Scope of Work

Services for Development of add-on modules for Web based Manufacturing process control, Configuration Control and Reporting Software

1. Objective:

The objective is to procure services for development of add-on modules for Web based Manufacturing process control, Configuration Control and Reporting Software incorporating the following technical specifications.

2. Pre-qualification criteria:

NIL

3. Product/ service details and specification:

Sl. No.	DESCRIPTION	QTY
1	Services for Development of add-on modules for Web based Manufacturing process control, Configuration Control and Reporting Software	1 No.

4. Scope of work of vendor:

4.1. Development Platform

The additional modules shall be developed in the same platform (mentioned in the table below) as the existing application software for ease of integration and maintenance.

Sl. No	Feature	Specification	Remarks
1.	Database Tool	SQL Server Management Studio	Open Source
2.	IDE	VS Code	Open Source
3.	Web servers	IIS	Open Source
4.	Development framework	.net Core	Open Source
5.	RDBMS	MSSQL	Perpetual License

4.2. Preparation of SRS for new modules:

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Analyse the existing software modules and arrive at a workflow for digitalizing the process with appropriate access controls. Arrive at the necessary application architecture to enable integration with existing software modules and prepare the Software Requirement Specification (SRS) document for the new modules to be implemented.

4.3. Following are the Terms of Reference (ToR):

4.3.1. Use of Open Source Frameworks with assured support.

4.3.2. Web Browser independence (if applicable).

4.3.3. Industry standard UI design documents shall be used for developing user interface and interactions.

4.3.4. Maximum use of predefined data fields (dropdown menus, checkboxes etc) for input of data by users. Minimum data entry by users.

4.3.5. Completely modular architecture such that any module can be replaced upgraded / added without affecting the functionality of other modules.

4.3.6. Application wide comprehensive "natural language" based search facility.

4.3.7. The application shall be accessible on Windows/ Linux/ based machine and shall accommodate for multiple levels and layers of data processing capabilities.

4.4. General Guidelines

4.4.1. **Data Validation and Management:**

4.4.1.1. The software shall facilitate the export and import of data in diverse file formats such as Text, Excel, MS-Word, XML, JSON, PDF, etc.

4.4.1.2. All critical data inputs shall be provided with data validation before usage.

4.4.1.3. Database backups and restoration processes shall be supported to ensure data integrity and recovery in case of system failures or data corruption.

4.4.1.4. Efficient query optimization techniques should be employed to enhance database performance and responsiveness, ensuring timely retrieval and manipulation of data

4.4.1.5. Access control mechanisms must be implemented to regulate user permissions and privileges, safeguarding sensitive data from unauthorized access or manipulation

4.4.2. **Rights & Role-Based Access:**

4.4.2.1. The software shall support granular rights and role-based access control (RBAC) mechanisms to regulate user access to system resources and functionalities based on their roles and responsibilities.

4.4.2.2. User roles shall be defined and managed centrally, allowing administrators to assign specific permissions and privileges to each role according to organizational policies and security requirements.

4.4.2.3. Access control lists (ACLs) shall be implemented to enforce fine-grained access controls at the object or data level, restricting user actions based on the assigned roles and permissions.

4.4.2.4. Audit trails shall be maintained to record user access activities, including login attempts, resource accesses, permission changes, and other security-related events, for accountability and compliance purposes.

4.4.2.5. Regular access reviews and recertification processes shall be conducted to validate user' access rights, identify dormant accounts or unnecessary privileges, and mitigate the risk of unauthorized access or data breaches.

4.4.3. **Design Guidelines:**

4.4.3.1. Modular Design: The solution shall be designed with a modular architecture, allowing for flexibility and scalability. Modular components shall be developed, tested, and deployed independently, facilitating easier maintenance and upgrades.

4.4.3.2. Separation of Concerns: Design shall follow the principle of separation of concerns, dividing the application into distinct layers such as presentation, business logic, and data access. This separation enhances maintainability, reusability, and testability of the codebase.

4.4.3.3. Clean Code Principles: Developers shall adhere to clean code principles such as readability, maintainability, and simplicity. Writing clean, well-structured code reduces complexity and makes it easier for developers to understand and modify the code in the future.

4.4.3.4. Security by Design: Security shall be integrated into the design process incorporating secure coding practices, encryption mechanisms, and access controls to mitigate potential security threats and vulnerabilities.

4.4.3.5. Error Handling and Logging: Robust error handling mechanisms shall be implemented to gracefully handle exceptions and errors, providing informative

error messages and logging relevant details for troubleshooting and debugging purposes.

4.4.3.6. User Experience (UX) Design: User experience shall be prioritized by designing intuitive interfaces, clear navigation flows, and responsive layouts. User testing and feedback sessions shall be conducted to iteratively improve the usability and accessibility of the application.

4.4.3.7. Iterative Design Process: Iterative design process shall be adopted soliciting feedback from stakeholders and end-users at each stage of development. Iterative design allows for incremental improvements and adjustments based on real-world usage and feedback

4.4.4. **Development and Testing:**

Resources / Engineers for carrying out software development and testing shall be provided by the industry partner. Testing shall also include ease of installation, user friendliness and security besides adherence to the functional requirements in the SRS following the industry best practices. Although the industry partner may be permitted to develop few identified parts of the system at their facility, certain modules must be developed inside GTRE. This classification shall be done and notified to industry partner after SRS document is complete. To enable such development work inside GTRE, the industry partner is expected to deploy skilled manpower as specified below:

4.4.4.1. One (1) Software engineer with bachelor's degree in computer science with minimum 3 years of experience shall be available at GTRE campus throughout the development, testing and commissioning of the software.

