

TENDER SPECIFICATION OF NAVIGATIONAL RADAR AND HELO CONTROL RADAR WITH COMBINED DISPLAY FACILITIES - BNS UMAR FAROOQ AND BNS ABU UBAlDAH

1. **Name of Equipment** : Navigational Radar and Hel Control Radar with Combined Display Facilities.
2. **Installation Site** : The Radar system will be installed onboard naval ships replacing the existing navigation and helo control radar systems.
3. **Purpose** : The Radar system shall be used onboard for navigation and helicopter landing/ launching control facility.
4. **Quantity** : 02 (two) Complete sets
5. **Type** : Marine type (To be mentioned).
6. **Brand** : Kelvin Hughes (UK) or HENSOLDT / Furuno (Japan) / Thales (France/Netherlands) / Leonardo (Italy) / GEM Elettronica (Italy) / Terma (Denmark) (To be mentioned).
7. **Model** : To be mentioned (As per para 6).
8. **Country of Origin** : UK, Japan, France, Netherlands, Italy and Denmark (To be mentioned).
9. **Manufacturing Country** : UK, Japan, France, Netherlands, Italy and Denmark (To be mentioned).
10. **Year of Manufacturing** : 2023 or later.
11. **Original Equipment Manufacturer (OEM)** : Name & Full address with telephone number and e-mail of OEM to be mentioned.
12. **Principal/Supplier/Bidder** : Name & Full Address with telephone number and e-mail of Principal supplier is to be mentioned.
13. **Local Agent** : Name & Full Address with telephone number and e-mail of Local agent is to be mentioned.
14. **Qualification for Bidder** :
 - a. Manufacturers of Radar, System integrator or their authorized distributor/ agent can submit quotations through their authorized local agent enlisted in DGDP. In case of offer from distributor/ agent, certificate of dealership/ agencyship from OEM is to be submitted with the offer. Moreover, one additional certificate is to be submitted with the offer stating that the warranty, after sales support, interfacing and training will be provided under the full responsibility of OEM. All authorization certificates and relevant certificates from OEM are to be submitted with the offer.
 - b. The bidder must provide OEM certificates of Radar system, equipment and all other items with the offer and at the time of delivery.
 - c. Any involvement of third party (equipment/ integration) will be the responsibility of the bidder. The relevant authorization certificate from third party is to be given and the same is to be submitted with the offer and at

the time of delivery.

15. **Classification Standard** : The Radars along with associated accessories offered/supplied under the scope of the supply are to be designed, constructed/ manufactured and tested up to the requirement of IEEE/ IEC, IALA, IMO/ MIL-Standard and it shall comply other referenced international standards. The applicable classification standard(s) of the offered item is to be mentioned and should be well supported by the brochures/ certificates.

16. **Scope of Supply**. The scope of supply of the complete system shall include as follows but not limited to:

- a. 02 X Complete sets of Navigational Radar and Hel Control Radar with Combined Display (3 in no) Facilities including associated accessories for immediate operation (as per paragraph 17- 24).
- b. Necessary Cables (as per paragraph 23).
- c. Standard Accessories (as per paragraph 33).
- d. Test Equipment/ Special Equipment (as per paragraph 32).
- e. Software, Documentation and Certificate (as per paragraph 21, 31, 45, 46, 47, 48, 49 and 50).
- f. Interface Control Document (ICD) (as per paragraph 22).
- g. Integration/ Interfaces Requirement (as per paragraph 25).
- h. Integration/ Interfaces Requirement (As Optional) (as per paragraph 26).
- j. Interfacing Responsibility (as per paragraph 27).
- k. Fast moving spare parts and accessories (as option) (as per paragraph 34-35).
- l. Factory Acceptance Test (FAT) (as per paragraph 36).
- m. Foreign and Local Training (as per paragraph 37, 38 and 39).
- n. Installation, Supervision, STW and Commissioning (as per paragraph 29, 30, 31 & 42).
- p. Test/ Trial and Acceptance (as per paragraph 43).

17. **Environmental Condition and Other Standard.**

- a. Temperature : -5°C to 55°C.
- b. Relative Humidity : Up to 95% (non condensing).
- c. For Shock : MIL-STD-810F or equivalent (To be mentioned).
- d. For Vibration : MIL-STD-810F or equivalent (To be mentioned).
- e. Sea Keeping : To comply with the ship's movement as follows:
 - (1) Roll : $\pm 30^\circ$.
 - (2) Pitch : $\pm 10^\circ$.

