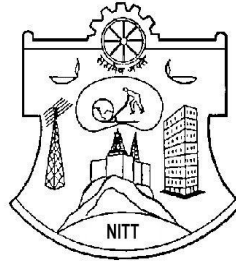# NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPPALLI – 15

Department of Instrumentation and Control Engineering

Web: www.nitt.edu   **Phone: 0431 - 2503363**

TENDER DOCUMENT

Tender Notification No.: **NITT/ICE/RA-DST-FIST/II-2/2013-2014**   **Dated: 29- 07-2013**

Name of the component	**: Distributed Control System**
Quantity required	**: 1 No**
EMD Amount	**: Rs. 50,000/-**
Cost of the Tender Document	**: Rs.150/-**
Delivery	**: 08 weeks**
Last Date of submission of Tender	**: 19-08-2013 up to 3.00 p.m.**

Address for submission of Tender   **:** The Director,
National Institute of Technology- Tiruchirappalli,
Tiruchirappalli – 620015, Tamilnadu, India
Kind ATTN to: Dr.K.Srinivasan,
Assistant professor,
Department of Instrumentation and Control Engineering
National Institute of Technology, Tiruchirappalli-620 015,
Phone: 0431-250 3350

Date of opening of bid   **: 19-08-2013 at 3.30 p.m.**

Department of Instrumentation and Control Engineering

Tender Notification No.: **NITT/ICE/RA-DST-FIST/II-2/2013-2014**   **Dated: 29-07-2013**

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 **THREE COVER SYSTEMS** 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/-**
Cost of the Tender Document	:	**Rs.150/-**
Time for completion of supply after placing purchase order	:	**08 Weeks**
Last Date of submission of Tender	:	**19-08-2013**

Tender to be submitted at the following address   : The Director,
National Institute of Technology- Tiruchirappalli,
Tiruchirappalli – 620015, Tamilnadu, India
Kind ATTN to: Dr.K.Srinivasan,
Assistant professor,
Department of Instrumentation and Control Engineering
National Institute of Technology, Tiruchirappalli-620 015,
Phone: 0431-250 3350

Place, Date and time of opening of bid   :

Date: 19-08-2013 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.

1. This document set contains the following:
   a) Terms and conditions of the Tender
   b) Details of the Firm offering this Quote
   c) Technical Compliance Form
   c) Quotation form (Price Bid)
   d) Currency Form (quoted on behalf of the foreign suppliers)
   d) NIT-T's check list copy
2. The bidder's copy is for your future records. Please fill in and return only NIT-T's copy.
3. 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.
4. Read through the terms and conditions given and affix your signature and seal if you find them acceptable. Any deviations may be recorded. Read carefully list of specifications that we have enclosed.
5. Fill in the questionnaire regarding the Firm.
6. The downloaded documents **'Technical Compliance Form'** and **'Quotation Form (Price Bid)'** should be **TYPE WRITTEN USING CAPITAL LETTERS ONLY**. At the time of filling the "**Quotation Form** (**Price Bid**)" make sure that you have not missed anything. Specify the model number & specification for each item. The form should be filled item-wise. Do not leave blank fields. If you are not quoting for a specific item, you should specify "**NOT QUOTING".**
7. **Do not use** ambiguous terms like **"yes", "complied" or "available".** Specifically mention the matching specification of the product offered by you. Make sure that you have affixed your signature with date and seal on all the documents.
8. Please send the tenders in a sealed envelope super scribed as **"QUOTATIONS AGAINST TENDER NOTIFICATION NO: NITT/ICE/RA-DST-FIST/II-2/2013-2014 Item No. "Distributed Control System"** so as to reach "The Registrar, National Institute of Technology, Tiruchirappalli - 620 015, India" on or before **19-08-2013 at 3.00 pm. along with a Softcopy of the Technical Compliance form and Quotation Forms in MS-Excel file format in a CD/DVD or USB drive.**
9. For any further clarifications, contact by E-Mail:**srinikkn@nitt.edu** or by written request to "The Registrar, National Institute of Technology, Tiruchirappalli - 620 015, India"
10. Prebid conference will be held on **07-08-2013. At 3.30 pm**

