



**Department of Measurement Units, Standards and Services**

**BIDDING DOCUMENT -- SECTION VI  
SCHEDULE OF REQUIREMENT  
(Volume 2)**

**(Single-Stage Two Envelope Bidding Procedure)**

**Procurement of Design, Development, and  
Implementation of Measurement Standards Management  
Information System (MSMIS)**

**IFB No: MS/F/PROC/2023/05**

**November 2023**

Please note the following abbreviations used throughout this tender document.

API	Application program Interface
CR	Change Request
CICD	Continuous Integration and Continuous Delivery
DSRS	Detailed Software Requirement Specification
DSTD	Detailed Software Technical Design
FAQ	Frequently Asked Questions
NFR	Non-Functional Requirements
NPF	National Policy Framework
ICTA	Information and Communication Technology Agency
LGC	Lanka Government Cloud
LGN	Lanka Government Network
OAT	Operational Acceptance
PoC	Proof of Concept
REST	Representational State Transfer
SRS	System Requirement Specification
SLA	Service Level Agreement
SQA	Software Quality Assurance
UAT	User Acceptance Certificate
UI	User Interface
MUSSD	Measurement Units, Standards and Services Department
NML	National Measurement Laboratory
MSMIS	Measurement Standard Management Information System
SLAB	

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# Procurement of Design, Development and Implementation of Measurement Standards Information Management System (MSIMS)

## 1. Background

Measurement Units, Standards and Services Department is responsible for providing accurate and reliable measurement procedures and metrology services safeguarding the interest of the consumers and stakeholders maintaining updating the national measurements standards conformity with the international measurement system (SI) by implementing the law and regulations of measurements units, Standards and services act no 35 of 1995.

Metrology can be mainly divided into three sub sectors as,

**Scientific Metrology**- For the development of measurement standards at highest levels

**Industrial Metrology** -Carrying out accurate and satisfactory functioning of measurement standards used in industry, production and testing.

**Legal Metrology** - The assurance of correctness of measurements where these have an influence on the transparency of trade, on law enforcement, on health, on safety and on the environment.

**These all above operations are controlled through the MUSSD head office in Homagama and MUSSD has expanded its Legal Metrology services establishing a network of 25 district offices to better serve a diverse array of stakeholders.** Currently MUSSD carries out all services mainly in manual and paper-based documentation with general software and IT facilities for operation.

It raises more disadvantages including lack of information, Corruption and irregularities, time wasting, Limited Accessibility, Risk of Data Loss, Lack of Version Control, limited data Reporting, Reduced auditability, Environmental Impact, Limited Data Analysis, Difficulty in Scaling, Compliance Challenges, Security Concerns etc.

To overcome these disadvantages, the Department of Measurements Units, Standards and Services should transition to digital solutions, such as electronic data capture, database management systems, effective reporting, data analysis and automation of processes, which can improve accuracy, and data accessibility for effective and efficient operations, information management and decision making.

## 2. Objective of the Project

The Objective of the project is to implement the functions, roles that comply with the mission and vision of the MUSSD in a more reliable, accessible, efficient and effective manner removing current barriers to expansion with modern IT and digital technologies.

### **Vision**

"Accurate and reliable measurements for a well-protected customer community".

### **Mission**

"To establish, maintain & disseminate the national measurement standards in compliance with international standards, ensuring justice & equity for producers, traders, metrological & other service providers & consumers, through the regulatory & service activities based on measurements to uplift the quality of life and standards of Sri Lankans"

### **Role of MUSSD**

MUSSD functions to establish, maintain and disseminate the national measurement standards in compliance with international standards, ensuring justice & equity for producers, traders, metrological & other service providers & consumers, through the regulatory & service activities based on measurement to uplift the quality of life of the Sri Lankan community.

### **Functions**

MUSSD is responsible for maintaining national standard of measurement and SI units and for realizing those units of measurement through the development and maintenance of standard of measurement, reference material and reference techniques.

### **Main Functions**

Establishment and maintenance of Scientific, Legal and Administrative structure, which is required to secure and ensure international recognition of the national measurement system of Sri Lanka.

1. Providing calibration facilities to testing/calibration laboratories.
2. Providing calibration facilities to industry.

3. Providing and maintenance of Sri Lanka Standard Time.
4. Secure the accuracy of measuring instruments used in trade, environmental protection, regulatory activities etc. by mandatory verification system.
5. Establishment of district basis verification centers, laboratories and verification of working standards.
6. Preliminary verification and re-verification of weights, measures, weighing and measuring equipment used in trade.
7. Legal control of manufacture, repair and sale of weighing and measuring instruments used in trade.
8. Pattern approval of weights, measures, weighing and measuring instruments used in trade and industry.
9. Protect consumers by taking legal action against personnel who violate the measurement law of the country (MUSS Act.No.35 of 1995).
10. Testing pre packed commodities.
11. Consumer Education.

### 3. Scope of Services

In order to meet the MUSSD requirements, selected Bidder to achieve the below stated brief scope of services within a period of **twelve (12) months**, conforming to the measurement units, Standards and services act NO 35 of 1995, implementing, integrating with internal and external applications and providing support and maintenance for a period given under the scope of work.

- a) Design, Development and implementation of MSIMS
- b) Deploy the MSMIS at Head office, 25 district offices and Islandwide field services in each district (**Annex-D: Staff details and number of users of services of MUSSD, Annex G: Measurement Units, Standards and Services Department district offices details**)
- c) Develop integration capabilities with interfaces of other relevant organizations for activities under the scope (**SL-Custom, Treasury System ITMIS, Company Registrar department, Consumer Affairs authority, Registration of persons, District Secretariat, divisional secretariat, Local government, Grama niladari office, ICTA**)

- d) Support and Maintenance of the developed MSMIS for a 3-year operational period.

The Bidder is required to conduct the following process;

1. Detail requirement gathering for all modules
2. Business process reengineering
3. Propose TO-BE solution
4. Detailed SRS
5. Design and development of the system
6. Conduct testing
7. Maintain the system

**Key Modules of the MSMIS**

Key Modules of MUSSD
<b>Registration</b>
<b>Legal</b>
<b>Laboratory Services</b>
<b>Operations</b>
<b>Alerts, Notifications, Dashboard and Reports</b>

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**Expanded view of key modules**

<b>Key Modules of MUSSD</b>	<b>Sub modules</b>
<b>Registration</b>	<b>Pattern approval</b>
	<b>Initial verification</b>
	<b>Subsequent verification</b>
	<b>Seller registration</b>
	<b>Repairer registration</b>
	<b>Cancellation of registration</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Legal</b>	<b>Complaint handling</b>
	<b>Court procedures</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Laboratory Services</b>	<b>Calibration /Testing</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Operations</b>	<b>Revenue and expenses</b>
	<b>Transport</b>
	<b>General maintenance</b>
	<b>Communication</b>

<b>Key Modules of MUSSD</b>	<b>Sub modules</b>
<b>Registration</b>	<b>Pattern approval</b>
	<b>Initial verification</b>
	<b>Subsequent verification</b>
	<b>Seller registration</b>
	<b>Repairer registration</b>
	<b>Cancellation of registration</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Legal</b>	<b>Complaint handling</b>
	<b>Court procedures</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Laboratory Services</b>	<b>Calibration /Testing</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Alerts, Notifications, Dashboard and Reports</b>	<b>Standard reports and status reports</b>
	<b>Customized reports and alerts</b>
	<b>Customized dashboard</b>

<b>Key Modules of MUSSD</b>	<b>Sub modules</b>
<b>Registration</b>	<b>Pattern approval</b>
	<b>Initial verification</b>
	<b>Subsequent verification</b>
	<b>Seller registration</b>
	<b>Repairer registration</b>
	<b>Cancellation of registration</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Legal</b>	<b>Complaint handling</b>
	<b>Court procedures</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
<b>Laboratory Services</b>	<b>Calibration /Testing</b>
	<b>Storage of data with backups</b>
	<b>Reports , Alerts, Notifications, Status information</b>
	<b>Analytics and data download</b>
	<b>Storage with backups</b>

**Payment gateway:** Payment gateway module shall be available in Registration, Laboratory services and Operations modules and appropriate places that traders costumes and MUSSD staff involved for online payments, Payment to bank and entering relevant payment details integrated with respective identification of service requests for further processing in the system.

Description of key modules refer, Annex – E: High Level Architecture - Architectural requirements to be met by the solution, Description of key modules

**Compliance to Scope of Services**

Description	Bidders Compliance	Reference (Section No and Page NOs)
<p><b>3.1. General Requirements</b>                      The bidder shall fulfill/facilitate all of the following;</p> <p>3.1.1. Understand the overall scope of the initiative.</p> <p>3.1.2. The bidder is responsible for the design, development, deployment, support, and maintenance of the solution within the given timeline.</p> <p>3.1.3. The employer will fulfill the facilities and services as indicated in <b>Section 5</b> “Services and Facilities provided by the employer” of the document. The bidder works in collaboration with the employer in order to fulfill the objectives of this project.</p> <p>3.1.4. Further to the above, any dependent actions/services should be mentioned by the bidder to the employer in advance.</p> <p>3.1.5. The bidder shall formulate an “Operational Manual” outlining, among others, maintenance and operational aspects. The operational manual shall include all relevant sub-manuals that would outline procedures and relevant criteria which would facilitate all stakeholders associated with this project for successful operational governance.</p> <p>3.1.6. The bidder shall be responsible for the successful and timely delivery of the project.</p> <p>3.1.7. The Project Director/Manager appointed by the bidder is responsible for the delivery of the project (single point of contact) and shall liaise with the Employer and work closely with the employer’s project management team with regard to all matters related to the project.</p> <p>3.1.8. Project Director/Manager appointed by the bidder’s responsibilities include among others;</p> <p>3.1.8.1. Attending all project meetings</p> <p>3.1.8.2. Ensure relevant project team members participate in project meetings</p>		

