DEENDAYAL PORT AUTHORITY

Hydraulic & Dredging
Division, Room No. 310,
Annexure Building,
Gandhidham – 370 210
Email:dyhekpt@gmail.com

No. MR/WK/ Dated :09/10/2025

To,

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Expression of Interest

Sub: - "Installation of Radar Tide Gauge at Cargo Berth No: 16 & Tuna Tekra Container Terminal."

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 along with budgetary offers for **"Installation of Radar Tide Gauge at Cargo Berth No: 16 & Tuna Tekra Container Terminal."** from well experienced & reputed Tide Gauge Manufacturers and Establishments/Organizations based in India.

Scope of work and specifications are attached herewith.

Interested firms/companies may send their EoI along with budgetary offer before 21/10/2025 on email address: dyhekpt@gmail.com, deputyhe@deendayalport.gov.in and send the duly signed original documents to the undersigned positively within 7 working days from submission through email to the following address:

To

Deputy Hydraulic Engineer Hydraulic & Dredging Division, Marine Department,
Room No. 310, Annexure Building,
Gandhidham – 370 210
Email: - dyhekpt@gmail.com
Kutch – GUJARAT.

Encl: Annexure A & B

Sd/-

Deputy Hydraulic Engineer
Deendayal Port Authority

ANNEXURE - A

SCOPE OF WORK

General information and area description: -

The Deendayal Port Authority, Kandla 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 work and the sensitivity of the port, it is required "Installation of Conventional Tide Gauge, Automatic / Radar Tide Gauge at Cargo Berth No: 16 & Tuna Tekra Container Terminal." The installation of Tide Gauge equipment shall be available to transmit data for minimum 7 years. The rates quoted by bidder shall include periodical maintenance upto 7 years.

For this purpose, Deendayal Port Authority (the Employer) is inviting Expression of Interest (EoI) for **"Installation of Radar Tide Gauge at Cargo Berth No: 16 & Tuna Tekra Container Terminal." from a well experienced & reputed Tide Gauge Manufacturers and establishments/Organizations based in India**

Technical Specifications

TECHNICAL DETAIL FORMS: Procurement of Tidal Sensors for Up-gradation of Tidal Observatories

Sr. No.	Production Description and Specification
1	**Data Logger 2 Nos.**
	The data logger should be microprocessor based and configurable in the field as per requirement with consistent performance. • Processor: 32-bit or better and ADC resolution 24bit or better • The units and frequency (lHz, 30 Sec, 1 min, 30 min, 1 hr) of measurements should be user definable. • A suitable in-built charge controller having over and under voltage protection should be provided • • The data logger should be compact and have multiple Input channels (individually configurable) considering the integration of existing sensors at the site wherever applicable and should also have minimum 2 digital output channels (individually configurab1e)Accuracy: +0.06% of FS • Memory: Up to 16 GB or more • Serial Inputs: RS 485, RS 232, SDI 12, MODBUS RTU / MODBUS TCP • Logging Data Rate: 1 Hz to 24 hours (Max.) • USB: Data Retrieval on a Pen drive • SIM Support :4G fallback to 3G/2G/GSM • User friendly online/offline web-page based configuration shall be possible through both Ethernet and Wi-Fi connection. • Local data download via embedded webpage and USB/Ethernet • Data logger should have multiple communication facility including RS 232, SDI - 12, Ethernet, Wi-Fi(compact flash), USB, GSM GPRS etc. • Data logger clock shall be updated through GNSS and Latitude and longitude of the station shall also be stored in the data, along with observed raw data which may be converted to RINEX 2.11/3.04. • The enclosure should be made of composite material for protection from dust and moisture (rain, snow, dew, etc.) and any other physical or electronic damage. (IP 67/68 rating for enclosure) • Other Features: • It should have Over the Air Firmware Updation capability • It should be accessible by secured remote connection from Desktop & Mobile