Last Date for receipt of tender at NIT-T : 19-08-2013
Opening Date for Tender : 19-08-2013

CHECKLIST TO BE FILLED IN BY BIDDER	
List of documents to be enclosed	Completed & Signed
1. Terms and Conditions form	YES / NO
2. Details of the Firm offering this Quote	YES / NO
3. NIT-T's Quotation form (Technical & Price Bid)	YES / NO
4. Currency Form(quoted on behalf of the foreign suppliers)	YES / NO
5. Other technical specifications & pamphlets	YES / NO

Note: 1. "Cover" should contain the following:
   a. Form of "**Acceptance of Terms and Conditions**".
   b. Form of "**Firms details**"
   c. Pamphlets, if any (in a separate sealed cover)
   2. Quotation Form (Technical, Price Bid and Currency Form)

Please retain this page with you for your future reference.

Section 1. IN THE CASE OF TWO BID TENDERS

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

1.2 *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. **Tender cost**

Cover 2 should contain the following

a. **Technical pamphlets**

b. **Detailed technical specification**

c. **The agency should furnish copy of license certificate for manufacture/supply of the item***

d. **The agency should furnish Income Tax PAN number & TIN number.***

e. **The agency should furnish the last three years balance sheet approved by the CA and the IT clearance certificate.***

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**

j. **If the prices are revealed in the cover 1, the offer will be summarily rejected**

1.3 The cover 2 shall be super scribed as 'Technical cover' duly indicating the Tender reference No. and the due date of opening.

* Appropriately pertaining to the country of origin.

1.3 *Cover 3:*

Cover 3 should contain the following

Cover 3 shall contain Price only and shall be super scribed 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, Cover 2 and Cover 3) should be sealed individually with the Sellers's distinctive seal and super scribed with the tender reference no. and due date of opening. All the inner covers shall be placed in a common outer cover which shall also be sealed with seller's distinctive seal and super scribed with the tender reference no. and due date of opening.

Mention "Kind Attention: **Dr.K.Srinivasan, Assistant professor, Department of Instrumentation and Control Engineering, National Institute of Technology, Tiruchirappalli-620 015**, *and submit at the address given in the Notice Inviting Tender.*

Cover 1and Cover 2 will be opened on the scheduled date and time mentioned in the tender enquiry. Cover 3 of the technically and commercially suitable offers alone will be opened on a date which will be intimated to the qualified bidders.

IMPORTANT: READ ALL THE FOLLOWING TERMS AND CONDITIONS AND SIGN THE ACCEPTANCE CLAUSE FOLLOWING IT

1. The offers should be addressed to "The Registrar, National Institute of Technology, Tiruchirappalli 620015, India" and should be sent in a sealed envelope super scribed **"QUOTATIONS AGAINST TENDER NOTIFICATION No.: NITT/ICE/RA-DST-FIST/II-2/2013-2014 Item No. "Distributed Control System"** so as to reach us **on or before 19-08-2013**

2. Each offer should be sent in a sealed cover with the tender documents. Tenders received through email or FAX will not be considered. **Softcopy of the Technical Compliance form and Quotation Forms should be submitted along with the tender in MS-Excel file format in a CD/DVD or USB drive. However, if there is any dispute between Hard copy and Soft copy, Hard copy will be taken.**

3. The tenders will be opened on **19-08-2013** in the presence of the vendors present with authorization letter from the respective companies / firms. Suppliers intending to attend the tender opening should intimate us in advance.

4. Full technical specifications and pamphlets should be sent along with the tenders. **Offers without proper technical specifications will be rejected.**

5. The rate quoted should be on unit basis excluding Taxes. Taxes and other charges should be quoted separately, considering exemptions if any.

6. All offers should indicate the taxes and duties applicable, if any. Additional charges for packing, forwarding, freight, insurance etc., if any, should be clearly mentioned. Clearance at Customs will be arranged by us.

