DEENDAYAL PORT AUTHORITY

Office of the
Dy. Hydraulic Engineer
Room No. 310, Annexure Building,
Gandhidham – 370 210
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No. MR/WK/ Dated: 21/11/2025

To,

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Expression of Interest

Sub: - "Supply of one Modern Steel Hull Hydrographic Survey vessel fitted with hydrographic survey equipment on hire for a period of seven years."

Sir,

Deendayal Port Authority is a Major Port under Ministry of Ports, Shipping & Waterways located in the Kutch District of Gujarat State would like to obtain Expression of Interest (EoI) along with budgetary offers for **"Supply of one Modern Steel Hull Hydrographic Survey vessel fitted with hydrographic survey equipment on hire for a period of seven years"** from reputed agencies associated with hydrographic survey based in India.

Scope of work and specifications are attached herewith.

Interested firms/agencies may send their EoI along with budgetary offer before 08/12/2025 on email addresses dyhekpt@gmail.com, supdtacmarine@deendayalport.gov.in and send the duly signed original documents to the undersigned positively within 15 working days from last date for submission mentioned above to the following address:

The Deputy Hydraulic Engineer,
Deendayal Port Authority,
Room no. 310, 2nd Floor,
Administrative Office-Annex Building,
Gandhidham – 370 201.
Kutch – GUJARAT.

Encl: Annexure A & B

Sd/-
Deputy Hydraulic Engineer
Deendayal Port Authority

ANNEXURE - A

General information and Area Description: -

The Deendayal Port is situated along the West Coast of India, in the Gulf of Kutch and along the West Bank of Kandla Creek at 70° 13'E longitude and 23° 01'N Latitude. The Port was developed after independence of India. It was commissioned in the year 1955 with 2 dry Cargo Berths and was declared a Major Port. The economic hinterland of the Major Port of Kandla comprises of Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Madhya Pradesh and Gujarat. The Port is served by broad gauge Railway. It is also connected with major cities of India by road through the National Highway No. 8 A. With the globalization of the trade the quantum of export/import of cargo in terms of tonnage being handled is rapidly growing. The Port therefore in need to creating new facilities to improve the standards of the cargo handling and provide better facilities, comparable with the best in the world. Considering the quantum of hydrographic survey work and the sensitive location of the port, it is decided to hire one modern steel hull hydrographic survey vessel fitted with hydrographic survey equipment for a period of seven years. Presently, the Port has sixteen cargo berths for handling dry cargo traffic, six oil jetties for handling liquid cargo traffic at Kandla.

The Hydrographic Survey plays an important role in determining the prevailing depths available in the navigational channel and adjacent waters of a port and this is vital for enabling the pilots to safely navigate the deep draught ships. Further, regular hydrographic surveys facilitate understanding the trends in the contours of the seabed and identification of the shoals adjacent to the navigational channel; analysis of the flow dynamics by interpretation of the reduced depths/contours for mathematical model studies and arrive at the estimated quantities for capital dredging / maintenance dredging. It is felt that hiring of a modern steel hull survey vessel fitted with hydrographic survey equipment (for a period of seven years) that can be deployed on as and when required basis for carrying out hydrographic survey throughout the year would meet the above requirements.

The following dredging tenders/dredging works are in progress:

1. Dredging in the Navigational channel, Kandla Creek and alongside Cargo berths / Oil jetties at Kandla (2024-2027).
2. Capital dredging of common Approach channel for Tuna Tekra Container Terminal scheduled to commence from 2026.
3. Capital dredging for Oil Jetties No. 8 and proposed Oil Jetty No. 9.
4. Maintenance dredging in the common approach channel in the Tuna – Tekra area; the navigational channel North of Outer Tuna Buoy, Kandla Creek and alongside Cargo berths / Oil jetties at Kandla from the year 2027.

In compliance with advisory of Ministry of Ports, Shipping and Waterways, Deendayal Port Authority(DPA) intends to hire a suitable modern steel hull survey vessel fitted with hydrographic survey equipment to measure and record the depths through use of Dual Frequency Echosounder and Multi-Beam Echosounder.

