Matrix Configuration Tools

Autoscribe’s Configuration Tools Guarantee a Truly Flexible LIMS

The needs of every laboratory are different in detail. Therefore, ease of LIMS configuration is key to the successful implementation and on-going usability of any LIMS solution.

There are two basic choices when choosing a LIMS:

- Change your procedures to fit a non-flexible out-of-the-box LIMS or
- Change the LIMS to fit your procedures

Autoscribe solutions uniquely feature genuine configurability that requires no software programming or custom coding. They ensure an exact fit to customer requirements for a wide range of laboratories and business processes.

Matrix Configuration Tools provide superior flexibility which results in fast implementation and user interfaces that are familiar and comfortable for each user. This results in quick acceptance of the system without protracted training sessions.

The Matrix LIMS family features dual desktop/browser operation that enables users to utilize the optimum interface depending on their specific needs e.g. in the office the desktop interface is used.

Successful systems cannot (and never do) stand still!

- Interfaces to new systems
- Global Harmonization
- Mergers & acquisitions
- New ideas etc

- Extra Departments Involved
- New Regulations
- New Instruments

Fig 1: The best LIMS solutions constantly evolve
whereas the browser interface can be used for remote access to the system.

It is important to note that when screen changes are made using the configuration tools the changes are instantly made for both desktop and browser interfaces.

User requirements are typically a snapshot in time for all but the most routine laboratories. Requirements change, new ideas for using the LIMS come to the surface, new regulations need to be considered and much more. The beauty of genuine configuration tools is that the Matrix system can keep pace with the changes needed either by utilizing Autoscribe after-sales services or by having authorized users trained in the use of the configuration tools.

Why Configuration?

Benefits of Genuine Configurability:

- Matrix LIMS can be designed quickly to represent user requirements.
- User requirements change over time. Matrix Gemini allows for easy changes to be made to accommodate new needs. This is termed as “future-proofing”. This leads to longer system life, lower cost of ownership and excellent return on investment.
- Matrix Gemini only needs to be configured once for use with desktop and/or browser user interfaces. This reduces implementation, validation and support time and costs.
- Authorized users can be trained to use the configuration tools if specified with the system. This allows customers to further configure their systems as needs change.
- Uniquely all customer created configurations are supported at no extra cost on the support agreement.
- Implementation and support risk is substantially reduced by eliminating the use of custom code.
- Configuration files are stored in the database and hence are unaffected by upgrades to the core code. This preserves the Matrix upgrade path which now extends to greater than 25 years.
- For global implementations, or for systems serving multiple departments, configurations can be designed to suit the local site or department without any compromises. This is hugely cost effective and results in a system that is much more cost effective to maintain.
But all LIMS Claim to be Configurable

In a broad sense this is true but there are significant differences in the approaches used – and this has a major impact.

There are several different approaches to configuration:

- **Fixed screens (no configuration)**
  - Must adopt workflow, naming conventions etc. of the LIMS as supplied

- **Configuration Switches**
  - Turn on/off some of the screen options to semi-configure the LIMS

- **Configuration Coding**
  - Change any screen, but coding is needed and this has a major impact on the validation task

- **Autoscribe Configuration Tools**
  - Core code identical (avoids system re-validation)
  - Interactive user interface
  - Visual drag and drop, point and click to add fields, list boxes etc.

In some LIMS, a programmer must write scripts or new custom programs to design new screens or link menus in different ways to support different workflows. In Matrix, all configuration changes are made using the unique configuration tools provided within the application and without writing any new code.

Every Matrix Gemini LIMS installation uses exactly the same core program suite. However, there is a configurable “layer” that allows each system to look and behave differently to match user requirements.

This design not only provides for easy and safe configuration changes, but also allows easy upgrades and remote support. Screen and menu design files can be e-mailed between the customer and the Matrix support group, allowing experts to review any proposed changes and provide advice on the implementation.

