

**INVITATION TO PROVIDE QUOTATIONS FOR
Ground Penetration Radar and SW for
Road Survey, Utility Mapping & Archeological Survey**

Date: 22.1.2015

To:

Ref. No: CE/MHRD/NC/03/2014-2015

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Sub: Quotation for Ground Penetration Radar (GPR)

IIT Kanpur invites quotations for the **Ground Penetration Radar** for ongoing teaching and research work in various areas such as Archeological Survey, Road Survey, and Utility Mapping. The equipment comprise the following Hardware/Software:

- (i) Ground Penetration Radar and accessories
- (ii) GPR data processing software

The prospective suppliers are required to send quotation in two parts in separate sealed envelopes, as "**Technical Bid**" and "**Financial Bid**". The Technical Bid should contain detailed technical specification of the product being offered, technical compliance report, training schedule and content, AMC and guarantee/warrantee details, complete product description, technical literature, delivery time and other terms and conditions BUT should NOT mention any prices. The Financial Bid should include the detailed price quotation clearly including the cost of the equipment, taxes, service and training charges if any, shipping and handling charges. The two separate and sealed envelopes should be clearly marked appropriately as "**Technical Bid**" and "**Financial Bid**". Please write the inquiry no. on the top of envelop and enclose complete product description, technical literature, price, warranty period, delivery time and other terms and conditions by 09 February, 2015 at the following Address:

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GENERAL GUIDELINES AND TECHNICAL SPECIFICATIONS

The general specifications for the equipment/systems are provided below. This is followed by the technical specification and other details of different systems.

GENERAL AND OTHER SPECIFICATIONS:

While quoting the prices for various items, the following guidelines should be followed:

1. Full details of the *standard* configuration of equipment along with *accessories* and *technical literature* should be provided. **The standard configuration must be accompanied by associated brochure giving the complete and clear configuration of the system offered (e.g. part no., preferably photograph of the part, number of units, accessories: wires, connectors, etc.).**
2. The vendor must provide a compliance document which should clearly specify how each technical requirement is satisfied by the system suggested by the vendor.
3. Various *optional features* with the equipment (along with their cost) should be specified.
4. All the accessories to be offered along with system should be OEM make only or recommended by the principal manufacturer.
5. Clearance required for Wireless, Bluetooth communication, if any, will be the responsibility of the vendor. However, necessary papers will be provided by IIT Kanpur.
6. The *authorized certificate and propriety certificates* must be attached with the offer.
7. A list of *Government institutions/organizations* and their feedback where these/similar equipment have been supplied in the recent past (last 2 years) must be enclosed. The vendor should have supplied at least 10 systems in India to these Government institutions.
8. A certificate from the manufacture that the equipment is still under production and not outdated.
9. Please note that as per the present Govt. of India notification, **IIT-Kanpur is expected to pay limited custom and excise duty as applicable for academic institutions.** The offer should, therefore, clearly and separately mention:
 - i) cost of equipment
 - ii) mode of payment
 - iii) academic institution discount
 - iv) country of origin
 - v) freight charges for delivery of equipment at IIT-Kanpur
 - vi) warranty period

Please note that IIT Kanpur is authorized to procure the equipment by opening the LC. Hence, procurement through opening of LC will be the preferred choice. All relevant documents to this effect will be provided by IIT Kanpur. However, one can also quote in Indian rupees as well. Therefore, it is desirable that the quotation is provided for procurement by both these arrangements.