The Survey vessel will be in operational at Kandla, Tuna-Tekra, Vadinar and the terminals / marine facilities coming up in future in DPA waters. The survey vessel should be available round the clock operations and be available for deployment as and when required by the DPA.

The Owner/Master of the hydrographic survey vessel hired by DPA will comply with all lawful instructions from the Deputy Conservator of the Port or any other Officer duly authorized by him.

Considering the quantum of hydrographic survey work and dredging, Hydraulic & Dredging Division of Marine Department, Deendayal Port Authority (The Employer) intends to invite an Expression of Interest for **"Supply of one Steel Hull Hydrographic Survey Vessel fitted with Modern Hydrographic Survey Equipment on Hire for a period of seven years."**

SCOPE OF WORK & TECHNICAL INFORMATION

The EoI is for Supply of one Steel Hull Hydrographic Survey Vessel fitted with Modern Hydrographic Survey Equipment on Hire for a period of seven years as per the specification below along with the Manning Staff for Hydrographic Survey in Deendayal Port waters at Kandla and Vadinar etc. The working hours will be normally 8 hours in a day, but sometimes may be operated more than 08 hours as per requirement.

A) Technical Specifications of Survey Vessel proposed for Hiring:

Supply of a Modern Survey Launch fitted with Survey Equipment along with Manning crew on Hire for Hydrographic Survey of Deendayal Port waters at Kandla and Vadinar for a period of seven years.

1) Period of Contract :- Seven years

2) Technical Specifications of Hull & Machinery for the Survey Vessel:

(i) Length (Overall)	18 to 26 mtrs.
(ii) Breadth (Overall)	6.0 to 7.0 mtrs.
(iii) Depth	3.5 mtrs. (Approx.)
(iv) Draft	Maximum 2.0 mtrs.
(v) Speed	Minimum 10 Knots.
(vi) Main Engines:	02 Nos. Suitable Main Engine minimum 400HP each to achieve above speed.
(vii) Generator	100% sea load independently
(Viii) Hull	Steel
(ix) Propulsion System:	02Nos., Steerable Rudder Propeller (Stern mounted)
(x) Battery Backup	For navigational Equipment & Emergency Light as per class requirement.
(xi) Accommodation, wheel House & Survey cabin	Aluminum /MS (Fully Air-conditioned) for minimum 10 persons including crew.
(xii) Age of survey vessel:	Maximum 12 years old as on 01.01.2026
(xiii) Registration	Under M.S. Act or RSV (Type-IV)
(xiv) Class	Coastal Vessel under Indian Register of Shipping or any IACS member
(xv) Manning	As per the approved Safe Manning certificate issued by MMD under M.S. Act (Sea/Harbour) manning.
(xvi) Communication & Navigation Equipment	Must have following equipment: Multi-Channel VHF (Range 25 Miles) – 02 No. Multi-Channel Walkie-Talkies – 02 Nos. Marine Radar – 01 No. Magnetic Compass – 01 No. Hand GPS – 01 No. AIS – Class A Transceiver Binoculars – 01 Pair LSA & FFA - as per the M.S. Anchoring Equipment – as per the Class Spot/Search Light (Range 200 Mtrs) -01 No 10. Navigational Lights – As per the Rules AIS Transponder Type 'B'

(xvii) Davit's SWL ½ tons each at Stbd. side & Port side

(xviii) All other machinery and equipment shall be installed as per the IR Class requirement for safe operation of the vessel inside the harbor areas and coastal waters in Gujarat State.

(xix) Dry docking - Completed as per Class requirement

(xx) Carrying Capacity shall be of 12 persons, including the crew members.

(xxii) Dingy Boat – 1 No. (made of FRP and provided with 2 sets of oars - capacity for 5 persons for carrying out hand lead line survey alongside/underneath berths/ jetties.

3**) Design:**

The vessel shall be round bilge and all welded steel construction. Bilge keel on either side of the hull is to be provided for 50% of the length of the vessel.

