

**DEPARTMENT OF OCEAN ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
CHENNAI 600 036, INDIA**

**Ref : OED/2017/001/Project/VSUN**

**Date: 17<sup>th</sup> April 2017**

**Robotic Total Station - 1 NO**

**Due date:**

\* Submission of technical and commercial proposal: **3 pm 3<sup>rd</sup> May 2017**

\* Bid opening: **3.30 pm 3<sup>rd</sup> May 2017**

1. Quotations are invited in duplicate for the item shown in enclosed list as Annexure 1.
2. The quotations must be submitted under two bid system indicating clearly technical bid and financial bid on the envelope. Both the bids should be closed in the single envelop in a sealed cover.
3. The Quotations duly sealed and super scribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.
4. The Quotations shall be valid for 180 days from the due date and the period of delivery, warranty terms etc. should also be clearly indicated. A minimum of one year warranty is required.
5. Brochure detailing technical specifications and performance, list of industrial and educational establishments where the items enquired have been supplied must be provided.
6. Compliancy certificate is to be provided indicating conformity to the technical specifications.
7. If the item is under DGS&D Rate contract No. and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the Rate contract price (Please note that we are not Direct Demanding Officers). If so please send copy of the RC.
8. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples / machine/ equipment if called for should be submitted / demonstrated at free of charges, and collected back at the supplier's expenses.
9. Packing and delivery charges must be clearly indicated.
10. The rate of sales / General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales / General Taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have concessional Sales Tax applicable to non Government Educational Institutions run with no profit motive for which a concessional Sales Tax Certificate will be issued at the time of final settlement of the bill.
11. IIT Madras is exempt from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand. IIT Madras will make necessary arrangements for the clearance of imported goods at the Airport/Seaport. Hence the price should not include the above charges.
12. Goods should be supplied carriage paid and insured.
13. Goods shall not be supplied without an official supply order.
14. Payment: Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later.
15. Acceptance and Rejection:- I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

Yours faithfully,

**Dr. V. SUNDAR**  
PROFESSOR  
DEPT. OF OCEAN ENGINEERING  
INDIAN INSTITUTE OF TECHNOLOGY MADRAS  
CHENNAI - 600 036, INDIA.

## DEPARTMENT OF OCEAN ENGINEERING

Ref.: OED/2017/001/Project/VSUN

## CALL FOR PROPOSAL OF THE FIELD SURVEY INSTRUMENT - "TOTAL STATION"

1.Robotic Total Station

## 1.Specification

Technical Specifications	Description
ANGLE MEASUREMENT	
Angle Display	0.2"
Angle Accuracy	1" ( In Manual, Robotic and Motorised Mode)
Telescopic Magnification	30X
Field in view	1° 30" (2.7 m at 100m)
Minimum Focusing Distance	2.0 m
DISTANCE MEASUREMENT MODE	With Prism and Without Prism Measurement
Using Long Range EDM	3 km or better, Long range: upto 10km with an accuracy of 5+2ppm
Accuracy	1+1.5ppm upto 3km, Time:3-5seconds
Least Count	0.1 mm
Without prism range (Reflector less)	upto 1000m
Accuracy Reflector less	+/-2mm+2ppm upto 500m, 4+2ppm upto 1000m
	Measuring time:3-6secs
Measuring Interval	1.0sec or less in tracking
ANGLE MEASUREMENT Method	Absolute Encoders
Motorized	Motorized movements to stake out points.
Rotation Speed	45 Degree Per Second
360deg prism, Target aiming/locking	Upto 1000m/1000m
Circular prism , target aiming/locking	Upto 1500m/1000m
Prism Search	Have facility to automatically search the prism upto a distance of 300m in typically 5-10secs
Display& keyboard	Identical display of size 5inches, WVGA, color, touch screen with 30 or more keys with Windows EC7
Internal memory, processor &weight	2GB, 1GB and 5-6Kg. external storage expandable upto 8GB
Battery	5-8hrs for a single battery. Charging time:2-3hours. Standby battery to be given with separate charger per battery.
Interface	RS232, USB, Bluetooth and WLAN, IP Protection:IP65 Temperature range:10 to 50deg C. Humidity:95% non-condensing.

