the FRC-B, including principal dimensions (length, beam, and depth) shall be identical to the Parent Craft up to the sheer line, with the exception that the addition of a stern ramp (for launch and recovery of a small boat, as described in the TLRD) is permitted within the extents of the Parent Craft hull form.
- (b) Arrangement changes are permitted, as required to meet the requirements of the TLRD.
- (c) Underwater appendages and shaft lines shall be identical in location and type to those of the Parent Craft. Modifications are permitted to the propeller, propeller shaft diameter and consequent revisions to shaft barrels and struts, all meeting the requirements of the TLRD and acceptable naval architectural practices.
- (d) The number of propulsion shafts and type of propulsor (e.g., waterjets or propellers) shall be identical to the Parent Craft.
- (e) For a metal hull, the material (steel or aluminum) shall be identical to that of the parent craft, except that a higher strength alloy may be substituted, as permitted by the TLRD. For a Fiber Reinforced Plastic (FRP) hull, the laminate shall be identical to that of the Parent Craft; except that vinylester resin shall be used in place of polyester resin.
- (f) The full load displacement of the FRC-B shall be within  $\pm 10\%$  of that of the Parent Craft.
- (g) In the full load condition, the longitudinal center of gravity of the FRC-B shall be within  $\pm 1\%$  of the waterline length of the Parent Craft.

### **Top Level Requirements Document:**

It is the intent of the TLRD to describe the principal performance requirements for the development of the Contract Design of the USCG FRC-B. The requirements within the TLRD have been prioritized into two categories: Category 1 Requirements and Category 2 Requirements.

### **I. Category 1 Requirements**

The requirements listed below shall be met by the parent craft design as built or as modified within the confines of the Modification Limitations Envelope. If objective and threshold are given, the threshold represents the minimum acceptable requirement.

1. LENGTH. The overall length of the FRC-B shall not exceed 160 ft. The FRC-B length, as an objective, should be as compact as practicable, consistent with meeting other TLRD requirements, to a minimum length of 120 ft.
2. DRAFT (NAVIGATIONAL). The navigational draft of the FRC-B shall not exceed 10 ft. The FRC-B, as an objective, should have the smallest draft consistent with meeting other TLRD requirements, not to be less than 7 ft.
3. VESSEL CLASSIFICATION. This requirement pertains to structure, electrical, outfitting and furnishings, and propulsion and auxiliary systems.

Threshold:

- (a) The Parent Craft selected as the basis for the FRC-B shall be designed and have received plan approval in accordance with the rules of a member society of the International Association of Classification Societies (IACS) applicable to high-speed naval craft, effective at the time of the Parent Craft design.
- (b) As applicable, the FRC-B modifications shall be designed and approved in accordance with the rules of a member society of IACS (preferably, to the same member society as the original design), as applicable to high-speed naval craft, effective at the date of issuance of this TLRD.
- (c) The FRC-B shall meet the requirements of Safety of Life At Sea (SOLAS) Chapter X, International Maritime Organization

(IMO) High Speed Craft (HSC) Chapters 7 and 8, if not covered by Classification Society rules.

4. SERVICE LIFE. The threshold for the selection of the Parent Craft for FRC-B will be a service life of 25 years minimum, with an objective of 35 years.
5. OPERATIONAL TEMPO. The FRC-B threshold shall be 2500 operating hours per year. Operating hours are defined as hours away from the pier. As an objective, suitability for 3000 operating hours per year is desired.
6. FLANK SPEED. Flank speed is defined as the maximum speed achievable at 97% of fuel stop power rating of the propulsion engines with the vessel in the Full Load Delivery condition and operating in Sea State 0, clean hull. As a threshold, flank speed of the FRC-B shall be 28 knots minimum. As an objective, a flank speed of 40 knots is desired.
7. INDEPENDENT OPERATION DURATION. Independent operation is defined as the duration in days the vessel can stay away from port without replenishing food, fuel and water supplies. As a threshold, the FRC-B shall be capable of independent operation for 5 days minimum. As an objective, capability for independent operation for 7 days is desired.