<p>3.1.8.3. Ensure all internal and external communications and escalations are done to avoid delivery delays.</p> <p>3.1.8.4. Delivery of the project successfully.</p> <p>3.1.8.5. Submit weekly progress reports to the MUSSD</p> <p>3.1.8.6. Ensure the help desk and related support functions are in place.</p> <p>3.1.9. The bidder shall submit a detailed project proposal at the commencement of the project and shall obtain acceptance from the employer.</p> <p>3.1.10. The bidder shall ensure a smooth handover of the related project components and artifacts at the end of the contractual time period.</p> <p>3.1.11. The items listed as requirements and deliverables must be used only as guidance of the deliverables and not as a limiting factor to providing additional information required that may not be listed here.</p> <p>3.1.12. The Employer will NOT expect to use any commercial licenses for this development.</p> <p>3.1.13. Adherence to common industry standards</p> <p>3.1.13.1. The software, hardware, network &amp; communication technologies proposed by the bidder MUST be based on non-proprietary and common industry standards whenever such standards are available and applicable.</p> <p>3.1.13.2. The bidder should study existing manual procedures and paper-based documentation and required integrations with organizations and carry out any enhancements needed for the proposed MSIMS solution in order to provide a more comprehensive service which will be reviewed by MUSSD.</p> <p>3.1.13.3. The bidder may leverage their own environments for development and end-user application training in order to achieve the delivery timelines if needed.</p> <p>3.1.13.4. The bidder should follow templates if provided by MUSSD for deliverables.</p> <p>3.1.13.5. Participate in Project Review Committee meetings and Project management committee Meetings as a member and present the status of the project when necessary.</p> <p><b>3.2. Implementation Approach</b></p> <p>3.2.1. The Bidder should study the existing manual procedures and paper-based documentation and should carry out a requirement study with the stakeholders to identify new features and functionalities to be implemented in MSIMS Solution. Refer to <b>Annex A, B &amp; E</b> and other related artifacts.</p> <p>3.2.2. Bidders should study and design improved user journeys.</p>		
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<p>3.2.3. On completing the above, a Detailed Software Requirements Specification (DSRS) and a Detailed Software Technical Design (DSTD), including the proposed solution architecture design should be submitted.</p> <p>3.2.4. Upon obtaining approval from the committee appointed by MUSSD for the above, the Bidder should design and develop the solution.</p> <p>3.2.5. The implementation shall span across the following stages of the software development lifecycle</p> <ul style="list-style-type: none"> <li>3.2.5.1. Planning</li> <li>3.2.5.2. Development and customization</li> <li>3.2.5.3. Set-up of staging and production environment including required tools</li> <li>3.2.5.4. Unit Testing, System Testing, Integration Testing, Performance Testing</li> <li>3.2.5.5. UAT</li> <li>3.2.5.6. Release management</li> <li>3.2.5.7. Continuous build (Continuous Integration, Continuous Deployment)</li> <li>3.2.5.8. Deploy</li> <li>3.2.5.9. OAT</li> <li>3.2.5.10. Enhancement and augmentation</li> <li>3.2.5.11. Technical Support, Troubleshooting, Identification, and Resolution</li> <li>3.2.5.12. Change and version control</li> <li>3.2.5.13. Patch management</li> <li>3.2.5.14. L1, L2, and L3 support for all applications</li> </ul> <p>3.2.6. The entire solution shall be web-based and web-enabled.</p> <p>3.2.7. The proposed solution should be browser independent and able to access with less configuration in the client workstation.</p> <p>3.2.8. The proposed solution should develop using the latest technology stack and should be able to deploy into staging and production in the cloud platform provided by MUSSD.</p> <p>3.2.9. The Bidder should define the infrastructure resource requirements based on the deployment architecture.</p> <p>3.2.10. The Bidder should study and facilitate API integrations to external systems.</p> <p>3.2.11. The Bidder should propose and develop the required APIs. Bidder should provide an API specification document.</p> <p>3.2.12. The Bidder should follow the proper coding standard and maintain project source code in the MUSSD GitHub system and upload all the relevant documents to the MUSSD Document Management.</p>		
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<p>3.2.13. Source code should be regularly updated when making changes to the system.</p> <p>3.2.14. The configuration file required for the deployment should be committed to the source code repository in a separate folder structure</p> <p>3.2.15. All IP rights of the source code should be with MUSSD</p> <p>3.2.16. Adopt a proper application release procedure to release the applications to the environments during the deployment in the staging/ production environments at the cloud (configure, replicate and data migration to the server).</p> <p>3.2.17. The Bidder should follow templates if provided by MUSSD for deliverables.</p> <p>3.2.18. Bidders should formulate test plans, and test cases, The UAT shall be conducted to give acceptance and commence operations.</p> <p>3.2.19. Developed solution shall be audited by Sri Lanka Computer Emergency Readiness Team (SLCERT) to identify system security vulnerabilities. The Bidder shall fix all security related recommendations as per the report submitted by SLCERT; prior to solution launch and during the support and maintenance period.</p> <p>3.2.20. The proposed solution should have a proper data backup plan and be equipped with a high availability and fault tolerance plan as per the project requirements.</p> <p>3.2.21. The Bidder should conduct meetings/ workshops when necessary to identify and verify the requirements with all the relevant stakeholders. Bidders should propose any business process improvement if required as well. MUSSD will assist in coordinating these meetings.</p> <p>3.2.22. MUSSD intends to launch the proposed solution in (12) months. One (03) year of Support and Maintenance will commence from the date of operational acceptance.</p> <p>3.2.23. The Bidder should present an application prototype covering major functionalities of the proposed solution such as, but not limited to user scenarios, workflows, document management.</p> <p>3.2.24. The bidder should implement all non-functional requirements (security, governance including role-based security, user lifecycle management, and complete audit trails, etc.) mentioned in the Annex B.</p>		
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<p>3.2.25. The Bidder should propose the most appropriate technical solution to secure and expose data.</p> <p>3.2.26. The Bidder should understand and ensure the existing data volume and data complexity and provide data migration strategy accordingly. Moreover, data transformation strategy should follow the proper industry standards and proper control mechanisms in transforming these data into the new solution.</p> <p>3.2.27. The Bidder should migrate the existing data of MUSSD (at given locations) to the newly developed system.</p> <p>3.2.28. The Bidder should ensure the high availability of the system and proper disaster recovery with a proper system backup procedure.</p> <p>3.2.29. The Bidder should provide support and maintenance services, from the date of operational and for a period of 3 years and adhere to the Service Level Agreement (SLA), during the period. Refer to Annex C.</p> <p>3.2.30. The Bidder should attend to any issues reported and carry out configuration changes (if required), apply relevant security patches, update and tuning of performance, etc. to ensure the security of the solution during the support and maintenance period.</p> <p>3.2.31. The Bidder should hand over the source code and relevant updated documents to MUSSD at the end of the Service &amp; Maintenance(S&amp;M) period with proper knowledge transfer sessions to the MUSSD technology team including the following updated artifacts.</p> <ul style="list-style-type: none"> <li>3.2.31.1.1. Detailed Software Requirement Specification</li> <li>3.2.31.1.2. System Architecture Design Document</li> <li>3.2.31.1.3. Detailed Software Technical Documentation (DSTD)</li> <li>3.2.31.1.4. Solutions Installation Guide (including deployment view)</li> <li>3.2.31.1.5. QA Test Plan, Test Cases, and Test Scripts</li> <li>3.2.31.1.6. Application User Manual</li> <li>3.2.31.1.7. Deployment guide, patch, and issue fix delivery approach</li> </ul> <p>3.2.32. The Bidder should accommodate change requests (CR) after obtaining the approval from the Change Control Board and as per the CR rate agreed in the Contract.</p> <p>3.2.33. The Bidder should participate in Project Review meetings and present the status of the project when necessary.</p>		
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<p>3.2.34. The Bidder should work collaboratively with MUSSD and some government organizations throughout the tenure of the project.</p> <p>3.2.35. The Bidder should sign a Non-Disclosure Agreement (NDA) at the signing of the Contract where applicable.</p>		
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<p><b>3.3. System Administration and Management Functions</b></p> <p>3.3.1. The proposed solution needs to support any functional requests raised by the MUSSD. Each support level will be organized as below.</p> <p>3.3.1.1.1. Level 1 (L1): Superusers, IT staff from MUSSD to manage basic queries and basic user management activities.</p> <p>3.3.1.1.2. Level 2 (L2): MUSSD staff to manage the Super Administrator role with basic technical support and user management activities.</p> <p>3.3.1.1.3. Level 3 (L3): Vendor technical team to resolve any technical issues with a pre-defined SLA.</p> <p><b>3.4. Architectural Requirements</b></p> <p>3.4.1. The Bidder should study the requirement of the propose system and propose the requirement of the cloud services and end user equipment.</p> <p>3.4.2. The proposed solution needs to be deployed in a cloud environment by the Bidder and MUSSD will provide cloud Infrastructure Services.</p> <p>3.4.3. MUSSD access to the Internet via Lanka Government Network (LGN). The proposed solution will be accessed by the individual users via LGN or any other ISP where the LGN is not available in location to access the solution in MUSSD Islandwide field services.</p> <p>3.4.4. The proposed solution needs to be deployed on the cloud environment where Bidder will be given admin access to the</p>		
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<p>cloud environment and they can deploy virtual instances, and create networks, security groups, and cloud storage.</p> <p>3.4.5. Bidder shall propose the high-level architecture based on the best latest technology and micro services architecture for the application development.</p> <p>3.4.6. The Bidder must ensure that the architecture is open and scalable by design.</p> <p>3.4.7. Screen designs (UI/UX) along with user journeys need to be reviewed and approved by MUSSD technical committee</p> <p><b>3.5. Performance Requirements</b></p> <p>3.5.1. Solution performance levels will be measured primarily with the end-user experience. These expected end-user experience levels need to be maintained even while the back-end office functionalities such as backup process, archiving process, etc... are getting executed.</p> <p>3.5.2. With the proposed solution, a performance level with concurrency behaviors needs to be submitted (preferred through a graph). Concurrency intervals to be considered between 500 and 1000.</p> <p>3.5.3. Expected general web application performance as mentioned in Non-functional requirements in <b>Annex B</b>.</p> <p>3.5.4. The Bidder should propose the minimum hardware requirement, network-related performance parameters (bandwidth, latency, jitter, packet loss, etc.), and hosting-related performance parameters (disk IOPs) to run the solution as per the expectations specified above.</p> <p>3.5.5. In the event of a performance-related incident, there needs to be a scientific or a technical tracing mechanism implemented in the solution to clearly segregate the cause of the incident from hardware and/or network or anything related to the software and its components provided by the Bidder. Performance parameters need to be measured through the tools and dashboards.</p> <p>3.5.6. If there are any software components that need to be installed or implemented to manage the service performance, those need to be included in the solution and the bidder needs to clearly explain the use and the behavior of the same. Such tools should not be licensed-based.</p> <p>3.5.7. The performance of the solution needs to be tested and demonstrated with automated load testing during the implementation phase of the project. Performance and load test plans need to be submitted along with the associated scripts. These test plans need to cover indicators such as ramp-up, scale-up, scale down, and peak loads.</p>		
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<p>3.5.8. Security Requirements need to be adhered to as per the Non-Functional Requirement (NFR) explained in <b>Annex B</b>.</p> <p><b>3.6. Mandatory / Minimum Performance Compliances.</b></p> <p>3.6.1. Bidder needs to deliver the features mentioned in the functional requirements (<b>Annex A</b>) and technical requirements given below. Bidders may suggest a better approach to deliver more value to the solution if there are any.</p> <p>3.6.1.1. Front end: Performance, usability, and security need to adhere to compliance given by MUSSD. The front end needs a security scan and a load test/performance test</p> <p>3.6.1.1.1. The solution should have a monitoring mechanism to monitor (application health and infrastructure monitoring) across the platform.</p> <p>3.6.1.1.2. Below specifications in development are recommended:</p> <ul style="list-style-type: none"> <li>● Deployment handover to include technical training.</li> <li>● React is recommended for front-end development</li> <li>● This should be a responsive web application that is fully usable with mobile device</li> <li>● maintenance to be easy and effective</li> <li>● Proposed front-end development and deployment architectures should be recommended by MUSSD</li> </ul> <p>3.6.1.2. Back end: Performance and security need to adhere to compliances given by MUSSD. It needs a security scan and a load test/performance test.</p> <p>3.6.1.2.1. Primary services shall include Citizen Service, and Monitoring Service, Reporting service. A suitable services list should be proposed.</p> <p>3.6.1.2.2. API management and documentation API specification document (swagger) should be provided. API doc should be maintainable with future upgrades and versioning.</p> <p>3.6.1.3. Testing</p> <p>3.6.1.3.1. The bidder should submit a quality plan and quality assurance and control criteria.</p> <p>3.6.1.3.2. Unit Test: Backend minimum 80% unit test coverage. Frontend 60% unit test coverage.</p> <p>3.6.1.3.3. API test automation 90% integration test coverage (REST Assured). Infrastructure for the automation will be provided by MUSSD.</p> <p>3.6.1.3.4. Cover 8 dimensions of quality management</p>		
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<p>3.6.1.3.5. Load testing approach and model.</p> <p>3.6.1.3.6. Stress testing approach and model.</p> <p>3.6.1.3.7. Endurance testing approach and model.</p> <p>3.6.1.4. <b>General specifications:</b> Entire applications should be implemented in a cloud-native fashion in a virtual environment and comply with the given architecture.</p> <p>3.6.1.4.1. Open-Source free tools, libraries, and frameworks preferred</p> <p>3.6.1.4.2. Loosely coupled services</p> <p>3.6.1.4.3. The API-driven back end is preferred</p> <p>3.6.1.4.4. Stateless APIs are preferred</p> <p>3.6.1.4.5. Should run on Cloud environment</p> <p>3.6.1.4.6. The solution should have High Availability (HA). Bidders should suggest the approach.</p> <p>3.6.1.4.7. Mobile-first responsive front ends. Need to provide OS and mobile devices front-end platform support.</p> <p>3.6.1.4.8. Preferred to adhere to 12-factor app (<a href="https://12factor.net/">https://12factor.net/</a>)</p> <p>3.6.1.4.9. The solution should have a Disaster Recovery mechanism. Bidders should suggest the approach.</p> <p>3.6.1.4.10. Data backup and recovery approach, tools and technologies used for the backup and recovery</p> <p>3.6.1.5. Implementation guidelines</p> <p>3.6.1.5.1. Code quality should be enforced both at the IDE level, peer review, and sonar lint level. Static scan reports, Dynamic scan reports, and Profiling reports need to be provided.</p> <p>3.6.1.5.2. Consistent look and feel across all UIs.</p> <p>3.6.1.5.3. Bidder can propose the working data model and get approval from MUSSD</p> <p>3.6.1.5.4. Bidders can propose the designer UIs for new features to serve the purpose. MUSSD should be able to customize the proposed UI design.</p> <p>3.6.1.5.5. Semantic versioning for APIs</p> <p>3.6.1.5.6. Ability to emulate service in the local environment for testing</p> <p>3.6.1.5.7. Documentation requirements:</p> <ul style="list-style-type: none"> <li>● System Requirement Specification</li> <li>● System Design Document (Architectural Document adhering to 4+1 views model)</li> <li>● Deployment guidelines</li> <li>● API specification document</li> <li>● Test plan and test results</li> <li>● UAT plan, UAT results</li> <li>● User manual</li> <li>● Hardware specification</li> <li>● Maintenance model with patching and support SLAs</li> <li>● Configuration details</li> <li>● Backup strategy and restoration plan</li> </ul>		
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- DR strategy and plan (Including BCP)
- Training plans and materials by user type
- Issue fixing, patch update and code deployment guide