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- f. EMI/EMC : (3) Yaw : $\pm 8^\circ$.
: MIL-STD-461 or equivalent (To be mentioned).

18. **General Features.** The Radar system should be suitable for operating in maritime environment and must have following features (but not limited to):

- a. Suitable for all kind of naval ships.
- b. Automatic Radar Plotting Aid (ARPA).
- c. Integrated route planning and trail maneuver for safe navigation.
- d. Navigating own vessel with regard to collision avoidance.
- e. Fixing the ship's position using terrestrial objects such as lighthouses, buoys, etc.
- f. Target tracking of radar targets and AIS targets.
- g. Advance rain and sea clutter suppression for small target detection.
- h. Differentiating capability between targets in high traffic density areas.
- j. Sector transmission.
- k. Helicopter tracking and landing/launching control facility.
- l. Blanking signal to other system and ESM system.
- m. Built-in test (BIT) facilities for fault detection and diagnosis.
- n. Suitable for inclement weather.
- p. High resolution and HD screen.
- q. Frequency agility and jamming detection feature.
- r. Chart Radar facility.

19. **System Composition and System Architecture.** Each set shall comprise of the followings (but not limited to):

a. **System Composition.**

- (1) 01 x Navigational Radar (forward) with associate accessories.
- (2) 01 x Radar with helicopter landing/ launching control facility (aft) including associate accessories.
- (3) 03 X Display & Control Console (DCC) with associate accessories.
- (4) 01 x Radar Inter-Switch Unit (Radar video of each radar can be displayed or interchanged at each console using this Inter-switch unit i.e single display console should have option to display both videos according to the selection by operator and two different videos can be displayed in different consoles at the same time) and other associate accessories.

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- (5) 01 x Set of Power Supply Unit.
- (6) 01x Radar Video Interface Board to integrate with ECDIS.
- (7) Associated Hardware, Electronics and Software for integration/ interface.

b. **System Architecture.** A block diagram of system configuration showing interface/ integration options is to be provided by the bidder with the offer for assessment.

20. **Technical Specification.**

Ser	Description	Navigational (Forward) Radar	Navigational Radar with Helicopter Launching Facility (Aft) Landing/ Control
1.	Type	Solid State.	Solid State.
2.	Brand	As per paragraph 8 (To be mentioned).	As per paragraph 8 (To be mentioned).
3.	Model	To be mentioned.	To be mentioned.
4.	Country of Origin	As per paragraph 5 (To be mentioned).	As per paragraph 5 (To be mentioned).
5.	Country of Manufacturer	As per paragraph 6 (To be mentioned).	As per paragraph 6 (To be mentioned).
6.	Year of Manufacturing	2023 or later.	2023 or later.
7.	Classification Standard	To be mentioned.	To be mentioned.
8.	Major Features	Details to be mentioned.	Details to be mentioned.
9.	Ingress Protection (IP)	IP 65 or better (To be mentioned).	IP 65 or better (To be mentioned).
10.	BIT (Built In Test)	To be mentioned.	To be mentioned.
General Characteristics			
11.	Frequency Band	X/S Band (To be mentioned).	X/S Band (To be mentioned).
12.	Frequency	To be mentioned.	To be mentioned.
13.	Instrumental Range	48 NM or more (To be mentioned).	24 NM or more (To be mentioned).
14.	Minimum Detectable Range	50 m or less (To be mentioned).	50 m or less (To be mentioned).
15.	Surface Detection Range: a. Large Target. b. Small Target (RCS 3m ²)	a. 48 NM or more/ Radar Horizon (To be mentioned). b. 3 NM or more (To be mentioned).	a. 24 NM or more/ Radar Horizon (To be mentioned). b. 3 NM or more (To be mentioned).
16.	MTI Feature	To be mentioned.	To be mentioned.
17.	Helicopter Detection Range	To be mentioned (if applicable).	To be mentioned.
18.	Helicopter Detection Height	To be mentioned (if applicable).	To be mentioned.

