

A proof of concept for a
Metrological Information Management System (MIMS)
based on Open-Source R-Shiny

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Digital transformation is reshaping industries, economies, and daily life by driving automation, connectivity, and data-driven decision-making. At the core of this transformation is metrology, working to ensure the reliability, accuracy, and interoperability of digital systems, providing the foundation for trust in emerging technologies as it currently does for analog measuring information. Metrology is both a key player and a major beneficiary of the Digital Transformation.

In response to a resolution of the CGPM regarding digital transformation [1] the CIPM has established the Task Group on the SI Digital Framework (CIPM-TG-DIG), to develop practical strategies for establishing a world-wide uniform, unambiguous and secure data exchange format for measuring information among digital systems [2].



A significant milestone in metrology for digital transformation is the establishment of the **SI Reference Point**, by the BIPM. This service is enabling robust and interoperable solutions for representing measurement information in a rapidly evolving digital landscape.

National Metrology Institutes (NMI) around the globe are encouraged to increase their level of commitment in the development, promotion and implementation of the SI Digital Framework [1]. This would require them to update their processes and their infrastructure to prepare for modern data management streamlines, and the metrologist' mindset might require to adapt to new ways of handling such information.

In this poster, we present an ongoing initiative at the Instituto Nacional de Metrología de Colombia (INM(CO)) for the digital management of metrological data based on graphical user interfaces constructed with the programming language R [3]. We discuss the current status of the tools developed with R and some of our planed upcoming developments.

INFORMATION MANAGEMENT SYSTEMS

Information Management Systems (IMS) are software solutions that collect, store, organize, and retrieve data in a structured manner. A Laboratory Information Management System (LIMS) is a specialized type of IMS designed to handle specific workflows within calibration and testing laboratories [4].

Our **Metrological Information Management System - MIMS** is a concept evolved from LIMS, with the added value that it presents a special focus on relevant metrological concepts, like metrological traceability, uncertainty estimation, and consistent representation of measuring information in digital systems. The MIMS seeks to promote the efficient management of data and processes, seeking to adhere to the FAIR principles. Such systems should focus on using the authoritative points of reference for the measurement data exchange format, such as the BIPM's SI Reference Point.

WEB APP INTERFACES DEVELOPED WITH R

R is a free software for statistical computing that has positioned as an important tool in metrology [3, 5]. Thanks to the **R library Shiny**, R can be used to develop and maintaining web servers that run user-friendly applications that may be accessed freely through the web, without the need for the end users of installing any software nor having programming skills [6].

Below is a short description of some of the LIMS components that are under development or planned for the future:

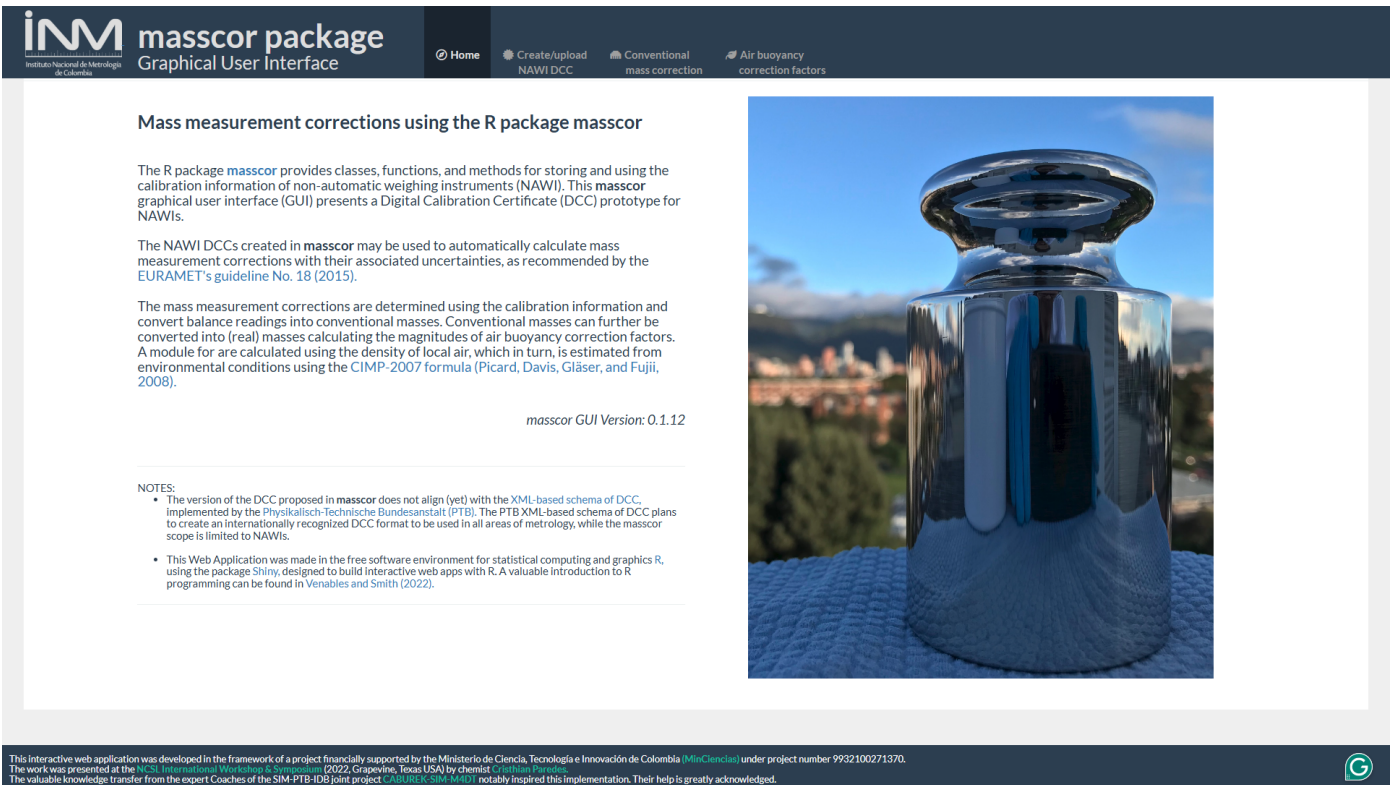
The homepage to the INM(CO) MIMS, accesible at the web page **validar.inm.gov.co/home**. Each icon should direct to one of the tools designed to enhance the efficiency and reliability of laboratory processes or to ease their compliance with the FAIR principles. Each web app is expected to produce structured machine-readable and machine operable files to be used by the other apps of the MIMS.



TitulaR: data treatment and generation of XML structured data during the characterization of CRMs that use gravimetric titration [7].



Masscor: data management of weighing processes, calibration data and global uncertainty calculations according to EURAMET Guide No. 18.



InventaRio: laboratories' stock inventories management using an SQLite database.

Buscar?

Buscar por código

10

Nombre del inventario

Crear Laboratorio

Crear nuevo inventario

Importar inventario

Exportar inventario a Excel

Actualizar inventario

Eliminar inventario

Inicio

Inicio de nuevo inventario

InventaRio

Código	Unidad	Marca	Modelo	Fecha	Cantidad	Preservación	Validado por	Observaciones	Ubicación	Fecha vencimiento	Fecha ingreso
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