Indian Institute of Technology Kanpur
Department of Civil Engineering

Inquiry No- CE/JNM/2013-14/R-10   30 December, 2013

Subject: Quotation for supply of Integrated System/Smart System – Reflectorless Robotic Total Station compatible with RTK enabled Geodetic quality GPS receivers and other accessories.

We propose to purchase Integrated System/Smart System – Reflectorless Robotic Total Station compatible with RTK enabled Geodetic quality GPS receivers and other accessories for our ongoing project. You are requested to submit quotation with best price/discounts with following preferable specifications.

Most preferable Technical Specification for Robotic Total Station and GPS Receivers are as follows:

The Robotic Total Station should be with automatic targeting/scanning capability and long DR range to measure points in extreme environment. The total station should be compatible to integrate with RTK enabled GPS receivers for combined survey in field in seamless manner. The data collector should also be able to operate the RTK GNSS receivers for survey. The instrument should preferably have dual layer password protection.

Other Specifications are as follows:

	ANGLE MEASUREMENT	
1	Angle Display (Least Count)	0.1" or better
2	Angle Accuracy (as per DIN 18723)	2"
	TELESCOPE	
3	Telescope Magnification	30X
4	Field view	1°30'(2.7 m at 100m)
5	Minimum Focusing Distance	1.7 m or better
	DISTANCE MEASUREMENT	
	WITH PRISM	
6	Using Long Range EDM	5000 m with single prism or better
7	Accuracy	1 mm + 1.5ppm
8	Least Count	0.1 mm
	WITHOUT PRISM	
9	Range	1000 m Kodak White 90%
10	Reflector Less Accuracy	2mm + 2ppm up to 500 meters
	ANGLE MEASUREMENT	
11	Method	Absolute Encoders
12	Motorized	Should have motorized movements to stake out points.
13	Rotation Speed	Should be more than 40 Degree Per Second
14	Automatic Target Aiming	Should have Auto Target Recognition for a distance of 1000 m or better
15	Target Lock	Should have facility to lock to targets for Robotic Survey for a range of 800 meters
16	Prism Search	Should have facility to automatically search the prism
	Imaging and Robotic Survey	
17	**Robotic Controllers**	The controllers with full VGA display and internal Radio, having processing speed of 500 Mhz, 512 MB RAM and 1 GB of flash should

		be supplied for Robotic Survey from prism position with functionality to controller entire system over a radio link
18	**Robotic Camera**	The controllers should have inbuilt camera
19	**Robotic accessories**	Complete accessories for Robotic survey like 360 Degree passive prisms and pole holders should be offered. Should have facility to mount the GNSS Antenna directly on 360 Degree Prism and TPS.
	MEASURING TIME	
29	Fine Mode	1.5 Sec or better
	MEMORY	
30	Internal Memory	Internal Memory of 1 GB
31	External Memory	Onboard Slot for USB2.0 pen drive and Flash Cards
32	**PROGRAMMES INBUILT**	**Graphical Intuitive Application Programs**
	System should run onboard Win CE 6.0 and processor with speed of minimum 533 Mhz with 512MB RAM and 1 GB flash inbuilt	Set Station and Orientation Setting out Free Station Remote Height Ties Distance Area Missing Line Measurement Reference Line Rapid measure code list Resection COGO
		Job Management Capable of attaching dxf and shape files in back ground Capable of switching the layers as ON/OFF for dxf files Zoom in and Out, Pan, Window Zoom facility
	COMPENSATOR	
33	Dual Axis	Dual Axis
34	Compensating Range	± 4'
	TEMPERATURE	
35	Operating	-20 °C to + 50°C
36	Storage	-40 °C to + 70°C
37	**DIGITAL LEVEL**	Graphical display on screen
	PLUMMET	
38	Laser Plummet	Inbuilt Laser Plummet from the Instrument.
	DRIVES	
39	Horizontal & Vertical Drives	Should have Endless movements with friction drives.
	DISPLAY	
40	**Resolution**	Should have Full VGA 640*480 pixels resolution or additional controller with Full VGA display.
41	**Illumination**	Capability to illuminate keyboard and display for day and night operation
42	**DATA OUTPUTS**	Should be capable of outputting the data In all standard formats including DXF and other customized formats directly from the total station.

43	**SURVEY DATA**	Graphical Display of the surveyed points, Lines & Areas with Codes & Symbols
	KEY BOARD	
44	**Type**	Identical Alphanumeric keyboard on both sides for traverse applications.
45	**Illumination**	Key Pad could be illuminated
46	**COORDINATE SYSTEM**	
		Should be Capable of Choosing Ellipsoid, Projection and other parameters, and also for triangulating other Lat, Long once the coordinate system is applied. Should be capable of determining coordinate system for given number of Geodetic Points.
47	**GPS COMPATABILITY**	The Total station should have on line compatibility with GPS. And should be able to log the GPS static data directly into the TPS and the connectors for this interface should be present on total station.
48	**UPLOAD OPTIONS**	DXF, shape files
	POWER OPTIONS	
49	Battery	Lithium Ion Batteries
50	Operation Time	Should be minumum of 6 - 8 hours
51	Charging Time	Less than 1 hour
52	External Battery	External battery which can be mounted on side of Tripod with cables should be offered
53	**WEIGHT**	Optimal Weight

Bill of Material per unit
Main unit – 1No
Batteries – 4 No
Charger - 1 No
Accessories Tripod -1 No
Tribrach/Tribrach Adaptor – 1Nos
Tripod/Bipod for holding Prism pole- 2 No
Prism Pole - 2 No
Single Prism with holder - 2 No
Robotic kit including Robotic holder with built-in Radio & 360° Prism - 1 No
Data Downloading & Processing Software -1 No.