	App • Product should be CE or equivalent compliant. • A detachable LED/LCD Display should be provided with the data logger. It must support facility to feed in command, data characters for configuration, downloading etc operation, via screen touch/inbuilt keypad. • The data logger shall have minimum two power inputs supporting both AC and DC operation. • The data logger must be capable of pushing logged and converted data files to three separate FTP servers. • There should be provision of storage for 18 months of data of all sensors installed in Tide gauge station including GNSS Receiver, in the Data logger and stored data shall be retrievable via serial port/ USB port/Ethernet port to a PC/laptop and a pen drive or any other compact and commercially available solid-state memory device in standard text file format without requirement of specific software to retrieve the data. • The data logger must support IP filtering restricting IP packet access to and from the data logger for enhanced access control security based on individual IP addresses or subnets based on a user specified net mask. • The data logger must support email alerts for various functions such as tracking, power, reboots, logging, status, etc. • The data logger must meet the following environmental specification: Operating temperature: -20° C - + 60° C, Humidity: 100%, fully sealed with IP68 certification, Shock: 1m drop to hard surface. Equipment must have Compliance to Vibration / Shock test of MILSTD-810 G or equivalent. • Equipment should be resilient to Marine Environment
2	**High Frequency Non-Contact RADAR Type Tide Gauge Monitoring System with Sensors 2 Nos.**
	• Measuring range - Distance: 0.3 to 30 m (continuous Wave) • Type of antenna- antenna suitable for transmitter. • Operating temperature: -20 to 80 °C • Measurement Accuracy: + 3 mm or better • Time Accuracy: 1 sec or better • Beam angle: 6° or lower for avoiding the hindrance for longer distance, Materials, wetted parts: PVDF • Output: compatible to data logger • Operatable interface Smartphone / Tablet / PC via Bluetooth • Electromagnetic compatibility: IC 61326-1 • Ingress Protection o Equipment: IP67/IP68 (3 bar), or equivalent o Antenna : Type 6P or equivalent o Housing: NEMA type 4X (housing) or equivalent

3	GNSS **Equipment 2 Nos.**	
	GNSS receiver	Measuring Mode Static
		Fast or Rapid Static Real Time Kinematic (RTK)
		Horizontal Accuracy 3mm + 0.1 ppm RMS Static (long) 0.5cm + 0.5ppm RMS (Static & Fast Static) or better lcm +- lppmRMS (Single base line Real Time Kinematic) or better lcm 0.5ppmRMS (Network Real Time Kinematic) or better
		Vertical Accuracy **3.5mm** + 0.4 ppm RMS Static (long) 1.0cmA0.5ppm RMS (Static & Fast Static) or better 2 cm+-lppm RMS (Single base line Real Time Kinematic) or better 2cm 0.5ppmRMS (Network Real Time Kinematic) or better
		The offered receiver shall have 500+ physical channels and Static baseline process Range of 300 kms or higher
		Multiple frequency and supporting the following simultaneous signal tracking: - GPS: L1 C/A; L2E/L2P; L2C; L5 - GLONASS: L1 C/A; UP; L2 C/A; L2P; L3 - GALILEO: LI; E5A; E5B; E5, E6 - BEIDOU: B1; B2; B3 - IRNSS: L5 - QZSS: L1 C/A; LIC; L1; L2C; L5 - SBAS : GAGAN
		Receiver must be capable of tracking all satellites in view, even if unhealthy, to an elevation angle of 0°.
		The receiver shall support real time Cinematic positioning using industry standard formats
		The receiver shall support onboard worldwide, real-time positioning via Internet Protocol (IP).