**3.7. Testing and Quality Assurance Requirements**

**3.7.1. Software Process Audit**

- 3.7.1.1. MUSSD will be conducting an independent audit process (Software Process Audit) on the developed applications. MUSSD Software Process Audit Team will review all the deliverables (Technical and QA) and verify the application based on functional and non-functional aspects in order to certify the application is aligned with the requirement.
- 3.7.1.2. The bidder should comply with the process/product quality and standards and should be required to implement recommendations provided by the MUSSD Software Process Audit team.
- 3.7.1.3. Acceptance / Rejection of Deliverables: An acceptable client delivery should be 3 - 4 defects without any blocker, critical or major issues. If there are any known issues with the delivery, the vendor should prior inform MUSSD & the MUSSD Software Process Audit team.
- 3.7.1.4. Any deliverables may be rejected under the following scenarios, where there is/are;
  - 3.7.1.4.1. One blocker issue
  - 3.7.1.4.2. Two critical issues
  - 3.7.1.4.3. One critical and 4 major issues
  - 3.7.1.4.4. Eight major issues

**3.7.2. User Acceptance Tests (UAT)**

- 3.7.2.1. A complete UAT document shall be supplied by the bidder including all positive and negative testing scenarios. The bidder shall also review and resubmit the UAT document including the comments and observations made by the employer.
- 3.7.2.2. The MUSSD team will execute the UAT according to the test plan and end-user scenarios submitted by the bidder. UAT acceptance will be conducted by an internal committee in MUSSD.
- 3.7.2.3. All test scenarios related to the end-user functionality and technical features need to be included as part of the UAT test scripts, and the MUSSD team may carry out additional testing if deemed necessary.
- 3.7.2.4. Any issues arising from the UAT would need to be logged and fixed by the bidder and the affected components/parts/sub-systems will be re-tested by

MUSSD. Iterations of this cycle will be executed until all blockers; critical and major issues have been resolved

3.7.2.5. Issue categorization (Eg: blocker, critical, major, minor) needs to be defined by the bidder along with MUSSD as part of the UAT execution plan.

**3.8. Training and Training Material**

3.8.1. The bidder shall provide a training plan, considering different users, different functionalities, and the number of days, training approach, required language, etc. Following staff members has to be trained; .

Staff Category	No. of Participant	Training Module/s
System administrators and IT staff	10	All
Executive officers of each section	15	All
District staff (Administrative)	52	Registration, legal and Alerts, Notifications, Dashboard and Reports
District staff (Verification)	100	Registration, legal and Alerts, Notifications, Dashboard and Reports
Laboratory staff (Calibration and pattern approval)	40	Laboratory Services, Operations and Alerts, Notifications, Dashboard and Reports
Other Office Staff	30	Operations and Alerts, Notifications, Dashboard and Reports

3.8.2. Initial training for the Administrators (10) must be trained by the bidder on the solution administrative functions. This should be conducted onsite with comprehensive hands-on sessions and training materials. This training will be executed right after the solution implementation is completed and just before the live operations start.

3.8.3. Administrators, Organization end-user training, (separate videos and presentations for each user category) shall be prepared and provided by the bidder to be used by the MUSSD for the end-user training sessions. Training material for Organization end-users should be in 3 languages (English, Sinhala, and Tamil).

<p>3.8.4. The Bidder should provide both soft and hard copies of all user manuals (e.g., Printed documents). All manuals should be in tri-lingual (Sinhala, Tamil, and English).</p> <p>3.8.5. FAQs with answers and user guides shall be published by the bidder to Administrators, organizational end-users.</p> <p>3.8.6. Below mentioned training needs to be provided to the MUSSD technical team</p> <ul style="list-style-type: none"> <li>● Developer training for future change requests</li> <li>● Developer training for change deployment to stage and production</li> <li>● Training for disaster recovery</li> <li>● Training for data backup and restore</li> </ul> <p><b>3.9. Deployment and Implementation</b></p> <p>3.9.1. The deployment guide needs to include the deployment architecture provided by the Bidder. Further, it must include configuration details, performance optimization details, and scale-up / down details, and strategy. The Bidder should provide an end-to-end deployment guide including deployment environment setup and tool stack.</p> <p><b>3.10. Documentation Requirements</b></p> <p>3.10.1. The Bidder shall provide all technical documents with adequate information in them mentioned in the compliance sheet. MUSSD shall review the documents and may ask for revisions.</p> <p><b>3.11. Data Protection and Security Audit</b></p> <p>3.11.1. The system should comply with the data protection act. Details of the act can be found at the below location, <a href="https://www.icta.lk/data-protection-legislation-overview/">https://www.icta.lk/data-protection-legislation-overview/</a></p> <p>3.11.2. SLCERT security audit should be performed and fix any vulnerabilities found before go-live</p>		
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Refer following Annexes which form a part and parcel of the document.