7. NIT-T is paying concessional Customs & Excise duty under Government of India Notification No.51/96 for Central Customs and 10/97 for Central Excise Duty vide Certificate No.TU/V/RG-CDE(183)/2011 dt.10.10.11. Currently the purchaser is paying 5% Basic Customs Duty, 2% Educational Cess on Basic Customs Duty, 1% Higher Education Cess on Educational Cess, and 4% Import Additional Duty.

8. The Institute is not authorized to issue C and D forms of Sales tax certificate.

9. In case the offered items are to be imported, the rates should be quoted in foreign currency on C.I.F. Chennai Airport basis, and it should include the Freight up to Chennai airport and the insurance cover should be up to National Institute of Technology, Tiruchirappalli. NIT-T shall pay Customs duty if any.

10. If the price quoted is in foreign currency and if the order value is more than US$10,000 then 100% payment will be made through **Letter of Credit (LC) at sight on acceptance**. If the order value is less than US$10,000 , then 100% payment will be through a Telegraphic Transfer (TT). **The bank charges outside India should be borne by the Supplier / Beneficiary. Part shipment not allowed**. If the price quoted is in Indian Rupees, then 100% payment will be made only after installation and commissioning. **No advance payment will be made.**

11. No revision of the price bid will be allowed once the price bids are opened. In case of foreign currency, the agency should mention the % of currency fluctuations they can bear.

12. No increase in price will be allowed after our firm orders are placed.

13. **Payment of excise duty and sales tax / VAT (on ultimate products)** as applicable on the closing date of tender will be to the supplier's / contractor's account. Any statutory variation (both plus and minus) in the rate of excise duty/sales tax/VAT after closing date of tender/revised price bid but before the expiry of the contractual delivery / completion period will be to the account of the office.

    The bidder(s) will indicate, in their bid, the amount with exact rate of the Excise and Sales tax/VAT on ultimate finished product, as applicable at tendering stage, separately in the bid. In case the above information subsequently proves wrong, incorrect or misleading (a) this Institute will have no liability to reimburse the excess in the difference in rates of the item under which the duty/tax assessed finally (b) this Institute will have the right to recover the difference in case the rate of duty / tax finally assessed is on the lower side.

    Any increase in excise duty, sales tax / VAT during extended period of the contract / supply order will be to supplier's / contractor's account where such extension in delivery of the materials/completion of the project was on the request of supplier / contractor. However, any decrease in excise duty/sales tax/ VAT during extended period of the contract / supply order, will be to the account of this Institute.