Proposed changes can be developed in the training/development database, a standard feature of Matrix Gemini, and once approved can be copied into the live database for immediate use over the web and desktop.
Dynamic Screen Generator

A very intuitive modern visual workflow screen editor shows the screen in edit mode along with all the options and control properties associated with that screen. Context sensitive help provides details of all the options available to that class of screen. Fields and controls can be dragged from the control palette and positioned on the screen as needed. Terminology and labels are easily changed to match the required nomenclature.

Screens can be linked together and information transferred between them without any programming. New screens can be created by copying and modifying existing screens from the screen library. Any number of screens and workflows may be readily created by Autoscribe or a trained user. Unlike other LIMS Matrix Gemini does not require custom coding or the use of esoteric, proprietary scripting tools.

A control palette is available that allows the easy configuration and addition of all required features to screens. Control properties and screen options can be set for individual screens ensuring an excellent fit to both business and user requirements. An unlimited number of screens can be created and can be readily accessed and updated through the visual configuration.

Fig 4: Everything configured using the configuration tools is fully supported by Autoscribe Informatics
workflow tool. Screens can be specific to users, groups of users, methods, instrumentation and can also be in different languages. Color list boxes are available that enable the system to be configured with color highlighted data fields based on sample status, for example - see figure 5.

List Builder

The list builder allows ‘pick-lists’ to be created and easily edited to include new selections or remove obsolete items. The extensive use of pick lists in the system reduces keystrokes and enhances consistency; both leading to fewer input errors. See figure 6.

Menu Builder

Menu “trees” are easily produced to guide the specific user through the system in the most efficient manner to match their workflow. Different users or classes of users may have different menus dependent upon their job function and security level. See figure 7.
Counter Editor

Matrix Gemini supports the use of multiple counters for uniquely and easily identifying samples, batches, lots, test codes, substance codes and more. These counters are set up to be configurable without programming e.g. “S”ymmnnnnn or “FP”yyymddnnn, etc.

Translation Editor

The translation editor provides convenient translation of system terminology into different languages or site-specific nomenclature which is very useful in the case of multi-site implementations. Each site can use their own names, terms and messages, which speeds acceptance and reduces training costs.

Event Triggers

Very flexible patterns of automated activities can be linked to specific LIMS “events”. These patterns can vary depending upon the customer, the product/sample type, packaging, etc. Hence it is possible to automatically send an email back to the submitter when a sample is received; or notify a plant supervisor when an in-process sample is out of specification; or add another confirming test when the regular test fails.

Off Screen Controls

Off screen controls can be used for various purposes such as setting screen defaults, preventing users accessing certain fields, to perform off-screen calculations, to perform ‘data’ transfers between fields and screens and to launch other screens that perform work that a user need not / should not see.

In this example the user will only see samples stored in freezers located in the “Stores” as the “Filter by Location” selection edit box has been moved off-screen and has been set to “Stores”. Similarly screens can be fired from off-screen areas that perform automated work on behalf of the user. The user may never actually have to interact with or see these screens.
Auto Buttons and Next Buttons

User workload can be reduced by configuring Auto and Next buttons. The examples below show Auto button and Next button in operation.

An Auto button is automatically pressed as a screen opens. Next buttons allow the designation of the ‘Next’ button that will be automatically pressed after another designated button is pressed. In the case below the Next button follows an Auto button. For example, this can be useful after a user has selected a client or submitter then the Next button action might be to cause the user to select a raw material to test.

1. User presses “Raw Materials” Button
2. Instead of the above screen appearing
3. The user is presented with the “Supplier Selection” screen as an Autobutton option has been set on the screen shown in 2.
4. On selecting a supplier in 3, the system automatically presents the Raw Material Select screen which was opened automatically by the “Nextbutton”
5. The Supplier and Raw Material edit boxes now have data entered.