4) Hull Requirements:

a. Survey launch to be registered under M. S. Act, and must be manned as per the approved safe manning Certificate MS Act (Coastal Vessel) manning and classed with under Indian Register of Shipping or any IACS for all weather operations around the coast of Gujarat;
b. Material shall be Steel
c. The vessel shall be divided into minimum four compartments by watertight bulk heads. Sufficient chamber shall be provided for deck. The manholes on deck to be finish type.
d. The passage on the main deck on either side of the wheelhouse shall have a minimum width of 0.70 m to facilitate Surveyors carryout inspection of MBES on the shipside, etc.
e. A davit or similar installation to be provided on both side of the hull to facilitate installation of the transducer for the MBES.
f. The transducer of the dual frequency echosounder to be hull mounted on the keel at a suitable location from the forward.
g. Heavy duty Rub Rail (Fendering) in the way of hull;
h. Manually operated davit for launching and recovery of FRP Dinghy Boat.
i. Grab / safety sails of stainless steel;
j. Side windows shall be existing with toughened glass;
k. Landing space for embarking and disembarking;
l. Two Anchors with anchor cables as per Class requirements.
m. Power mooring winch facilities.
n. Shall have non-skid deck.
o. Interior of survey cabin & wheelhouse cabin shall have stainless steel rails;
p. Strong cleats/bollards at various locations on deck for securing the survey vessel;
q. Proper guard arrangement shall be made below rudder/propellers to avoid entanglement of fishing nets if any.

5) Wheelhouse and Surveyors' Working Space:

Wheelhouse and Surveyors' space will form the super structure. It will be made of FRP/Aluminium/MS (Fully Air-conditioned) for minimum 12 persons. Two (2) entrance doors are to be provided both side of the wheelhouse. The space for surveyors and survey equipment shall have a dimension of 6000 X 3500 mm. One toilet and pantry are to be provided under deck at the fore part of the vessel. Working table of sufficient size with drawers to be provided in the surveyor's space.

6) **Machinery and Electrical Requirements**:

(a) Vessel minimum speed 10 Knots.
(b) 02 Nos. Of Steerable Rudder Propulsion (Stern Mounted) coupled with Diesel Engine.
(c) Two Diesel Generator set each one should be capable of taking full sea load and to provide power to all shipboard equipment and auxiliaries;
(d) Adequate air ventilation for engine room and accommodation as per Class requirements.
(e) Dual Mode Steering – Co-pilot/Joystick control and non-follow up
(f) Automatic Bilge Pump with float switches
(g) Emergency power to all the emergency Lights and equipment with auto changeover in case of main power failure.
(h) High Intensity Search light; (As per class requirements);
(i) Marine Battery Charger; (For charging the emergency batteries provided on board);
(j) Provision for Shore Power Connection in MSB and Cable;

(k) Fuel oil tank service line to all the engines should be connected through flow meter to monitor the fuel consumption. Flow meter to be calibrated annually.
(l) Air Conditioned wheel house, Survey Cabin & Accommodation;

7) LSA and FFA requirements:

(a) Life Saving Appliances (LSA) for 12 persons as per class requirements;
(b) Fire Fighting Appliances (FFA) as per class requirements;
(c) Aldis Lamp operating under mains and battery power;

B) TECHNICAL SPECIFICATIONS OF SURVEY EQUIPIMENTS

1. **R2 Sonic Multi-beam Echo-sounder with side scan Equipment** or equivalent latest version of multibeam echosounder with side-scan system of any reputed Brand which can be hull mounted/side mounted/moon pool on a vessel. The minimum technical specification of the system is as follows:

