

Notice Inviting Expression of Interest (EOI)

Expression of Interest (EOI) for Design, Supply, Installation, Integration and Commissioning of Robotisation & Automation Solutions for Civil, RPPT and Chemical Laboratories at National Test House – Southern Region (NTH-SR), Chennai

1. Introduction

National Test House (NTH), under the Department of Consumer Affairs, Government of India, is the country's premier multi location, multidisciplinary testing, calibration and evaluation organisation serving industry, government and consumers in diverse engineering and scientific domains. NTH laboratories provide testing, calibration, failure analysis, product development assistance, R&D and training services in accordance with applicable national and international standards.

In line with recent initiatives to modernize operations through digital testing technologies, data automation systems and advanced instrumentation, NTH is undertaking a programme to robotise and automate key laboratory workflows to enhance throughput, data integrity and turnaround time. As part of this programme, NTH-SR, Chennai intends to deploy integrated automation solutions in its Civil, Rubber, Paper, Plastic & Textile (RPPT) and Chemical laboratories.

2. Purpose of this EOI

National Test House (SR), Chennai, invites Expressions of Interest (EOI) from reputed and experienced system integrators, automation solution providers and laboratory technology firms for:

- Conceptualisation, design and engineering of comprehensive robotisation and automation solutions for Civil, RPPT and Chemical laboratories at NTH-SR.
- Supply, installation, integration and commissioning of robotic, mechatronic, metrology, vision and process-automation equipment along with associated software.
- Integration of the proposed solutions with NTH's Laboratory Information Management System (LIMS) and other digital platforms to ensure a closed loop, secure and auditable data chain.

This EOI is primarily an information gathering and vendor shortlisting exercise and does not, by itself, constitute a tender or Request for Proposal (RFP).

3. Background: NTH-SR Chennai

NTH-SR, located at Tharamani, Chennai, functions as the Southern regional laboratory of NTH with facilities in Civil, Mechanical, Electrical, Chemical, RPPT, NDT and allied disciplines. The laboratory supports government agencies, PSUs, private industry and individuals through testing and calibration services aligned with BIS, NABL, FSSAI and other regulatory frameworks.

To meet increasing demand and higher expectations on data integrity, traceability and turnaround time, NTH (SR) proposes to deploy advanced automation solutions in:

- Civil Laboratory – focusing on dimensional metrology and surface integrity (e.g. ceramic tiles, AAC blocks, paver blocks).
- RPPT Laboratory – focusing on automated tensile specimen preparation and UTM interfacing for rubber, plastics, textiles, paper and related materials.
- Chemical Laboratory – focusing on automated fertilizer and water testing workflows integrated with analytical instruments.

4. Objectives of the Automation Programme

The key objectives are:

1. Throughput Enhancement

- Reduce manual operator hours and increase sample handling capacity for Civil, RPPT and Chemical laboratories while maintaining or improving measurement accuracy.

2. Data Integrity & Traceability

- Implement a closed loop LIMS architecture in which sample barcoding, test recipes, instrument telemetry, processed results and certified reports are digitally linked and auditable, minimizing manual data entry and transcription errors.

3. Measurement Quality & Standard Compliance

- Achieve or exceed accuracy and repeatability requirements stipulated in relevant IS/ISO/ASTM standards through advanced multi sensor metrology and robotic workflows.

4. Operator Safety & Ergonomics

- Reduce operator exposure to repetitive, ergonomically demanding and hazardous tasks by deploying safety interlocked robotic cells and enclosed automation stations.

5. Future Ready Digital Laboratory

- Align with NTH's broader Laboratory Data Automation System (LDAS) and AI-driven certification roadmap, enabling future integration with mobile applications and external stakeholder interfaces.

5. Scope of Work (Indicative)

The following scope is indicative and may be refined during subsequent RFP stages. Vendors are encouraged to propose innovative, modular and scalable solutions.

5.1 Cross-Lab Digital Architecture (LES–LIMS Integration Engine)

- Design and deploy an integrated Laboratory Execution System (LES) linked to NTH's central LIMS, such that:

- LIMS acts as master for customer data, batch IDs, test standards, limit tables and high level work orders.
- LES orchestrates real time execution at each automation cell, translating test orders into machine parameters (robot trajectories, motion profiles, fluidic cycles, pneumatic pressures, etc.).
- Provide robust user and role management, audit trails, data encryption, backup and disaster recovery mechanisms ensuring regulatory and accreditation compliance.