14. The warranty period should be clearly mentioned. The maintenance charges (AMC) under different schemes after the expiry of the warranty should also be mentioned.
15. Quote should come from authorized dealer or distributor or reseller for each of the product quoted. An authorization letter should accompany your quote for each product quoted; otherwise it may lead to rejection.
16. The delivery period and other terms should be clearly mentioned.
17. Eligibility: Quotation from registered firms/company's / manufacturer under TNGST/CST / other statutory bodies alone be considered. Any Manufacturer / Supplier / Dealer who has been declared ineligible by World Bank/government of India shall not be eligible to participate in this bid. Any fraudulent practices including concealing of facts at the time of submission of bid and there after shall lead to disqualification. List of beneficiaries especially from Educational Institutions / R & D Institutions should also be enclosed with the quotations.
18. For those instruments Cost exceeding 5,00,000/- the company should have (i) Three similar works, each of value not less than 40% of the estimated cost put to tender, or (ii) Two similar works, each of value not less than 50% of the estimated cost, or (iii) One similar work of value not less than 80% of the estimated cost, all amounts rounded off to a convenient full figure, in the last 7 years ending on the last day of the month previous to the one in which the tenders are invited.
19. Complete user, technical and service documentation, and spare parts catalogue are to be provided along with the supply of the item.
20. The vendors are informed that they should not call us over phone or contact us in person. All clarifications can be obtained through E-Mail/FAX/Post. Vendors shall not make attempts to establish unsolicited and un-authorized contact with us after the opening of the offers and prior to the notification of the award. Any attempt by any vendor to bring to bear extraneous pressures on us shall be sufficient reason to disqualify the vendor.
21. Delay / loss in postal transit or due to other reasons will not be NIT-T's responsibility.
22. We are not responsible for accidental opening of the covers that are not properly super scribed and sealed before the time scheduled for opening.
23. The tender should be made only on the "**Technical compliance form**" & "**Quotation form**" which is available in our website, otherwise it shall lead to rejection. The technical compliance form & PRICE BID FORMshould be duly filled up (preferably **TYPE WRITTEN IN CAPITAL LETTERS**) and should clearly mention the features offered by the bidder against each specification.
24. Authorized signatory should sign on all the pages. Bids without authorized signatures will be rejected.
25. The manufacturers of the quoted make of the product must be of national / international repute and having ISO /BIS certificate.
26. **Liquidated damages:** If the bidder/supplier, after accepting the Purchase Order, fails to deliver any or all of the Goods within the period specified in the Order, NIT-T shall, without prejudice to its other remedies under the Rules of Purchase, proceed to cancel the order or agree to accept a delayed delivery on the condition of payment of liquidated damages by the bidder / supplier a sum equivalent to 0.50% of the total cost as indicated in the Purchase Order (which will be deemed as agreed price) for each week or part thereof of delay until actual delivery or performance is completed and such penal charges shall be limited to a maximum of 5% of the total cost. Once the maximum is reached NIT-T may proceed on its own to consider the termination / cancellation of the order.
27. **The vendors are informed that they should sign a stamp paper agreement with us, for Warranty, AMC, etc. before placing the final purchase order as per our terms & conditions and 5% -10% of purchase order value in the form of bank guarantee towards performance security. The bank guarantee will be returned to the supplier after the successful completion of supply, installation, and the warranty period.**
28. Failure to comply with all the terms and conditions mentioned herein would result in the tender being summarily rejected.
29. Vendors are informed that once the companies are shortlisted based on the technical specification, only then the price bids of the firms that meet NIT-T's Technical specification / requirements would be compared.
30. The order will be based on the actual requirement at the time of ordering, optional items may also be ordered based on the actual requirements at the time of ordering. Not quoting for this may result in disqualification.

31. NIT-T reserves the right to modify or alter the specifications after short listing of tenderers.
32. NIT-T reserves the right to change the order quantity or split the orders among multiple vendors without assigning any reason(s) whatsoever.
33. NIT-T reserves the right to reject any or all the tenders without assigning any reasons whatsoever.
34. NIT-T reserves the right to purchase decreased number of quantity of the item to be purchased
35. The agencies should submit their rate as per the format given in Section 4 of the Notice Inviting Tender in this cover. All the pages of the bid should be signed affixing the seal. All corrections and overwriting should be initialed.
36. The tender will be acceptable only from the manufacturers or its authorized supplier.
37. 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.
38. Details of quantity and the specifications are mentioned in Section 3 appended to this Notice Inviting Tender
39. 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.
40. 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.
41. In case of dispute, the matter will be subject to Tiruchirappalli, Tamil Nadu Jurisdiction only.

Release of EMD: The EMD shall be released after receipt of performance security from successful bidder.

Validity of bids: The rate quote should be valid for a minimum of 120 days. No claim for escalation of rate will be considered after opening the Tender.

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.

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.

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.

The Institute may at its own discretion extend the last date for the receipt of bids.

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.

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.

The bidder should give the following declaration while submitting the Tender.

ACCEPTANCE

We accept the above terms and conditions and shall comply with them strictly.

NAME OF THE VENDOR:

ADDRESS:

"DETAILS OF THE FIRM OFFERING THIS QUOTE"
(Write or print or type in block letters and please answer all the questions)

1. Name of the firm? _____   2. Date of incorporation? _____

3. Nature of the company - Government / Public / Private Company / Partnership / Proprietorship: _____

4. Specify the number of years in this line of activity by the Company :. _____

5. Quantity of sales in the last three years for the "………………." (same model that you have quoted)?

2009-2010	2010-2011	2011-2012

6. Turn over in the last three years (Figures should be in Indian Rupees in Lakhs):

2009-2010	2010-2011	2011-2012

7. Provide the postal address, telephone & fax numbers, and email address of the nearest service center.

8. A) Number of service engineers in the above location trained on the product quoted along with their educational qualification, certification and designation (applicable only for instruments) and B) Assured response time for service calls in hours:

A)

B)

9. What would be the delivery period in days from the date we place an official purchase order. _____

2. Enclose the list of customers to whom you have supplied "…………………." during the last 3 years ending 31/03/2012 with full postal address and name of the contact person with phone, FAX numbers, and E-Mail id. Certificate regarding satisfactory performance of the "…………………..." from the minimum three end users should be furnished.