Annex A - High Level Functional Features

Annex B - Non-Functional Requirements

Annex C – Service Level Agreement

Annex D - Staff details and number of users of services of MUSSD

Annex E – High Level Architecture Design

Annex F – Attachments and Report formats

Annex G - Measurement Units, Standards and Services Department district offices details

## 4. Implementation

### 4.1 Implementation Schedule

The Bidder will be engaged for 4 years, in which 12 months for the designing, development, implementation, operational acceptance and 3 years for providing support and maintenance.

The Bidder is required to submit the following list of deliverables from this assignment.

No	Deliverables	Duration
1	Acceptance of the followings; <ol style="list-style-type: none"> <li>1. Detailed Project Management Plan</li> <li>2. Master Test Plan and Performance Test Plan</li> </ol>	Commencement Date + 2 weeks
2	Acceptance of the following; <ol style="list-style-type: none"> <li>1. Sign off requirement gathering documents.</li> <li>2. BPR Documents.</li> <li>3. Detailed Software Requirements Specification (DSRS)</li> <li>4. Specifications for cloud services and required hardware</li> <li>5. Data migration and integration plan</li> <li>6. Detailed software technical design (DSTD)</li> <li>7. QA test plan</li> <li>8. Acceptance criteria for the UAT/OAT</li> <li>9. Prototype using a wireframe tool</li> </ol>	Commencement Date + 5 weeks
3	Acceptance of the following for Development <ol style="list-style-type: none"> <li>1. Updated DSRS, and detailed Software Technical Design (DSTD)</li> <li>2. Updated QA Release Notes</li> <li>3. Updated Test cases and test scenarios</li> <li>4. Updated Source code maintenance in GIT</li> <li>5. Successful deployment of staging and production environments</li> <li>6. Updated Test results</li> <li>7. Updated UAT test cases and successful UAT acceptance</li> <li>8. Updated User / Administration Manual</li> <li>9. Updated Deployment guide</li> </ol>	Commencement Date +40 weeks



	<ul style="list-style-type: none"> <li>10. Updated Production deployment confirmation report for 7 sites</li> <li>11. Data Migration and Integration to other solutions</li> <li>12. Help Desk document for the system</li> </ul>	
5	<p>Acceptance of Trainings</p> <ul style="list-style-type: none"> <li>1. User manuals, Training Materials should be given to the users to check against the functionality of the system</li> <li>2. Completion of Training (Admin Training and User Training)</li> </ul>	Commencement Date + 44 weeks
6	<p>Acceptance of the System</p> <ul style="list-style-type: none"> <li>1. UAT</li> <li>2. OAT</li> </ul>	Commencement Date + 52 weeks
7	Successfully delivering of Maintenance and Software Support up to the acceptable level of MUSSD	Operational Acceptance + 36 months

**4.1.2 Change Request:**

No.	Deliverables	Phase	Duration
1.	1.1. CR Proposal, including effort	Estimation	-
2.	<ul style="list-style-type: none"> <li>2.1 Updated test plan for the iteration (Functional and Non-functional)</li> <li>2.2 Updated detailed software technical design (DSTD))</li> <li>2.3 Updated test cases and test scenarios (functional and non-functional)</li> <li>2.4 Proper maintenance of source code in MUSSD GitHub</li> <li>2.5 Updated developer and QA release notes</li> </ul>	Implementation	Agreed duration for the CR

	2.6 Successful deployment of staging and production environments 2.7 Updated test results (functional and non-functional) 2.8 Updated UAT test cases and successful UAT acceptance 2.9 Updated User/Administration manual 2.10 Deployment guide (if applicable) 2.11 Data Migration and Integration (If applicable) 2.12 Production deployment confirmation report 2.13 User Training for assignments (if applicable)		
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## 5. Services and Facilities Provided by MUSSD

- 5.1. Hosting facility (Cloud facility).
- 5.2. Web-based access to the MUSSD GitHub
- 5.3. Access to Staging/ production environments (Cloud).
- 5.4. Arrange and facilitate meetings/trainings/ workshops (if required)

## 6. Review Committees and Review Procedures

A Selected Bidder is required to work closely with the MUSSD team.

All versions of deliverables will be reviewed by the Technical Review Committee appointed by MUSSD.

## 7. Minimum Qualifications of Key Professional Staff

The Bidder shall give the team of key professionals with the curriculum vitae and the team organization.

## 7.1 Development Team Key Professionals

No	Position	No of People	Full Time/Part Time	Minimum Work Experience (SIP Need to mention the current resource experience)	Marks allocated in the TECH evaluation
1	Project Manager	01	Full Time	5 Years	6
2	Business Analyst	01	Full Time	5 Years	5
3	Software Architect (Each Sprint, the SA needs to certify the standard of the product.) Need to conduct the Code Review.	01	Part Time	10 Years	5
4	Senior Software Engineers	02	Full Time	5 Years	2X3
5	Software Engineers	03	Full Time	3 Years	3x2
6	QA Lead	01	Full Time	5 Years	3
7	QA Engineers	03	Full Time	3 Years	3X1
8	Training Expert	01	Part Time	3 Years	2
9	IT Infrastructure and Implementation Engineer	01	Part Time	2 Years	2
10	Support / Help Desk Engineer	02	Full Time	1 Year	2X1

## Annex – A: High-Level Functional Features

**Key modules of the Measurement Units, Standards and Services Department**

**Key modules of MUSSD**

<b>Registration</b>
<b>Legal</b>
<b>Laboratory Services</b>
<b>Operation</b>
<b>Alerts, Notifications, Dashboard and Reports</b>

**Main activities under each module**

<b>Registration</b>	
<b>Manufacture and Importer registration</b>	<b>Pattern approval (Head office)</b> <b>Initial verification (Island wide with selected districts offices and in field)</b>
<b>Trader registration</b>	<b>Subsequent verification (Island wide with all districts and head office, In field)</b>
<b>Measuring instrument seller registration (Head office)</b>	
<b>Measuring instrument repairer registration (Head office)</b>	
<b>Cancelation of registration (Due to discontinued models, Removal of use or decision of the department based on control activities)</b>	
<b>System generated certificates for above registrations. Unique identification for measuring instruments for its lifecycle from pattern approval to subsequent verification. Status updates, alerts and notifications for registered users with self-registration interface</b>	

<b>Legal</b>
<b>Raids and Inspections (Island wide in all districts, In field)</b>
<b>Court cases and Fines (Island wide in all districts)</b>

<b>Laboratory services</b>
<b>Inform service request, status update</b>

<b>Calibration/Testing (Workflow) (Head office)</b>	<b>Service request management with external and internal communication including Preparation and delivering of Quotations and Letters, Notices, Memos, Orders, Messages, Information and delivering of certificates. (Workflow)</b>
<b>Status updates, alerts and notifications for registered users with self-registration interface</b>	
<b>E-Library and document storage</b>	<b>Restricted access working drive (Shared, for each laboratory and for each officer in the laboratory)</b>
	<b>Restricted access certificate storage (Shared and for each laboratory)</b>
	<b>Restricted access document storage (Shared and for each laboratory)</b>
	<b>Restricted access E-Library</b>

<b>Operation</b>	
<b>General External and internal communication (Workflow - through email) (Head office, district offices and other stakeholders)</b>	<b>Preparation and delivering of Letters, Notices, Memos, Orders, Messages, Information</b>
<b>Finance (Head office)</b>	<b>Revenue and expenses management</b>
<b>Transport and fleet management (workflow)(Head office, district offices)</b>	<b>Vehicle allocation (Workflow)</b>
	<b>Vehicle inventory and fuel usage</b>
	<b>Vehicle Maintenance services and repair</b>
<b>General Maintenance and repair (Workflow) (Head office, District offices)</b>	<b>Inform Repair and maintenance</b>
	<b>Repair and maintenance management (Workflow)</b>
<b>E-Library and document storage</b>	<b>Restricted access working drive (Shared, for each section and for each officer in the section)</b>
	<b>Restricted access document storage (Shared and for each laboratory)</b>
	<b>Restricted access E-Library</b>

<b>Alerts, Notifications, Dashboard and Reports</b>	
<p><b>This module integrates with all the other modules and should have capability to generate notifications, alerts, and messages as per the predetermined trigger points which will be decided by the department. Also have a dashboard with user selectable activities and reports</b></p> <p><b>This module should be accessed from each module with the relevant data of the respective module. Bidder shall provide customized report preparation capability. (Head office, District offices)</b></p>	<b>Progress report for each module</b>
	<b>District wise reports for activities of district offices</b>
	<b>Laboratory wise reports for laboratory services</b>
	<b>Reports for registration activities (No of registration and Items, Categories)</b>
	<b>Customized reports and reports using advanced analytics tools</b>
	<b>Revenue and expenses reports (Overall, District wise, officer wise, Category wise)</b>
	<b>Transport management reports</b>
<b>General maintenance reports</b>	

Users of the services mentioned in registration module is currently around 800,000 therefore self registration for service requests is suitable to reduce the workload for data entering. Self registration can be implemented in other activities also with administrator authorization for user accounts. MUSSD needed to track the user activities, and inform with alert messages for expiration of approvals, status of approvals, and information for obtaining the services. Therefore history of user activities shall be stored with a unique identification method. The developed system shall be capable of managing all user accounts and use of data of user activities mentioned above.

All above processes shall be implemented based on detailed analysis of following documents, formats and observing and detailed analysis of current processes of the department. Any existing process or formats can be changed to suit the digitization solution however it shall be assured that the requirement of the implementation of the Act no 35 of 1995, Measurements units, Standards and Services, relevant regulations and internal orders are fulfilled and properly communicated to MUSSD and acknowledged before continuing further. **Refer Annex F: Attachments and Report Formats currently used in MUSSD** for specific and additional references.

