

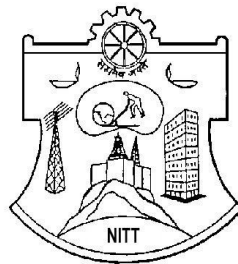
NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPPALLI – 15

Department of Instrumentation and Control Engineering

Web : www.nitt.edu

Phone : 0431 - 2503350



TENDER DOCUMENT

Tender Notification No.: **NITT/R&C/ICE/DST-FIST/2011-12/11**

Dated : **8.9.2011**

Name of the component : Distributed Control System

Quantity required : 1 No.

EMD Amount : Rs.50,000/-

Delivery : 8 Weeks

Last Date of submission of Tender : **30.9.2011 upto 3.00 p.m.**

Address for submission of Tender : The Director
National Institute of Technology
Tiruchirappalli – 620 015.

With kind attention : Dr.A.Ramakalyan
Head of the Department
Instrumentation & Control Engg.
National Institute of Technology
Tiruchirappalli – 620 015.
Phone : 0431-2503351

Date of opening of bid : **30.9.2011 at 3.30 p.m.**



**NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI – 15**

DEPARTMENT OF INSTRUMENTATION CONTROL ENGINEERING

Tender Notification No.: **NITT/R&C/ICE/DST-FIST/2011-12/11**

Dated : **8.9.2011**

NOTICE INVITING TENDER

The National Institute of Technology, Tiruchirappalli (NITT) is an autonomous body under MHRD, GOI, imparting Technical Education and engaged in Research Activities. It is proposed to procure the following component for the departmental academic/research activities.

Sealed Quotations under **two cover system** are invited for the following component subject to the following terms and conditions, from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time. The technical cover will be opened on the same day in the presence of bidders or their authorized agents who may choose to be present.

Name of the component : Distributed Control System
Quantity required : 1 No.
EMD : Rs.50,000/-
Time for completion of supply after placing purchase order : 8 Weeks
Last Date of submission of Tender : **30.9.2011 at 3.00 p.m.**
upto 3.00 p.m.
Tender to be submitted at the following address : The Director
National Institute of Technology
Tiruchirappalli – 620 015.

With kind attention : Dr.A.Ramakalyan
Head of the Department
Instrumentation & Control Engg.
National Institute of Technology
Tiruchirappalli – 620 015.
Phone : 0431-2503351

Place, Date and time of opening of bid :

Date: **30.9.2011**

Time: **3.30 p.m**

Venue: **Dean (R&C) office/Admin Block**

Note : The Institute shall not be responsible for any postal delay about non-receipt / non delivery of the bids or due to wrong addressee.

SECTION : 1 INSTRUCTION TO BIDDER

1. The bidder should give details of their technical soundness and provide list of customers of previous supply of similar items to Universities, Institutes or Government Departments/Undertakings/public sectors with contact details. The details of the agency/profile should be furnished along with the copy of all related documents.

1.1 *Bids are to be submitted under two cover system.*

Cover 1:

Cover 1 should contain the following:

- a. ***EMD - Earnest Money Deposit (EMD) is to be remitted by way of Demand Draft drawn on any Nationalised bank in India by Demand Draft drawn on any scheduled bank in favour of "The Director, NIT, Trichy" payable at Trichy should be submitted. EMD shall bear no interest. Any bid not accompanying with EMD is liable to be treated as non-responsive and rejected.***
 - b. ***Technical pamphlets***
 - c. ***Detailed technical specification***
 - d. ***The agency should furnish copy of license certificate for manufacture/supply of the item.***
 - e. ***The agency should furnish Income Tax PAN number***
 - f. ***Warranty period offered for the tendered item to be specified. If the warranty period is not conforming with the schedule of requirements given in section 3 of the document, the bid is liable to be treated as non-responsive and rejected.***
 - g. ***Duly filled up technical questionnaire, if any***
 - h. ***Duly filled up deviation schedules to technical specification***
 - i. ***Copy of supply orders completed during the last three years ending 31-12-2010.***
 - j. ***If the prices are revealed in the cover 1, the offer will be summarily rejected***
- 1.2 ***The cover 1 shall be superscribed as 'Technical cover' duly indicating the Tender reference No. and the due date of opening.***

1.3 **Cover 2:**

Cover 2 should contain the following

Cover 2 shall contain Price only and shall be superscribed as 'Price Cover' duly indicating the Tender Reference No. and the due date of opening.