3. Are you the authorized dealer or distributor or reseller for the products quoted:

4. Have you supplied "………………….." to National Institute of Technology, Tiruchirappalli is the last 3 years? If yes, specify the quantity supplied in the last 3 years and last PO reference

5. Was there any elapse or delay in supplying the goods ordered or any service related issue during the warranty period for the products ordered by NIT-T with your firm? If yes, provide details.

6. On Manufacturer's Side to whom NITT have to contact in case of delayed supply and other issues committed by the authorized dealer / distributor / reseller :

Contact Person Name :
Address :
E-mail ID :   Telephone / Cell Phone :

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

SECTION: 3 SCHEDULES OF REQUIREMENTS, SPECIFICATIONS AND ALLIED DETAILS

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

Distributed Control System Specifications:

1. General Requirement :

- Automation System

   The automation system architecture need to support technologies including function blocks and field devices, "off the shelf" computing platforms, Microsoft Windows operating system, OLE/OPC for interconnectivity of multiple systems from different suppliers. Also, it should have provision of adding HART, Foundation Fieldbus, Profibus and Wireless Field Networks. The communication network shall utilize automatic network self-addressing technology (plug-and-play), which automatically assigns unique new controller addressing when a new device get connected to the control network. Provision should be made available for MODBUS communication without any major modification in the system (Controller).

- Software:

   ✓ The software need to permit license for a minimum 1,00,000 tags.

   ✓ The system shall allow for upgrading of system operating software on all modules of the system without the necessity of shutting down the process, should not lose the operator interface, with controllers maintaining control, and without the loss of access to any control function.

   ✓ All the operator stations shall have Diagnostic displays.

   ✓ The offered software shall be of multi window type.

   ✓ The DCS software shall support OFFLINE and ONLINE function.

- Controller:

   ✓ Controller Processor should be greater than 100 MHz.

   ✓ RAM capacity – Minimum 64 MB

   ✓ Processor should be with Pair and Spare Concept

- HMI:

   ✓ HMI should be with OS of Windows 7 / later

   ✓ Monitor shall be of LED type.

   ✓ Concealed in a flat metallic console and rugged.

   ✓ Controller based and not client-server model.

   ✓ It shall have Operator key board with 32 functions keys.

2. Equipment Maintenance

- ✓ Control configuration in the controllers should be stored in flash memory / RAM providing an infinite storage time. Controller memory shall have battery backup for a minimum period of 72 hrs.
- ✓ The equipment shall use standardized, modular, plug-in construction so that any module may be easily removed from the system and replaced without breaking or making I/O connections.
- ✓ All I/O modules and controllers shall be installable under power supply ON condition.

3. Inputs and Outputs

- ✓ Analog I/O

    8 Analog Input and Analog Outputs. All channels shall have 500 V isolation.
- ✓ Digital I/O

    32 Digital input and Digital outputs. All DI cards shall be offered with individual terminal boards.
- ✓ Provision for Expansion for HART, Fieldbus, T/C, RTD, wireless inputs in future.

4. System Cabinet

- ✓ All panels shall be of RITTAL make, with RAL 7035 color (standard). The dimension shall be 600mm (W) x 800mm (D) x 1200mm (H).