Specification Category	Details
Selectable Frequencies	170 - 450 kHz
Beamwidth (Cross-track × Along-track)	• 0.45° × 0.9° at 450 kHz • 1° × 2° at 200 kHz
Soundings per Ping	Up to 1024 independent soundings per ping.
User-Selectable Swath Sector	From ~10° to 160° in real-time.
Maximum Surveying / Full Coverage Speed	~8 knots for full coverage
Pulse Type / Pulse Length	Shaped continuous wave (CW) pulses; pulse length from ~15 µs up to ~1.115 ms.
Ping Rate	Up to 60 Hz
Bandwidth	Up to 60 kHz
Sounding Depth	Operates effectively > 500 m in many environments. Standard immersion rating is 100 m; optional versions rated for 4000 m and 6000 m immersion depth.
Bottom Detect Resolution	~3 mm
Operating Temperature Range	−10 °C to +50 °C
Storage Temperature Range	−30 °C to +55 °C
Power Consumption	~50 W average
Electrical / Interfaces	• 90-260 V AC 45-65 Hz, or 10-55 V DC input • Ethernet uplink/downlink (10/100/1000Base-T) • Sync in / Sync out (TTL)
Mechanical Details	• Receiver dimensions (L×W×D): 480 × 109 × 190 mm; mass ~ 12.9 kg • Projector dimensions: 273 × 108 × 86 mm; mass ~ 3.3 kg • Interface module (VOX-IM): ~212 × 160 × 70.5 mm, ~2.9 kg

2. **GNSS/RTK (Global Navigation satellite system with Real time Kinematic)**

GNSS/RTK (Real-Time Kinematic) is a high-precision satellite positioning technique that uses corrections from a base station to provide centimetre-level accuracy in real time. It enhances standard GNSS by correcting signal errors due to atmospheric delays and satellite clock inaccuracies.

Category	Specification
GNSS Constellations	GPS, GLONASS, Galileo, BeiDou, QZSS, SBAS
Frequencies	Dual / Triple Frequency (L1, L2, L5 or equivalents)
Channels	400 – 1600+ channels
RTK Accuracy (Fixed)	Horizontal: ±(8 mm + 1 ppm), Vertical: ±(15 mm + 1 ppm)
Float Accuracy	Horizontal: 20–30 cm, Vertical: 30–40 cm

DGPS Accuracy	~0.3 – 1 m
Standalone Accuracy	1 – 5 m
Update Rate	1 – 20 Hz
Initialization Time	~5–10 sec (RTK fix)
Correction Input	RTCM 2.x / 3.x, CMR+, NTRIP
Output Formats	NMEA 0183, RINEX, RTCM, BINEX, proprietary binary
Base-to-Rover Range	Up to 50 km (best < 20 km)
Data Logging	RINEX, internal memory or SD card
IMU/Tilt Sensor	Optional or integrated; ±60° tilt compensation
Antenna Type	Survey-grade, multipath-resistant, choke-ring for base
Interfaces	RS-232, USB, Bluetooth, Ethernet, Wi-Fi
Power Supply	9–36 V DC; internal battery option
Power Consumption	~2–5 W typical (receiver only)
Operating Temp	−40°C to +65°C
Ingress Protection	IP67 / IP68 (dust/waterproof)
Mounting	Pole, tripod, fixed monument
Time Sync	1PPS, event input/output support

3. Motion Senior

Octans 3000 is a subsea gyro-compass and motion sensor (by iXBlue / Exail) that provides heading, roll, pitch, and heave for depths up to 3000 m, using fiber-optic gyros.

Parameter	Typical Specification
Heave Accuracy	±5 cm or ±5% (RMS, real-time)
Pitch & Roll Accuracy	±0.02° to ±0.05° (dynamic RMS)
Heave Range	±10 m to ±300 m (model dependent)
Update Rate	50 Hz to 200 Hz
Latency	<20 ms
Resolution	Pitch/Roll: 0.005° to 0.01° Heave: 1–5 cm
Heading (if available)	±0.3° to ±1.0° (optional in INS-capable models)
Interfaces	RS-232 / RS-422 / Ethernet / CAN bus
Protocols / Output	TSS1, MRU, NMEA, Ethernet UDP, ASCII
Power Supply	9–36 V DC Power: 1 W to 12 W
Environmental Rating	IP68 or subsea rated (300 m to 3000 m optional)
Operating Temp	–20°C to +60°C (typical)
Mounting Options	Fixed, rail, or universal bracket mounts

4. Sound Velocity

The velocity profiler shall be able to use self- recording or direct reading mode.
The data must also be downloadable to any PC. It shall meet the following specification:

