



# भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद

धनबाद, झारखण्ड, भारत, पिन-826004

(मानव संसाधन एवं विकास मंत्रालय, भारत सरकार के अधीन एक राष्ट्रीय महत्व का संस्थान)

INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

DHANBAD, JHARKHAND, INDIA, PIN-826004

(An Institute of National Importance under Ministry of H.R.D., Govt. of India)

STORES & PURCHASE SECTION Phone: (0326) 2235678 || Email : purchase@ismdhanbad.ac.in || Website : www.iitism.ac.in

No. MME-500165-2017-18

Date: July 31, 2017

## NOTICE INVITING TENDER

**Subject: Supply & Installation of Microcontroller board for real-time monitoring and wireless transfer of specific environment parameter**

Indian Institute of Technology (Indian School of Mines), Dhanbad invites quotations for the following to be supplied and delivered in MME Department.

S No	Full Description of items/ store	Qty	Delivery
1	Supply & Installation of Microcontroller board for real-time monitoring and wireless transfer of specific environment parameter (Detailed Specification is given in Annexure – I)	01 No	At the Earliest /Ex-Stock

### Tender Schedule

Item	Particulars
Bid Security or Earnest money deposit	Rs 6,200.00(Rupees Six thousand Two Hundred only)
Last date and time for submission of tenders	24/08/2017 at 3:00 P.M.
Date and time of opening of tenders	24/08/2017 at 4.00 P.M.

1. You are requested to quote your lowest rates for the supply of above items in the attached format for Financial Bid (Annexure – II)
2. You may send your representative in the office of the undersigned at the scheduled date and time of opening of tender.
3. Tender should be submitted in sealed cover only superscribed with Enquiry No. and due date at the following address only:

*The Deputy Registrar (P&S)  
Indian Institute of Technology (Indian School of Mines),  
Dhanbad – 826 004 Jharkhand*



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Date: July 3, 2017

## Technical Specification for Micro-controller Board Development

### Required Functionality :

The micro-controller board will enable real-time temperature, humidity, air pressure, impact, explosive and noxious gases (like methane, CO, CO<sub>2</sub>, O<sub>2</sub> etc). It has to be based on a low power consuming, cost-effective non line-of-sight wireless transceiver to be used for transmitting and receiving of data from one remote end to a central monitoring station via a gateway.

The complete board will have four different sections : Controller Board, Sensor Board, Compatible Wireless Gateway and Compatible Sensors.

### Controller board: 1 unit

The proposed micro-controller board be designed to monitor parameters such as temperature, humidity, atmospheric pressure and some types of noxious and combustible gases. The board's design should allow for:

#### Technical Specification :

1. Add or change a sensor probe in seconds
  2. Radio - unlicensed, non-line of sight, long distance transmission
  3. Allow for external, contactless reset with magnet
  4. Ultra low power consumption of the tune of 71-1A or less
  5. Support Industrial Protocols: RS-232, RS-485, Modbus, CAN Bus, 4-20mA
  6. Battery voltage 3.3-4.2 V (lithium-ion) or better
  7. Microcontroller ATmega 1281 or similar
- Microcontroller frequency 14.7456 MHz or better, SRAM 8 kB or better, EEPROM 4 kB (1 kB reserved) or better, Flash 128 kB or better, SD card 2 GB or better
- Weight 20 g or less
- Temperature range From -10 to 65°C or better
- Clock RTC (32 kHz) or better
- RTC Watchdog reset
- Unique identifier.
- Secure 32 kB EEPROM or better.
- AES-128 support or better
- Have a charging indicator LED
- Provide a way to measure by software



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Sensor board : 1 unit

Date: July 7, 2017

The Gas sensor board be to implement environmental monitoring, industrial, environmental with high requirements in terms of high accuracy, reliability and measurement range

Technical Specification :	
1.	The sensor board should allow to connect minimum 17 different sensors to the controller board.
2.	To measure the exact value in ppm's of a gas concentration.
3.	Support particle sensor to measure PM1, PM2.5, and PM10 particles. This sensor should come calibrated from factory.
4.	Sensor Board should read up to 16 gas sensors: it should also have a high-end sensor for 3 parameters, temperature, humidity and pressure.
5.	The parameters which are to be monitored: Carbon Monoxide - CO, Molecular Oxygen - O <sub>2</sub> , Methane and other combustible gases - CH <sub>4</sub> . Temperature, humidity, air pressure
Electrical characteristics:	
1.	Board power voltage: 3.3V and 5V
2.	Maximum admitted current (continuous): 200mA
3.	Maximum admitted current (peak): 400mA

# All needful Wires connectors and other cables for interconnecting have to be provided

Minimum Specification of Compatible sensors.