5. System Architecture and Communication

- ✓ The system shall be of the distributed type such that all operator interfaces on a system with multiple operator interfaces retrieve their process data directly from the system's process controllers.
- ✓ The DCS communications system shall exclusively employ a fully redundant Ethernet Network for interface to all DCS controllers, Operating Consoles, Engineering Consoles with a speed of 100 Mbps and Control System with a speed of 1 GBPS. No failure of a single control systems station should result in communication loss between any other network resident stations and controllers. The control communication should be offered through redundant switches. Make of switch is CISCO / NET Gear.
- ✓ Continuous communications diagnostics shall give an alarm on a failure in the minimum off time and switch to the redundant communications automatically. Any communication errors shall be available to be logged to any console in the system. Communication system status / performance shall be made available to any console in the system.

6. Control and Data Handling

- Initialization
    - ✓ Initialization is the process by which initial values of the mode, set point and output of a control block are set.

- ✓ Variables that are being initialized shall be subject to the following:
  - ➢ The system shall suppress nuisance alarms created by the initialization of the algorithm.
  - ➢ Calculations involving time-based data shall be reset.
- ✓ Set point shall be initialized when the block get turned from off to on. It should be possible to configure its initial value.

- • Calculations

  Algorithm calculations shall be performed in floating point engineering units or other such equivalent methods that do not require scaling.

- • Regulatory Control
  - ✓ Algorithms

    Standard software algorithms shall be made available to perform regulatory control functions, with provisions for future requirement point of view. These process control functions shall be performed by predefined algorithms with configurable parameters.

    Standard control algorithms should be identical regardless of whether they reside in system controllers or the H1 field devices, for future requirement point of view.

  - ✓ Continuous Control Functions

    The following control functions shall be supplied as standard configurable items and, when applicable, shall be the same regardless of whether the execution occurs in the system controller or field device:

    a) Proportional Integral Derivative (PID) with linear and non-linear gain.

    b) Auto/manual with bias control

    c) Ratio control and override control.

    d) Adaptive tuning

    e) Signal Splitter

- • Control Loop Execution Frequency

  It shall be possible to select the execution frequency of each control loop regardless of execution in the system controller or field device. The following selections should be available:

  a) One second

  b) One half (1/2) of a second

  c) One quarter (1/4) of a second

- • Output Functions

  The following output functions shall be supplied as standard configurable items and shall be the same regardless of execution in the system controller or field device for future requirement point of view.

  a) Linear

b) Linear with clamping (high and low restricted)

c) Non-linear characterization

d) Rate of change limits

- Sequential Control

  The system shall be capable of performing the following sequential control without any modifications to the standard configuration software.

- Sequence Language

A structured, IEC 61131-3 compliant high-level control programming language shall be available and shall conform to the following specifications:

a) It should provide the necessary facilities for real-time control of   sequential Processes.

b) It should have access to process control and other database information.

c) It should be possible to modify the program logic while other sequences are active.

- Sequential Functions

  The following sequential functions should be supplied as standard instructions:

  a) Relational expressions

  b) Calculations

  c) Exponentiation (whole and fractional)

  d) Square root

  e) Timers

  f) Counters

  g) Logical expressions

  h) Single bit memory elements (flip/flops)

  i) Hold sequence:

  j) Recycle to prior step

  k) Skip one or more steps

  l) Restart at beginning

- Self tuning

  A self tuning facility shall be embedded as a standard part of the automation system requiring no extra cost or licensing. It shall be:

  a) Applicable to processes with slow and fast dynamics

  b) Used with self-regulating and integrating processes

  c) Immune to noise and process load disturbances

7. Configuration and Database

- Engineering Workstation

  Only one engineering workstation shall be necessary to perform all traditional,

Foundation Field bus configuration, database generation and editing.

- Configuration Displays

   Configuration displays shall be provided to aid in system configuration. All displays and tags shall reside in one global database shared by the entire system. No data mapping between systems or within an individual system shall be allowed. Each system shall be capable of accommodating a minimum of 1,00,000 tags. It shall be possible to show:

   - ✓ All tags in the system.
   - ✓ All parameters for each tag, including (as applicable) tag ID, tag descriptor, the hardware address, tuning constants, mnemonics associated with the tag, algorithm relating to the tag, and input/output details.
   - ✓ All configurable (or soft) keys and their function.
   - ✓ All hardware modules in the system and the configuration parameters for each.