10. The quotation should be valid for *at least 6 months*.
11. The delivery of the equipment must be made within six weeks after payments as per institute rules.
12. The short listed vendor(s) may be asked to demonstrate the functionality of quoted equipment and associated software at IIT-Kanpur within two weeks of opening the quotations. This demonstration should be provided free of cost.
13. Please clearly mention the arrangements and cost of the following:
 - i) Minimum warranty period (2 years for control unit, antenna and major items and preferably three years or more) for hardware.
 - ii) Minimum software maintenance period (minimum one year and preferably three years or more)
 - iii) The annual maintenance contract (AMC) facility or provision of extended warranty and provide details of other terms and conditions, if any.
 - iv) Details of after-sales service (a) how will the services be provided, details of in-house facilities for the same, turn-around time with acceptable solution, availability of spare parts and their warranty and stand-by system.
14. Training: Provision of training of highest standards is one of the primary requirements in this work.
 - (i) First a minimum of three working days training on operation, data collection, data processing and Interpretation at IIT-K should be provided by the expert. Further, two to three times repetition is desired for the training for the better understanding). A good quality training should be provided to cover the basic and the advanced concepts on the usage and data processing with the equipment.
 - (ii) Please mention number of certified/qualified staff members/trainers who will conduct the training.
 - (iii) One hard copy of handout and one softcopy of all training manuals should be provided, covering installation, operation, maintenance and calibration of the system, usage and the system application software at IIT Kanpur.
 - (iv) The vendor should provide all operation, service and maintenance manuals (in English).

Technical specification for the Ground Penetrating Radar (GPR) for Road Survey, Utility Mapping & Archeological Survey

The desired GPR should be useful for the High resolution survey with shallow depth of investigation to deeper depth of investigation, for current as well future application. The system should meet to the specifications described below. It should be complete in nature including all the accessories, cables, batteries for field survey including processing & interpretation software.

A. Control System

- GPR Control System with in-built rugged color LED display (no additional Laptop should be required in the field) having Antenna input ports for analog and digital antennas (one at a time), DC power input, Serial RS232 (GPS port), HDMI port for video output, Ethernet port, USB 2.0 port, mini USB port and Wi-Fi for data communication and transfer.
- The System should run through rechargeable battery having internal casing in the control unit itself, with low power consumption so that it can run for 4 to 6 hrs or more. No external battery is accepted, because of cumbersome field operations.
- The system should have antenna compatibility lower & higher frequency (central) antennas like 15 MHz to 2.6 GHz or better for deeper & shallower profiles for future applications, so that just by adding the other frequency of antenna, the system can be used for other applications.
- The system should have in-built rugged digital color display to visualize the data in the real time with day & night visibility.
- Data should be shown in LineScan view (multi-color, Black& White), Oscilloscopic view during data acquisition.
- Data collection should be possible in point mode (for undulated terrain), distance mode and time mode (plain terrain) with facility of start & stop anytime in the field during data acquisition and back-cursor real time display to mark/visualize the over-ground attributes/features in the field while data collection.
- Data collection should be in Direct 2D & 3D mode, with 2D and 3D data display in the field, without transferring to Laptop/PC.
- Data storage should be internal in the control unit at least 32 GB or more.
- It should have internal data logger and have integrated support to GPS.
- The system should have automatic recognition of antennas, like their frequency, desired setup to allow maximum compliant of transmit rate etc., so that even the novice can easily use the system in the field.
- Advance real-time filters like Migration, Surface Position Tracking, Signal Noise Floor Tracking, Adaptive Background Removal should be able to apply at the time of data collection to get excellent data quality.
- Multi-point Gain function should able to be applied during data collection to understand the better data quality at the time of data collection.

- Environmental: should comply to IP-65 or better.
- System Performance
 - PRF – 800 KHz or more
 - Scan/Sec – 400 or more
 - Samples/Scan – 16,834 or more
 - Max Time Range – 20,000 ns or more
 - Data Format – 32 bit or more
 - Gain – (-40 to 120 dB) or better range

B. Antennas

These should be with Rugged, military-style connectors, Long-life replaceable wear skids, Coated, sealed electronics, Rugged, high-density molded cables, and should operate from -20°C to 50°C.