		The offered receiver shall offer a minimum of two power inputs supporting both AC and DC operation with a minimum input power range of 10-28VDC.
		The offered receiver shall contain an internal (Li-Ion) and with battery charger. The internal battery shall be capable of operating the unit standalone for up to 12 hours. The offered receiver shall contain capability to Automatic swapping between power sources without affecting data recorded.
		Internal battery must be capable of operating as an internal battery

		backup system (UPS) functionality.
		The receiver must automatically restart after loss of power and must power up in the same configuration when powered down (or loss of power).
		The receiver must have LED indication/LCD screen to view satellite tracking, Memory, Network connectivity, Bluetooth/Wifi, Battery status .
		Support of logging rates from 50Hz to 600 seconds
		Must contain internal/removable memory with 16 GB or more of logging space. The internal memory should not dislodge from its socket during high motion events such as earthquakes should be able to maintain operation and logging during said events.
		In addition to the internal memory, the receiver must have a port for removable storage media.
		Must support a minimum of 8 independent and concurrent logging sessions.
		Internally logged data shall have a file size of less than 6MB (unzipped), for a continuous 24 hour observation at interval of 15 second, to maximize storage capacity
		Must be capable of producing RINEX and stream BINEX file format
		Must be capable of pushing logged and converted data files to three separate FTP servers.
		Receiver must support both a configurable ring buffer style memory deletion scheme as well as session specific “pools” with similar functionality.

		Receiver must support the configurable input, output and logging of Met/Tilt measurements.
		The receiver must have an integrated RJ45 or equivalent connector (supporting both TCP/IP/upgradable to UDP), one serial ports, one USB/Mini USB, and an external frequency input. RJ45 or equivalent connector should be enabled for server feature.
		A minimum of 6 unique TCP/IP ports. Unique meaning one multicast TCP/IP port (allows multiple connections) only counts as 1 TCP/IP port. Each port must be fully configurable independent of the other ports and outputs.
		In addition to the 6 TCP/IP ports, the receiver shall support a minimum of 1 NTRIP Caster, 1 NTRIP Client, and 1 NTRIP Server ports

		Receiver must support IP filtering restricting IP packet access to and from the receiver for enhanced access control security based on individual IP addresses or subnets based on a user specified netmask.
		The receiver must support one Bluetooth/Wifi connections or greater.
		The receiver must support FTP downloads as well as the FTP PUSH command.
		The receiver must support the following streaming data types: CMR, CMR+, RTCM v2.x, RTCM v3.x, BINEX, and NMEA. Proprietary message types will be considered in addition to (not in replace of) the before mentioned formats.
		The receiver shall support dynamic domain name system (DDNS).
		Receiver must implement a secure network connection (secure means via an encrypted, authenticated session) as well as provide various access levels to the receiver controls.
		Communication interface: Receiver must be provided with cellular modem (internal/external) for accessing internet through 4G LTE or equivalent cellular technology
		Receiver must meet the following environmental specification: Operating temperature: -20° C - + 65° C with external power and -20° C - + 50° C with internal batteries, Humidity: 95%, fully sealed with IP67certificationor better, Shock: 1m drop to hard surface. Equipment must have Compliance to Vibration / Shock test of MILSTD-810 G or equivalent.

	GNSS Antenna	Chock Ring Antenna tracking GPS, Glonass, Galileo, Beidou, SBAS,IRNSS, L-Band, With Technology that minimizes multi-path interference. **2 Nos.**
		Phase center stability better than 2 mm and repeatability less than 1mm
		Antenna gain 29 dB or better
		Supply current 125 mA maximum
		Minimum tracking elevation = 0 degrees
		Absolute calibration file from IGS must be available. For antenna calibrations to be valid the GNSS antenna must be orientated to within +5° of True North while installation at site.
		Powered by receiver (supply voltage 3.5 to 20VDC)
		Antenna shall operate in humidity, high winds, sand storm and blowing rain
		Temperature range is —20°C to +60°C
		Humidity up to 95%, fully sealed
		Shock rating Inn drop
	Antenna cable	One 30 mt length cable and one 5 mt Length to be supplied. The Supplied cables and components should have a total signal loss of less than 9 dB over the entire length of the cable run. **2 Set**
	Accessories	GNSS-Receiver must have a robust heavy-duty wooden tripod stand, tribrach, antenna adopter along with USB data cable, Power cable, Connectors, cable for connecting Car Batteries and other standard OEM accessories. Light weight Rugged carry case **for transporting equipment is to be provided.**