01. Measurement Units Standards Act No35 of 1995 and relevant regulations	02. Administrative regulations
03. Financial regulations	04. Organization chart and carder
05. Line of authority and order	06. ISO 17025 and ISO 17043 standard and available institutional documentation
07. Relevant international standards (BIPM, OIML,APLMF and APMP)	08. Internal circulars
09. Job descriptions	10. Existing government formats
11. Existing department formats	12. Existing work instructions
13. Department website and existing software	14. Current undocumented good practices

**Legal Requirements covered by the Act No 35 of 1995, Measurement Units, Standard and Services Act.**

- Maintaining National Standards
- Calibration/Testing
- Pattern Approval
- Registration
- Verification
- Raids and Inspection
- Authorization of Officers

**Features of MUSSD key Modules:**

Module		Modular description
1.Registration	1.1. Importer and Manufacturer Registration	<ul style="list-style-type: none"> <li>● This module manages all customer registration related activities</li> <li>● Generating Customer and Instrument Identification Number</li> </ul>

		<p><b>Pattern Approval</b></p> <p>The pattern approval is an attestation of any weights, measure or weight/measuring instrument by a recognized laboratory after performing a pattern test to check whether they are in conforms to the measurements law in Sri Lanka. before being sent to the market by a manufacturer or before they are imported. Pattern approval is technical assessment. The original model of the instrument is undergone through a series of tests at the National Measurements Laboratory (NML). The design and structure of each component of the instrument are checked against the recommendations on type approval defined by the International Organization of legal metrology (OIML). Subsequently, based on the evaluation of the test results a pattern of approvals granted by MUSSD for the intended weights, and measuring instruments including vehicle emission testing units and fuel dispensers. This service is provided in head office with field visits if required at location informed by applicant (Weigh bridges, Road tankers, Fuel dispensers, etc...)</p>
		<p><b>Initial Verification</b></p> <p>Any individual / organization that uses Measures and weighing or Measuring Instruments when used in commercial transactions that instruments should be done verification before first use.</p> <p>Working standards used for verifying weights, measures and weighing and measuring instruments related to trade and industry have been retained under the custody of the secretary of each district in the country. Verification is divided into two sectors according to its functions.</p> <ul style="list-style-type: none"> <li>● <b>Initial Verification Process</b></li> </ul> <p>Step1: The individual or organization sends a request letter to Department addressed to the Director requesting the stamping of their instrument</p> <p>Note: If an individual or organization buys a new measuring instrument, they should be checked to see whether they are stamped. Otherwise, it must be stamped by the Measurement Units, Standards and Services Department.</p> <p>Step2: The Department will inform the requester via mail or phone the time, date and location where the Inspectors will test the accuracy and suitability of the measuring equipment</p> <p>Step3: The applicant arrives at the specified venue with the measuring instrument</p>



		<p>Step4: The Inspector examines and verifies the instrument</p> <p>Step5: If the instrument meets the requirements, the Department stamps the instrument and a certificate is issued to the party concerned.</p> <p>Above service is provided in head office, district offices or applicant premises on request of applicant with additional fee.</p>
	<p>Traders Registration</p>	<p><b>Subsequent Verification</b></p> <p>Any individual / organization that uses Measures and weighing or Measuring Instruments when used in commercial transactions that instruments should be done verification in predetermined interval. (Annually, once in two years, etc....)</p> <p>Step1: The Government Agent decides the stamping date and location and informs the Inspector.</p> <p>Step2: The Inspector informs the Grama Niladhari</p> <p>Step3: The Grama Niladhari then informs the retailers</p> <p>Step4: The retailer visits the specified location and submits the instrument</p> <p>Step5: The Inspecting Officer of Measurement Units, Standards and Services verifies Instrument</p> <p>Step6: If instrument meets requirements, Department stamps instrument and issues a certificate</p> <p>Note 1: If the instrument does not meet the requirements and minor amendments are needed, the amendments can be made to the instrument by the Technical Officer at the location itself.</p> <p>Note 2: If the instrument needs major amendments, the retailer can return it to the seller and get it repaired. Thereafter the seller will do the necessary amendments and get the instrument stamped at the District Secretariat and return the stamped instrument to the retailer.</p> <p>Also MUSSD conduct verification services in fields for weighbridges, Fuel dispensers, Vehicle emission testing equipments, large volume tanks, Road tankers, Platform scales etc... which is can not be bring to verification centers and permanently installed in user locations.</p>

		Field verification services for any measuring instrument are also conducted on request of traders with additional charges.
	Measuring instrument seller and repair registration	<p><b>1.2 Registration of Certificates</b></p> <p>All weights, measures or weighing and measuring instrument importers, sellers, manufactures and repairs must register under section 21 of Measurements Units, standards and Services act no 35 of 1995. Registration certificate holders divided into two as new registration and renewal of registration.</p>
Laboratory Services		<p><b>Calibration</b></p> <p>Calibration facilities for pressure gauges, thermometers, weights, scales and length measuring instruments, electrical measuring instruments, moisture meters, laboratory balances etc; which are used in industry, engineering or any other related field.</p> <p>Calibration certificates are also issued with such calibrated instruments. Industrial calibration is one of the main services provided by the National Measurement Laboratory. The calibration provided by NML is given below. The management of measuring instruments, industrial calibration and documentation are done according to the requirements of quality aspects of ISO/IEC 17025.</p> <p>1. Providing necessary laboratory facilities for calibration of weights, measures, weighing and measuring instruments/systems used in production industry (including laboratory calibrations and onsite calibrations)</p> <p>2. Inspection and verification of large-scale measuring instruments established in production and service industries</p> <p>The calibration services are provided in the National measurement laboratory of Head office and in field on request of the customer in customer premises.</p>
Legal Module		<ul style="list-style-type: none"> <li>● Prosecution against persons who commit fraud measurements by conducting market raids (Details included in the Act No 35 of 1995 of MUSS)</li> <li>● Inspection of Pre-Packed Commodities (extraordinary gazette No. 1499/7 dated 29 May 2007)</li> </ul> <p>Legal activities organized and conducted by head office and district offices as random inspection, in response to complaints, and as a control activity for adaptation of traders for registration and subsequent verification activities.</p>
Operations Module		<p>The module consist of;</p> <ul style="list-style-type: none"> <li>● Providing proper communication channels for distribution of letters, notices, messages, instructions, orders, documents etc... in electronic formats.</li> </ul>

		<ul style="list-style-type: none"> <li>● Revenue and expenses calculations and summaries for Planing, Budgeting and financial purposes.</li> <li>● Transport management in head office and district offices for field works for calibration , verification and general office and laboratory work.</li> <li>● General maintenance in laboratories, Offices in head office and district offices (Generator, Power panels, Air conditioning, IT and network, telephone system, Printers and photocopy machines etc...)</li> </ul>
<p>Alerts and Notification/ dashboards and Reports Module</p>		<p>This module integrates with all the other modules and should have capability to generate notifications, alerts, and messages as per the predetermined trigger points which will be decided by the department.</p> <p>The system reporting module supports department specific reporting.</p> <p>Progress report, District wise report, Laboratory wise report, Instrument wise report, financial management report, Inventory management report, Transport management report, General maintenance reports, Use of Advance Analytical Tools for customized reports</p>

Bidders should study the MUSSD business process and should carry out requirement study to identify new functionalities and features to be implemented in MSIMS. The below are the high-level functional features that provide understanding about the requirements.

Bidders should conduct end to end requirement gathering and come up with the Detailed Software Requirement Specification and obtain the approval from MUSSD before implementing.

## **Annex – B: Non-Functional Requirements**

### **1. SECURITY**

- 1.1 The Bidder should provide what methodologies /standards are used for security testing and development.
- 1.2 The Bidder should provide information if any third-party assessments involved for security such as vulnerability testing of actual code and application
- 1.3 The Bidder should provide information if any automated tools are used for internal testing.

- 1.4 The Bidder should provide the patch strategy and use of any patch development tools
- 1.6 The proposed solution should be able to adhere to functionalities as per scope of work.
- 1.7 Audit logs recording user activities, exceptions and information security events must be generated and stored for a defined period of time for future investigation and monitoring purposes.
- 1.8 The Bidder should provide their DRP (Disaster Recovery Plan) and BCP (Business Continuity Plan) to the MUSSD
- 1.10 The Bidder should adhere to the Data Protection Act when handling personal and organizational data.
- 1.12 The Bidder should provide documentation that explains the design for achieving each of the security requirements. The design should clearly specify whether the support comes from custom software, third party software, or the platform.
- 1.13 The Bidder should provide secure configuration guidelines that describe all security related configuration options and suggestions for the overall security of the software. The guideline shall include dependencies on the supporting platform, including the operating system, web server, and application server. The default configuration of the software shall be secure.
- 1.14 The Bidder should validate, and encoding each input to the application, whether from users, file systems, databases, directories, or external systems. The default rule shall be that all input is invalid unless it matches a detailed specification of what is allowed. Specifically, the application shall not be susceptible to injection, overflow, tampering, or other corrupt input attacks.
- 1.15 The Bidder should state in what way authentication credentials and session identifiers would be protected all over their lifecycle. Requirements for all

correlated functions, including forgotten passwords, changing passwords, remembering passwords, logout, and multiple logins, will be included.

1.16 The Bidder should disclose all third-party software used in the software, including all libraries, frameworks, components, and other products, whether commercial, free, open-source, or closed-source.

1.17 The Bidder should use a source code control system that authenticates and logs the team members associated with all changes to the software model and all related configuration files and build files.

1.18 The Bidder will be responsible for verifying that all members of the software development team have been trained in secure programming methods.

#### 1.19 User authentication and authorization

All applications should be able to access via MUSSD common infrastructure/application itself and independently via the respective department's website if required. Any authorization requirements should be implemented within the specific web application.

However, the solution should have the provision to integrate with the MUSSD proposed Identity Management solution in the future.

An administrative application needs to be developed wherever applicable.

Wherever applicable internal small applications need to be developed to capture and store relevant data.

#### 1.21 Confidentiality and Integrity

All developed web applications should ensure “confidentiality” and “integrity” whenever required by adhering to transport and message-level security standards. (i.e.: HTTPS, WS-Security) including point-to-point encryption (P2PE)

#### 1.22 Authentication

The web application should be able to verify the users.

### 1.23 Authorization

The web application should be able to verify that allowed users have access to resources.

### 1.24 non-repudiation

All Web applications should ensure non-repudiation by having standard audit trails and provisions to have WS-Security using digital signatures.

### 1.25 OWASP Guidelines

All web applications should ensure that the OWASP guidelines for security are followed when designing, developing, and deploying the web application.

### 1.26 Data Protection

- Develop an application in line with its Personal Data protection Act
- Data should be encrypted according to the ISO Standards.