1. Antenna with 1600 MHz Central frequency, Shielded type for the Road layer thickness estimation with high resolution data and 50 cm depth of investigation. It should be used in the distance mode in the 4 wheel cart. All the desired cable and accessories should be offered.
2. Antenna with 400 MHz Central frequency, shielded type, with facility of distance mode data collection with 4-wheel cart for utility mapping. The depth of investigation should be 3 to 4 m depending on the soil condition.
3. Antenna with 270 MHz Central frequency, shielded type, with facility of distance mode data collection with survey wheel for deeper utility survey. The depth of investigation should be 6 m on the soil condition.
4. Antenna with 200 MHz Central frequency, shielded type, with facility of distance mode data collection with survey wheel. The depth of investigation should be 7 to 9 m in soil condition.

All these antennas should have:

- Integrated support to GPS, Fiducial Markers.
- Direct 2-D & 3-D data collection

C. Cable and other Accessories

- Antenna Control Cable to connect with the control system to antenna, 2 m, 7 m and 15 m length with rugged military connectors, molded cables - 1 no. each.
- Single wheel based Survey wheel with odometer to use with 270 MHz, 200MHz antennas - 1 No.
- Carry harness – to carry the control unit on shoulder for undulated terrain survey.
- Compact 4-wheel survey cart with odometer for distance mode data collection and to fit 1.6 GHz and 400 MHz antennas

D. Software: 10 activations or more (means software should run in 10 PCs/Laptops at a time)

2-Dimensional Software:

- Line scan display, with zooming in/out facility.
- Should show raw and applied user gain data simultaneously and dynamically with mouse movement.
- Mouse cursor can be used for display position, depth, time range, GPS information, and signal amplitude of the point in the data image.
- Topography correction can be applied using the elevation from users.
- Should have facility of Linked windows scrolling.
- Facility to measure the velocity from hyperbolas and CMP data files.
- Multi-layer variable velocity migration facility should be available.
- It should have image optimization of gain, color palette, contrast and sensitivity, as well as wiggle trace options for better interpretation.

3-Dimensional Software:

- It should crate 3D volume data with 3-D Interactive facility to design the Utility data and able to transfer utilities with all attributes directly to AutoCAD Format for GIS preparation.
- 3D presentation, plan views, time slice maps, and linear functions. Super 3D capability allows the combining of survey files. 3D Map Mode permits 2D files to be viewed in 3D, or combined with GPS data.
- For viewing survey data in 4 screens simultaneously. Allows automatic pipe identification, user defined pipe sizes and colors, movie view of slice information, stretch and compress data in any axis.
- Images can be saved in graphic image files, such as BMP etc.
- *Road Module*: Road Structure Assessment module to provide layer interpretation, pavement layer thickness, and roadway condition assessment.
- *Bridge Module*: Bridge Assessment module adds the capability to identify rebar and concrete cover over rebar on new deck structures. Also includes layer interpretation, provides data for deterioration-mapping, and is designed so that post-processing and analysis are streamlined specifically for bridge deck analysis. Permits analysis of large bridge deck structures with typical two-layer orthogonal grid reinforcement patterns.

Schedule of requirement:

1. Complete GPR System fulfilling the above basic needs :1 No.
Rechargeable Battery- 2 nos., Charger and relevant cable for complete Connectivity, AC/DC Adapter for Lab use
2. 1600 MHz Shielded antenna with belt strap :1 No.
3. 400 MHz Shielded antenna with skid and pull strap :1 No.
4. 270MHz shielded antenna with skid and pull strap :1 No.
5. 200 MHz Shielded antenna with skid and pull strap :1 No.
6. 4- wheel survey cart to fit the 1600MHz, 400MHz and 270MHz antennas :1 No.

7. Single wheel based Survey wheel with odometer to fit to 270MHz & 200MHz antennas:1 No.
8. Software: 2-Dimensional, 3-Dimensional, Road Module & Bridge Assessment Module fulfilling the above mentioned facilities :10 activations
9. 2 m, 7 m and 15 m antenna control cable :1 No. each
10. Sunshade for working in day light :1 No.
11. Carry harness to carry the GPR Control Unit for Field survey in rugged terrain :1 No.
12. Hard PVC Carrying Case for GPR Control Unit
13. User manuals: soft and hard Copies: 1 set