	Firmware/ Software and **Security**	Instrument should be supplied with necessary software/firmware for Full control and configuration of receiver. Software/firmware should allow remote data retrieval, and firmware updates over HTTPS/HTTP. It should have FTP server and FTP Client (push), Email notification and SNMP support It should also have access management facility with following Security features • HTTP login • HTTPS/SSL • NTRIP It must have NTRIP Caster utility with support for at least 6 mount point for streaming/redirecting RTK correction from reference station to NTRIP 1.0 and/or NTRIP 2.0 compliant rover user.
4	Meteorological Sensor **2 Set**	
	Measurement of temperature, pressure , humidity wind speed wind direction to be integrated with binary file in GNSS receiver with following specification: • Accuracy — Temp: 0.2 deg. C, pressure: 0.15 hPa humidity: 2% wind speed : + - 2% ,wind direction +-5 deg. • Stability - Temp: 0.5 deg. C/year, pressure: 0.1 hPa/year humidity: 2%/year, wind speed : 0.05m/s /year ,wind direction 0.5 deg./year Operating range - Temp: + 60 to -40 deg. C, pressure: 650 to 1100 hPa humidity: 0 to 100%, wind speed: 100 m/s, wind direction 0 to 360 deg. • Power +6 to +16V DC, typical current drain 3 mA in sleep mode, and 38mA maximum • Port: RS232/USB should be adaptable with GNSS receiver Install meteorological sensors separately from the GNSS Antenna to minimize any effect ofthe multipath environment. RINEX shall be used to record and transmit meteorological data. Survey the position of all auxiliary sensors for inclusion in the site logs and metadata. The height difference between the pressure measurement reference mark of the meteorological sensor and the GNSS Antenna reference point should be determined to better than 10 millimeters	

5	**Router 2 Set**
	Cellular router for primary and backup connectivity over 3G/4G/LTE/ADSL/Broadband with at least 2 SIM Slots and at least 4 RJ45 (1 WAN and 3 LAN) 10/100 Mbps ports With following functionalities • Operator black/white list • advanced routing protocols, VPN and stateful firewall • Supports at least 4 VPN tunnels • • Link integrity monitoring • Virtual Router Redundancy Protocol (VRRP) • SNMP, event logging, and QOS • reboot through SMS • with -20° C to 60^{o} C Operating Temperature and Relative Humidity 10% to 90%(non- condensing) @ 25° C

6	**Power System 2 Set:**
	• Each Solar Panel with Rated capacity 40 W or better, Open Circuit voltage: 21 V or better, Short circuit current: 2.5 A or better. • Quantity of solar panels should be sufficient to meet continuous operational requirement in marine environments throughout the year. • Installed batteries should be of Sealed Maintenance Free type and rechargeable through a solar panel as well as AC supply. The battery shall be capable to run the system for minimum period of 30 days on full load during total cloudy or foggy conditions. Suitable charge controller along with auto charging off switch, capable of taking power supply from Solar Panel as well as AC power supply are required to be supplied. • Adequate protection via surge arrestors, Circuit Breakers and fuse etc should be provided to protect against electric surge, Over-load protection, Short circuit protection, Protection from the lightning strike and Under-voltage protection at inlet from solar panel as well as from AC supply. The bidders shall provide power budget calculation in the technical bid, taking care of solar panel and battery efficiency and sufficient safety factor of the system supported with documentary proof in technical bid for power consumption of the all sensors including GNSS receiver, data logger, storage media routers etc installed at tide gauge station. Cabling and conduiting for 240VAC power supply between 80 to l00meter distances with MCB, surge protectors, relay and switches for alternate power backup for the system is required. Desired good quality AC to DC converter for charging of battery shall be provide with the system.
7	**Mast/Structure/Protective Housing 2 Set:**
	• A corrosion free high-grade stainless-steel mast as per details given in the drawing in image-A shall be provided with the system, system should withstand corrosion free in marine environment. • The housing should contain enough space for data logger battery and essential tools. It should be manufactured in such a way that all the equipment inside the housing are easily accessible to the user. • The housing and its fixtures should be strong enough to resist any blunt force and high pressure jets. Preferably of IP66 Rating
8	Accessories & Toolkit **2 Set**:
	• A set of complete toolkits along with carrying case for each Tide Gauge Monitoring System should be provided by the vendor. • The tool kit should have all the equipment to open or re-fix the sensors, data logger and mounting. • A user manual having the details of operation of the equipment & software, data downloading and basic troubleshooting should be provided by the vendor.