Fuel Endurance shall conform to the following:

(a) Definitions for Fuel Endurance Calculations Only

- (i) Transit speed is defined as an economical speed above the craft's resistance hump speed.
- (ii) Loiter Speed is defined as an operating speed between 10 and 16 knots that provides full vessel control, with propulsion clutches fully engaged on a minimum of two shafts, and engine revolutions sufficient for the vessel to operate continuously.

(b) As a threshold, the FRC-B required fuel shall be calculated as follows:

- (i) Based on a 5-day mission with an existing in-service speed-time profile (i.e. loiter, transit, flank), propulsion and ship's service generating plant fuel consumption are to be based on the propulsion power required at half-load delivery displacement condition.

For the Transit Speed portion of this profile, the propulsion power shall be increased by 10% to account for adverse sea conditions.

- (ii) An additional 250 U.S. gal allowance shall be added to the ship's fuel consumption for small boat (SRP-B) operations.
  - (iii) A 25% search and rescue reserve (includes tail pipe allowance) shall be added to the total.
- (c) As an objective, the FRC-B required fuel shall be calculated as follows:

- (i) Based on a 7-day mission with an existing in-service speed-time profile (i.e. loiter, transit, flank), propulsion and ship's service generating plant fuel consumptions are to be based on the propulsion power required at half-load delivery displacement condition.

For the Transit Speed portion of this profile, the propulsion power shall be increased by 10% to account for adverse sea conditions.

- (ii) An additional 350 U.S. gal allowance shall be added to the ship's fuel consumption for small boat (SRP-B) operations.
- (iii) A 10% search and rescue reserve (includes tail pipe allowance) shall be added to the total.

Potable water storage capacities shall conform to the following:

- (a) As a threshold, if on-board water-making capability is provided the FRC-B shall have potable water storage capacity sufficient for at least three days, based on consumption of 20 U.S. gal per day per permanent crew berthing accommodation.

- (b) If on-board water-making capability is not provided, then the FRC-B shall have potable water storage capacity sufficient for the entire Independent Operations duration based on consumption of 20 U.S. gal per day per permanent berthing accommodation.
- (c) As an objective, it is desired that potable water stowage capacity be based on 25 U.S. gal per day per permanent berthing accommodation.

The FRC-B shall also have the minimum gray and black water storage capacities:

- (a) The waste water (gray water) system shall have a threshold holding capacity sized for 17 U.S. gal per day per permanent berthing accommodation for three days duration threshold, five days objective, plus 15% of holding capacity.
- (b) The sewage (black water) system shall have a threshold holding capacity sized for 3 U.S. gal per day per permanent berthing accommodation, for the entire Independent Operations duration, plus 25% of holding capacity.

#### 8. SEAKEEPING.

As a threshold requirement, the FRC-B shall be capable of:

- (a) Conducting all missions through Sea State 4 at speeds up to Transit Speed for 8 hours on all headings.
- (b) Survival through Sea State 6 up to loiter speed for 8 hours on all headings.

#### 9. TOWING.

- (a) As a threshold, the FRC-B shall be capable of towing a vessel similar to itself in size and displacement, at speeds of 5 to 8 knots, in Sea State 4 for 200 nautical miles, while maintaining capability to launch and recover SRP-B.

- (b) As an objective, it is desired that the FRC-B be capable of towing vessels up to 200 ft length and 500 tons displacement, at speeds of 5 to 8 knots, in Sea State 5 for 200 nautical miles, while maintaining capability to launch and recover SRP-B.

10. CREW SIZE. The FRC-B shall be configured for a permanent complement of 20 enlisted personnel and two officers.

11. CREW BERTHING.

- (a) FRC-B Patrol Boat crew berthing shall be arranged to provide segregated berthing compartments for male and female crew members.
- (b) As a threshold requirement, no more than eight (8) permanent berths shall be located in any one compartment.
- (c) As an objective, it is desired that no more than four (4) permanent berths be located in any one compartment.
- (d) As an objective, provide berthing for two (2) additional guests that are equivalent to that for the permanent crew.