Each Cover shall be sent in a double sealed cover. The inner covers (Cover 1 and Cover 2) should be sealed individually with the sellers's distinctive seal and superscribed with the tender reference no. and due date of opening. Both the inner covers shall be placed in a common outer cover which shall also be sealed with seller's distinctive seal and superscribed with the tender reference no. and due date of opening.

Mention "Kind Attention: HOD/ICE DEPARTMENT, and submit at the address given in the Notice Inviting Tender.

Cover 1 - will be opened on the scheduled date and time mentioned in the tender enquiry.

Cover 2 - technically suitable offers alone will be opened on a date which will be intimated to the qualified bidders.

2. The agencies should submit their rate as per the format given in Section 4 of the Notice Inviting Tender in this cover. Rate should be quoted in Indian Rupee. The rate should be quoted both in words and figures. All the pages of the bid should be signed affixing the seal. All corrections and overwriting should be initialed.
3. The tender will be acceptable only from the manufacturers or its authorized supplier.
4. The bid shall be in the format of price schedule given in Section 4. The contract form as per format given in section 5 shall be submitted. Incomplete or conditional tender will be rejected.
5. Details of quantity and the specifications are mentioned in Section 3 appended to this Notice Inviting Tender.
6. The item to be used is strictly according to the specification and subject to test by the Institute/concerned authorities. It must be delivered and installed in good working condition.
7. The Institute reserves the right to cancel or reduce the quantity included in the schedule of requirements at any time after acceptance of the tender with a notice. The Contractor/Supplier shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work/supply in full but he did not derive in consequence of the foreclosure of the whole or part of the works.
8. Performance Security of 5% of the contract value in terms of Bank guarantee by scheduled banks shall be given by the successful bidder for the total period of warranty.
9. **Release of EMD:** The EMD shall be released after receipt of performance security from successful bidder.
10. **Validity of bids:** The rate quote should be valid for a minimum of 90 days. No claim for escalation of rate will be considered after opening the Tender.
11. **Imports:** In case, goods are to be imported, the Indian agent should furnish authorization certificate by the principles abroad for submission of the bid in response to this Notice Inviting Tender.
12. **Clarification of Tender Document:** A prospective bidder requiring any clarification of the Tender document may communicate to the contact person given in this notice inviting tender.
13. **Amendment of tender document:** At any time prior to the last date of receipt of bids, Institute may for any reason, whether at its own initiative or in response to a clarification requested by prospective bidder, modify the Tender document by an amendment.
14. ***The Institute may at its own discretion extend the last date for the receipt of bids.***
15. The bids shall be written in English language and any information printed in other language shall be accompanied by an English translation, in which case for the purpose of interpretation of the bid, the English translation shall govern.
16. The Institute reserves the right of accepting any bid other than the lowest or even rejecting all the bids without assigning any reasons therefor. The decision of the Institute Purchase Committee is final in all matters of tender and purchase.
17. The bidder should give the following declaration while submitting the Tender.

DECLARATION

I/we have not tampered/modified the tender forms in any manner. In case, if the same is found to be tampered/modified, I/we understand that my/our tender will be summarily rejected and full Earnest Money Deposit (EMD) will be forfeited and I/we am/are liable to be banned from doing business with NIT, Trichy and /or prosecuted.

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm

18. Any other details required may be obtained from the contact person given in the notice inviting tender during the office hours.