1.27 The Bidder should provide an SSL certificate and it should be an extended validated (EV) SSL certificate with a trusted brand.

## 2. AUDIT FACILITIES

Wherever applicable, an audit trail of all activities must be maintained. On service or operation being initiated, the system should log the event, creating a basic 'audit log entry. It should not be possible for the operation to be executed without the log entry being made.

The information recorded in the audit trail depends on the type of activity which takes place. Each service would be responsible for logging detailed information. The different types of operations are -

- Data Capture & Maintenance
- Creation of an entry/item
- Modification an item
- Deletion
- Control (or status change)
- Process execution
- Data synchronization

- Print (only selected item)
- Retrieval
- Monitor

Detail logging may be enabled or disabled for each type of operation, and/or for each business object. It should be possible to configure which attributes of a data item should be traced at the detail level. Tracing some attributes may be considered mandatory, and they should not be turned off.

### 3. BACKUP AND CONTINGENCY PLANNING

The main contingencies that should be considered and the training with regards to these shall be given to the relevant staff -

- Equipment failure
- Physical / natural Disaster
- Messaging or communication facilities.
- Changes in operations and policy
- Sudden absence of key personnel
- Breach in Security

Automatic Backups daily, weekly, *and* monthly should be taken. All the backup procedures and backups need to be tested regularly for restoration.

### 4. PERFORMANCE TESTING

Please find the below index as a guide to determine the benchmark values for the Application under the test.

Following the performance, criteria are provided as a guideline only. If the actual performance is falling below the stipulated figures, the Bidder is to justify the reasons. However, the performance level must be accepted by the technical evaluation committee appointed by the client. The bandwidth is assumed at 1mbps (shared) with 1,000 concurrent users (50% load factor) in total.

Item	Performance
Screen Navigation: field-to-field	< 5 milliseconds

Screen Navigation: screen-to-screen	< 3 seconds
Screen Refresh	< 3 seconds
Screen list box, combo box	< 2 seconds
Screen grid – 25 rows, 10 columns	<3 seconds
Report preview – (all reports) – initial page view (if asynchronous)	< 40 seconds in most instances. It is understood that complicated/large volume reports may require a longer period
Simple inquiry – single table, 5 fields, 3 conditions – without screen rendering	< 4 seconds for 100,000 rows
Complex inquiry – multiple joined table (5), 10 fields, 3 conditions – without screen rendering	< 6 seconds for 100,000 rows
Server-side validations/computations	< 10 milliseconds
Client-side validations/computations	< 1 millisecond
Batch processing (if any) per 100 records	< 120 seconds
Login, authentication, and verification	< 3 seconds
Daily backups (@Dept.) – max duration	1 hour (on-line preferred)
Total Restore (@Dept.) – max duration	4 hours

#### 4.1 Performance Test Process Outputs

- Performance Test Scripts
- Performance Test Results



## 5. USABILITY

The web application should be extremely usable, even a greenhorn user should be able to handle the system and incorporate all the functionality of the system in a simple and user-friendly interface. The web application should be internationalized and localized if needed. The web application should be responsive where it should be viewable on any computing device.

## 6. INTEROPERABILITY

The web application should be able to view in standard compatible web browsers.

## 7. AVAILABILITY

The web application should be performed as follows,

- 99.99% available unless the web application is designed with expected downtime for activities such as database upgrades and backups.
- Hence to have high availability, the web application must have low downtime and low recovery time.

## 8. ROBUSTNESS

The web application should be able to handle error conditions gracefully, without failure. This includes tolerance of invalid data, software defects, and unexpected operating conditions.

- Failure Detection
  - Once deployed, there should be appropriate tools to discover anomalies and failures of the system
- Fault Tolerance
  - Web application developers should anticipate exceptional conditions and develop the system to cope with them. The web application must be able to use reversion to fall back to a safe mode, meaning, the application should continue its intended functions, possibly at a reduced level, rather than falling completely.

## **9. MAINTAINABILITY**

The code of web application should be properly documented with appropriate comments and no complex codes (highly cohesive and loosely coupled) to do modifications such as corrections, improvements, or adaptation.

## **10. COMPLIANCE TO STANDARDS**

The code of web applications should be standardized by following web standards like W3C and ECMA – European Computer Manufacturers Association, to save time, augment the extensibility of the code, increase web traffic and improve the accessible and load time of your application.

## **11. REUSABILITY**

The web application should be able to use existing assets in some form with the software product development process. Assets are products and by-products of the software development life cycle and include code, software components, test suites, design and documentation.

## **12. API MANAGEMENT**

### **12.1. API Standards and Best Practices**

API standards and best practices should adhere in the code.

### **12.2 API Documentation**

- Swagger documentation should be provided.

### **12.3. API Security**

The web application should use the appropriate API security protocol mentioned below.

- Basic API authentication
  - Basic authentication should never be used without TLS (formally known as SSL) encryption as user name and password combination can be easily decoded otherwise.
- OAuth1.0a
  - Uses cryptographic signature value that combines the token secret, nonce, and other request-based information. Can be safely used without SSL.

- Recommend for sensitive data applications
- OAuth2
  - No need to use cryptographic algorithms to create, generate and validate signatures as all the encryption is handled by TLS.
  - Recommend for less sensitive data applications
- JWT (JSON Web Tokens)
- Key cloak security of FHIR server

### **13. SCALABILITY**

The web application should be both scalable and resilient. A well-designed application should be able to scale seamlessly as demand increases and decreases. It should be resilient enough to withstand the loss of one or more hardware resources.

### **14. LEGAL AND LICENSING**

The web application should comply with the national law.

### **15. EXTENSIBILITY**

The web application should be designed and developed in a way that it can cater to future business needs.

### **16. TESTABILITY**

The web application should be designed and developed in a way that testability is high, meaning, the ease of testing a piece of code or functionality, or a provision added in software so that test plans and scripts can be systematically executed. In simple terms, the software should be tested easily with the most famous 5 testing categories,

- Unit test
- Integration test
- System test
- Safety test
- Experience test

Refer Aden (2016)'s view on semantic testing for more information.

The web application should be working according to the given criteria in the latest version and 5 versions before in web browsers such as Mozilla Firefox, Google Chrome, Opera, and Apple Safari and the latest version and 2 versions before in Internet Explorer.

## 17. NOTES

- The Bidder can propose similar standards/requirements for the above-mentioned standards/requirements with the approval of the MUSSD Technology Team.
- The design documents should be based on the 4+1 architecture model or the template provided by MUSSD.
- Bidders should sign a non-disclosure agreement with respect to MSIMS source code and data provided by the MUSSD.

## **Annex – C : Service Level Agreement for Support and Maintenance Services**

### **(i) Introduction**

The aim of this agreement is to provide a basis for close co-operation between the Client and the Bidder for support and maintenance services to be provided by the Bidder, thereby ensuring a timely and efficient support service is available. The objectives of this agreement are detailed in Section 1.1.

This agreement is contingent upon each party knowing and fulfilling their responsibilities and generating an environment conducive to the achievement and maintenance of targeted service levels.

**(ii) Objectives of Service Level Agreements**

1. To create an environment conducive to a co-operative relationship between Client, Bidder and Client's representatives (government organizations) to ensure the effective support of all end users.
2. To document the responsibilities of all parties taking part in the Agreement.
3. To define the commencement of the agreement, its initial term and the provision for reviews.
4. To define in detail the service to be delivered by each party and the level of service expected, thereby reducing the risk of misunderstandings.
5. To institute a formal system of objective service level monitoring, ensuring that reviews of the agreement are based on factual data.
6. To provide a common understanding of service requirements/capabilities and of the principals involved in the measurement of service levels.
7. To provide for all parties to the Service Level Agreement a single, easily referenced document which caters for all objectives as listed above.
8. The Bidder should adhere to the non-functional requirements that are stated in (Annex B) to maintain high availability and business continuity.
9. To design a business continuity plan with clients in terms of disaster recovery, maintain system back-ups and related roles and responsibilities of both parties.

**(iii) Service Level Monitoring**

The success of Service Level Agreements (SLA) depends fundamentally on the ability to measure performance comprehensively and accurately so that credible and reliable information can be provided to customers and support areas on the service provided.

Service factors must be meaningful, measurable and monitored constantly. Actual levels of service are to be compared with agreed target levels on a regular basis by both Client and Bidder. In the event of a discrepancy between actual and targeted service levels both Client and Bidder are expected to identify and resolve the reason(s) for any discrepancies in close co-operation.

Service level monitoring will be performed by Client. Reports will be produced as and when required and forwarded to the Bidder.

**(iv) Principal Period of Support (PPS) Requirements**

The Bidder must provide support and maintenance services during Support Levels mentioned below;

PPS category	Support hours		Applicability
<b>PPS1</b>	From	To	For the internal department administration system/ external integrations, API exposed to external departments.
	08:00 a.m.	06:00 p.m.	
	Monday to Friday (excluding Public Holidays)		
<b>PPS2</b>	From	To	Online services offered via portal/ external integrations related to smooth operation of the online services
	08:00 a.m.	10:00 p.m.	
	All days in the week (including Public and Mercantile Holidays)		

**(v) On-Call Services Requirements**

Bidders MUST make at least ONE qualified personnel available to the Client by telephone and email for the reporting and resolution of non-conformities or other issues, defects or problems. Dedicated telephone numbers and emails should be available for reporting issues. Clients will nominate the personnel who are authorized to report non-conformities or other problems with the system from the departments. Reporting of non-conformities includes requests by the Client to apply critical software updates or patches.

Table-1 shows the response priority assigned to faults according to the perceived importance of the reported situation and the required initial telephone response times for the individual priority ratings. All times indicated represent telephone response time during specified Support Levels. The indicated telephone response time represents the maximum delay between a fault/request being reported and a Bidder's representative contacting the Client by telephone. The purpose of this telephone contact is to notify the Client of the receipt of the fault/request and provide the Client with details of the proposed action to be taken in respect of the particular fault/request.