5.2 Civil Laboratory – Automated Dimensional Metrology & Scratch Detection Cell

Design, supply and commission a fully integrated metrology workcell mounted on a stable base (e.g. granite) within a controlled environment, comprising at least the following subsystems:

1. Sample Handling Robot

- Multi-axis articulated robot with configurable vacuum/pneumatic grippers for handling tiles, blocks and similar specimens from input racks to metrology stage and onward to output area.

2. Optical CMM Metrology Stage

- Precision XY motion stage with linear encoders (micron level resolution) for positioning samples under fixed optical and height sensors.

3. Multi-Sensor Metrology Head

- Telecentric imaging for 2D perimeter and squareness.
- Confocal chromatic or equivalent sensor(s) for thickness, flatness and warpage parameters.
- Structured light 3D scanning for global surface topography, enabling extraction of all dimensional parameters required by relevant IS standards.

4. Photometric Stereo Imaging Dome with AI Scratch Detection

- Multi sector LED illumination dome and high-resolution machine vision camera to capture multi angular images of glossy/vitrified surfaces.
- AI pipeline (e.g. CNN/U-Net based segmentation) to distinguish true surface scratches from print patterns and colour variations, optionally linked to Mohs hardness evaluations.

5. Control System & LIMS Interface

- Industrial controller/IPC hosting measurement recipes, sensor calibration, Pass/Fail logic and communication with LES–LIMS.

Note : The solution should target significant reductions in per sample measurement time and operator hours while increasing parameter coverage and eliminating manual data entry errors.

5.3 RPPT Laboratory – Universal Robotic Tensile Specimen Preparation & UTM Cell

Design, supply and commission a safety-interlocked robotic work cell integrating stations for automated specimen preparation and UTM interfacing, serving textiles, rubber, plastics, paper and similar materials:

1. Material Feeding Station

- Motorized unwinding for roll stock and sheet handling gantry for rigid materials with vacuum pickup.

2. **Adaptive Cutting Station**

- Multi technology cutting solutions (e.g. oscillating knife, CO₂ laser, heated die press, routing spindle) with automatic tool changer (ATC) to generate standardised ISO/ASTM dumbbell and strip profiles for different material types.

3. **Vision QC & Orientation Station**

- Backlit and downward facing vision systems to verify specimen dimensions and orientation prior to UTM loading.

4. **Robotic UTM Interface**

- Robot with appropriate grippers to insert specimens into UTM grips, guided by laser alignment and visual servoing, followed by handshake signalling for automated test start.

Note: The solution should aim to reduce specimen preparation and test setup time, improve dimensional accuracy, eliminate grip crush failures and speed up material changeovers.

5.4 Chemical Laboratory – Fertilizer & Water Testing Automation Loop

Design, supply and commission automation systems for routine fertilizer and water testing workflows, integrated with existing analytical equipment in the Chemical Laboratory:

- Automated XYZ sampler unit for handling multiple sample containers and delivering precise aliquots to processing streams.
- Continuous flow or manifold based fluidic integration between sample preparation, reagents dosing and analytical instruments (e.g. spectrophotometers, chromatographs) as applicable.
- LES core data parsing engine for acquisition, processing and transfer of instrument outputs to LIMS, with appropriate calibration, quality control (QC) and compliance checks.

5.5 Training, Documentation and Support

- Provide detailed system documentation including user manuals, maintenance guides, calibration procedures and risk assessments.
- Conduct comprehensive training for NTH-SR scientists, technologists and technicians on operation, basic troubleshooting and routine maintenance.
- Offer post commissioning technical support and annual maintenance packages, including remote diagnostics and software updates.

6. Deliverables (Indicative)

Responding firms are expected to outline and, in subsequent stages, provide:

- System design documents (architecture, layout drawings, specifications).

- Bill of materials (equipment, sensors, robots, controllers, software licences).
- Integration plans (electrical, mechanical, software, networking).
- Factory acceptance test (FAT) and site acceptance test (SAT) protocols.
- Training plan and documentation set.
- Warranty and post installation support framework.