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19.	Resolution		
	1. Range	25 m or less (To be mentioned).	25 m or less (To be mentioned).
	2. Azimuth	2.5 ^o or less (To be mentioned).	2.5 ^o or less (To be mentioned).
20.	Polarization	To be mentioned.	To be mentioned.
21.	Beam Width	a. Horizontal - 2.6 or less (To be mentioned).	a. Horizontal : 1.2 or less (To be mentioned).
		b. Vertical - 25 ^o or less (To be mentioned).	b. Vertical : 25 ^o or less (To be mentioned).
22.	Radar Technology	To be mentioned.	To be mentioned.
23.	MTBF	50,000 hrs or more (To be mentioned).	50,000 hrs or more (To be mentioned).
24.	Interface Protocol	To be mentioned.	To be mentioned.
25.	Power Supply and Consumption	To be mentioned.	To be mentioned.
Transmitter/ Receiver Characteristics			
26.	Brand	As per paragraph 8 (To be mentioned).	As per paragraph 8 (To be mentioned).
27.	Model	To be mentioned.	To be mentioned.
28.	Country of Origin	As per paragraph 5 (To be mentioned).	As per paragraph 5 (To be mentioned).
29.	Country of Manufacturer	As per paragraph 6 (To be mentioned).	As per paragraph 6 (To be mentioned).
30.	Year of Manufacturing	2023 or later.	2023 or later.
31.	Frequency Generator	To be mentioned.	To be mentioned.
32.	Modulator Type	To be mentioned.	To be mentioned.
33.	Oscillator Life time	To be mentioned.	To be mentioned.
34.	Wave Form	To be mentioned.	To be mentioned.
35.	IF Frequency	To be mentioned.	To be mentioned.
36.	Interference & Sea Clutter Rejection	To be mentioned.	To be mentioned.
37.	Power Amplification	To be mentioned.	To be mentioned.
38.	Peak Power	200W or more (To be mentioned).	200W or more (To be mentioned).
39.	Average Power	To be mentioned.	To be mentioned.
40.	Number Track Processing	80 tracks or more (To be mentioned)	80 tracks or more (To be mentioned).
41.	Sector Transmission	To be mentioned.	To be mentioned.
42.	SART Detection	To be incorporated.	To be incorporated.
43.	Dimension of Tx/Rx Unit	To be mentioned (Height not more than 2 ft).	To be mentioned (Height not more than 2 ft).
44.	Weight of Tx/Rx Unit	To be mentioned.	To be mentioned.
45.	Power Supply	To be mentioned.	To be mentioned.
46.	Helicopter landing/ launching control function	-	Details to be mentioned.
Antenna Features			
47.	Brand	As per paragraph 8 (To be mentioned).	As per paragraph 8 (To be mentioned).

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48.	Model	To be mentioned.	To be mentioned.
49.	Country of Origin	As per paragraph 5 (To be mentioned).	As per paragraph 5 (To be mentioned).
50.	Country of Manufacturer	As per paragraph 6 (To be mentioned).	As per paragraph 6 (To be mentioned).
51.	Year of Manufacturing	2023 or later.	2023 or later.
52.	Type of Antenna with length	To be mentioned. (Length Max 7 ft)	To be mentioned (Not more than 10ft).
53.	Antenna RPM	20 rpm or more (To be mentioned).	20 rpm or more (To be mentioned).
54.	Antenna Gain	To be mentioned.	To be mentioned.
55.	Dimension of Antenna	To be mentioned.	To be mentioned.
56.	Weight of Antenna	To be mentioned.	To be mentioned.
57.	Power Supply	To be mentioned.	To be mentioned.
Display & Control Unit/ Radar Console			
58.	Type	TFT/ LCD/ LED (To be mentioned).	
59.	Brand	As per paragraph 8 (To be mentioned).	
60.	Model	To be mentioned.	
61.	Country of Origin	As per paragraph 5 (To be mentioned).	
62.	Country of Manufacturer	As per paragraph 6 (To be mentioned).	
63.	Year of Manufacturing	2023 or later.	
64.	Major Features/Marks	Cursor, Range Ring, Heading Marker, Bearing Marker, Target Trail, VRM, EBL, Acquisition Zone, AIS Track, Way points, Routes, Map etc (To be mentioned).	
65.	Ingress Protection (IP)	IP 21 or more (To be mentioned).	
66.	Number of Display & Control Unit	03 (Three).	
67.	ARPA Features	To be incorporated.	
68.	Helicopter Landing/ Launching Control	To be incorporated	
69.	Helicopter Approach Path/ Sector	To be incorporated.	
70.	Size	24 inch or more (To be mentioned).	
71.	Technology	Computer added color graphic technology or better.	
72.	Display Resolution	HD Quality.	
73.	Power Supply	To be mentioned.	
74.	Display & Control Console	<p>03 (Three) Display & Control Console will serve different purpose as described below. However, any Radar can be switched 'on'/'off' from any console. Any console may work as master/ slave at any time defined by the operator. All the consoles shall be connected by a network and to be installed in the following location as mentioned below:</p> <p>a. <u>CIC</u>. One (01) display & control consoles will be installed in CIC for both helicopter landing/ launching control purpose and navigation purpose. Dimension maximum 24 to 28 Inch hanging type.</p> <p>b. <u>Bridge</u>. One (01) display & control console will be installed in bridge for navigational purpose. Dimension maximum 24 to 28 Inch table top type.</p> <p>c. <u>Hel Control Room</u>. One (01) display & control console will be installed in hel control room for</p>	



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		helicopter landing/ launching control purpose. Size of display with standing console maximum L – 595mm, W- 460mm, H- 1200mm.
75.	Radar Inter-switch Unit	Details to be mentioned.
76.	Power Supply Unit	Details to be mentioned.