Fig 11: Example Auto and Next buttons
Screen Calculations

It is possible for a control on a screen (usually an edit or text box control) to be the result of a calculation of other values on a screen. Formula of varying complexity can be used in screen controls similar to ‘Excel type’ calculations in a spreadsheet cell. Screen calculations are secure and version controlled.

Control Palette / Different Control Types

The screen editor contains a rich “screen controls palette” that enables the system implementer to easily design and configure screens and workflows. Every control has fully configurable properties. For example, required fields can be colored in yellow and associated caption text can be highlighted in red – see example below. The Matrix configuration tools screen editor automatically creates an identical user experience for both desktop and web browser use without the need for custom programming or the use of esoteric scripting tools.
eMail Capability

Matrix Gemini can send configurable plain text emails using SMTP from any screen. Notifications of an action, warnings or changes in resource allocation can be sent from either the desktop or web client screen options. Reports, quotations and invoices can also be sent by email in multiple formats such as Word, Excel, Crystal Reports, text and PDF. Matrix Gemini can be configured to send emails in specific formats for different customers / clients / suppliers. (Request Technical Note TN013 for further information on setting up the screen options for email).

Generic Selector

The Generic Selector is a Matrix Gemini screen type / class that permits the retrieval of data from many data sources. It is a configurable Matrix screen that can use standard query language to retrieve data from other SQL Server, Oracle or ODBC / OLE DB compliant systems. Generic Selector screens are often used to ‘seamlessly’ interface external systems with Matrix Gemini. These include SAP, BPCS, JD Edwards, Client / Supplier / Patient Information management systems and external Excel spreadsheets. A system can contain multiple Generic Selector screens.

Fig 13: Example of using a Generic Selector to interface with an SAP system
Transfers

The “Transfers” option allows the system to copy data automatically from one screen control to another. Data can also be transferred between controls on different screens. Transfers can also be used to populate fields for automated parameter passing to, for example, Crystal Reports.

Listbox Headers

All list boxes may be configured to bring back required data in the columns of the list box. The data is sorted for one column as default but other column headers can be activated to sort by the data in that column.
Progress Control Bar

A progress bar control is available for use with both Web and Windows clients. The new control can be utilized on any screen class.

For example, the progress bar control can be configured on the main user screen to provide “Dashboard Metrics” as “Key Performance Indicators (KPIs)” to show managers/users current KPIs.

Gantt Chart

A configurable Gantt chart control is available. This has been configured for use as the instrument booking system which is available as a licensable option. iPlanner permits the automatic allocation of sample-tests to an appropriate instrument within constraints which include:

- the booking of pre-requisite tests
- test order
- sample availability dates
- instrument capacities

The iPlanner Gantt chart instrument booking plan displays the number of sample tests booked for each instrument and its capacity. This is color-coded so that it is easier for the user to see under/over allocated instruments. Users with the appropriate authority can also move sample-tests from one instrument to another.

Another example of the Gantt chart in use would be to configure a dynamic view of users booked on training courses for a particular location/room. The location/room could also be pre-allocated with a maximum number of attendees.
Crystal Reports / Crystal Runtime

Matrix Gemini LIMS ships with a developer’s copy of Crystal Reports to create new reports or to modify existing reports. Matrix Gemini LIMS comes complete with an on-board runtime license for users to be able to run, view, export and print reports.

Crystal Reports is a powerful reporting tool that enables you to easily access your data, format it with stunning new visuals and deliver it as interactive content within your applications and via the web, all with less effort than ever before.

**Fig 18: Crystal Report Examples**
Easily extract and format customer and management data

**Fig 19: Example real time trend analysis Crystal report**
Configurable Crystal Reports

Reports can also contain control / trend charts and the data can be exported in many file formats which include Excel, PDF, Word, XML and more. Optionally files can be eMailed to users and customers.

The data presented in figure 20 shows result data displayed with upper and lower limits. The result data values have been formatted into a table with a graphical representation below. This report could, for example, be cut and pasted into a final report or indeed exported into Excel format complete with the graph. In figure 20 the standard deviation of the results has been calculated and the limits set at +/-3 standard deviations of the calculated value.