GAS	Oxygen (O <sub>2</sub> )	Methane (CH <sub>4</sub> )	Carbon monoxide (CO)
Performance Characteristics			
Nominal Range	0 to 32 Vol.%	0 to 100% LEL	0 to 32 Vol.%
Long Term Output Drift	< 3% signal/3 months	< 2% signal/month	< 3% signal/3 months
Response Time	:5 32 seconds	:5 30 seconds	:5 32 seconds
Sensitivity	1.68 ± 0.240 nA/ppm		1.68 ± 0.240 nA/ppm
Accuracy	0.30%	±0.15% LEL	0.30%
Operation Conditions			
Temperature Range	-30°C to 50°C	-40°C to 55°C	30°C to 50°C
Operating Humidity	5 to 90%RH non-condensing		5 to 90%RH non-condensing
Min Operating Life	2 years in air	2 years in air	2 years in air

Humidity sensor	
Measurement range	0- 99% of Relative Humidity
Accuracy	< ±3% RH (at 25°C. range 22 -78%)



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Hysteresis	$\pm 1\%RH$
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## Compatible Wireless Gateway: One Unit

Operating temperature	-40 -+85 °C
Response time	max 1.2 second
Temperature sensor	
Operational range	0-+65°C
Accuracy	$\pm 1^\circ C$ (range 0 °C - +65 °C)
Response time	max 1.7 seconds
Typical consumption	1 !!A measuring

Specification	Compliance
Cost-effective, non-line-of-sight, long distance wireless transceiver based compatible gateway to be provided for testing along with power supply and other accessories.	

## Complete sensors required

Description:	Unit
Carbon Mono Oxide (CO)	1 no
Oxygen (O <sub>2</sub> )	1 no
Methane (CH <sub>4</sub> )	1 no
Pressure, Temperature, Humidity	1 no

# please provide datasheet of each sensors



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## Terms & Conditions

- 1) The rates should be quoted for each item separately.
- 2) Conditional offer will not be accepted.
- 3) IIT (ISM) does not issue any Form 'C' or 'D' towards sales tax concessional rate. Hence, full rate of GST applicable should be quoted.
- 4) **Bid Security or Earnest Money Deposit (EMD)**: Should be submitted in form of A/C payee demand draft drawn in favor of Registrar, IIT (ISM), Dhanbad and payable at any other Bank/ Branch located in Dhanbad.
- 5) **Educational discount**, if any, should be clearly mentioned.
- 6) You are requested to submit your quotation strictly as per the specifications mentioned in the NIT.
- 7) Your tender must be valid for minimum 90 days from the date of opening of tender.
- 8) Please mention warranty/ guarantee in your offer clearly. Material/ equipment to be supplied must have minimum warranty/guarantee of 12 months.
- 9) *Each page in the bid document must be numbered properly* and duly signed & sealed by the bidder on every page of the bid.
- 10) The items/ materials shall be required to be delivered at MME Department/ Section through Purchase & Store Section, IIT (ISM) Dhanbad at the risk and cost of the tenderer.
- 11) Unloading and installation shall be the complete responsibility of the supplier.
- 12) The stores are required to be delivered within 30 days. Late delivery may not be accepted.
- 13) The items offered should be of good quality confirming to BIS standards, wherever applicable.
- 14) **Advance payment is not admissible**. Payment shall normally be made within 3-4 weeks subject to receipt and acceptance & installation (as per Purchase Order Terms) of the ordered materials/items.
- 15) In the event date on which the tender is opened for acceptance is declared to be a holiday, the tenders shall be deemed to remain open for acceptance till the next working day.
- 16) Please send your offer by Regd. Post/ Speed Post/ Courier along with Courier receipt. Tender/ quotation will be received during IIT (ISM) working hours only (i.e. Monday to Friday). *Late or delayed tenders shall be summarily rejected.*
- 17) Any other information that you may like to obtain, you are free to contact IIT (ISM) before submission of tender.
- 18) IIT (ISM) reserves the right to accept and/or to reject any/ all tenders without assigning any reason.

Deputy Registrar

31/7/17



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Annexure - II

## Format for Financial Bid

NIT No.: MME-500165-2017-18

Date:

Bidders Ref: No.

Date

GSTIN No.:

**Subject: Supply & Installation of Microcontroller board for real-time monitoring and wireless transfer of specific environment parameter**

Sl. No.	Full Description of Items with (HSN Code/SAC Code)	Qty.	Rate	Amount
			Packing & Forwarding (if any)	
			<b>Total</b>	
			GST	
			Freight (if any)	
			Installation (if any)	
			<b>Grand Total</b>	
Amount should be in figure as well as word				

### Note:

- 1) All the details must be provided as per prescribed format only
- 2) Prices quoted by the bidders should include GST, HSN Code, SAC Code, duties, livies, transportation cost and insurance costs etc. if any
- 3) All the rates must be quoted in Indian Rupees.