9	Data Collection:
	• Real time / near to real time data collection from each station shall be done at the server at Meteorological Observatory, SEVA SADAN-III Building, New Kandla . • Data shall be compatible to open in CSV directly with headers of the data and shall not need any additional software for converting the data. • A web User Interface must be provided for real time/ near real time monitoring of stations along with facility of pushing email alerts in case any station is down.
10	Communication system
	Communication system should be secure (with end to end encryption) and should have N+1 redundancy. For this communication between Tidal station and control center should be provided a) Primary: ADSL/ Broadband or VSAT b) Secondary: Wireless cellular i.e. GSM/CDMA GPRS/LTE/ (2G/3G/4G/5G). ADSL/ Broadband or VSAT and Wireless cellular connection at each reference station is to be taken by bidder on behalf of purchaser. If VSAT connection is taken as Primary communication at tidal station, it should be of sufficient bandwidth to deliver Tidal data along with all other sensors data to CDRPS in near real time. VSAT connection should be capable to deliver data to CORPS end via broadband IP services. Each receiver station shall be equipped with 2 CDMA GPRS/LTE(2G/3G/4G/5G) SIMs to increase reliability. Both SIMs shall not be from same Network/Service provider. Irrespective of the communications method used, the data latency between the Tide Gauge System router and the CDRPS should be designed to be less than 200 Millisecond. ADSL/ Broadband/ VSAT and Wireless cellular connection at each reference station is to be taken by bidder on behalf of purchaser. 1. ADSL/ Broadband or VSAT connection should have Less than 1% packet loss (Average over 1000 ping) and minimum 95% uptime per month for the connectivity. 2. Calculation of Actual Uptime % = • (Actual Uptime Hours / Total Uptime hours) X 100 • Definition: • Total Uptime hours = No of days in month X 24 • Actual Uptime Hours = Total Uptime hours — Downtime in hours in a month • Example: • In the Month of May total days is 31 and total down time in the same month in hours was 7 hours. In such case the Actual Uptime can be calculated as follows: • Total Uptime hours = 31 X 24 = 744 • Actual Uptime Hours = 744 —7 = 737 • Actual Uptime % = (737/744) X 100 = 99 % 3. If the Actual Uptime is less than 95 % then penalty will be charged @ Rs 2000/- per day per station from the Vendor.