7. Eligibility Criteria (Minimum)

Interested firms should, at a minimum:

1. Be a registered legal entity in India with valid PAN and GST registrations.
2. Have at least 3 years of experience in laboratory automation, industrial robotics, advanced metrology or closely related fields.
3. Have successfully executed at least 3 comparable projects in government, public sector, R&D laboratories or regulated industries (e.g. NABL-accredited labs, BIS/ISO-compliant facilities).
4. Demonstrate capability in integrating hardware (robots, sensors, instruments) with software platforms (LES/LIMS or similar).
5. Possess adequate technical manpower including automation engineers, software developers, and service/support teams.
6. Be willing to comply with applicable Indian standards, safety regulations and cybersecurity norms.

NTH (SR) may prescribe additional eligibility criteria at the RFP stage.

8. Information to be Provided in the EOI Response

Interested parties are requested to submit an EOI containing at least the following information:

1. Company Profile

- Legal status, year of incorporation, registered address.
- Organisational structure and key technical personnel.

2. Relevant Experience

- Summary of similar projects executed in the last 5 years, especially laboratory automation / robotic workcells / LIMS-LES integrations.
- Client list with brief case descriptions (sector, scope, technology, outcomes).

3. Technical Capability Statement

- Overview of proposed technical approach for Civil, RPPT and Chemical laboratory automation (at concept level).
- Description of core technologies, sub systems, software platforms and integration strategy envisaged.
- Any reference architectures or standard solutions that can be adapted to NTH (SR).

4. Compliance and Standards

- Statement on adherence to relevant IS/ISO/ASTM standards, BIS/NABL/FSSAI/other regulatory frameworks, as applicable.

5. Indicative Project Timelines

- High level plan covering design, procurement, installation, integration, qualification and training phases.

6. Commercial Overview (Optional, Non-Binding)

- Broad cost bands or typical budget ranges for similar deployments, if available, for NTH(SR)'s internal planning (this will not be treated as a financial bid).

7. Any Additional Inputs

- Suggestions on phasing (e.g. pilot vs full roll-out), risk mitigation, sustainability, AI/ML use in inspection, etc.

9. Submission Format and Mode

- The EOI shall be submitted in **English** and should be duly signed by an authorised signatory with official seal.
- Submissions may be made in **hard copy** and/or **soft copy (PDF)** as specified below:
 - Hard copy: in a sealed envelope clearly superscribed
“Expression of Interest for Robotisation & Automation of Civil, RPPT and Chemical Laboratories at NTH-SR, Chennai”
 - Soft copy: via e-mail as a single consolidated PDF attachment (plus annexures, if any).

10. Address for Submission and Contact Details

EOI responses should be addressed to:

The Director, Head of Office

National Test House (Southern Region)

Tharamani, Chennai – 600 113

Helpdesk: 044-22432374 / 044-29501966 (Mon–Fri, 09:15–17:45 hrs)

E-mail: director-chn@nth.gov.in

For technical clarifications related to this EOI, prospective firms may contact:

Scientist D (NDT), OIC – Business Promotion

National Test House (SR), Chennai

Phone: 044-22433158 (Extn. 222)

E-mail: rajagopal@nth.gov.in

11. Important Dates

- Date of issue of EOI:
- Last date and time for submission of EOI: **04.09.2026**
- Mode of submission: Physical / E-mail.

NTH-SR may later publish clarifications, corrigenda or extended timelines on its website or through other official channels.

12. Evaluation and Next Steps

- EOI submissions will be evaluated by NTH-SR on the basis of organisational capability, relevant experience, technical competence, understanding of scope and overall suitability.
- Shortlisted firms may be invited to make detailed presentations and/or participate in site visits, discussions and technical interactions to refine the scope.
- Based on the outcome of the EOI process, NTH-SR may issue a detailed **Request for Proposal (RFP) / tender document** to shortlisted firms, containing comprehensive technical specifications, commercial terms and evaluation criteria.
- NTH (SR) and NTH reserve the right to accept or reject any or all EOIs, cancel or modify the process and/or not proceed to the RFP stage, without assigning any reason.

13. General Terms

1. This EOI does not create any contractual obligation on NTH (SR) or NTH and is intended solely to obtain information and identify potential solution providers.
2. No reimbursement of costs or expenses incurred in connection with the preparation and submission of the EOI shall be made.
3. All information provided by respondents will be treated as non binding and may be used by NTH (SR) for internal planning and preparation of subsequent RFPs.
4. Respondents are expected to comply with all applicable laws, regulations, standards and ethical practices governing public sector engagements in India.