SPECIFICATIONS FOR GNSS RECEIVER SET

Specifications for GNSS receiver set with antenna and receiver in single housing with capability to work in RTK mode. The units should be RTK ready. The receivers should be supplied in separate rugged boxes with all necessary accessories of OEM make only. The GNSS receiver should have facility to integrate with robotic total station in real time on field in combined survey.

S. No	CHARACTERSTICS	SPECIFICATION
	Measurement Specification	
1.	Satellite Tracking	Satellite signals tracked simultaneously: – GPS: L1C/A, L1C, L2C, L2E upgrade for L5 – GLONASS: L1C/A, L1P, L2C/A, L2P – SBAS: L1C/A – Galileo: E1, E5A, E5B – BeiDou (COMPASS): B1, B2 upgrade • SBAS: QZSS, WAAS, EGNOS, GAGAN • Positioning rates: 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz
2.	No of Channel	100 channels with SBAS capability or better
3.	Measuring Modes	Static, Post processed kinematic, Real-time Kinematic
4.	Measurement Technology	High Precision multiple co-relator for GNSS Measurements for Low noise, low multi-path error. Receiver should be capable to log data in receiver without controller also.
	Accuracy High Precision Static	
5.	Horizontal	3 mm +0.1 ppm
6.	Vertical	3.5 mm + 0.4 ppm
	Real Time Kinematic	
7.	Horizontal	10 mm + 1 ppm
8.	Vertical	15 mm + 1 ppm
9.		
10.		
11.	**GNSS Antenna**	Multi frequency Geodetic Quality, High gain combined antenna with Sub-mm phase center repeatability.
	General Specification	
12.	No of Port	1 nos serial ports, 1 no for Power/Data and other port dedicated to data communication
13.	Power Port	1 No power port with input voltage of 11V DC external power input with over-voltage protection
14.	Power consumption	Power consumption for satellite receiver and antenna including Internal Radio should be less than 3.5W in RTK mode.
15.	Internal Batteries	Both the receiver as well as antenna should be operable with internal batteries long enough to last at least 7-10 hours of field operation. An external battery should be supplied for the base.
16.	Weight	The Entire RTK rover including internal batteries, range pole controller and bracket should not weigh more than 4 Kg
17.	Operating Temperature for all major RTK component	- 40°C to + 65°C
18.	Storage Temperature for all major RTK component	-40°C to +75°C
19.	Humidity	100% Condensing
20.	Drops	Should be designed to withstand 1m pole drop on hard surface
21.	Initialization Reliability	Better than 99.99%
22.	Initialization Time	typically less than 8 seconds

23.	Position Update Rate	Upto20 Hz
24.	RTK Data Formats for Transmission and reception	CMR: CMR+, CMRx input and outputs RTCM: RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1 input and outputs
25.	NMEA output	Support for NMEA output.
26.	Memory	Memory of 50MB inbuilt/removable in the receiver.
27.	Cellular Compatibility	The receiver should have inbuilt cellular RTK functionality.
28.	Radio	License free Radio for Base and rover RTK communication.
29.	Chargers	External charger to be provided.
30.	**Configuration Software**	
31.	Configuration	The software should be able to configure the receiver for static data collection and also should be able to configure RTK base.
32.	Combined	The GPS should be possible to mount on Total Station to compute orientation of Total Station through TPS.
33.		Should also have capability to log data at desired logging rate
34.		The software should be able configure and create schedule for data logging at specific interval. Field input of antenna height. Display of battery charge. Display of date, time. Display of files in memory. Display of antenna position and PDOP. Display of satellite sky plot. Display of satellite elevations, azimuths and signal to noise ratio (signal strength). Display of WGS 84 coordinates COGO functionality The software should be able to operate the total station and should have all the necessary functionality to operate the RTK survey. The software should have background maps. The controller which operates RTK GPS should have full alphanumeric hard keys with color TFT display. The controller should be able to operate the TS and GPS together in field. The controller should have inbuilt camera of at least 2MP.

OFFICEPOSTPROCESSINGSOFTWARE

1.	Operating System	Windows
2.	Importing Raw Data	Should be able to import and process Raw data from all satellite constellation. Also should be able to import raw data as well as precise ephemeris data via internet IGS data from met
3.	Baseline Processing	Should be capable of processing GPS L1 and L2 as well as GLONASS L1 and L2 and other constellations
4.	Network Adjustment	Should be able to perform Network Adjustment using Least Square adjustment method.
5.	Export	Capable of Exporting the data in CAD Format.
6.	Reporting	Software should be capable of generating reports directly for the surveyed data
7.	Datum Information	Should have in built datum information. It should also be able to transform the data from one datum to another.
8.	Feature Coding	Software should support feature coding.

9.	COGO	Software should have COGO functionality
10.	RTK Data	Should be able to handle RTK data.
11.	Surfaces	The software should be a capable of Surface Modeling, 3D Visualization and quick contouring.
External Battery		
12.	External Battery Connectivity	External 12V battery with necessary original battery cables with crocodile clips and charging cable/ instrument should be provided

Bill of Material per pair

Receiver – 2No,
Packing Boxes – 2Nos.
Internal Batteries – 4 No,
Accessories Tripod -2 No,
Tribrach/Tribrach Adaptor – 1Nos
Data Downloading & Processing Software -1 No.
External 12V battery – 1Nos
External Battery Cable – 1Nos
Controller – 2 Nos.

You are requested to submit your quotation in sealed envelope with complete product description, technical literature, price, warranty period, delivery time and other terms and conditions by January 06, 2014. If you have any question please call Dr. J. N. Malik at+ 91 - 0512 - 2597723; + 91- 9956300101.

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