SECTION : 2 CONDITIONS OF CONTRACT

1. The rates should be quoted in Indian Rupee F.O.R. NIT, Trichy for supply within India.
2. In case of import both CIF and / or FOB rate should be quoted. All components of expenditure to arrive at Chennai need to be explicitly specified.
3. The bidder shall indicate the excise duty exemption for the goods if applicable
4. The Institute is eligible for customs duty and excise duty exemption.
5. The rate quoted should be on unit basis. Taxes and other charges should be quoted separately, considering exemptions if any.
6. Rate quoted should be inclusive of Testing, commissioning and installation of equipment and training.
7. **Payment** : No advance payment will be made. Payment will be made only after the supply of the item in good and satisfactory condition and receipt of performance security by supplier. In case of imports, the payment will be made through LC after installation and performance security need to be submitted at the time of LC commitment.
8. Guarantee and Warrantee period should be specified for the complete period conforming to the section 3 of this tender document.
9. Period required for the supply and installation of item should be specified conforming to the section 3 of this tender document.
10. In case of dispute, the matter will be subject to Tiruchirappalli, Tamil Nadu Jurisdiction only.

SECTION : 3 SCHEDULE OF REQUIREMENTS, SPECIFICATIONS AND ALLIED DETAILS

Name of the Component to be procured : **DISTRIBUTED CONTROL SYSTEM**

SPECIFICATIONS :

Sl. No.	Description	Quantity
1.	LOCAL CONTROL UNIT	1
2.	INPUT-OUTPUT SUB SYSTEM <ul style="list-style-type: none"> • 8 channel AI/AO • 16 channel AI • 32 channel DI, 32 channel DO • T/C input modules • RTD Input Modules • H1 Interface Card • Serial Interface module • HART AI/AO • Remote (Wireless RF I/O) 	1
3.	Operator cum Engineering Interface Sub System <ul style="list-style-type: none"> • Human Interface System (19" LED Monitor, CDROM,FDD, USB, KEY BOARD, Touch screen facility etc.) 	3
4.	Furniture's Table for Operator cum Engineering subs system	2
5.	Cabinets, Cables and accessories	1 Lot
6.	Software Packages Operation and Monitoring Standard Package OPC Interface Package Field bus Media Software Field bus Communication package	

	HART bus Media Software and Communication Package Engineering software	
7.	Field Instruments: <ol style="list-style-type: none"> 1. Pneumatically actuated control valve with HART Enabled Smart Positioner 2. Pneumatically actuated Field bus Enabler Smart Positioner 3. HART and Field bus hand held communicator 	1 each
8.	System Documentation Manuals Operator Manuals and Maintenance Manual with Hard Copy Software Documentation on CDROM/USB drive	
9.	DCS Training at VENDOR place Man-week = 15 days/person 5days After Installation 5 days After 6 Months of Installation 5 days After 12 to 18 Months of Installation (Excluding TRAVEL/Accommodation etc.)	Teaching Faculty: 3 Non Teaching Faculty: 2
10.	DCS Erection and Commissioning: Vendor has to do the following works (After Commissioning) <ul style="list-style-type: none"> • They have to connect process systems such as TPS, FPS, LPS, PPS, Multi process trainer, Heat Exchanger, Hybrid Tanks system, pH process system (P& ID's will be provided by the NIT Trichy) and other field instruments have to be 	

	<p style="text-align: center;">installed and connected to DCS</p> <ul style="list-style-type: none"> • They have to demonstrate DCS in working condition of process station in closed loop operations. 	
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DETAILED DESCRIPTION OF DISTRIBUTED CONTROL SYSTEM (DCS)

SYSTEM FUNCTIONALITY

The Distributed Control System (DCS) will be microprocessor based with functionally and geographically distributed architecture and in general, will cater to the following functions:

- Signal conditioning of various input types.
- Data acquisition & Monitoring.
- Closed loop controls with face plate display.
- Sequential start/stop and Protection & Interlocking functions.
- Fieldbus Interface for Control & monitoring.
- Process parameter display in bar graph and digital format.
- On/Off status display for drives and valves.
- Process graphic with analog parameter displays & equipment on/off status indications.
- Alarm monitoring and reporting.
- Real-time and historical trending.
- Generation and printing event logs and reports.
- Third party devices interface for monitoring.