11	O&M Support and Comprehensive Warranty: 1. 5-years on-site operation support, maintenance, and comprehensive warranty from the date of acceptance against any manufacturing defects on all sensors and other installed hardware shall be part of scope of work. In case of any failure under warranty period and conditions, fault shall be corrected and shall be reverted to working condition maximum within 72 hours of from the time of reporting of the fault by the buyer. 2. Comprehensive warranty support shall include post deployment driver & firmware updates. 3. Comprehensive on-site full operational and maintenance support for all components of the Tidal Stations for a period of 5 years, including monthly recurring expenses for communication line (ADSL/Broadband/VSAT as well as GSM/CDMA/LTE etc) bills 4. The Supplier shall undertake work of servicing and routine Preventive Maintenance (PM) of Tide Gauge sites once in every three months. The PM shall include cleaning of solar panel, Met Sensor and Antenna and general upkeep of site, ensure the data quality and retrieval of logged data from the system. It also include, painting of mast, and enclosure on yearly basis. 5. The quality data will be monitored by Control Center alongwith performance check of sensors. If any sensors accuracy is not as per purchaser criteria, supplier has to rectify/replace that sensors. 6. Tide Gauge Station will be considered as non-functional during onsite Comprehensive Warranty periods: i. Even if a single sensor or any component/unit becomes faulty. ii. In case of non-receipt of data even from a single sensor. iii. In case the output of any sensor is not upto desired accuracy. iv. If data reception of any tide gauge station at receiving station is less than 95 % on daily basis. 7. Scope of Comprehensive Warranty shall include replacement of SMF battery at every Two years in Mainland and at every one year at Islands. However, if during preventive/midterm maintenance, power backup is reduced by 60% of designed capacity of power backup, then battery/batteries need to be replaced earlier than said period. 8. Scope of Comprehensive Warranty shall include replacement of Pressure Sensor at every Two years in Mainland and at every one year at Islands. 9. It is the responsibility of the bidder to ensure that all Tide Gauge Stations are in working condition during comprehensive warranty periods.

12	**Environmental Requirement:**
	The data acquisition system, se+isers, Cables, power system, mounting & fitting accessories and all other parts of the system should be able to operate at optimal efficiency and withstand the following environmental condition: • Operating temperature range: -20 °c to +60°c or better • Since the system must be operate under stringent weather condition i.e. marine region; the system should be rugged and hermetically sealed to avoid ingress of moisture. • All the electronic components should have low power consumption and should be reverse polarity protected. • All part of system including complete tool-kit must be completely weather proof(rugged) and rustproof.
13	**Central Data Receiving and Processing Station** (CDRPS) Hardware
	The Central Data Receiving and Processing Station (CDRPS) at Meteorological Observatory,SEVA SADAN-III, New Kandla shall be able to operate the network of 2 Tide gauge stations, download the data and perform the quality control, thus significantly improving the quality of the data (completeness, accuracy), disseminates to users and also to upload the website. High availability configuration for the database tier as well as application tier — two separate servers running in hot-fail over configuration: (a) Two application/Monitoring servers, rack mountable , each of them shall include as minimum: (i) 2 x Intel Xeon Gold 12 core CPU or better version (ii) 2 x 600 GB SATA SSD, hot plug in RAID 6 configuration (iii) 8x 2.4 TB SAS 10K RPM HDD in RAID 6 configuration (iv) Suitable RAID controller (v) 128 GB RAM or more (vi) dual hot plug power supply (vii) remote management module (b) SAN storage with RAID 10 functionality, SAS hot plug disks, 30TB useable capacity with dual controller, and redundant power and fan system. SAN should have further 30 TB expandable capacity. (c) Necessary peripherals such as RJ 45 Patchs, power cables etc accessories required for installation of above said components will also be part of supply (d) UPS with SMF batteries for 72 Hours power backup. Necessary power calculation sheets need to be attached. (e) 100 Mbps Lease Line connection along with dedicated static IP and AC power supply for control center shall be provided and borne by purchaser.

14	**Central Data Receiving and Processing Station Software with perpetual license**
	Software should be capable to facilitate Purchaser to collect and archive data collected by Tide gauge stations in real time.Data from Tide gauge stations should be capable to disseminated via FTP or TCP/IP to atleast two static IP, one to Met.Observatory ,New Kandla Central Server and another to DR Server in .csv format. The details of data format for dissemination will be provided by Sol. The bidder has to configure Datalogger for Tidal and meteorological data transmission as per user defined time interval (1 min to 60 minutes). The GNSS is to be transmitted as NTRIP Stream at user defined time interval (20Hz to 1 minutes).
	Client/Server Architecture
	Must run automatically and continuously as a windows service under Windows'" 2022 Server and 64bit operating system supported
	Software Services shall start automatically with other services when booting.
	The software must support installation in virtual environments including Microsoft Hyper-V and VMWare
	The operator does not need to be logged into Windows.
	If power fails, the software will restart immediately when the power returns and the computer reboots
	Shall have fast and efficient multiple-user access to its own database
	Graphical User-interface
	The client application shall have a "graphical user interface", with typical Windows™ look and feel, that controls the server. It should be able to be installed on remote PC's as well as on the server:
	Easy to learn and use and Self-explanatory panels, boxes, windows, toolbars
	Map-views must include background map for a better visibility of the network.