Support Level	Business Critical		Non-Business Critical	
	Fatal	Impaired	Fatal	Impaired
<b>PPS1</b>	10 minutes within Support Hours	20 minutes within Support Hours	20 minutes within Support Hours	45 minutes within Support Hours
<b>PPS2</b>	20 minutes within Support Hours	45 minutes within Support Hours	1 hour within Support Hours	2 hours within Support Hours

Table-1: Response Priority

**Note:**

- Fatal - Total system interoperability
- Impaired - Partial system interoperability
- Business Critical - Unable to perform core business functions
- Non-Business Critical - Able to perform limited core business functions

Bidder notification can occur outside Support Level time, and thus the response may occur after the next Support Level begins. Furthermore, “Time to Arrive On-Site (specified in above table) starts from Support Level starting time and “Time to Resolve the Problem” is Support Level time starting from the actual time of arrival on site.

**(vi) Problem Resolution and Penalties**

If faults are not corrected within the time limits specified in Table-2, the Client shall be entitled to a penalty payment for each hour that the Bidder fails to resolve the fault.

Support Level	Business Critical		Non-Business Critical	
	Fatal	Impaired	Fatal	Impaired
<b>PPS1</b>	1 Hour LKR 10,000.00 per hour	1.5 Hours LKR 7,500.00 per hour	1.5 Hours LKR 7,500.00 per hour	3 Hours LKR 5,000.00 per hour
<b>PPS2</b>	1.5 Hour LKR 7,500.00 per hour	3 Hours LKR 5,000.00 per hour	3 Hours LKR 5,000.00 per hour	4 Hours LKR 4,000.00 per hour

Table-2: Resolution Time and Penalties

“At the beginning of maintenance period Bidder and Client will mutually identify and agree on “Business Critical and Non-Business Critical” functionality/tools classification to apply SLA terms”

### **Annex-D: Staff details and number of users of services of MUSSD**

Module	Activity/Service	No of officers involved	No of Traders or customers/Year	No of Instruments considered/Year



Registration	01	Importer and Manufacture Registration (Pattern Approval and Initial Verification)	50	250	20000
	02	Trader Registration (Subsequent verification)	100	200,000	600,000
	03	Measuring Instrument Seller Registration	5	300	Not Applicable
	04	Measuring Instrument Repairer Registration	5	300	Not Applicable
Legal	01	Raids	50	Not applicable	Not applicable
	02	Court cases and Fines	50	Not applicable	Not applicable
Laboratory Service	01	Calibration/Testing (Workflow) (Head office)	40	500	2500
Operation	01	Finance	15	Not applicable	Not applicable
	02	Transport and fleet management (workflow)	25	20 (Vehicle)	Not applicable
	03	General Maintenance and repair (Workflow)	6	On requirement	On requirement

Main modules of MUSSD	No of users (Approximate current values)
Registration	800,000/Year
Legal	1000/Month
Laboratory services	500/Month
Operations	350/Day
Alerts, Notifications, Dashboard and reports	100/Month

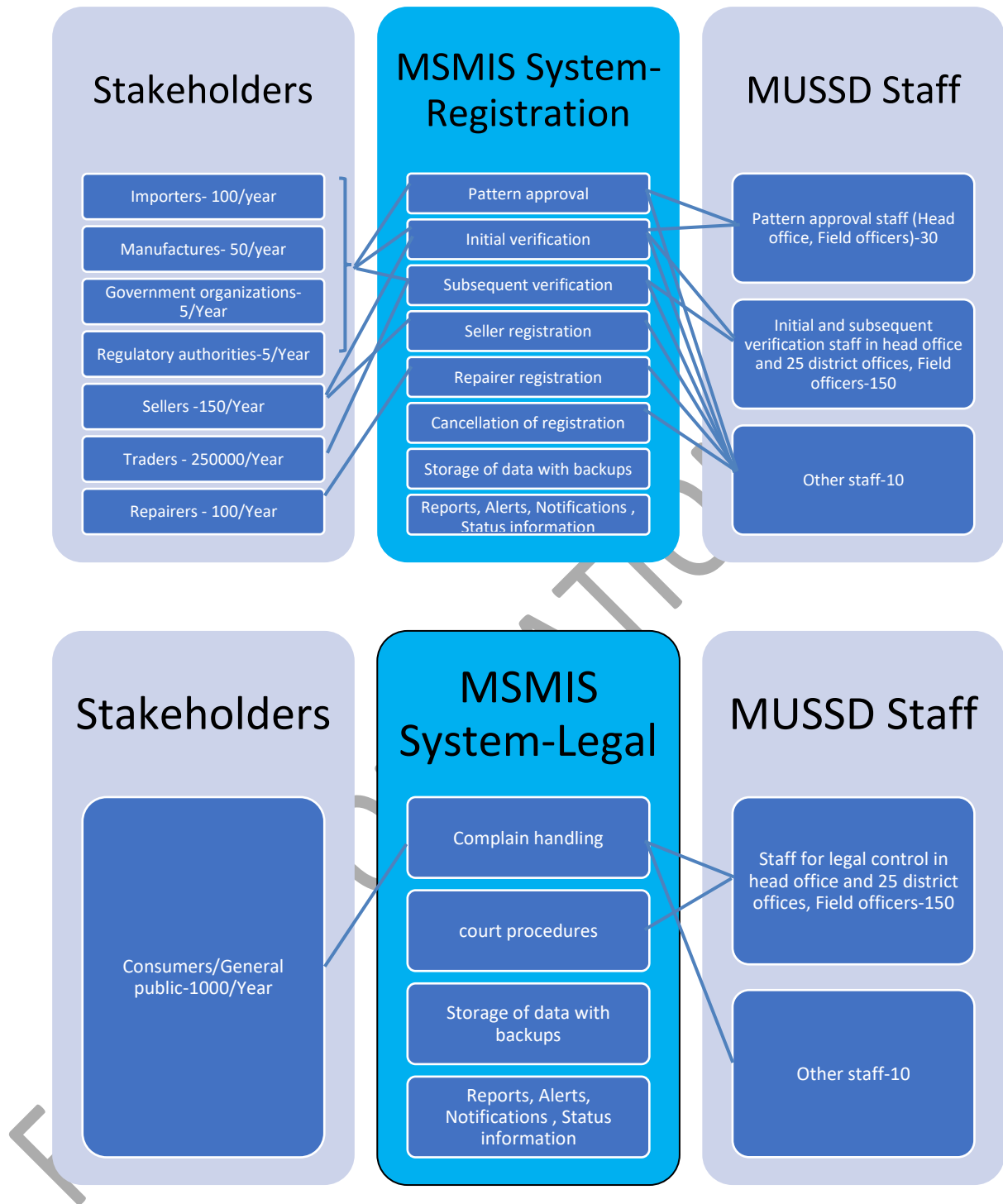
FOR INFORMATION ONLY

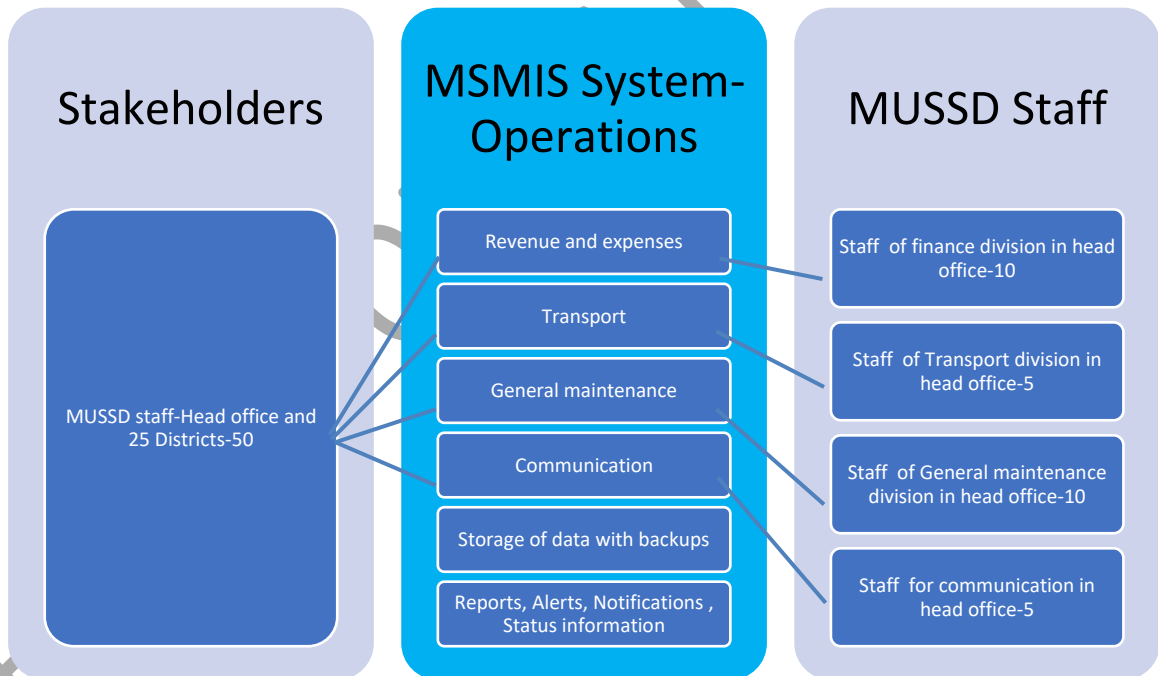
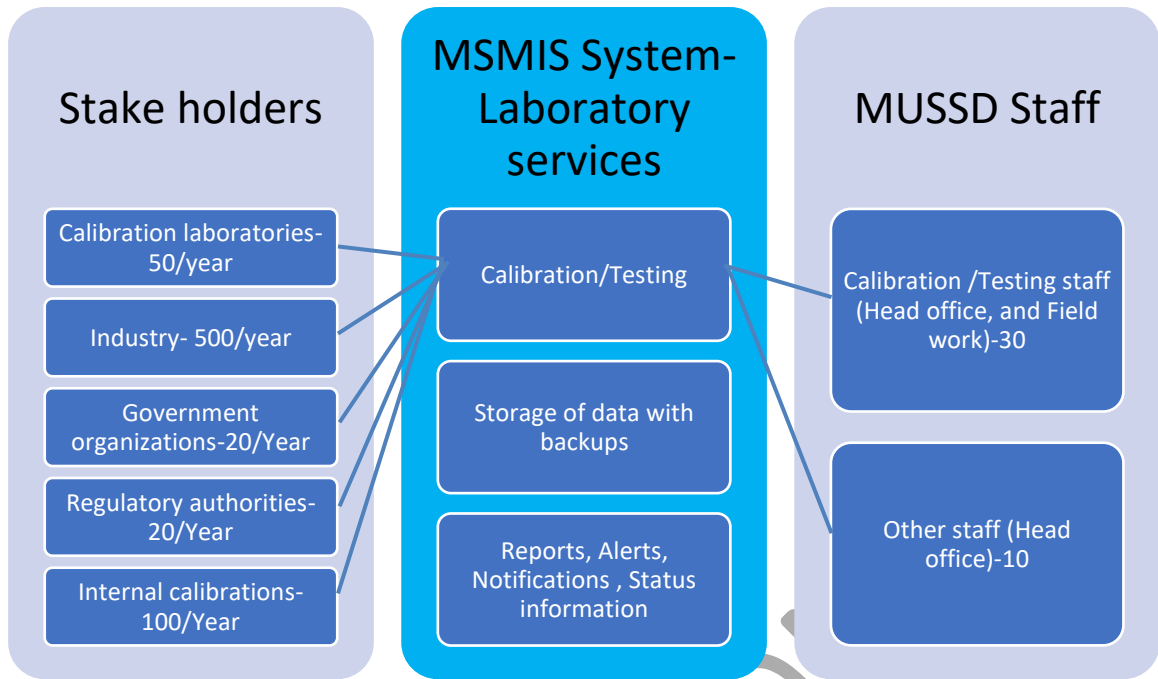
## Annex – E: High Level Architecture - Architectural requirements to be met by the solution