The system software will be governed by the operating system running in a real time mode to meet all functional requirements necessary for proper and efficient operation of the plant.

The system will have self-surveillance, monitoring and diagnostic facility so that failure/malfunction can be diagnosed automatically up to individual modules.

The regulatory control, sequential and interlocking functions of the system will be executed by a set of algorithms which are easily field configurable using user friendly software.

The regulatory control loops will be able to operate in either manual, auto or cascade mode.

All loops will have facility for slow and fast ramping of set points and output.

The system will be modular to facilitate easy expansion.

The DCS hardware will be designed to operate satisfactorily up to 45 Deg C ambient and between 10% and 90% non-condensing relative humidity.

The proposed scan time for the analog closed loops 250 msec to 500 msec. Scan time for all open loop for monitoring purpose should be 1 sec.

DCS Architecture

An integrated Distributed Control System (DCS - Refer General Figure 1) consisting of System Panels consisting of Controller, Power supply, Communication Interface modules, Input/Output Modules, Fieldbus Modules and associated hardware/software.

DCS should, in general, consist of the following sub-systems :

- Controller Sub-system
- Engineering / Operator Sub-system
- Communication Sub-system
- Input/Output Sub-system
 - Conventional I/Os
 - Fieldbus I/Os

Controller Sub-system

The controller sub-system consists of microprocessor based DCS controller, power supply for the controller, external or inbuilt communication interface modules for Main communication bus, IO communication Network and Fieldbus communication Network.

For the controller, battery back-up will be provided for adequate time period to keep the program storage intact.

Engineering / Operator Sub-system

The operator interface to the system should be through Operator Station (OS) and the Engineer's interface to the system should be through Engineering Station (ES). One (1) no of Engineering Station cum Operator Station and three (3) nos of Operating Stations should be provided.

The Operator Station should cater to the following requirements:

- Indication of all analog and digital process variables of control loops, open loops and all loop related parameters
- Manipulation of control loops including changing set point, Auto-Manual, output and configuration.
- Process/Plant Graphic displays and status indication.
- Faceplate display on Graphics screens for operation.
- Alarm displays and annunciation.
- Logging and trending including historical trend recording.
- Self diagnostic messages.

The Engineering Station should cater to the following requirements:

- Configuring, tuning and maintenance of the system.
- Data base configuration including overview, group, loop, multi loop and multi-variable control configuration.
- Configuration or re-configuration of alarm settings, their values, addition or deletion of any control block or component in loop.
- Tuning of control loops like changing PID dead time values etc.
- Compilation of graphic displays.
- Compilation of logs/reports/historical trend points.
- To call detailed self diagnostic displays for maintenance aid.

The offered Engineering software should have at least minimum of three programming languages as per the IEC 61131-3 Standard.

Communication Sub-system

The system should have different digital communication buses/networks that provide a high speed data transfer rapidly and reliably between the operator stations, engineering station, controllers, conventional Inputs/Outputs and Fieldbus devices connected to it.

Main Communication Bus: The Main Communication Bus should cover the communication between the Controllers and Engineering/Operator Stations. Communication speed on the communication bus should be sufficient to update the operator station with real time data. The minimum speed of the communication bus should be 10 Mbps. It should be possible to connect or disconnect any Station from the system without disturbing the normal operation of the system.

Input/Output Network: I/O Network includes the communication between the Controllers and I/O Nodes (wherein I/O Modules are installed within the system panel) and Remote I/O Network (wherein I/O Modules are located further away from the system panel).

Fieldbus Network: The Fieldbus Network covers both Profibus & Foundation Fieldbus Network.

A separate network for Foundation Fieldbus should be offered. All Foundation Fieldbus components required for connecting Foundation Fieldbus instruments should be included. (in general, Foundation Fieldbus Interface Modules, High Speed Ethernet module (FF HSE), H1 Bus interface module, power supply modules for these components and software required for the same).

