Part 1: PURPOSE

1.1 The statement of requirements is for the supply of four (4) Classification Society approved electro-hydraulic "knuckleboom" type cranes. The marine knuckle boom cranes shall be of an established marine design, operationally proven on ships in Eastern Canadian / North Atlantic waters on a year-round basis. Two cranes shall be for the CCGS Ann Harvey and 2 cranes shall be for the CCGS George R Pearkes.

1.2 In addition, the Contractor shall provide options for nine (9) additional Class approved cranes for a period of 18 months from the time of contract award.

Part 2: GENERAL REQUIREMENTS

2.1 The knuckle boom crane design shall be fully approved by at least one recognized member of the International Association of Classification Societies (IACS) and the Delegated Statutory Inspection Program (DSIP).

2.2 The knuckle boom crane shall be supported by a **service and parts facility** located in Canada that is capable of providing qualified technicians for on-site support in St. John's, NL within 24 hours of a request by CCG.

2.3 Contractor shall include all engineering, construction, and Classification Society certification costs for the knuckleboom crane package.

a) Contractor shall have Engineered Stamped drawings approved by the same recognized organization for which the proposed crane will be certified for mounting the proposed crane onboard the vessel. This shall include crane bedding/foundation and underdeck stiffening modifications required to vessels' structure to mount the crane. See Dwg 2925-01-00, Existing Crane Installation.

b) Contractor may propose another Hiab 201-2 seacrane as per the existing installation. It is expected that no modifications would be required with 'like for like' crane replacements, however the Contractor shall have the Classification Society approve the existing mounting arrangement found on Dwg 2925-01-00.

Part 3: OPERATIONAL REQUIREMENTS

3.1 The knuckleboom cranes shall have at minimum the same lifting capacity and SWL as the crane to be replaced. It shall have a lifting capacity of at least 185 kN-m – with a Safe Working Load (SWL) of at least 2160 kg at a "hydraulic reach" of 8.2 meters with a safety factor of 5. "Hydraulic reach" is the outreach of the crane using only the hydraulically telescoping boom sections.

3.2 The bare crane shall not exceed 3000 kg in mass and, when stowed, shall not exceed 2.55 m along any horizontal plane.

3.3 The knuckleboom crane shall be capable of achieving this lifting capability when the ship is heeled to either port or starboard, and trimmed either forward or aft. The maximum static angle of heel or trim shall be within the range of 4 to 8 degrees.

3.4 The knuckleboom crane shall have a minimum of 380 degree slewing range.

3.5 The crane's winch shall be of a planetary TC2 design or equivalent with the following capabilities:

3.5.1 Hoisting (line pull) capability with a full drum of wire equivalent or greater than that of the crane capacity at minimum reach, wire spool should have a minimum of 30m of cable.

3.5.2 Automatic braking arrangement with proportional control providing variable speeds from creeping (1 m/min) to maximum speed,

3.5.3 Anti-two block safety incorporated and operable,

3.5.4 Capability to be lowered in an emergency situation such as loss of electrical power.

3.6 The knuckleboom cranes shall be supplied complete with one (1) hand-held remote control operating system, capable of wired or wireless operation, backed up by controls mounted on the crane /pedestal/stand with weatherproof cover per crane. The remote control units shall have a cable length of no less than 10 meters and shall be fitted with an emergency stop switch. The remote control unit and associated gear shall be suited to shipboard service at sea, and shall allow full functionality of the knuckleboom crane.

3.7 The crane shall be fitted with safety features including overload protection and load retaining capabilities of winch / cylinders meeting the requirements of the Classification Society and Canada Shipping Act, 2001 – Cargo, Fumigation, and Tackle Regulations.

3.8 The crane shall be fitted with a load cell to display the lifting weight to the crane operator.

Part 4: PROOF OF PERFORMANCE

4.1 Unless specified otherwise, all supplied components, materials and installations shall be adequate to meet the following minimum service conditions:

4.1.1 Outside Air Temperature of -40 ^{0}C to +35 ^{0}C;

4.1.2 Wind Velocity of 50 Knots;

4.1.3 Sea State of 1 (calm).

4.2 Unless noted otherwise, all components of the knuckleboom crane are to be corrosion-resistant to ensure long-lasting protection against corrosion in a salt-water marine environment.