	Graphical UI with drop-down menus for better configuration.
	Software must run independently from the GUI and software must run as a Windows Service
	Security
	The Software shall have two-access level Administrator and User:
	Administrators must be able to start and stop the various operations, create and change configurations, set parameters and modes etc.
	The User security level allows viewing of status of collected data and the downloading of collected data in various preset configuration/parameters

	Viewers should only be able to inspect the operation of the software, configuration parameters, system and tidal station status etc. and not be able control the software and its operation
	System monitoring
	The software shall Monitors the various communication links and the operation of the entire system
	The software must provide one view with offers the health status of all modules in the system.
	Controls Tidal Station, directly and remotely
	The software shall remotely control the Tidal Station data logger
	Generates event logs, alarms & warnings on Tidal Station status, and data quality status
	Check all downloaded data for completeness and retrieve missing data automatically from the Tidal Station data logger memory and retry it till complete data downloading is successfully completed.
	The Software must be able to monitor the Tidal Station data in real time and compare relative height of water level monitoring based on pre-fed Maxima, Minima and average height with the possibility to configure alarms and reports. The results shall be presented in a graphical way and shall allow a system administrator to view time series on the water level
	Distribution channels
	The Software shall provide access to the following communication channels:
	Provisional dial-Up via cellular/GSM moderns and a multiplexer.
	Internet, intranet, local or wide area networks (TCP/IP) or with Mobile Cellular GPRS or

	Wireless technology
	Availability and compatibility
	High Availability of data service for user of specified accuracy and precision on an average > 95 % computed on monthly basis
	Quality Control

	The Control Center shall perform in real-time the quality control of the received data. In addition to the data format checks and data completeness tests following checks shall be implemented as minimum: A. Tolerance checks: a) Interval checks (for particular station / region, for all year / seasonal / for selected months) b) related combination of parameters - when parameter A equals value specified, then parameter B should be within range specified. B. Consistency checks: a) related parameter on same line (for example minimum water level should be higher than chart datum); b) related parameter difference - the difference between values of two related variables should be less than the value specified; c) related difference of variables - difference between parameters A and B should be less (higher) than the parameter C. C. Statistical checks: a. Rate of change check— the difference between two successive values of the parameter is higher or lower than set thresholds. b. Standard deviation check — the standard deviation of variable over selected interval should be higher than the value specified in order to warn when e.g. sensor is stuck at a constant value, but naturally the value should variate over time. D. The Central receiving station software shall support multi-layer quality flags. Each data value shall have several flags, depending on: a. Validation stage (checked, not yet checked) b. Basic QC result (correct, warning, erroneous) c. Detailed QC result (reference to rule that was violated by the value) d. Data source e. method (original value, manually corrected value, value calculated by system using physical equations, value manually forced) f. special flags (e.g. significant, Surge) E. The Control Center software shall have the tool for manual inspection of the values and their quality control flags, with possibility to edit the data and run quality control manually. F. The data processing subsystem of the Control Center software receiving station shall be able to calculate in real-time the derived parameters from the measured ones (for example Hourly Value, Daily Maxima, Daily Minima, Monthly Maxima/Minima etc.). G. The Control Center software shall provide the Open Geospatial Consortium web services to flag Quality indicator at each tide gauge station ii) The web services shall provide the station data as well as georeferenced data from other sources: Web based maps

iii) The station data shall be produced in KML, GML, JPEG, GIF, PNG, SVG formats on output. The 2D data sets interpolated from the station data shall be displayed in the forms of the colored fields, flags. The integrated web map client shall provide users with an easy-to-use interface to access browse and animate various Quality flags.

iv) The system shall include the map server with the openly licensed maps of India (up to the street level) or Web Map Service of Purchaser. The map server and the database shall be fully incorporated into the Control Center in order to enable the full functionality without the need of the internet connection to the external map providers.