Specification	Target Value
Maximum Depth	≥ 500 m
Sound Velocity Range	1400-1600 m/s (or a bit wider to account for varying salinity/temp)
Sound Velocity Accuracy	± 0.05 m/s or better
Sound Velocity Resolution	≤ 0.001 m/s
Sampling / Output Rate	5-30 Hz (adjustable)
Depth Accuracy	± 0.2 m or better
Depth Resolution	~0.01 m

Temperature Sensor Accuracy	± 0.05 °C or better
Power	battery-powered with at least 6-10 h usage, or external power option
Size/Weight	manageable for your deployment platform; rugged materials (stainless / titanium)

5. Base Station D.G.P.S. with RTK mode

a. The Base Station DGPS consists of following equipment
i. One reference receiver/Base Station with UHF transceiver.
ii. 30 m Antenna cable for reference.
iii. UHF Radio should be differential data up to 40 Kilometers with mobile station.
UHF radio for mobile station & INS should be part of supply.
iv. Power and data cabling.
v. The base station should have the following specifications:
Nos. Of Channels: 300
Signal Received: GPS, GLONASS, BeiDou, GALILEO & Atlas
Transmit protocol: RTCMv2.3, 3.2, CMR, CMR+
Communication Ports: 1 Ethernet, 2 RS232, 1xUSB
Operational temperature: 0^0 to 60^0 C
Update rate: 10 Hz

6. Hull mounted/Side mount Side Scan Sonar

The side scan sonar shall have Digital recorder facilities.
The Side scan should have Chirp & CW mode with internal HPR compensation.

7. **Data Acquisition Hardware** (latest version Industrial computer in suitable for use onboard vessel).

8. **Data Processing Hardware** (latest version Industrial computer in DPA office)
Above industrial Computers with the following Specifications - 2 set as under:

a) Intel Core i7 - 6th Generation, i7Gigabyte Motherboard 4 PCI slot / RAM 8 GB / 1 TB Hard disk, keyboard, Mouse, Logitech /Nvidia Graphics card 4 GB /Circle Cabinet with Gold SMPS Moxa - 8 port Moxa card with cable, Online Dongle and Offline dongle key separately.

b) 12GB RAM, 6/8 Moxa serial ports card in built with Hard Disc, USB serial hub, 1 TB external hard disk of 2 nos, 1 TB of internal hard disk, DVDRW, RS-232 support and to link and interface with heave sensor, DGPS, Echo Sounder, Gyro etc. PC is to be supported with splitter box (VGA) and helmsman of 24 inch or more monitor, 32 GB USB drives of 2 nos. for data transfer etc.

9. Latest Version of HYPACK & HYSWEEP Software for data Acquisition & Processing with two nos Dongles (each having Acquisition & Processing).

The Data acquisition & processing Hypack / Hysweep software shall operate under Windows and be able to perform the following tasks:

a) Survey Planning

Prepare route planning such as:
Line planning Area
Planning Channel Design
Upgradable to define survey lines and grids via polygon clipping

b) Datum/ Projection

The system must support the following as a minimum:
Common co-ordinate systems

i. WGS 84 datum
ii. UTM (Universal Transverse Mercator) North and East zones
iii. XYZ Cartesian Earth- Centered Earth Fixed (ECEF)
iv. Grids for India.
v. Entire project can be converted from old to new Geodetic basis
vi. Manually enter X-Y or Lat-Long way-points for the planned lines

vii. Map Projection.
viii. Datum Transformation (based on Local test points)

c) **Data Acquisition**

i. The data acquisition process must perform the following tasks:
ii. Raw data storage and supporting sensors, non- destructive RAW format
iii. Real- time motion correction
iv. 1 millisecond time tagging
v. Real- time clipping for processed data
vi. Online event log for hydrographic tracking
vii. Flags for hydrographical tracking in raw and processed files
viii. Real time transfer of data to an external image processing system
ix. Data Acquisition Software 3D TV viewing
x. Beam Editor for correcting the RAW data.
xi. Among the tools to be provided as part of the quality control are:
xii. Standard deviation display of the bathymetric data
xiii. Observations statistical testing
xiv. Coverage plot