21. **Original Software and Back-up Software.**

a. Supplier shall provide all related original software (lifetime license version) with backup software, maintenance /fault finding software and step by step procedure for installation to BN during delivery of the items. In case of software crash, BN personnel should be able to install the back-up software to restore the whole system using step-by-step procedure. OEM engineer/ expertise is to provide necessary training on installation of those provided backup software to restore the whole supplied radar system using step- by-step procedure during radar installation. A list of all required software is to be provided with the offer.

b. Supplier shall also provide Electronic Navigational Chart (ENC) including license (if needed). Chart management from Bay of Bengal, Indian Ocean, Arabian Sea up to Mediterranean Sea shall be provided for 2 (Two) years after installation on board ship.

c. All ENC and other digital charts that will be required as per para-21(b) shall be mentioned in details including their update facilities. A list of such charts is to be mentioned. The price of electronic charts with duration is to be quoted separately.

22. **Interface Control Documents (ICD).** The supplier shall provide necessary ICD (Interface Control Documents) and interface protocol during delivery and installation of the item. The provided ICDs will be tested and demonstrated in the presence of buyer's representative during installation by qualified OEM Engineer. A job completion report/ certificate is to be signed by both parties in this regard. The cost of ICD is to be quoted separately. The supplier shall also keep necessary provision in the software so that Radar track information of both the Radars can be sent to onboard COMBAT Management system (through Ethernet and serial interface) and supplied Radars can also be integrated with COMBAT Management system (if needed, in future). However, OEM of COMBAT Management system will be employed by BN and supplier shall provide necessary assistance in this regard (in future, if needed).

23. **Cables.**

a. **Power Cable.** Necessary power cables should be of high quality (as per IEEE/IEC standard) is to be supplied by the bidder. **Actual requirement of cable is to be assessed by the bidder through on site visit** and to be submitted with the offer indicating unit price (per meter).

b. **Control Cable.** Necessary control cables should be of high quality (as per IEEE/IEC standard) is to be supplied by the bidder. **Actual requirement of cable is to be assessed by the bidder through on site visit** and to be submitted with the offer indicating unit price (per meter).

24. **Cabinets.** All cabinets should be made of chromium plating or similar and painted sea water resistant aluminum to prevent corrosion.

25. **Integration/ Interfaces Requirement.** The navigational and helo control radar system shall be integrated/ interfaced with following equipment and cost is to be quoted separately:

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Ser	Description	BN Ship 1 (UF)	BN Ship 2 (AU)
1.	AIS	Brand: FURUNO Model: FA-100	Brand: FURUNO Model: FA-100
2.	GPS	Brand: FURUNO Model: GP-150	Brand: FURUNO Model: GP-150
3.	ECDIS	Brand: TRANSAS Model: Navi Sailor 4000	Brand: SIMRAD MARIS Model: 900 MK15
4.	TDL	Brand: Tecnobit (Spain) Model: Bangla 22	
5.	Western Origin Gyro Compass INS and Other equipment & system	Bidder has to ensure the online assistance of OEM during any interfacing/ integration work with any western origin equipment and system of onboard these ships provided whenever necessary (not exceeding 03 years from the acceptance) and requested by BN. In this regard, necessary assurance certificate of OEM has to be submitted by bidder with offer.	
6.	ESM	Provision is to be made both Navigation and Helo Control Radars, so that they can provide blanking pulse for ship's ESM. This blanking pulse would be used in present ship's ESM or will be used in future system.	