Integrated Total station camera	Integrated overview camera of 5MP, Focal length:21mm, focus:2m to infinity, Image storage: JPEG, 4step Zoom
Adapter	Suitable adapter to mount the GNSS antenna onto the total station directly for Integrated surveying/Smart station surveying.
Radio handle for robotic surveying	Suitable radio handles for one man surveying from the pole side.
On-board software in total station and data controller. Should be same interface for Total station as well as for GPS.	<p>Suitable on-board software cable to do</p> <ul style="list-style-type: none"> <li>• Measure Code points</li> <li>• Automatically measure points &amp; Remote Heights</li> <li>• Target Offset calculations, Resection up to 10 target points</li> <li>• Resection Helmert</li> <li>• Orientation to Line</li> <li>• Orientate to Object, Navigate to point using various methods: from and behind instrument, point, base line, arrow, North</li> <li>• Quality control - checking of coordinate differences before storing</li> <li>• Automatically select next closest point</li> <li>• Graphical selection of point from map, Line &amp; arc calculations</li> <li>• Bearing &amp; distance calculations</li> <li>• Shift, Rotate, Scale (manual &amp; matching points)</li> <li>• Triangle calculations 1 step, 2 step, 3D Transformation</li> <li>• All common projections</li> <li>• Horizontal alignments</li> <li>• Vertical alignments, • Cross sections</li> <li>• Chainage equations, • Create points and lines</li> </ul> <p><b>Data import:</b> ASCII, XML, DXF, DTM, alignments</p> <p><b>Data export:</b> ASCII, Custom, DXF, XML, Style Sheets, FBK, RW5, RAW and local formats</p>
Provision for Grid scanning	Provision to be given for grid scanning in total station.
<b>Imaging and Robotic Survey</b>	
Robotic Controllers.	The controller with full VGA display and internal Radio (upto Automatic target locking distance of :1000m) having processing speed of 1000Mhz, 1024 MB RAM and 2GB internal memory supplied for Robotic Survey from prism position with functionality to controller entire system over a radio link(upto 1000m)
Robotic Camera	The controllers should have inbuilt camera.
Robotic accessories	Complete accessories for Robotic survey like 360 Degree passive prisms and pole holders .Mounting facility of the Antenna directly on 360 Degree Prism Pole and TPS.
Instrument Memory	External SD Card with total memory storage capacity of minimum 8GB.
Internal Battery	Rechargeable batteries with minimum working time of 6hrs. Each battery to be given a separate charger.
Dust & water Protection	IP68
Display	5inch, with USB client, USB host, serial RS232< power jack, Audio jack, Integrated Bluetooth, Integrated WLAN, Integrated GSM SIM for RTK, Robotic total station compatible, Qwerty & Touch screen with integrated distance meter upto 40m
Data Downloading	Suitable cable to download from Total station and data controller.
<b>GNSS Specification for Integrated Surveying/Smart station Surveying</b>	