d) **Online Displays/ Processing**

Data shall be able to displayed using:

i. Waterfall display
ii. A swath display with adjustable horizontal and vertical scales Quality and status indication of the soundings.
iii. Upgradeable to provide online operator selectable rotation of 3D display.
iv. A Matrix file (*.MTX) allows you to display real time bottom coverage and to quickly display the bottom depth info in a colour scheme of your selection.
v. HYPLOT that outputs high- quality plots to any Windows™ printer-plotter.
vi. Vessel Display (2D/3D)-The vessel Perimeter and the location of all sensors are relative to a “boat origin” established by the user.
vii. SORT: Creates a cartographic data set that guarantees the minimum or maximum soundings will be saved.
viii. CROSS SORT: Selects soundings to prevent overwrites at where lines intersect.
ix. MAPPER: A binning program used to reduce multi-beam data.
x. CS&V computes volume quantities by determine the area of material in segments above the design, over depth and super grade template.
xi. The TIN MODEL is a powerful tool that creates surface models (Triangulated Irregular Networks) of your survey data.
xii. Dredge volume computation
xiii. SOUNDING REDUCTION: Creates a subset of XYZ data points that accurately models the original data set.
xiv. CONTOURING: Contours are saved to DXF format, allowing for easy import into CAD/GIS Application.
xv. Contours can be either lines, labeled lines, and/or solid color fills.

e) **Imagery**

The imagery display must allow:

i. Waterfall view of real side scan beam forming data
ii. Upgradeable to zoom in one section of the waterfall view
iii. Geo- referencing of side scan view using current projection
iv. Support manual linear contrast enhancement
v. Support for black dominant/ white dominant and halftone palettes
vi. Support for inverted palette
vii. Slant range correction using bottom tracker algorithm
viii. Print current side scan view
ix. Export current side scan view to BMP file CAD/GIS Support
x. HYPACK® allows the display of several different background formats: DXF/DGN,S-57/S-63 ,Ortho TIF, GeoTIF BSB, UKHO ARCS

xi. Vector Product Format
xii. SHP from Arc Info

f) **Helmsman Display**

The Helmsman Display must show

i. The across line distance and speed as well as a port/ starboard indicator
ii. The distance along the line
iii. The track plot including track, planned and actual fix numbers Survey Run In/ Out.

g) **Navigation Display**

- Navigation display is an important feature of the system since it provides the operator with real- time information between the vessel and the environment of the survey area.
- A target is an X-Y position of interest to the user. Targets can be used to mark aids to navigation or locations of bottom samples or any point of interest.

- The navigation display must be capable of reading ENC (Electronic navigation Chart) in CM- 93 edition format and display this on a separate layer on the navigation display. Survey shall be displayed on ENC (Electronic navigation Chart).
- It must be possible for the user to:
  i. Set the position at which the chart will be centered
  ii. Set the display view vessel motion True or Relative
  iii. Display either Geographical or Projection Grid
  iv. Add symbols and survey lines while on- line.

h) **Helmsman Alphanumeric Display**

The following information of the vessel must be displayed upon request from the operator:

i. Latitude/Northing,
ii. Longitude/Easting
iii. Height
iv. Calculated tide
v. Speed over ground
vi. Course made good Heading
vii. Heading

i) **Positioning**

Positioning system must be able to read raw data from the GPS receiver output string

j) Navigation

The process must be able to:

i. Show or hide individual CM 93 Objects
ii. Show or hide the Coverage
iii. Ensure the select object remains in the display view

k) **Running Survey Line**

The process must:

i. Show the location and movement of the vessel
ii. Provide indicator to the offset between the current position of the
iii. vehicle and the pre-defined line

l) **Data Editing and Processing**

This process shall provide the following:

i. Extensive tools for automatic editing and decimation of processed data
ii. On-the-fly coverage, depth, deviation plot creation for visualization and quality Control
iii. Clipping, filtering of the processed Multi-beam data
iv. Geo- referencing of the bathymetry and imagery data

m) **Data Displays**

Plan View

Upgradable to enable the plan view to show the XY positions of the soundings in the input data cells in one of several was like dots or cells of a grid. It will also display lines showing the vessel tracks during data collection. A zoom facility will also be available to select the display accuracy of the data.