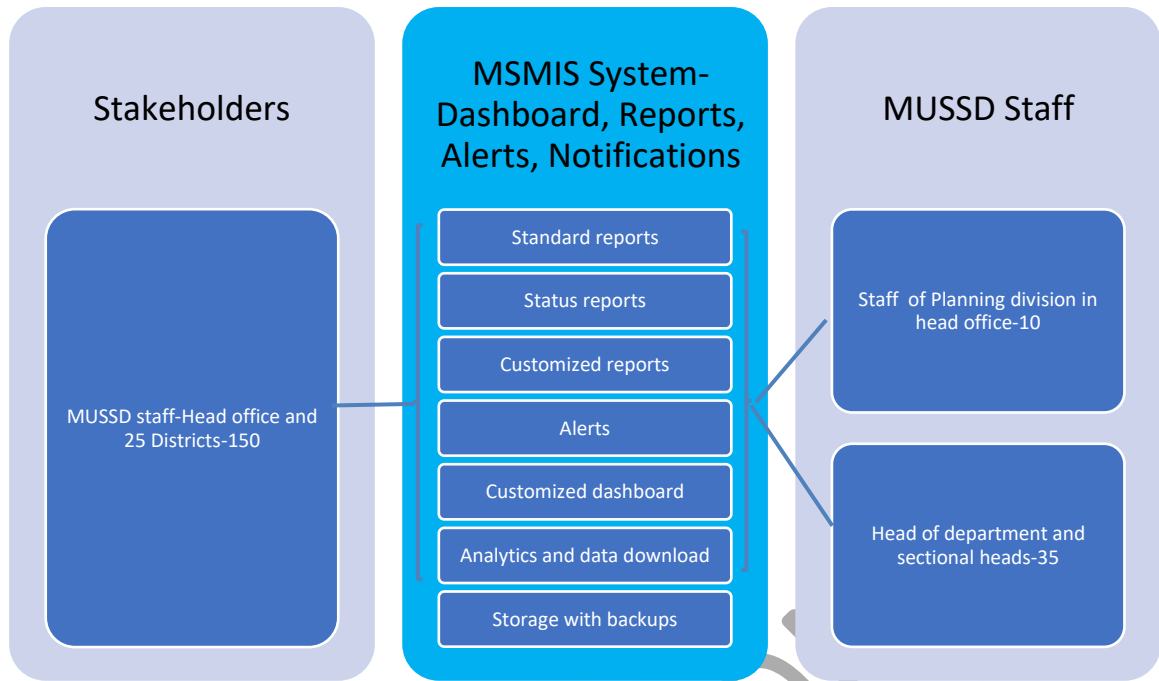


FOR I

### Description of key modules







## Unique Identification formats and minimum information for activities used in MUSSD

### Registration

Identification Requirement	Format/Identification Method
Pattern Approval Number	<b>Pattern Approval Number (XXX:000-ZZZ),</b> Model Number (Manufacture selected format) OIML Recommendation Number (XXX:000-999) Sub Category Number (X:0-9, A-Z) Year, Month and Date of Approval (YYYY-MM-DD) Year, Month and Date of Expire (YYYY-MM-DD) Approval Status Model Specifications and Metrological Characteristics
Initial Verification Number	<b>Initial Verification Number (XXXXX:00000-ZZZZZ)</b>  Initial Verification Date (YYYY:MM:DD) Pattern Approval Number Status of Instrument
Subsequent Verification Number	<b>Verification No (YYYY-MM-XXXXX)</b>

	Initial Verification Number Pattern Approval Number Verification Date Date of Expire
Importer/Agent Identification Number	<b>BR or NIC</b> Approved Models Company Name/Name Contact Details
Manufacture Identification Number	<b>BR or NIC</b>  Company Name/Name Contact Details Authorized Agents/Importers Approved Models
Government Organizations or Regulatory Authority Identification Number	<b>Short Abbreviation or Long Name</b>  Contact Details Pattern Approval Numbers of Approved Models Initial Verification Number of Instruments
Seller Identification Number	<b>BR or NIC</b>  Approval Number for year Pattern Approval Numbers of Approved Models
Trader Identification Number	<b>BR or NIC</b>  Initial Verification Number of Instruments Subsequent Verification Numbers
Repairer Identification Number	<b>BR and NIC, NIC</b>  Approval Number for year

**Legal**

Identification Requirement	Format/Identification Method
Complain Identification Number	XXXX
Received Date	YYYY-MM-DD
Status	Status
Complain	Text
Response	Text

**Laboratory Services**

<b>Identification Requirement</b>	<b>Format/Identification method</b>
Customer identification Number	<b>BR or NIC</b>
Calibration Instrument Identification Number	Instrument Identification Number
Instrument Category	Code
Instrument Name	Text
Quotation Number	Quotation Number (YYYY-XXXXX)
Calibration Certificate Number	<b>Calibration Certificate Number (LLL-YYYY-MM-XXXXX)</b>
TAX Invoice Number	Invoice Number
Status Information	Timeline Update

**Operations**

<b>Identification Requirement</b>	<b>Format/Identification Method</b>
Service or Repair or Maintenance Number	<b>XXXXX</b>
Instrument Identification Number	<b>XXXXX</b>
Instrument Name	Text
Location	Code
Service Request Received Date	YYYY-MM-DD
Completion Date	YYYY-MM-DD
Status Information	Timeline Update



## **Annex F - Attachments and Report Formats currently use in MUSSD**

### **1. Registration Module**

#### **1.1 Importer and Manufacturer Registration**

- Pattern Approval
  1. Pattern Approval Application
  2. Manufacture Letter
  3. Annex -B-R76-Pattern Approval General Requirements
  4. Annex-B-R76-check list
- Initial Verification
  1. Verification Certificate

#### **1.2 Trader Registration**

- Subsequent Verification
  1. Verification Certificate

#### **1.3 Measuring Instrument Seller Registration**

1. Seller Application

#### **1.4 Measuring Instrument Repairer Registration**

1. Repairer Application

### **2. Legal Module**

#### **2.1 Raids**

- Log Book
- Reporting Formats

### **3. Laboratory Services Module**

#### **3.1 Calibration/Testing**

- 4.4-F3-Format of request letter
- 4.4-F4-Format of receiving and returning form
- Note sheet+

- Quotation Format
- Tax Invoice Format
- 4.7-F1-Format of Customer Feedback Form
- Calibration/Testing Certificate

#### **4. Operations Module**

##### **4.1 Revenue and Expenditure**

- Paying in Voucher- General 118
- Voucher- General 35

##### **4.2 Transport and Fleet Management**

- Running Chart
- Log Book
- Transport Schedule
- Vehicle Request Forms
- Gate Pass
- Summary Reports

##### **4.3 General Maintenance and Repair**

- Request Form
- Status Report
- Register
- Log Book
- Summary Reports

#### **5. Alerts, Notification, Dashboard and Reports**

- Annual and Quarterly Progress Reports of MUSSD
- Sectional and Overall Activity Summaries
- Sectional and Overall Customized Summaries
- Sectional and Overall Graphical Illustrations
- Sectional and overall Customized reports
- Alerts on trends
- General notification of abnormalities and progress

## Annex G - Measurement Units, Standards and Services

### Department district offices details

Contact details of district offices

District office	Address	Telephone No
Colombo	District Secretary, Measurement Units, Standards and Services Division, District Secretariat Narahenpita, Colombo 5	0112-500987
Gampaha	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Gampaha	0332-221664
Kalutara	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Kaluthara	0342-221765
Puttalam	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Puttalam	0322-266189
Kurunegala	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Kurunegala	0372-228770
Kegalle	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Kegalle	0352-221323
Ratnapura	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Rathnapura	0452-226299
Galle	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Galle	0912-231211
Matara	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Matara	0412-237079
Hambantota	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Hambantota	0472-256160
Monaragala	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Monaragala	0552-277406
Badulla	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Badulla	0552-228200
Nuwara Eliya	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Nuwaraeliya	0522-235703
Kandy	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Kandy	0812-239971
Mathale	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Mathale	0662-222135
Anuradhapura	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Anuradhapura	0252-225190
Polonnaruwa	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Polonnaruwa	0272-226706
Batticaloa	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Batticaloa	0652-226584
Ampara	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Ampara	0632-222982

Vavuniya	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Vavuniya	0242-224816
Jaffna	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Jaffna	0212-217399
Mullaitivu	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Mullaitivu	
Mannar	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Mannar	0242-224816
Kilinochchi	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Kilinochchi	
Trincomalee	District Secretary, Measurement Units, Standards and Services Division, District Secretariat, Trincomalee	0262-050800

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