4.3 The knuckleboom cranes shall be delivered with self-contained, electro-hydraulic power units that shall be mounted inside the crane base as per the existing locations of the current hydraulic power units within the Hiab 201-2 Seacranes.

The hydraulic power units shall be supplied complete with a totally-enclosed , fan-cooled electric motor(s); pump(s); starter with soft start; reservoir; thermostatically controller anti-condensation heater; directional control valves; vent and fill pipes; level gauge; and all required valves, filters, strainers and gauges to meet regulatory requirements and make the system fully functional.

4.4 The crane is to operate from an existing electrical supply of 575V/3ph/60Hz. There is also an existing 115 V, 15 amps supply for the current heater power requirement.

4.5 All required electrical work shall conform to the requirements of the Transport Canada Publication TP127 – Ships Electrical Standards.

4.6 All hydraulic tubing shall be of one-piece, seamless, annealed stainless steel (AISI 316) construction. All hydraulic hoses shall be SAE 100R2 high-pressure, steel wire reinforced, rubber-covered hydraulic hose. To the greatest extent possible, all hydraulic fittings, adapters and other connections shall be JIC Standard, high pressure, flareless, reusable, stainless steel (AISI 316) type.

4.7 Wire ropes shall be of non-rotating or rotation-resistant, right regular lay and IWRC construction. The breaking tensile strength shall be not less than six times the safe working load of the crane.

4.8 All crane components of carbon steel construction are to be abrasive blasted to “near white” blast (SSPC-SP 10) prior to coating and then be coated with a high performance, low maintenance, marine coating. Special attention shall be given to those areas, such as the interior of boom sections and other hard-to-reach areas that will not be subject to touch-up painting when the crane is in service. All extension booms shall be hot dip galvanized. The crane and hydraulic power unit shall have an overall topcoat finish in "Interlac 665 E143 BUFF" to match other deck machinery on the ship. This shall also extend to designs that do not have open penetrations in the main crane column for the passage of hydraulic hoses.

4.9 Contractor shall complete commissioning and load testing of the crane in accordance with the Canada Shipping Act, 2001 – Cargo, Fumigation, and Tackle Regulations which require cranes in this range to be subjected to a Proof Load Test of 1.25 times the SWL.

Part 5: DELIVERY REQUIREMENTS

5.1 The Contractor shall deliver the new Classification Society approved knuckleboom crane(s) to the CCG Fleet Stores, c/o CCGS Ann Harvey & CCGS George R Pearkes, 280 Southside Rd., St. John’s, NL, on or before 31 March 2018.

5.2 Each of the knuckleboom cranes shall be delivered complete with its corresponding hydraulic power unit, winch, wire rope, remote control unit and any other components required for a fully operational system.

5.3 All components of the knuckleboom cranes are to be effectively preserved, packaged and protected for shipment with the possibility of outside storage prior to installation. Any damages incurred during shipment and storage due to inadequate protection or improper handling is to be the sole responsibility of the Contractor and/or those acting on the Contractor’s behalf.

5.4 Delivery of the knuckleboom cranes shall include all necessary **spare parts** and special **tools** required for installation, testing, commissioning and trials and shall be included for each of the new cranes.

5.5 The Contractor shall supply all drawings and specifications, in the English language, in both electronic and paper formats. The electronic formats shall be compatible with Microsoft, Adobe, and / or AutoCAD.

5.6 The Contractor shall deliver to the above address, three (3) copies of all test certificates for all wire ropes, shackles, sheaves, and hooks that form part of the knuckleboom cranes per vessel. These certificates are to be manufacturer / supplier test certificates documenting the test loads and / or breaking strengths of all supplied items and materials.

5.7 The Contractor shall deliver to the above address, three (3) copies per vessel, in both electronic and paper formats, of comprehensive manuals describing the full installation, operation, shop and technical maintenance requirements of the new knuckleboom cranes. The manuals are to be completely legible and written in the English language. French language manuals shall also be included should they be available.