This way of calculating limits is quite specialized and is used by the Nuclear Industry to report results to the Environment Agency. This report illustrates the configurability of Matrix Gemini and its reporting capabilities. Traditionally limits are more commonly based on fixed values such as specification limits or manufacturing limits.

DB Combo/List Boxes & Editable List Boxes

DB Combo/List Boxes allow the user to view the contents of any table within the Matrix (or 3rd party application) database. The advantage over an ordinary List Box is that any database changes (for example additional users, samples or tests) are shown in an instantly updated list. The functionality of these controls is handled by the screen options and standard SQL select statements.

Editable List boxes additionally allow the user to save time by writing into, as well as reading, the database. Rather than clicking an edit button and then updating the database the user can update the data directly on the list screen. Any list box can be directly replaced by an editable list box.
Charting

Multiple chart types are available within Matrix in 2D, and 3D where applicable, in linear and logarithmic scale:

- Line
- Bar
- Area
- Pie
- Funnel
- Histogram
- Stock
- Doughnut
- Radar
- Bubble
- XY

SPC Charts

Matrix Gemini also supports Statistical Process Control (SPC) Charts. SPC control charts are useful to distinguish background variation from events of significance based on statistical techniques and are particularly useful for quality control in production type environments.

The Matrix SPC chart can show the following 4 chart types:

- Trend
- Histogram
- R-Chart
- X-Chart

Fig 22: Example of Chart Types

Fig 23: Example of SPC Charts
994 buttons

994 buttons are special control buttons that can be configured to open other types of screen / functionality from any other screen – they are often used to create workflows or reporting screens. Some examples of different screen classes that can be opened by 994 buttons are shown in the table:

<table>
<thead>
<tr>
<th>994 Button Option Number</th>
<th>Function when button clicked</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Register a single sample</td>
</tr>
<tr>
<td>101</td>
<td>Register template</td>
</tr>
<tr>
<td>120</td>
<td>Select samples</td>
</tr>
<tr>
<td>121</td>
<td>Select samples and tests</td>
</tr>
<tr>
<td>122</td>
<td>Select batches</td>
</tr>
<tr>
<td>123</td>
<td>Generic selector</td>
</tr>
<tr>
<td>124</td>
<td>Generic selector</td>
</tr>
<tr>
<td>130</td>
<td>Crystal report dialogue</td>
</tr>
</tbody>
</table>

Using Multiple Menus Simultaneously

Matrix Gemini desktop runs ‘modeless forms’. Modeless forms let you shift the focus between the form / screen and another form / screen without having to close the initial form. The user can continue to work elsewhere in Matrix Gemini while the current screen (form) continues to be displayed. Practically this means that you can open more than one menu item at a time. For example you could have sample registration screen, results entry screen and a Certificate of Analysis or audit report, all open at the same time.

Cascading Combo Boxes

Combo boxes and list boxes may be ‘cascaded’. For example if the user chooses a particular type of product – “Aerial” then automatically another combo box may display options that include Radio and TV. If the user selected Radio then a further cascaded combo box / list could display options for FM, AM, Digital, Short Wave.
Example Workflows

Matrix Configuration Tools ensure an exact fit to customer requirements for a wide range of laboratories and business processes.

Fig 24: Genuinely user configurable to your exact needs
About Autoscribe Informatics

Autoscribe Informatics offers industry leading configurable future-proof database management applications. Solutions include Laboratory Information Management Systems (LIMS) and Quality Management Systems that are configured to match user requirements.

Autoscribe has offices in the UK and USA, with distributors around the world.

Our worldwide team of LIMS, scientific and business software professionals are passionate about delivering solutions that meet the evolving needs of our customers. We leverage our highly configurable solutions and our 30+ years of experience to help our customers automate their processes to work more efficiently, provide real cost savings and meet regulatory compliance needs.

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