GNSS Specification either to be mounted on the total station or on the pole for one man surveying	Geodetic, 400+ channels, with GSM&UHF inbuilt, Sim Slot, Internal memory of upto 8GB, 20hz data update, IP68
Satellite tracking	The GNSS receiver of the system have 400 or better channels for the tracking of most of the presently available frequencies of globally existing GNSS constellations like GPS (L1, L2, L2C, L5), GLONASS (L1, L2), BeiDou (B1, B2), Galileo (E1, E5A, E5B), QZSS, SBAS (WAAS/EGNOS/MSAS/GAGAN) and IRNSS (L5)
Position accuracy for the smart station in static observation.	Horizontal: 5 mm + 0.5 ppm & Vertical: 10 mm + 0.5 ppm
Battery for GNSS	6-7hours with standby battery. Charger to be provided for each battery. Charging time:2-3 hours
Initialisation	Less than 8seconds
<b>Data Processing software</b>	
Data Downloading Survey software in original-Permanent 10seater network License	<p>Traverse adjustment, Alignment reports, Configuring the units, code table, Least square adjustment, import XML, Fix observations, retrieve coordinates, modify standard deviations, Automatically generate identifiers, compute approximate elevations, vertical least square adjustments Least Squares Control File Editor (Adjustment File Management, Extract Field File Observations, Import XML, Create points, line Arc, circle, spiral, spline, combined curve, radiation, alignment, polygon, intersection points, line segments, reverse alignment, trace and break alignment, Line conversions, validate alignments. Projections: Manager and apply transformation between projections, coordinate definition, view and apply using affine, semi affine etc., Validating data, Form models, Delete triangles, Delete models, Breakline segmentation, interpolate elevations, and examine elevations. Base, Progressive base plane and surface to surface volumes. Create section markers-3 methods, corridors of interest, create cross section sets, create long section floating points, define end area volumes, CAD output of long sections, Cross section report, transfer long section into plan., Import and register image and support to Georeferenced images formats like MrSID, ECW, GeoTIFF etc.</p>
Scope of Supply	<p>Robotic Total station with identical display on both sides, 2batteries for the total station ,2batteries for Data controller, two batteries for the GNSS, 6chargers, tripod, Reflector Pole, SmartAntenna Pole, Data controller with its adapter to pole, Tribrach, 360degree prism, Pole Smart antenna adapter, 3nos , 8GB Memory card, data downloading cable for the Total station and Data controller, Radio handle for the total station, GNSS mount point for the Total station, Carrying case to house the Total station, along with GNSS sensor and Data controller.</p>

OGC Compliance	Certificate Required (Optional)
Any auxiliary components and spare parts should be given as optional items	
Annual Maintenance Requirements, if any to be mentioned for 5 years (optional)	
NB: Should indicate the authorized service centre in India if the item is 'imported'.	

## 2. Prerequisite

The vendor has to submit proof of documents for similar studies. In addition, the proof of documents for successful completion of at least two projects of similar nature should be submitted.

## 3. Payment terms

Please specify the payment terms. IIT Madras reserves the right to negotiate the terms of payment as acceptable to the purchase procedures prevalent from time to time.

## 4. Terms and conditions

Please quote the rate with the following details.

1. Quotation validity minimum 180 days.
2. Submission of Methodology, Delivery and commissioning periods.  
Tax details.
3. Please note IIT Madras is exempted from Excise Duty.

## 5. Force Majeure

Neither the Agency nor the owner shall be considered in default in performance of its obligations hereunder if such performance is prevented or delayed for any causes beyond the reasonable control of the party affected, such as war, hostilities, revolution, riots, civil commotion, epidemic, major fires, explosions, floods, earthquakes or because of any law, order, proclamatory regulations or ordinance of Government, provided notice in writing of such cause with necessary evidence that the obligation under the Contract is thereby affected or prevented or delayed, is given within 14 days from the happening of the event and in any case it is not possible to serve the notice within the said 14 days period, then within the shortest possible period without delay.

As soon as the cause of Force Majeure has been removed, the party whose ability to perform its obligation has been affected shall notify the other party the actual delay occurred on account of such activities.

Although the time for completion of work shall be suitably extended (not exceeding the period during which the work was stopped on account of Force Majeure clause), such extension shall not result in any financial claim by the Agency against the Owner on any account of such a delay for any other reason whatsoever.

**Pre-bid meeting will be held on 26<sup>th</sup> April 2017 at 3.00 pm – Venue 2<sup>nd</sup> Floor Seminar Hall, Department of Ocean Engineering, IIT Madras.**