26. **Integration/ Interfaces Requirement (As Optional).** Price of the following Integration/ Interfacing is to be quoted separately. Buyer may select the Integration/ Interfaces as required from the list for procurement:

Ser	Description	BN Ship 1 (UF)	BN Ship 2 (AU)
1.	AIS	Brand: Chinese Model: AIS Class B	Brand: Chinese Model: AIS Class B
2.	GPS	Brand: Chinese / GERMIN Model: (H/HQD003)/ MAP 232	Brand: Chinese / GERMIN Model: (H/HQD003)/ MAP 232
3.	EM Log	Brand: Chinese Model: JD-5W	Brand: Chinese Model: JD-5W
4.	Platform Gyro Compass	Brand: Chinese Model: H/HLP003/ GINS-C01	Brand: Chinese Model: H/HLP003/ GINS-C01
5.	Meteorological Instrument	Brand: Chinese Model: XAC2-2G	Brand: Chinese Model: XAC2-2G
6.	ESM	Each Radar shall provide blanking signal to ship born ESM system (Chinese origin 984-2). The specification of blanking pulse will be provided.	

27. **Interfacing Responsibility.** The requirement of interfacing responsibility is stated as follows:

- a. Interfacing with Ships fitted navigational equipment as stated above in paragraph 25 is to be done under the full responsibility of supplier. Complete cost of addition/ alteration of any kind of hardware, software and document of any interfaced/ integrated systems or ship's system/ items are to be borne by the supplier. The supplier may visit the



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ship and collect necessary information with due consent from BN before submitting the offer. Buyer will not be responsible for interfacing work. The supplier shall provide all types of protocol and ICD to interface other sensors/ systems during installation and it will be tested and demonstrated as per paragraph 22.

b. Any sort of complication for interfacing of supplied radar with any equipment and system in future (whenever necessary, whenever requested by BN not exceeding 5 years from the date of acceptance) is to be solved by online assistance of OEM expertise without any additional cost. In this regard, bidder has to provide online assistance assurance certificate from OEM with offer.

28. **Ship's Power Supply.** The ship's available Power Supply is as follows:

Ser	Description	BN Ship	Remarks
1.	Ship's Power Supply	a. <u>Primary.</u> 380V AC, 50Hz, 3 Phase b. <u>Secondary.</u> 220V AC, 50 Hz, 1 Phase	Necessary converter/ transformer is to be provided (If needed).
2.	Power Consumption	The total power consumption of the offered Radar system is to be mentioned.	-

29. **Assessment for Installation.** The supplier should make pre-assessment for installation of whole system onboard at their own expenses. BN will facilitate like removal & refitting of existing equipment/ structures and docking if required. In this regard, bidder has to mention clearly about the actual requirement of installation and docking facility with duration in details in site survey report and submit with offer.

30. **Installation Materials.** All installation materials including shock mountings (but not limited to) is to be provided by the manufacturer. Available Welding/ Cutting will be provided by the buyer. Support equipment may be provided (if available) from the user side upon request prior installation. Bidder may visit the site to evaluate the actual requirement prior submission of offer and submit the list with the offer.

31. **Installation Drawings.** Following drawings are to be submitted for buyer's approval prior 04 (Four) months of commencing of installation work onboard ship:

- a. Layout drawing of equipment including working and maintenance space.
- b. Electrical inter-connection diagram of all equipment (showing the position of circuit breaker, switches, etc).
- c. Cable diagram including cable route, cable type and cable grouping.
- d. Diagram showing interface (mechanical and electrical) and data protocol among the ship systems.
- e. List of works (welding/ cutting/ drilling, etc.) those are needed from BN.
- f. 04 (Four) sets of these drawings are to be supplied during the time of delivery of the radars.