Notification Module

The Control Center software shall contain notification module, which can send alerts via email and/or SMS. The module shall be integrated with the quality control module in order to enable triggering of the notifications by any QC issues — erroneous/suspicious data, missing data. (It can be also configured to react on other system statuses).

Notification module shall generate and send system or data warnings to selected people. Notification module configuration shall enable to configure database of people to which some warnings should be sent, to specify warnings and conditions for their issuing as well as customize sending of warnings to people (in order to send specific warning to responsible person).

Several groups of features shall be configurable:

a) People - database of people to whom warnings should be sent.

b) System warnings — configuration of incidents and threshold when warning is invoked— for faulty communication (whole messages are missing) and faulty sensor (some individual parameters are missing).

c) Data warnings - configuration of incidents and threshold when warning is invoked —for data reason like value is not within range, value highest/lowest, value above 90 th percentile, other QC rules are broken, high/low variation of element, time change, AND/OR combinations of rules are possible.

d) Send to — which alerts to be sent to whom

It shall be possible to configure text of SMS and e-mail. In the message body shall be possible to address the data / metadata values from database (e.g. %STATION% might represent the name from selected stations for which the alert threshold was broken). Sent message shall contain particular value of the parameter. In addition it shall be possible to set the behavior of messages repetition, in case the cause of the error was not immediately solved.

Data Retrieval and Visualization

The Central receiving station software shall provide the user interactive query tool for ad-hoc selection / export of the data for the selected station(s), parameter(s), time interval, with aggregation functions (sum, average, min, max) applied in the form of the table, chart, CSV, Excel format.

It shall be possible to view the SQL queries prepared by the interactive tool and copy/paste them for reuse.

15	O&M Support and Comprehensive Warranty
	1. 5-years on-site comprehensive warranty, operation support, maintenance, and on all software as well as hardware supplied, from the date of acceptance against shall be inclusive in scope of work. In case of any failure under warranty period and conditions, fault shall be corrected and shall be reverted to working condition maximum within 72 hours of from the time of reporting of the fault by the purchaser. 2. The Supplier shall undertake work of servicing and routine Preventive Maintenance (PM) of Control Center once in every Six months. The PM shall include updating of Firmware/Software, ensure the data quality and retrieval of logged data from the system. 3. It is mandatory to replace SMF battery at every Two years in control center UPS. However if during preventive/mid term maintenance, power backup is reduced by 60% of designed capacity of power backup, then battery/batteries need to be replaced earlier than said period. 4. Software solution will be provided with 5 year comprehensive onsite warranty. Supplier will regularly review its software applications and systems for bugs & errors, and in light of new products or software releases providing enhanced functionality, and replace or “patch” existing software required for fixing bugs and error corrections or as enhancements become available, without any additional cost.
16	Training:
	On Site training to purchaser's personnel is to be provided by Principal/Indian Agents (if they have the requisite know-how) at the supplier's plant and/or/onsite to check the performance, in assembly, startup operation, maintenance and/or repair of the supplied equipment/s to the satisfaction of the user department.

ANNEXURE – B

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

NAME OF WORK: “Installation of Conventional Tide Gauge, Automatic / Radar Tide Gauge at Cargo Berth No: 16 & Tuna Tekra Container Terminal

Sr.	Description	Qty.	Unit	Rate in INR	Amount in INR
1	Radar Tide Gauge	2	Each		

The above work includes supply of equipment (as mentioned scope), periodical maintenance upto 7 years’ insurance and all other costs / expenditure in connection with the contract for smooth functioning of works for entire period.

Sd/-

Contractor’s Seal & Signature

Deputy Hydraulic Engineer
Deendayal Port Authority