Modbus Communication: The DCS should be offered with Modbus RTU RS-485 or RS-232C communication facility. We propose to interface the existing Programmable Logic Controller (PLC) with the DCS through this Modbus communication.

Conventional Input / Output Sub-system

The system should be capable of accepting process signals from various process sensors and switches without requiring external or auxiliary signal conditioning devices while preventing noise errors due to electromagnetic interference or radio frequency. Similarly, the system should be capable of generating analog signals and digital signals for controlling the final control elements.

The system inputs should include 4-20mA DC signal from 2-wire and 4-wire transmitters and potential free digital inputs 24 V DC from Switches and MCC.

The system should be able to generate 4-20 mA DC current signals for analog outputs and potential free contacts for the digital outputs. External pluggable relays should be used for required potentials.

All Analog modules should have module status LED indication and Digital I/O modules will have LED indication for each channel to indicate the status of each Digital I/O.

All modules should be isolated from the external control circuits and should be protected from short circuit and reverse polarity of power voltage.

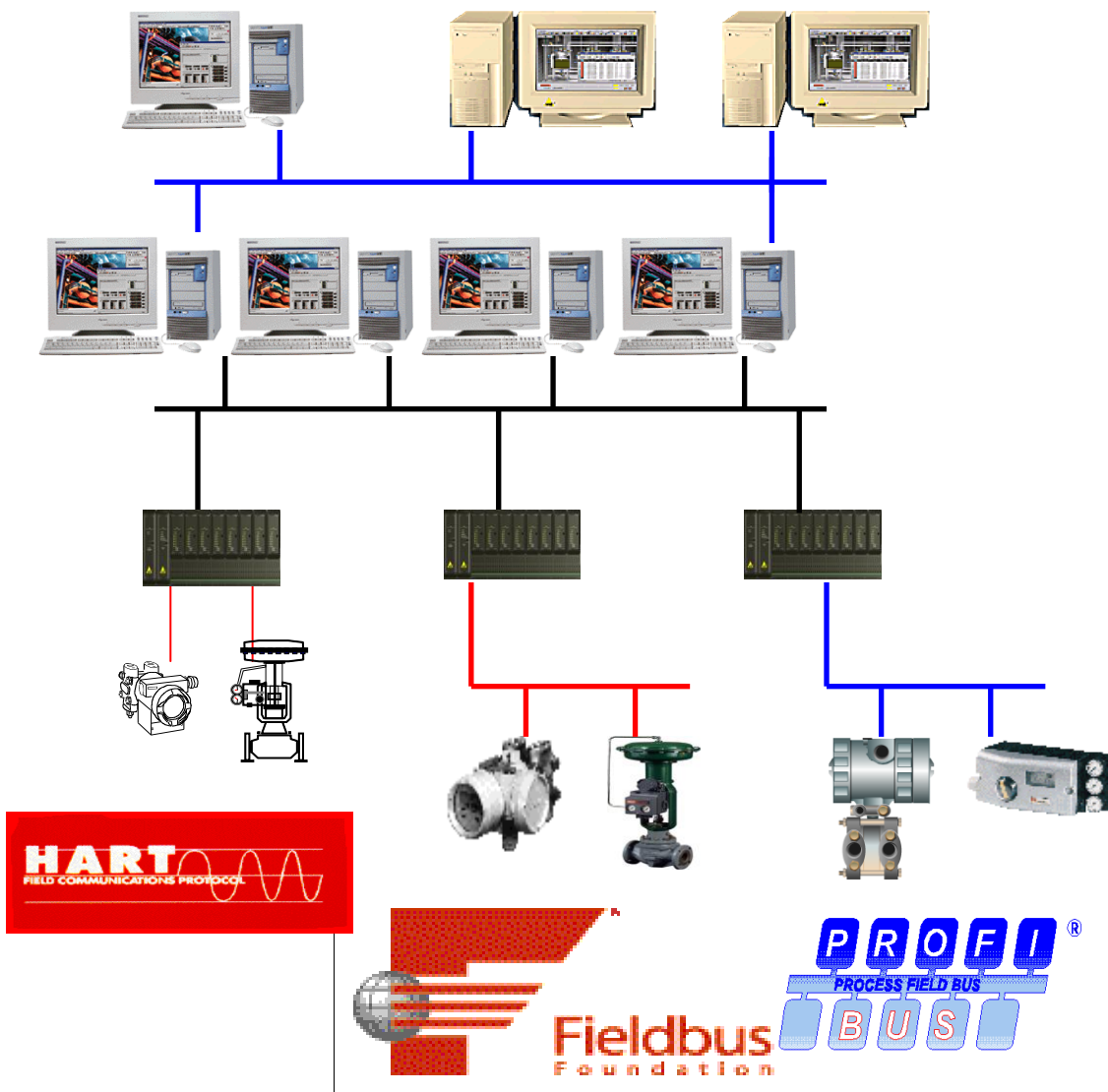


Figure 1 Distributed Control System

SYSTEM CABINET / REMOTE IO CABINET

The system cabinets and Input/output remote cabinets should be of wall mounted or free standing, enclosed type and should be designed for top or side or bottom entry cable connection. The exact cable entry should be decided during detailed engineering.

Cabinets should be fabricated from cold rolled steel sheet of minimum 2 mm thickness suitably reinforced to prevent warping and buckling. Doors should be fabricated from cold rolled steel sheet of minimum 1.6 mm thickness.

Table top type wooden furniture should be supplied for Operator Consoles for Operator Stations and printers.

For heat dissipation, cabinets should be provided with vent louvers backed by wire mesh and ventilation fans. Illumination should be provided for system cabinet by fluorescent lamps and door operated micro switches.

DCS Modules within the cabinet should be laid out in an accessible and logically segregated manner. Clamping rails should be provided for incoming cables to prevent excessive stress on the individual terminal. All metal parts of the cabinet including doors will be electrically continuous and should be provided with a common grounding lug.