32. **Test Equipment/ Special Equipment.**

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- a. List of special test equipment (if any) required carrying out system check/maintenance of the Radar system is to be provided with the quotation indicating item-wise price.
- b. If inter-switch is not available and system is connected via LAN network, a fault diagnostic laptop with software to be provided.
33. **Standard Accessories.** Standard accessories must include every item and accessories, which are essential to make the offered system operational with full functionality, whether those are mentioned in the specification or not are to be supplied by the bidder within the scope of the supply. Any such accessories, kit and items associated to operate the said equipment are to be mentioned clearly with purpose and submit with the offer mentioning item wise price.
34. **Optional Accessories.** A list of OEM recommended Accessories (if any) are to be quoted separately mentioning item-wise price. The buyer may select item/ items from the proposed list.
35. **Fast Moving Spare Parts.** Original Equipment Manufacturer (OEM) recommended fast moving spares for 03 (Three) years trouble free operation are to be quoted showing item wise price as an option. The buyer may select any item for the list from purchase.
36. **Factory Acceptance Test (FAT).** Following FAT is to be carryout in OEM premises for the offered radar system:
- a. FAT will be carried out by 04 BN members for duration of 05 working days in OEM premises at the buyer's expense. Both way air fare, accommodation and food for the FAT team will be borne by BN. All types of movement/ transportation (air/sea/road) of the team within the manufacturer's country, reception and arrangement for entry into the country/ concerned area for the FAT are to be arranged by the supplier. The item-wise cost in this respect is to be quoted in the offer. The supplier should inform the buyer about the date of FAT (schedule) and FAT criteria at least 08 (Eight) weeks prior to the date of FAT. Moreover, FAT procedure shall be forwarded to the buyer 8 (Eight) weeks prior to the date of commencement of the FAT to the concerned directorate for approval of BN.
- b. On return from the country of manufacturer, the FAT team will submit the report to concerned Directorate at Naval Headquarters. Naval Headquarters will, in turn, forward final decision along with FAT report, basing on which DGDP will render clearance for shipment of stores to the supplier concerned. The supplier will not make shipment of any item of the contract without clearance from DGDP.
- c. The prime objective of FAT will be to check the capability of the system as the technical specification mentioned in the offer. Therefore, the capabilities of the quoted system which will be tested during FAT are to be separately mentioned in the offer. The FAT will be carried out at manufacture's factory premises. In this regard, the FAT protocol is to be submitted for approval by BN well in advance.
- d. During FAT, various tests for checking performance are to be carried out and recorded. After FAT, a joint test report will be prepared and signed by both the seller and buyer's representative.
37. **Foreign Training.** The prime objective of foreign training at OEM premises is to develop compatible operator and maintainer for both ships (BN Ship-1 and BN Ship-2). The supplier will provide operators and maintainers training to the nominated BN personnel at manufacturer's premises. Cost of both way air fare (Dhaka to manufacturer's premises and back) will be borne by the purchaser. Food, accommodation, training material and internal travel cost are

to be arranged by the Supplier and the same is to be quoted separately. Training shall be provided in English Language as per the duration below:

Ser	Training	Remarks
1.	Operator's training for 04 (Four) BN personnel for a duration of 05 working days regarding operation of offered Radar system is to be given	The details of training syllabus are to be provided with the offer.
2.	Maintainer's training for 06 (Six) BN personnel for a duration of 14 working days regarding operation of offered Radar system is to be given.	The training should include 1 st and 2 nd level maintenance and interfacing aspect of the system in details. The details of training syllabus are to be provided with the offer.

38. **Training Contents.** The objective of the training should include flowing but not limited to:

- a. BN personnel should have comprehensive knowledge on system overview and its features and limitations. They should also acquire detailed knowledge and orientation with sub systems.
- b. BN operators should be totally oriented and skilled for the operation of the radar system including various software functions and applications.
- c. Maintainer should know which level of maintenance they can do, what kind of tools and skill needs to be used to carry out maintenance works as per OEM recommended maintenance system/schedule.
- d. All BN personal should be completely aware of all hardware/ software including all kinds documentations related to the system.
- e. There should be a standard operating procedure for a small ready response team to address problems.
- f. BN maintainer group will be able to un-install, install, set to work, configure and interface the whole system including all software used in the system.
- g. BN maintainer group will be able to do alignment, calibration, testing, tuning and software-based system check etc of the offered radar system.
- h. Lectures and training should focus on the following:
 - (1) System Overview and system configuration.
 - (2) System operation covering all functions (navigation and helicopter operation).
 - (3) Details about System architecture.

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- (4) Lessons on ICDs (consisting communication type, NMEA standard, message format, data structure and etc).
- (5) Hardware and software and their function, troubleshooting, backup software, system restoration (if crashed) etc.
- (6) Familiarization of manuals, publications and document which are to be provided.
- (7) Signal/ Power flow diagram.
- (8) Testing of Receiver Sensitivity.
- (9) Network Configuration and troubleshooting.
- (10) Repair and maintenance.
- (11) Fault finding and understanding error message.

39. **Local Training.** A group of operators/ technicians are to be trained locally in Bangladesh for 05 (Five) working days by the Manufacturer's Engineer on completion of installation and Test/Trial. Cost of air fare (to and from Bangladesh (installation site)), accommodation, food and internal transportation (to and from work site and hotel) of the Manufacturer's engineer will be borne by Supplier. The cost of local training is to be quoted with the offer separately. The training should include (but not limited to) the following:

- a. System composition, configuration, principle of operation and troubleshooting.
- b. Software installation, operation and configuration for smooth conducting of all the tests.
- c. Theoretical concept and procedure of tests (practical).
- d. Repair and maintenance.

