

# Integration of Freedom EVOware® Sample Tracking with Applied Biosystems SQL\*LIMS®

## Towards fully automated management of high throughput genotyping data

The Genomics Platform team at the Parco Tecnologico Padano (PTP) provides a high throughput genotyping service in the AgBiotech area using its automated platform that includes three Freedom EVO® workstations and two automated analyzers. Tecan's Freedom EVOware® Sample Tracking software is being set up as a bridge to send the data generated from the Tecan instruments to the fully integrated laboratory information management system (LIMS) for further processing.



*Pietro Piffanelli (far left), Gert Sclep (far right) and the PGP team*

The PTP is located in the Lombardy region of Italy and is recognized as a center of excellence in the agro-biotechnology sector. The research and development unit focuses on both animal and plant genomics. In 2005, the PTP Genomics Platform (PGP) team was created to provide a central high throughput genotyping service for all internal projects and to coordinate the DNA national project on genomics platforms. The PGP performs molecular genomics analyses for approximately 70 agro-biotech

researchers within the PTP, as well as other research centers and universities in Italy. It has developed a fully automated platform to process the large sample numbers it receives to a high standard.

The platform consists of two distinct pre-processing and processing areas. The incoming samples are logged into the LIMS and aliquoted into microplates using a Freedom EVO 75 liquid handling workstation. A Freedom EVO 150 workstation with an integrated

GENios™ microplate reader next carries out isolation, quantification and normalization of genomic DNA or RNA. The samples enter into the processing area where a second Freedom EVO 150 workstation is set up for high throughput purification of genotyping reactions using a Te-MO™ 96 head and low volume head, enabling reduction of reaction volumes. Finally, the samples are analyzed using a 7900HT Fast Real-Time PCR System or a 48-capillary 3730 DNA Analyzer from Applied Biosystems. All Freedom EVO workstations are equipped with a barcode reader (Tecan PosID™) which facilitates LIMS mediated tracking of the microplates throughout the entire process.

“We chose Tecan instruments because of the robustness of their components,” explained Dr Pietro Piffanelli, the team’s Scientific Coordinator, “and because we found the Tecan liquid handlers represent the best combination of hardware technology and state-of-the-art software solutions.”

In order to fully integrate the platform’s multiple instruments with the laboratory’s existing LIMS, scientists at the PGP are using Tecan’s Freedom EVO Sample Tracking software to create a



PGP set-up

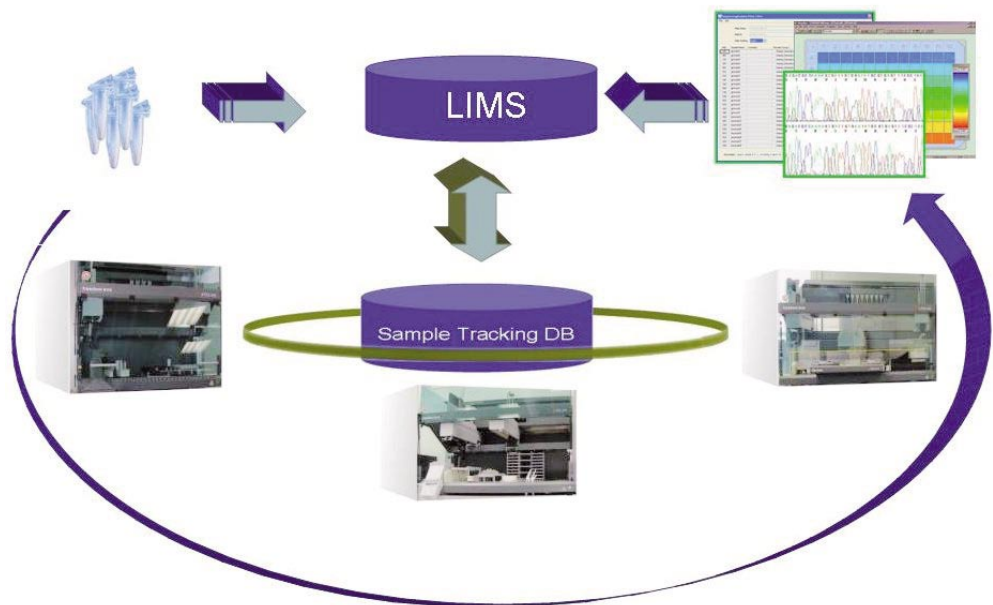


“There were no major hurdles in combining the Sample Tracking software with our existing LIMS”

bridge for transferring all data between the Freedom EVO workstations and the LIMS. The PGP's SQL\*LIMS® from Applied Biosystems records and tracks all the samples, the processing steps performed and the data generated. This means the platform has two software systems running concurrently: the Sample Tracking manages all the data from the Tecan instruments and transfers them to the SQL\*LIMS®, which incorporates them with the rest of the tracked data for further processing.

Gert Sclep, the PGP team's bioinformatician and LIMS specialist, was directly involved in the implementation of the current system, as he explained: “There were no major hurdles in combining the Sample Tracking software with our existing LIMS; different database management systems underlie the two programs, which introduced a slight incompatibility that we have successfully overcome to form one coherent database system. It took about a month to link the two systems, and another month for the synchronization of the GENios reader data. We are now in the third phase of implementation, in which actual plate manipulation steps performed on a Freedom EVO workstation are stored in the Sample Tracking database and transferred to the SQL\*LIMS® database.”

The completed integration will represent an enormous upgrade of the automation capacity of the entire platform. All the data from the Tecan instruments and workstations will be automatically



Schematic of workflow and LIMS/Sample Tracking

entered into the LIMS, relieving the analysts from laborious, manual data input. This has major advantages for the quality of service the PGP team can provide. “We estimate that manual input has an error rate of about three per cent, so minimizing our manual input operations will significantly decrease this error percentage,” explained Gert. Pietro added: “With the automated set-up of our genotyping platform, we can generate up to 5,000 genotyping data points in a day, depending on the assay protocols. This means that at full capacity we expect to generate around one million data points annually.”

“The technical assistance we received from the Tecan Italy team has been instrumental and of high quality, enabling us to be fully operational with all three liquid handling workstations in just a few months and we are now halfway through

our ISO 9001 certification. The feedback that we have received from our customers so far is very encouraging, both for the quality of our service and the quality of the data that we have generated for them.”

*SQL\*LIMS is a registered trademark of Applied Biosystems*