4.4.4.2. One (1) Project manager with bachelor's degree in computer science with minimum 3 years of project management experience is expected to visit once in every 2 weeks, for code inspection, review and co-ordination with the project office. This frequency shall be changed as required at any point during the project phase.

4.4.5. **Source Code:**

The entire source code shall be provided with version management along with documentation explaining the functions of each module/ routine etc. It must be understood that the software shall be developed for the GTRE as a dedicated project. Entire software and other details shall be made available to the GTRE and it cannot be utilized for any other purpose without specific clearance from GTRE.

4.5. Software Modules

Most of the foundational modules are already available on the current system. Developers shall utilize the existing implementation to maintain consistency and leverage existing functionality. However, if modifications or enhancements are necessary to meet the requirements of the new features, developers shall document and implement these changes accordingly.

Following are the new top level software modules to be developed. The detailed requirements on the work flow management shall be captured in the SRS document.

4.5.1. ACSN & NCR Management Module

ACSN is Advanced Change Control Study and NCR is Non Conformance Reports. The work flow shall be developed to implement the following features:

a. Creation of new ACSN and NCR entries, allowing users to document instances of change and non-conformance details.
b. Modification of existing ACSN and NCRs, enabling users to update information during the resolution process.
c. Capturing the various stages of clearance of ACSN and NCR approval process.
d. Summary information to display the number of NCRs raised and the overall status (cleared/rejected) with relevant information
e. Dashboard to highlight all the ACSN details and status pertaining to its clearance along various stages

4.5.2. Forging and Casting Management Module

This module shall capture all the forging and casting orders placed on various industries with comprehensive details and reports.

a. Creation of orders for forging and casting components placed with industry partners
b. Management of orders including monitoring of order status, quantities, and delivery schedules.
c. Provision to upload technical documents/ reports generated by industry partners and clearance reports by GTRE

d. Generation of summary reports indicating the status of all forging and casting components and detailed reports w.r.t vendor-wise, order-wise, accepted and rejected quantities

e. Creation of custom links to access this module independently from a browser for document upload facility

4.5.3. **SOP and Build Management Module:**

Engine Builds and SOP Management module aims to streamline the process of creating and managing engine builds based on Master Parts Lists (MPL) and generation of SOP (Standard Operating Procedure) report.

a. Creation of new engine builds based on MPL (Master Part List)
b. Provision for a hierarchical view of components within each build.
c. Enabling users to access, update, and manage serial numbers and other pertinent part information in each build.
d. Provision for attachment of required SOP documents at each part level and status indicators to identify uploaded documents.
e. Automatic Generation of SOP report for each build with the details entered for each part/component of the engine and highlighting the changes between engine builds.

4.5.4. **Document Management Module**

This module shall manage all the technical documentation and project specific documents and reports:

a. Creation of document repository (folders and documents) for storing various technical and project-related documents

b. The interface shall resemble a file explorer with a tree structure, allowing users to navigate through folders

c. Facility to search and filter documents based on tags, keywords, and other metadata

d. Options to View/Download/Edit the documents shall be provided

e. Access control mechanisms shall be built to ensure the confidentiality of documents based on user roles and permissions

5. **Scope of work of GTRE:**

5.1.GTRE shall provide required inputs and guidance for the development and testing of application software.

5.2. At each stage of the development, review and approval shall be done by the user group. The user group shall be actively engaged in guiding and monitoring the software development process to ensure that the software development is going in the right direction.

5.3. All the milestone deliverables shall be reviewed, tested and service completion certificate shall be issued by the GTRE

6. **Deliverables by the vendor:**

6.1. Software deliverables:

a) Software modules along with the source code as per Section 4.5

6.2.Service deliverables:

As per section 4 of the document

6.3. Documents:

The industry partner shall provide the soft copies of all the documents mentioned below:

- Requirement document
- Design document
- User manual
- Test reports

7. **Acceptance criteria:**

The software modules and its associated documents submitted shall be reviewed and accepted by GTRE.

8. **Warranty:**

The industry partner shall provide free updates/bug fixes on the software for a period of 1 year from the date of last milestone deliverables.

9. **Delivery schedule:**

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The industry partner shall carry out the activities as mentioned in the scope of work and shall generate the deliverables as per the table below. The entire set of activities shall be completed within a span of **120** days. T0 shall be the date of placement of order by GTRE.

Milestone	Deliverables	Duration
Milestone 1	ACSN & NCR Management Module	T0 + 30 days
Milestone 2	Forging and Casting Management Module	T0 + 60 days
Milestone 3	SOP and Build Management Module	T0 + 90 days
Milestone 4	Document Management Module	T0 + 120 days

10. Payment terms:

Delivery payment (Milestones based) shall be done as per the schedule below.

Time	Vendor Responsibilities	Payment
T0 + 60 days	Completion of Milestone 1 and Milestone 2 activities &	**50%**
T0 + 120 days	Completion of Milestone 3 and Milestone 4 activities	**50%**

11. General terms and conditions:

11.1. As per GTRE standard terms and conditions.

11.2. The industry partner shall sign an NDA in the standard and government agreed format with G.T.R.E

11.3. All intellectual property rights lie with GTRE. The industry partner shall not make any publication or presentation based on the activities carried out towards this project without written permission from GTRE.

12. Documents to be submitted along with quotation:

The industry partner shall sign (and affix its seal) on every page of this document and attach a copy of the same with the quotation. This is required to indicate that the industry partner has read and understood all the information provided here in.

Signature of DO

Signature of SPC-Chairman