Validation Window

The validation window shall be used to evaluate the quality of the match between overlapping data sets. Possible display modes must include colour coded standard deviation plot.

n) **Multi beam Acquisition**

Software provides tools to allow you to quickly and accurately calibrate the orientation of your multi-beam transducer and the time delays between the sonar and positioning system.

The Patch Test function inside the MBMAX multi- beam editor computes the following errors from a set of test lines: Roll, Pitch, GPS Latency, Yaw.Data that has already been collected can be corrected for alignment and delay errors. System calibration should be a matter of hours, not days.p

o) **Multi beam Processing**

i. The Software adds the ability to calibrate, log and edit data from multi-beam and multiple transducer sonar systems.
ii. Provides for real-time display of Bottom coverage Swath wire frames Swath TIN surface QC information Side scan.
iii. The first stage of editing in MBMAX allows you to review and edit: Vessel track lines, Heave-pitch-roll, Gyro, Tide, Draft, Sound Velocity
iv. During second stage, you can visually review each line and graphically edit or apply automated filters to each line. Filters include: Min/Max Depth, Spike Overhang/Undercut. Topography, Sonar Quality Flag, Port/Starboard Beam Angle Limits, Specific Beams.
v. During the third stage of editing, data from all multi-beam lines is combined and displayed. Statistical Filters can now be applied based on the surrounding multi-beam data points. Displays include: Survey window Profile, window Cell window having calibration of patch test.

09. HP Design jet Plotter (T850 or latest model) which shall print day –to- day Hydrographic Charts (compatible width of 36").

10. Portable DGPS for land survey must be 1cm accuracy.

11. Pressure Based tide Gauge:

A compact and rugged pressure based tide gauge with built in touch screen LCD with data storage capability. Recorded tidal data should be displayed on the screen of the unit in digital and graph form. The unit should have provision for the Tide telemetry through UHF/RADIO.

i. Rugged waterproof design: Pelican case housing.
ii. Measurement Range: 0 to 1 bar.
iii. Internal Memory : Minimum 8GB.
iv. Accuracy: ± 0.1% of full scale.
v. Resolution: 0.01meter.
vi. Cable: 50 metres.
vii Weight :2kg.
viii Power : 0.5 A @12-volt DC.
ix. Communication: USB, Ethernet, serial (all ports should be IP65)

12. Software for ENC (Electronic Navigational Chart) preparation in standard ENC format should be part of supply. This software shall have the function of ENC optimization, editing, updating & validating the chart for updating in the VTMIS System.

13. <u>Training for DPA Personnel:</u>

The Agency hiring modern survey vessel with hydrographic survey equipment shall arrange training for seven officials of Hydraulic & Dredging Division of the Deendayal Port by the Technical Expert(s) with knowledge in the Software and Hardware that is installed onboard the survey launch**.**

The Training schedule will be as under:

(i) The training shall consist of theoretical classroom training and onboard practical training **initially for a period of 15 days** prior to handing over of the survey vessel in DPA waters.

(ii) The above training will be followed by refresher training consists of theoretical classroom training and onboard practical training for a period of **3 days every year** (within one month from completion of every year during the seven year period).

14. Tests & Trails of Survey Vessel Prior to Delivery:

The supplier of the modern survey vessel with hydrographic survey equipment shall arrange for tests and trials / inspection / pre-checks of the mechanical / electrical / navigational / Safety equipment onboard the survey vessel and the hydrographic survey equipment by Engineers / Officials of the DPA prior to delivery of the survey vessel and commencement of work in Deendayal Port waters.

15. Service & support should be available from the authorized Indian representative of OEM. OEM test certificate of various equipment onboard must be produced before commencement of the work.

