Increase Walk-Away Time, Speed and Reliability in a Fully Automated Multiplex ELISA Platform

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Agenda

• Introduction to automation solutions
  – Instruments
  – Systems
  – software
• Flexible Automated ELISA platforms
  – BenchCel Workstations
  – Systems
• VWorks automation control software
  – New features
Instruments—Liquid Handling

Bravo™ Liquid Handling Platform

Bravo: The fastest, highest performance, and smallest footprint liquid handling system; able to do cell work in laminar flow hood

Vertical Pipetting Station

Vertical Pipetting Station: Precision, high-throughput, and small footprint

Broad range of cell biology, genomics, and drug discovery applications
Instruments—Workstations

BenchCel® Microplate Handling System

The most capable and versatile bench top automation workstation solution

General Sample Processing, Plate Replication, Mix/Read Assays, ELISA, and Molecular Diagnostics Sample Prep Workflows
The most advanced sample processing system on the market that can be easily configured to meet specific application needs

Compound Management, HTS, HT-Genomics, ADME-Tox, Mass Spec Sample Prep, and Automated Cell Biology Workflows
Software – VWorks

VWorks™ Automation Control Software

The most powerful and flexible automation control software, an integral part of workflow implementation

All automated workflows in drug discovery, genomics, proteomics, cell biology and chemical/materials sciences
## What is VWorks Software?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Customer Benefit</th>
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<tr>
<td>Event Driven Controller</td>
<td>Designed to <strong>maximize throughput</strong>.</td>
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<tr>
<td>True Device Pooling</td>
<td>Works around bottlenecks and hardware errors to <strong>maximize walk-away time</strong>. <strong>Greater reliability</strong> compared to other packages.</td>
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<td>Single Application Interface</td>
<td>Drive all levels of automation from the same interface for a <strong>consistent user experience and lower support burden</strong>.</td>
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<td>Robust, Fully Recoverable Error Handling</td>
<td>Diagnose and fix errors <strong>without having to restart your run</strong>. <strong>Maximize walk-away time</strong>. Consistent device handling.</td>
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<td>Data-Driven Capability</td>
<td>Dynamically execute in progress runs for <strong>extensibility</strong> and <strong>better resource utilization and throughput</strong>.</td>
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<td>Standards-Based Technology and Supported Application Programming Interfaces</td>
<td><strong>Flexibility to integrate VWorks</strong> into the corporate infrastructure to <strong>leverage existing processes and IT investments</strong>.</td>
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<tr>
<td>Inventory and Resource Management</td>
<td>Manage barcodes, labware, liquids, and users. Communicate plate data with <strong>LIMS, sample management, and sample ordering systems</strong>.</td>
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<td>Protocol Error Checking and Simulation</td>
<td>More <strong>efficient use of time</strong> in writing protocols.</td>
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Why ELISA Automation?

1) Plate coated with capture antibody
2) Sample added – antigen binds to capture antibody
3) Detecting antibody binds to antigen
4) Enzyme-linked secondary antibody binds to detecting antibody
5) Substrate is added and is converted by enzyme to detectable form.

Tedious and Numerous steps

- Washes, additions, detections, incubations….

Demand from Scientists for instrument companies to create an automation solution

- Walk-away time, one platform, reliability, flexibility, throughput, economy….
Flexible ELISA Platforms from Agilent Automation Solutions

BenchCel Workstations

• More walk-away time
• Compact Benchtop platform
• One flexible interface for every configuration
• 50 to over 100 plates per day

Systems

• Most walk-away time
• Maximum flexibility for device integration
• From simple protocols to most advanced protocols
• Maximum throughput
ELISA Building Block Workstations

- First step to walk-away time
- Maximum flexibility to scale up on demand
- Simple VWorks protocols
- 50 – 100 assay plates per day
Complimentary ELISA Workstations

- More walk-away time
- Cost effective automation
- Flexibility to expand on existing VWorks protocols
- More than 100 assay plates per day
Systems – Cell Based ELISA

Smooth and reliable operation with 500 plates per run in a 3-day experiment

- VWorks automation control software
- Vertical Pipetting Station
- Multiskan Ascent reader
- Agilent Microplate Labeler
- 10 Labware Stacker units to accommodate large batches of plates
- A Liconic CO₂ incubator
- A BioTek Elx405 plate washer
Maximize Walk-Away time, throughput and resource utilization with simultaneous protocols and application of two readers.

- VWorks automation control software
- Agilent Direct Drive Robot
- Bravo liquid handler
- PlateHub and three VStack
- A BioTek Elx405 plate washer
- A Teleshake
- Two Readers: a Multiskan Ascent and a Tecan SpectraFluor
- A MultiDrop Combi bulk dispenser
VWorks Software New Feature Set

**Multiple Simultaneous Protocols**
- Run several protocols concurrently from a single instantiation of VWorks, pre-planned or walk-up.
  - **Get better utilization of valuable resources.**

**Error Library**
- Create and maintain custom error libraries.
  - **Have less downtime due to ‘nuisance’ errors.**

**Time Constraints**
- Graphically bound tasks by a time constraint.
  - **Easy to control timing between tasks in time-critical assays.**

**System State Editor**
- Interface to aid manual recovery of deadlock states.
  - **Recover runs from deadlocks by moving plates manually.**

**Task Groups**
- Allow tighter control of liquid handling tasks; layout Bravo deck before liquid handling takes place.
  - **More ‘intuitive’ behavior of liquid handling.**

**Looping Enhancements**
- Define and increment variables in a loop; reduced dependence on scripting.
  - **Set up and increment loops more intuitively.**

**Gantt Chart**
- Monitor progress and device utilization; export/import to compare side-by-side.
  - **Better able to troubleshoot and optimize protocols.**

**Export/Import Tool**
- Export all relevant files for a protocol; import into another VWorks instance.
  - **Better able to share files between live and simulated systems, customer and techsupport, …**

**Hit Picking Wizard**
- Use worklists to define hit picks; create dilution series for secondary screens.
  - **Easy-to-configure hit picking.**
Time Constraints

Improved performance for time-critical assays.

• Control and track timing of steps before and after incubation.
• Regulate timing of reagent additions.
Multiple Simultaneous Protocols

You can now run as many protocols as you want at the same time.

- Utilize instrument availability during incubation and optimize throughput.
- Prioritize protocol runs and monitor progress.
Error Handling Library

Reduce number of interruptions and maximize walk-away time.

• Preload a default set of errors and responses in the error handling library.
• A recovery action is automatically performed when the error is encountered.
System State Editor

Recover from deadlocks and continue with the run.

- View state of the run, status of devices, location of labware and cause of error.
- Correct the error by physically moving a labware or fixing a device problem.
- Reset the status of devices and labware locations and continue with the run.
Export and Import Tool

Facilitate back up, troubleshooting, and file transfer between computers with a simple to use tool.

- Import and export protocol and relevant files such as log files in one compressed file.
Summary

• We have implemented numerous ELISA automation platforms at customer sites.

• Together with customers we have identified the challenges and created automation solutions.

• Our software which is the heart of Automation is reliable, flexible and continues to introduce new features.
Questions?