40. **Shipment & Delivery.**

a. The supplied will arrange shipment of all items to Chittagong within **12 (Twelve)** months after signing the contract to the following consignee:

The Commanding Officer
Naval Stores Depot
New Mooring, Chittagong,
Bangladesh
BIN 002349278-0503

or Officer In Charge
Naval Stores Sub Depot Dhaka
Naval Unit Khilkhet
Namapara, Dhaka-1229, Bangladesh

- b. In case of CFR, the supplier will carry the items from Chittagong sea port /Air port (as applicable) to NSD Chittagong.
- c. All items are to be delivered in seaworthy packing to ensure safe transit by sea.
- d. All packages are to have packing notes showing their contents in detail and all packages shall be marked with the name and address of the consignee and gross weight.

- e. **Port of Shipment.** To be mentioned. The port of shipment is to be from the country of manufacturer or country of origin.
41. **Source of Supply.** The source of supply of radar is from country of manufacturer or country of origin (to be mentioned).
42. **Installation, Supervision, Setting to Work (STW) and Commissioning.**
- a. The complete Radar system is to be installed by replacing the existing navigation and helo control radar systems and to be commissioned by the supplier. Installation includes STW, integration/ interfacing with associated equipment, test/ trial at harbour and at sea.
- b. The supplier at no additional cost will do any modification/ alteration required to install the set. The supplier has to mention in the offer whether docking of ship will be required for said installation work.
- c. Available welding, cutting, paneling work facility in BN and assistance (if required) for equipment installation will be provided by BN. In this regard, qualified manufactures' engineer are to supervise. Any supporting structure for installation of the Radar will be fabricated by BN. The Supplier is to provide the drawings for the supporting structure well in advance. In this regard, qualified manufactures'/ suppliers' representatives are to supervise the supporting structure fabrication and fixing the same onboard. All other works are to be done by supplier.
- d. Qualified manufacture's engineer is to be employed for the installation and STW. All expenses for food, accommodation, airfare and internal travel etc for installation engineers are to be borne by the supplier.
- e. Cost of installation works, Supervision, STW and Commissioning are to be quoted separately.
- f. Any damage to onboard existing systems, items, equipment and machineries due to cable laying and installation of supplied radar shall be compensated by supplier to make damage items operational.
43. **Test, Trial and Acceptance.**
- a. The supplier's representative/ OEM engineer will ensure satisfactory tests, trial and functioning/ commissioning of the equipment at purchaser's premises after all necessary integration/interfacing with other systems.
- b. **HAT.** Harbour Acceptance Test (HAT) will be carried out at harbour on completion of setting to work (STW).
- c. **SAT.** Sea Acceptance Test (SAT) will be carried out at sea on completion of satisfactory HAT.
- d. **HAT and SAT Protocol.** The HAT and SAT protocol/ procedures is to be approved by BN at least 06 (Six) weeks prior to commencement of individual schedule.
- e. **Acceptance.** On completion of satisfactory Test/ Trial (HAT and SAT), an acceptance certificate will be signed by both user/ purchaser and supplier.

44. **Lead Time.** The Supplier will install and commission the offered systems on board BN Ships within 03 (Three) months after delivery in Bangladesh. Liquidated Damage (LD) will also be applied in this respect as per DGDP rule for the delay beyond lead time.
45. **Quality Assurance Certificate.** The Quality Assurance Certificate (QAC) in respect of manufacturing and performance of the offered Radar and their associated equipment and instruments is to be provided by the manufacturer at the time of delivery.
46. **After Sales Service Support Certificate.** The bidder has to submit after sales service support certificate from OEM with offer.
47. **Certificate and Reports.** Following certificates and reports are to be provided in English for the each Radar set including associated equipment/ accessories:
- a. Type approval certificates of classification society during submission of offer
 - b. Quality assurance certificates during submission of offer
 - c. Supply assurance certificates during submission of offer and delivery
 - d. Factory Test Certificates during delivery
 - e. Guarantee and warranty certificates during submission of offer and delivery
 - f. Certificate regarding brand new item during submission of offer.
 - g. After sales service support certificate from OEM during submission of offer and delivery.
 - h. Online assistance assurance certificate from OEM during submission of offer and delivery .
48. **Documentation.** The following documents (03 sets each) are to be provided in English including all text in illustrations, drawings and circuit diagrams at free of cost during delivery:
- a. **Technical and Maintenance Manuals.** The technical manual shall contain descriptions based on figures, diagrams and tables. The system description should cover the following information:
 - (1) System functionality with detail description.
 - (2) Functional build-up of the system and its sub units (hardware and software).
 - (3) The interfaces, protocol and adaptation to external systems and equipment.
 - (4) Necessary block diagrams and circuit analysis to be given for easy understanding of the system.
 - (5) Detailed message implementation and message interaction.
 - (6) Fault finding and remedial actions up to the second level of maintenance.
 - (7) OEM manual of each subsystem.