16. The agency hiring the modern survey vessel to DPA will include the expenses towards installation / re-installation of the survey equipment during dry docking repairs of the vessel.

17. All expenses towards the repair & maintenance of the survey vessel as well as parts & services, consumable items onboard the survey vessel including those related to hydrographic survey equipment shall be borne by the agency hiring the survey vessel to DPA.

Following are some of the items list covered under consumables related to hydrographic survey:

(i) thermal paper for echosounder,
(ii) ink-cartridges (06 sets of per annum each set having six types of color ink of 300ml),
(iii) print-heads (03 sets per annum),
(iv) tracing paper (Dimension: Width 1067mm (36'')X Length 45mtrs. & GSM-: 90/95) @ 08 rolls per annum.
(v) plain /coated paper (dimension: width 1067mm (36'')X length 50mtrs. & GSM-: 80) @ 12 rolls per annum for the supplied plotter for printing & publishing the Charts.

C) SUPPLY OF SURVEYOR & TECHNICIAN FOR HYDROGRAPHIC SURVEY WORK

The Agency shall engage a Technician and a Hydrographic Surveyor throughout the seven year hire period as per details hereunder:

(i) **Survey Technician - One No.**

The Survey Technician shall responsible for the daily maintenance and upkeep of the hired hydrographic survey vessel and hydrographic survey equipment onboard survey vessel throughout the contract period of seven years. He shall coordinate with the Master and the crew of the survey vessel in ensuring dedicated quality services.

The survey technician shall possess minimum qualifications and experience as under:

(a) *Degree in Electronics & Communication/Electrical Engineering branch with three years' relevant experience in operation of Hydrographic Survey Vessels.*

OR

(b) *Diploma in Electronics & Communication/Electrical/Civil Engineering branch with five years' relevant experience in operation of Hydrographic Survey Vessels*.

(ii) **Hydrographic Surveyor- One No.**

The Hydrographic surveyor shall be responsible for Bar check, calibration of survey equipment including electronic position fixing system, SBES & MBES survey works as and when required by the port to meet the essential requirement of hydrographic surveys throughout the contract period of 7 years.

The hydrographic surveyor shall be posted by the agency throughout the contract period of 7 years and shall possess minimum qualifications and experience as under:

(a) *Degree in Civil Engineering branch with 3 years' relevant experience in Hydrographic Survey works.*

OR

(b) *Diploma in Civil Engineering branch with 5 years' relevant experience in Hydrographic Survey works.*

OR

(c) *Surveying Recorder 1st class from National Institute of Hydrography of the Indian Navy with relevant experience in experience in Hydrographic Survey Operations and training in Indian Navy (retired naval personnel).*

The candidates for survey technician and hydrographic surveyor should know swimming and be confident for saving their life at Sea.

Sd/-

Dy. Hydraulic Engineer
DEENDAYAL PORT AUTHORITY

ANNEXURE – B

(S C H E D U L E O F Q U A N T I T Y)

NAME OF WORK: "Supply of one Modern Steel Hull Hydrographic Survey vessel fitted with hydrographic survey equipment on hire for a period of seven years.

Sr. No.	Description	Qty.	Unit	Rate	Amount
1.	**Supply of one Modern Steel Hull Hydrographic Survey vessel fitted with hydrographic survey equipment on hire for a period of seven years.**	1470	Days		

Note: - 1. The minimum days considered is 210 Days Per Annum.

2. The above rate is inclusive of all taxes and duties, etc. except GST. GST will be reimbursed separately as admissible under GST Act.

3 The supply of fresh water and fuel shall be on port account; the bidder may quote the price accordingly. Engine Fuel Consumption graph issued by the manufacturer is to be enclosed.

4. The above work includes supply of vessel, equipment, stand by charges, mobilization, demobilization of equipment, Crew as per safe manning certificate Survey Technician, Hydrographic Surveyor, insurance, and all other cost /expenditure in connection with the contract as per terms and conditions.

Sd/-
Dy. Hydraulic Engineer
Deendayal Port Authority

SIGNATURE OF THE CONTRACTOR