12. ACCOMMODATION AREA.

- (a) As a minimum, compartments shall be sized such that the total gross deck area allocated to personnel related spaces (berthing, sanitary, mess, and galley) is at least 35 ft<sup>2</sup> per permanent accommodation.
- (b) As an objective, compartments shall be sized such that the total gross deck area allocated to personnel related spaces (berthing, sanitary, mess, and galley) is at least 50 ft<sup>2</sup> per permanent accommodation.

13. STABILITY.

- (a) As a threshold, stability and reserve buoyancy shall be in accordance with a standard that is generally accepted in the ship design profession or by the rules of a member society of the International Association of Classification Societies (IACS)

applicable to high-speed naval craft, effective at the time of the Parent Craft design.

- (b) As an objective, stability and reserve buoyancy shall be in accordance with “Procedures Manual for Stability Analyses of U.S. Navy Small Craft, NAVSEACOMBATSYSSENGSTA Report No. 6660-99 Rev A May 1988 for Ocean Service, vessels expected to avoid centers of tropical disturbances.

14. SRP-B LAUNCH AND RECOVERY SYSTEM. The FRC-B shall be capable of storage, launch, and recovery of one (1) Short Range Prosecutor B-Class (SRP-B). The SRP-B will be a 23 ft (up to 8,500 lb) Rigid Inflatable Boat. An SRP-B launch and recovery system shall be provided and capable of rapidly and safely launching and recovering the SRP-B. The SRP-B launch and recovery system shall be designed so that the SRP-B is always under positive control from the FRC-B and/or the SRP-B crew during launch and recovery operations in the following conditions:

- (a) As a threshold requirement, the SRP-B launch and recovery system shall be designed to rapidly and safely launch and recover the SRP-B fully loaded, through Sea State 4, with the FRC-B taking best heading and speed.
- (b) As an objective, the SRP-B launch and recovery system shall be a stern ramp designed to rapidly and safely launch and recover the SRP-B fully loaded, through Sea State 5, with the FRC-B taking best heading and speed.

15. WEAPONS MOUNTS.

- (a) 25-mm Gun. The FRC-B shall be designed to mount one remotely operated 25-mm stabilized MK 38 Mod 2 minor caliber gun station.
- (b) Machine Gun Mounts. The FRC-B shall be designed to mount four 0.50 caliber heavy barrel machine guns. As a threshold requirement, the four machine-gun mounts shall be for unstabilized crew-served machine guns. As an objective, it is desired that two of the machine-gun mounts be stabilized and

remote-controlled, and two be for unstabilized crew-served machine guns.

16. C4ISR SUPPORTABILITY.

(a) As a threshold, the FRC-B shall have the space and capability to support a C4ISR suite with the following parameters, divided into two spaces (37.5% of each parameter in one and the remaining in the other):

- Deck Area            125 ft<sup>2</sup>
- Volume                900 ft<sup>3</sup>
- Power                 23 kW
- Cooling               2.7 tons
- Weight                7900 lbs

(b) As an objective, the FRC-B shall have the space and capability to support a C4ISR suite with the following parameters, divided into two spaces (37.5% of each parameter in one and the remaining in the other):

- Deck Area            170 ft<sup>2</sup>
- Volume                1200 ft<sup>3</sup>
- Power                 32 kW
- Cooling               4.55 tons
- Weight                8900 lbs

**II. Category 2 Requirements**

The requirements listed below shall be met by the parent craft design as built or as modified within the confines of the Modification Limitations Envelope. If objective and threshold are given, the threshold represents the minimum acceptable requirement. Consistent with the priorities of the FRC-B program, the Contractor shall propose changes to the Category 2 Requirements threshold values for the purpose of achieving either schedule or cost gains.

