

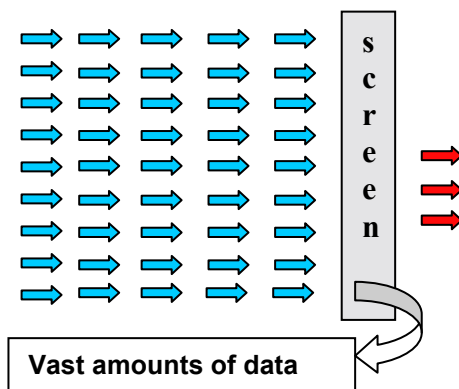


Managing the High Throughput Laboratory

Tessella's Capabilities in Robotics and Laboratory Automation

High throughput screening and experimentation have led to a growing reliance on robotics and automated systems. The enormous volumes of data produced require ever more powerful computer hardware, coupled with reliable, high-quality software solutions for instrument control, data capture, data storage, analysis and visualization.

Tessella have a wealth of experience in all these areas, and have assisted many customers in developing software-based solutions for the high throughput laboratory. This document briefly outlines a selection of our capabilities and experience in laboratory software solutions.



Robotic control and automation

Tessella helped GlaxoSmithKline develop a system called PROSPER, which controls a robot, enabling chemists to run up to 52 reactions in parallel. This is used for investigating and optimizing chemical reaction processes. Tessella later developed another robot control system which was incorporated into a smaller scale version of PROSPER.

Scientific process workflow

Tessella has developed a system for a major pharmaceutical company that helps them manage very long-running experiments. The system allows the user to design the experiments using a graphical workflow editor. It then manages the whole process, which can take months to complete. The system carries out functions, such as:

- notifying the users what tasks are due to

- be carried out on which samples
- carrying out some of the tasks automatically, collecting all experimental data and storing it in an Oracle database
- ensuring that all results data can be reliably associated with the sample that produced them
- displaying results in real-time via an interface that allows the users to 'drill down' to the required data

Automation of spectrometers

Tessella designed a system for PerkinElmer to set up experimental runs of spectrometers, using a range of accessories, including autosamplers, temperature probes, cell changers and sippers. The system can be left unattended and passes control to an accessory to perform a user-defined task.

Real-time microbiology testing

Tessella helped Chemunex enhance and upgrade a system which performs real-time microbiology testing for filterable samples. Rapid identification is performed through a combination of cell labelling and laser scanning technologies. The system controls hardware, detects events and displays results.

Primary Liquid Store controller and scheduler

Tessella helped develop the software for real-time control of a large-scale robotics system for a large pharmaceutical company. The Primary Liquid Store is a major part of a larger automated compound management facility, used to significantly improve the quality, efficiency and speed of delivering solid and liquid samples to chemists and biologists for use in pharmaceutical drug discovery.

Robotics and automation software

Tessella developed embedded and high-level control software for a custom-built sample shaking device for GlaxoSmithKline.

Automation, analysis and fixed workflow

An Electrophysiology Automation System was

developed by Tessella for GlaxoSmithKline to simplify the operation of experiments for drug-screening staff, and to aid in data analysis. EASY combines existing control software with a drug delivery control system. Whole experiments can be controlled from a single desktop with near-instantaneous data analysis, together with a simple electronic 'data log'.

Sample tracking system

A leader in agricultural biotechnology needed a sample tracking system for biological samples. The system Tessella designed has PCR result import, and assists in the interpretation of results. A range of customizable reports can be exported to geographical information systems (GIS), so that biologists can visualize the distribution of certain genes.

NMR spectral analysis tool

Tessella developed Spadez, a desktop application, for AstraZeneca. Spadez allows scientists to load 96 spectra from a 96 well plate as easily as a single spectrum. It offers sophisticated controls for panning and zooming the spectra.

Laboratory Information Management System for Microarrays

LIMaS was developed by Tessella for two Medical Research Council research units to replace traditional paper notebooks. The 'electronic notebook' stores micro-array data and experimental annotation. LIMaS had to be highly portable and configurable, which Tessella achieved by storing all variable data in the database, and using pure Java/SQL.

Scientific Process Workflow

Flux-View was developed by Tessella for the Centre for Ecology and Hydrology. A new field instrument for measuring turbulent fluxes of heat, water vapour and CO₂ from the land surface had been introduced previously. Tessella developed a streamlined system to download, process, visualize and archive the field data.

Data pipeline for discovery of active ingredients

Tessella helped in the development of a suite of applications to assist in the discovery of new active ingredients for a global agribusiness. The system maintains a central database of compounds and samples, and integrates with analysis equipment and automated bottle stores.

Instrument File Archival (and GLP)

Tessella developed a system for a leader in crop protection to archive raw data files from analytical instruments to networked file storage. It was a requirement for the system to conform to GLP standards with a multi-role security model.

Infusion pump control software

This project for Alaris Medical Systems involved developing embedded software to control an infusion pump which delivers intravenous drugs to a patient at a controlled rate. An exceptionally high level of quality was required in the project, to ensure that the pump gained regulatory approval.

Statistical Process Control for HTS

Tessella are helping a major pharmaceutical company in the development of a statistical process control system for their high throughput screening department.

Decision Support Systems

Decision support systems developed by Tessella are being applied to high throughput screening in the pharmaceutical industry.

Genetic algorithms are used to run 'simulated screens'.

Biotechnology Data Pipeline

Tessella helped a major agribusiness develop a set of web-based applications to manage data from the research pipeline. This system replaces many disparate legacy systems. Tessella helped with project management, data migration and reporting.

LIMS for field trial samples

For one of our customers, Tessella developed a LIMS for the management of samples collected from field trials. The software interfaces to HPLC instruments and tracks sample location and custody throughout. The system conforms to GLP standards.

Tessella plc 26 The Quadrant, Abingdon Science Park, Abingdon, Oxfordshire OX14 3YS, UK
T: +44 (0)1235 555511 | F: +44 (0)1235 553301 | E: info@tessella.com

Tessella Inc 233 Needham Street, Suite 300, Newton, MA 02464, USA
T: 1 617 454 1220 | F: 1 617 454 1001 | E: info@tessella.com

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