- Shall be possible to change, delete, and add any independent loop of a multiple loop process controller module without affecting the other loops.

The addition of new system controllers and I/O modules shall be auto sensing without manual intervention.

8. Diagnostics

- On-line and off-line diagnostics shall be provided to assist in system maintenance and troubleshooting. Diagnostics shall be provided for every major system component and peripheral. This shall include segment as well as device diagnostics and firmware diagnostics in the devices. If diagnostics do not exist for particular peripheral devices (for example printers and terminals), the system must detect and provide an error indication for the failure of these devices.

- It shall be possible to configure, monitor and troubleshoot field devices from control system stations. The automation system shall be capable of storing calibration information and device status history for each field device. It shall also be possible for the automation system to upload field device configuration changes implemented in the field. Once the configuration information set stored in the automation system, it should be possible to download it to any other similar device, whether new or replacement device.

- Existing signal wiring should be used to pass field device data to the diagnostic utility. This should not degrade the operation of the system in any way.

9. Data Historization

- A configurable, real time and historical data collection package shall be available to support trending, logging, and reporting. The automation system shall be able to support multiple historian packages. It should be possible to collect historical parameters on multiple workstations providing historical backup capability. It shall be possible to supply on-line storage media.

- On-line process point collection and storage need not require any additional configuration other that the normal module configuration. It shall be possible to enable data historization for each module within its standard configuration.
- The historian shall be capable of collecting continuous history for up to 20,000 parameters. Historical data must be available to remote desktop PC's, using standard, off-the-shelf viewing and analysis software, including Microsoft Excel and Access.
- The historian shall be integrated into control strategy configuration, such that a separate historian configuration database does not need to be maintained. Each control strategy shall maintain its own historical configuration information. When a new control strategy is created and downloaded, it shall include the history definition and the history definition is downloaded to the historian.

10. Trend Displays

Continuous and event data should be able to be combined into a single view. Only the appropriate events for the trends displayed in the trend shall be shown. For example, if the PV of a loop is being trended, all events about the loop shall also be displayed. This shall include any of the events listed in Diagnostics, Alarm and Events such as operator changes to loop SP or tuning changes to gain or loop alarms.

11. OPC Interface

- The automation system should be able to communicate bi-directionally with auxiliary systems using OPC. The OPC interface shall be configured in a client-server relationship with the automation system as a client and the auxiliary system as the server.
- The automation system shall be able to support OPC servers.
- There shall be no need to write any custom code to set up the OPC interface.
- Configuring the OPC shall be done using drag-and-drop functionality to link the
- data source and target.
- As a minimum, the OPC interface shall support 200 data per second.
- Scan time:The proposed scan time for the analog closed loops shall be 250 msec to 500 msec or better. Scan time for all open loop for monitoring purpose should be 1 sec or better.

12. Other Requirements:

- The automation system to be supplied to Department of Instrumentation and Control Engineering, NIT (T) should not be PLC based Control System. It should be a full-fledged DCS system. The same

- make should have been supplied to Process Industries like Refinery, Power plant etc in the name of DCS. A list containing details shall be furnished along with the offer.
- Similar make should have been supplied to both industries as well as academic institutes.
- Bidders shall provide separate quote (with unit price) for recommended spare parts for two years requirements.
- Bidder shall provide five years warranty for DCS (from the date of commissioning) and also shall provide separate quote for AMC after two years of warranty period.
- DCS Erection and Commissioning:

  The vendor shall take care of the following works after commissioning:

  Install and connect process systems such as Temperature, pressure, flow, level Multi process station trainers, Heat exchanger, Hybrid tank, pH process (P& ID will be provided by NIT Trichy) and other related instruments have to be hooked up to DCS. Vendor shall demonstrate DCS in working condition with process stations in closed loop operations.

- DCS Training at Vendor works:

  Number of Persons to be trained: 5 (Teaching faculty: 3 & Non teaching faculty:2)

  Period of training: 15 days/person

  5 days after Installation

  5 days after six months of installation

  5 days after 12-18 months of installation

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)	:	**08 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(excluding   :
    Taxes)

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 the ………………………………by 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