1. ALIEN MIGRATION INTERDICTION OPERATIONS (AMIO) HOLDING REQUIREMENTS.

(a) As a threshold requirement, main deck areas shall have sufficient clear area to hold 150 alien migrants for 24 hours, allowing a minimum clear area of 5 ft<sup>2</sup> per person.

- (b) As an objective, it is desired that main deck areas have sufficient clear area to hold 150 alien migrants for 48 hours, allowing a minimum clear area of 7.5 ft<sup>2</sup> per person.

2. SERVICE LIFE MARGINS.

- (a) As a threshold, the FRC-B design shall include a service life weight allowance of 4.5% of light ship displacement, and a service life KG margin of 3% of the light ship KG.
- (b) As an objective the FRC-B design shall include a service life weight allowance of 6.5% of light ship displacement, and a service life KG margin of 5.5% of the light ship KG.

3. ENVIRONMENTAL STANDARDS.

- (a) As a threshold, the FRC-B diesel engines shall be certified to meet International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 relating thereto (MARPOL 73/78) Annex VI.
- (b) As an objective, the FRC-B class diesel engines shall be certified to meet Environmental Protection Agency (EPA) Tier 2 requirements.

4. PROPULSION SYSTEM BACK-UP POWER. The propulsion system of the FRC-B shall be configured so that loss or interruption of ship service electric power for a minimum period of 30 minutes will not affect the performance or control of the propulsion system.

5. ELECTRIC PLANT.

- (a) A minimum of two independent ship service diesel generator sets shall be provided.
- (b) All ship service generator sets shall be capable of being operated in parallel.
- (c) The ship service electrical plant shall be sized to supply 120% of the worst case (winter or summer) cruising electric load.

- (d) The electrical plant shall be an ungrounded emergency and ship service electrical system delivering power at a nominal system voltage of 450 volt, 60 Hz, three-phase, connected delta-delta. Nominal utilization voltages are:

- 440-volt, 60-Hz, three-phase
- 440 volt, 60-Hz, single-phase
- 115 volt, 60-Hz, three-phase
- 115 volt, 60-Hz, single-phase
- 24 volt d.c.
- 12 volt d.c.

6. EMERGENCY POWER.

- (a) As a threshold, an emergency source of power capable of supplying 130% of the emergency load for a minimum of 30 minutes shall be provided.
- (b) As an objective, the FRC-B shall be provided with one emergency diesel generator, sized to deliver 130% of the emergency load.
- (c) Emergency loads shall be as specified by SOLAS Chapter X, IMO HSC, Chapter 12 or 46 CFR.
- (d) The electrical plant shall be an ungrounded emergency and ship service electrical system delivering power at a nominal system voltage of 450 volt, 60 Hz, three-phase, connected delta-delta. Nominal utilization voltages are:

- 440-volt, 60-Hz, three-phase
- 440 volt, 60-Hz, single-phase
- 115 volt, 60-Hz, three-phase
- 115 volt, 60-Hz, single-phase
- 24 volt d.c.
- 12 volt d.c.

7. FIRE PUMPS. The FRC-B shall have two or more installed fire pumps. Each single fire pump shall deliver 100 psig pressure at the



nozzle at any two fire stations simultaneously, each with 50 feet of 1 1/2" hose and a standard nozzle on full stream (approx. 95 gpm).

**Intent to Bid**

Interested bidders shall identify their intent to bid by the 28<sup>th</sup> day of November 2006 by registering on [www.teamdeepwater.com](http://www.teamdeepwater.com) website. A link is located on the home page which will bring bidders to the registration page. All interested bidders should review the overarching technical requirements prior to registering intention to bid. All interested bidders who register by the deadline will be provided the complete Request for Proposal package within one week following the close of the call for interested bidders.

**Proposal Requirements**

Technical Proposals shall be submitted by 5:30 pm Central Time on the 8th day of January 2007. Cost Proposals shall be submitted by 5:30 pm Central Time on the 29th day of January 2007.

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