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- (8) Standard Maintenance Schedule (Daily, weekly, monthly & yearly) documents.
- (9) Manual and documents on alignment, calibration, testing, tuning and software based system check etc of radar system.

b. **Operator's Manual.** The operator's manual shall cover:

- (1) Basic information and overview of the Radar System with block and necessary diagrams.
- (2) Operating procedures.
- (3) System setup and operation.
- (4) Description of all operation modes and menus with explanations.
- (5) Navigation and helicopter operations.

c. **Spares Manual.** The spares manual shall cover:

- (1) Parts Identification List (PIL).
- (2) List of spare parts.
- (3) List of replaceable units/ spares with their time interval.

49. **Brochures/ Booklet.** Two sets of original brochures / booklets in English having detail technical information about the quoted Radar are to be provided along with the quotation for evaluation/ assessment.

50. **User List.** List of users of the offered Radar(s) is to be mentioned with full address. The list shall provide the name of various navies/coastguards with respective model and brand of Radar. The offered Radar should be widely used by various navies/coastguards. The user list will be used for the assessment of the offer.

51. **Warranty.**

a. Minimum 12 (Twelve) months manufacturer's warranty for trouble free operation is to be provided for the item from the date of acceptance by the buyer. If any component of the supplied items becomes defective during the warranty period, the warranty of whole system shall be extended automatically for the period of the subject component remains defective.

b. For warranty repair/ replacement, the supplier will collect the defective item from NSD, Chittagong/ NSSD, Dhaka (as applicable) and re-supply the same to collecting place after warranty repair or for replacement within 90 (ninety) days from the date of defect at no cost to the purchaser.

52. **Guarantee of Supply of Spares.** The supplier is to give guarantee of continued supply of spares for at least 10 (Ten) years at a reasonable price with offer.

53. **Validity.** The offer shall remain valid till 30 November 2024.

54. **Terms of Payment.** Letter of Credit will be opened for full amount of contract price in favour of the supplier for the complete scope of supply with the following terms of payment:

- a. 75% of LC value (excluding the cost of FAT, Training and Installation) will be released after shipment of hardware, electronics and software and on submission of necessary documents as per DGDP rules.
- b. 20% of LC value (excluding the cost of FAT, Training and Installation) will be released after successful completion of installation, integration with related ship borne equipment, HAT & SAT jointly carried out and Final Acceptance issued by the purchaser.
- c. The remaining 5% of LC value (excluding the cost of FAT, Training and Installation) will be released after successful completion of warranty period.
- d. 100% cost of FAT, Training and Installation shall be released after satisfactory completion of each service upon submission of job completion certificate from purchaser.

55. **Price.** Price of the each item of the total offer is to be shown separately (e.g. price of the main items, additional and optional accessories, Installation, interfacing & integration work, FAT, foreign training, local training, ICD and warranty/ guarantee etc) and then grand total of the foreign currency to be shown on the original offer submitted by the bidder. Moreover, if the item is imported against this tender, price to be quoted without import duties.

56. **Ship Visit and System Study.** Prospective bidder may visit the installation site (BNS UMAR FAROOQ AND BNS ABU UBAlDAH at Mongla Naval area) to estimate installation materials, cables requirement, interfacing/ integration issues, docking requirement and works (including requirement of any supporting structure to install the radar, relevant drawing etc) involved in installation (but not limited to) works before submission of offer to avoid any difficulties/ confusion after placing order. Site survey report has to be submitted by the bidder with offer in this regard. Bidder may send application to BN through DGDP for security clearance 06 (Six) weeks prior to said site survey. Similarly, a system study is to be carried out onboard after signing the contract covering all technical details and list of works that is to be carried out. In this regard, the system study report is to be submitted to naval headquarters for further approval within two months of signing the contract.

57. **Additional Feature Offered by Bidder.** The bidders may suggest and offer additional features for the Radar. In this case, Bidders have to explain the detailed advantage of that/ those features of the Radar.

58. **Compliance Statement.** A compliance statement fulfilling all the requirement of the tender is to be submitted for evaluation of the quotations. Stating mere 'Yes or No' will not suffice and detailed evidences with description/ information, brochures/ booklet, drawing and diagram as required is to be given. An incomplete compliance statement may attribute to cancellation of the offer. If any clause of this specification does not commensurate with the offered Radar system, the deviation has to be spelt out clearly.