Each cabinet should be provided with an earthing lug. All these lugs should be properly connected to the AC mains earthing bus. All circuit grounds of electronic instruments, shields wires of signal cables should be connected to instrument ground bus which should be electrically isolated from the AC mains earthing bus. All AC mains earth bus and instrument ground bus should be properly connected to separate earthing points.

Name of the Component to be procured : Distributed Control System

Specifications : Refer Specification Details

Quantity : 1 No.

Any other details/requirement : Refer Specification Details

Warranty period required : 5 Years From The Date Of Demonstration

Delivery schedule expected after release of purchase order (in weeks) : 8 Weeks

EMD (in Rupees) : Rs.50,000/-

Performance Security to be given by Successful bidder after release of purchase order (in Rupees) : 5% of the equipment cost.

SECTION : 4 PRICE SCHEDULE

[To be used by the bidder for submission of the bid]

- 1. Component Name :
- 2. Specifications (confirming to Section 3 of Tender document-enclose additional sheets if necessary) :
- 3. Currency and Unit Price :
- 4. Quantity :
- 5. Item cost (Sl.No.3 & Sl.No.4) (in Indian Rupee) :
- 6. Taxes and other charges :
 - (i) Specify the type of taxes and duties in percentages and also in figures
 - (ii) Specify other charges in figures
- 7. Warranty period (confirming to the Section 3 of Tender document. This should be mentioned in Technical bid also in order to get qualified for Financial bid) :
- 8. Delivery Schedule (confirming to the Section 3 of Tender document) :
- 9. Name and address of the firm for placing purchase order :
- 10. Name and address of Indian authorized agent (in case of imports only) :

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm

SECTION : 5 CONTRACT FORM

[To be provided by the bidder in the business letter head]

1. (Name of the Supplier's Firm) hereby abide to deliver theby the delivery schedule mentioned in the Section 3 tender document for supply of the items if the purchase order is awarded.

2. The item will be supplied conforming to the specifications stated in the tender document without any defect and deviations.

3. Warranty will be given for the period mentioned in the tender document and service will be rendered to the satisfaction of NIT, Trichy during this period.

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm