

Brainy

solutions

System
Review Series

On pages 90–100 is CAP TODAY's lineup of clinical laboratory automation—17 systems supplied by 13 vendors. Although total lab automation is now understood to be affordable by only a handful of large laboratories, it spawned a variety of task-targeted tools suitable for many lab operations. Before sampling what's profiled on the following pages, enjoy Dr. Rodney Markin's take on the need for clinical lab automation. A lab automation pioneer, Dr. Markin put his money where his mouth is in creating Lab-InterLink, one of the companies whose system is featured in this survey.

—Raymond D. Aller, MD

Rodney S. Markin, MD, PhD

In the 2002 lineup of clinical lab automation, you will find information provided by the vendors that highlights their system's features, functionality, and installed sites. Compared with the 2001 survey of automation, this year's display features more vendors, more installed sites, and even some pricing.

The automation technology profiled in this issue is the next logical step in the evolution of the clinical laboratory. When lab information systems were introduced in the late 1970s and early 1980s, early adopters led the way and helped introduce the mainstream laboratory operators to this new technology. In the early 21st century, we are now looking at another wave of change in laboratory operations that parallels those of the past.

The drivers for automation are still in place and becoming more pressing: decreasing reimbursement; increasing supplies, labor, and support costs; consolidation of hospitals and health systems; the graying of medical technologists; the growing awareness of biohazards still unknown and known; and greater demands for service to patients and providers.

As our government determines how to reimburse hospitals and providers and makes changes annually, so do the other payers who follow the government's lead by linking their fee structures to Medicare. Our supply costs are at an all time low on a cost-per-test basis because of our having spent the past decade chipping away at the in vitro diagnostics vendors' margins until there is not much left to shoot at. And as the supply side of the indus-

try has merged in an attempt to rest on an economy of scale, so have the hospitals and the health systems. Unless something miraculous happens, we could end up with one IVD manufacturer with a name that sounds like a law firm—Abbott, Bayer, Beckman, Coulter, Dade, Dupont, Johnson, Johnson and Roche—and a single hospital system—the Sisters of Perpetual Medicare.

On the human side of the system, we have seen significant decreases in medical technology programs and the volumes of students they educate. The graying of the medical technology profession is a multifactorial problem. If *Newsweek* had run a story about hepatitis in the mid-1970s like it did in April, tattoos and medical technologists would be a thing of the past. The risks of working in the health care environment have become staggering, and last I looked, being a javelin catcher was not high on the list of dream professions. During my most recent hospital stay as a patient, I was happy, however, that these health care daredevils were ready, willing, and able to take care of me—and to my surprise, and to the chagrin of many, the anesthesiologist actually woke me up after the procedure was finished.

So what is an administrative director to do these days? In the absence of a wholesale makeover of the health of the North American continent, which would probably make us all feel better and more productive, it looks as though automation may be in our future. In particular, I believe that software-driven automation—which I've promoted for the past 13 years—is the best answer. Why software-driven automation? Because in the absence of the medical technologist, which is the intelligent component in the clinical laboratory, hardware and hard-coded systems will not provide a viable short-term or long-term solution. The clin-

ical laboratory, as you know, is a highly complex and variable production environment with no room for error. And the laboratory's most valuable resource, the medical technologist, cannot simply be replaced by a robotic arm, a flip-mover, or a swinging actuator. You must replace intelligence with intelligence when automating a complex process.

Flexibility is second only to software in the automation game.

In industrial applications, flexibility is the name of the game. In the clinical laboratory, flexibility means you are not tied to one instrument manufacturer or held hostage when you look for an interface to a system. The NCCLS has published a consensus standard series for the clinical lab that provides the laboratorian with the mechanism to have instruments interfaced. When the LIS craze swept the clinical laboratory, no one would have even considered purchasing a system that would not interface to *every* instrument system needed to operate the clinical laboratory.

We confront risk every day. In the hospital and health care environment, it is a paradox: We would sooner start a head transplant program, as improbable as it sounds, than use a technology in our hospital that created the car we just drove to work after eating a breakfast made with the same technology. At this turning point, risk is relative, and running a clinical laboratory with a limited number of trained professionals is a risk we all need to mitigate.

According to the data displayed on the following pages, there are about 335 installations of varying sizes, shapes, and functionality in North America where you and your colleagues can go to look at, touch, and feel clinical laboratory automation in action. Think about it after you eat breakfast while you are driving to work. For those who do not drive to work, think about it when you see someone driving a car, listening to a radio, or working with a computer. □

Dr. Markin is professor and vice chairman of pathology and microbiology, associate dean for clinical affairs for the College of Medicine, University of Nebraska Medical Center, Omaha, and president of University Medical Associates. He is also vice chairholder of the NCCLS Area Committee on Automation and Informatics.

Replacing
intelligence with
intelligence
in automated systems

GARY COX

Laboratory automation systems & workcells

Part 1 of 9	Ai Scientific Pty. Ltd. Stephen Pronk stephen.pronk@aiscientific.com 91 Landsborough Ave., Scarborough 4020 Australia 617 3897 3888 www.aiscientific.com	A&T Corp. Akira Igarashi aigarashi@alice.aandt.co.jp 2-24-27 Sekido, Tama-shi, Tokyo 206-0011, Japan +81-423-57-8520 www.aandt.co.jp
Please see accompanying article on page 88		
Name of system/First year installed	Pathfinder/1998	Clinilog/1993
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/no no/no yes/yes/yes no/yes no/yes open system n/a — laboratory automation systems Paradox, Microsoft SQL server/Windows 95, 98, 2000, NT4/Windows 2000 Server, NT4 Workstation/Borland C++, Borland Delphi	yes/yes yes/yes yes/no/no yes/yes yes/no open system 10% 10% laboratory automation systems, analyzer (chemistry, serology), LIS, clinical reagent Betrieve/Windows NT/—/—
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/—/LAS SW feature LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/— LAS SW feature/n/a LAS SW feature/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature, LIS requirement LAS SW feature, LIS requirement/LIS requirement LAS SW feature/LAS SW feature, LIS requirement/LAS SW feature, LIS requirement LAS SW feature, LIS requirement LAS SW feature, LIS requirement LAS SW feature/LAS SW feature, LIS requirement/LAS SW feature LAS SW feature LAS SW feature LIS requirement LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature, LIS requirement LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Kestral, MelbPath, Triple G, Apollo, Bayer/ASTM, HL7	A&T, Triple G, Techni Data/based ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	—/— no — — — — — —	0/50 yes 2.0/yes/~400 yes 16x100, 13x100, 16x75, 13x75 no/floor & subfloor mounted/yes electricity/annually multiple specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	no — — — yes Mk2/yes/150–500 16x100, 13x100, 16x75, 13x75 yes Mk2/—/>150–500 16x100, 13x100, 16x75, 13x75, 12x75, 16x108 yes Mk2/—/>500 tubes 16x100, 13x100, 16x75, 13x75, 12x75, 16x108 no — — yes Mk2/—/150–500 16x100, 13x100, 16x75, 13x75, aliquot can be 12x75 or 16x100 yes/yes/yes	yes —/yes/~240 16x100, 13x100, 16x75, 13x75 yes yes —/yes/~1,500 16x100, 13x100, 16x75, 13x75 yes —/yes/~400 16x100, 13x100, 16x75, 13x75 no — — no — — yes —/yes/~200 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation <ul style="list-style-type: none">• Immunoassay/Urinalysis	no no —/—/— —/—	yes yes pt.-of-reference sampling/pt.-of-reference sampling/pt.-of-reference sampling pt.-of-reference sampling/pt.-of-reference sampling
Instruments to which your system/product is interfaced Other robotic products/components to which system, product is linked	n/a, interfaces LIS only —	Hitachi 747, 7600; Toshiba 200 FR, DAX; Bayer Advia 1650; Coulter Gen-S; Abbott Aeroset i2000; Bayer Centaur; Tosoh AI21; A&T 502X —
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	yes Mk2/yes/150–500 16x100, 13x100, 16x75, 13x75	no — —
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	no — — — samples placed in storage racks can be refrigerated—manual removal & storage — 2 weeks/Ai Scientific/24/7 no/no	no — — — — HW is like module based and easy to add; SW is LAN, C/S type IT & reduces necessary modification of software 1 week/A&T or subcontractor/depends on contract no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	— — — — — —	— —/depends on system layout ~\$100k/~\$100k ~\$160k/—/— —/~\$240k >\$80k/—
Distinguishing features * Ave. throughput in specimen containers per hr per device	<ul style="list-style-type: none">• camera-based specimen container recognition• delivers capped or uncapped daughter tubes in two sizes• large automated sorting table accepts up to 30 destinations	<ul style="list-style-type: none">• Clinilog a "true open" LAS that meets NCCLS standards• client/server-like information structure is easily upgraded, reducing necessary modification of LAS program and LIS

Laboratory automation systems & workcells

<p><i>Part 2 of 9</i></p> <p><i>Please see accompanying article on page 88</i></p>	<p>Bayer Diagnostics Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6123 bayerdiag.com and labnews.com</p>	<p>Bayer Diagnostics Mike Iskra michael.iskra.b@bayer.com 511 Benedict Ave., Tarrytown, NY 10591 914-333-6123 bayerdiag.com and labnews.com</p>
Name of system/First year installed	Advia LabCell/1998	Advia WorkCell (chemistry & immunoassay instruments)/2000
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/yes (storage & mapping) no/available 2002 yes/no open system — — instrument systems/reagents SQL & Progress/Windows NT/Windows NT/Bayer-user interface (proprietary)	yes/yes no/yes no/yes/yes (storage & mapping) no/no yes/no closed system — — instrument systems/reagents SQL & Progress/Windows NT/Windows NT/Bayer-user interface (proprietary)
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LIS requirement/LAS SW feature LAS SW feature, LIS requirement/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature via error management LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature (load balancing) LAS SW feature/LAS SW feature LAS SW feature/— LAS SW feature (database mgmt)/—	LIS requirement/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature via error management LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature (load balancing) LAS SW feature/LAS SW feature LAS SW feature/— LAS SW feature (database mgmt)/—
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Sunquest, LMX, OSI/HL7, ASTM	Cerner, Sunquest, PGP/ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	1/6 yes —/no/2,000 yes 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) yes/floor mounted/yes compressed air, electricity/weekly, monthly, quarterly, annually single specimen container per carrier/yes	3/9 yes —/no/2,000 yes 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) yes/floor mounted/yes compressed air, electricity/weekly, monthly, quarterly, annually single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/—/300 11.5–16.2 mm (diam) & 75–100 mm (ht.) yes yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) yes —/—/300 11.5–16.2 mm (diam) & 75–100 mm (ht.); cap, plug, screw top yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) no — — in development — — —	no — — — yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) no — — yes —/no/600 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.) no — — no — — —
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation <ul style="list-style-type: none">• Immunoassay/Urinalysis	yes no (high level only) robotic arm interface/pt.-of-reference sampling/robotic arm interface pt.-of-reference sampling & robotic arm interface (both avail.)/pt.-of-reference sampling	yes no (high level only) n/a/pt.-of-reference sampling/n/a pt.-of-reference sampling/n/a
Instruments to which your system/product is interfaced Other robotic products/components to which system, product is linked	Bayer: Advia 120, 1650, & Centaur; Clinitek Atlas, Immuno1, Stago STA-R none	Bayer: Advia 1650 & Centaur none
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	no — —	no — —
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate• Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	software tracking retrieval — — no can contain as few as two interfaced modules/instruments & can be expanded to include up to 16 interfaced modules; instruments open system allows for instrument exchanges 1 month/Bayer Diagnostics/24/7 no/no	software tracking retrieval — — no future chemistry & immunochem systems from Bayer will be able to connect to the track and can be exchanged; designed so it can be upgraded to LabCell 2 weeks/Bayer Diagnostics/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	varies by configuration —/— —/— —/—/— —/— —/—	varies by configuration —/— —/— —/—/— —/— —/—
Distinguishing features	<ul style="list-style-type: none">• modularity—provides a menu of modules from which to design an individual solution• flexibility—customizable & reconfigurable as needs change• manageability—allows customer to plan & manage around their changing needs	<ul style="list-style-type: none">• instruments operate separately from track• pre- and postanalytical sorting capability• single-tube carrier vs. rack carrier• upgradability allows customers to grow into a larger system or Advia LabCell
* Ave. throughput in specimen containers per hr per device		

Tabulation does not represent an endorsement by the College of American Pathologists

Laboratory automation systems & workcells

Part 3 of 9	Beckman Coulter Ronald Berman rberman@beckman.com 200 S. Kraemer Blvd., Brea, CA 92821 714-993-8817 www.beckmancoulter.com	Dade Behring Contact Dade Behring representative 1717 Deerfield Rd., Deerfield IL 60015 800-242-3233 www.dadebehring.com
Please see accompanying article on page 88		
Name of system/First year installed	Power Processor/1994	StreamLab Analytical Workcell/2000
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/yes no/yes yes/yes open system 5% 7% lab automation systems and instruments	yes/yes yes/yes yes/yes/no no/yes yes/no open system — — instruments and reagents
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature n/a LAS SW feature, LIS requirement LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature n/a LAS SW feature LAS SW feature, LIS requirement LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	ADAC, Cerner, Meditech, Sunquest, SCC, SMS, Antrim, HBOC, Per Se Technology/direct, worklist consol. download or listen on analyzer line	none/ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	105/50 yes n/a/n/a/900 yes 16x100, 13x100, 16x75, 13x75 yes/floor/yes compressed air, electricity/monthly single specimen container per carrier/yes	1/0 yes StreamLab/yes/300 yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes compressed air, electricity/weekly single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	yes n/a/n/a/300 16x100, 13x100, 16x75, 13x75 yes yes n/a/n/a/900 16x100, 13x100, 16x75, 13x75 yes n/a/n/a/600 16x100, 13x100, 16x75, 13x75 yes n/a/n/a/500 16x100, 13x100, 16x75, 13x75 no — — yes n/a/n/a/450 16x100, 13x100, 16x75, 13x75 yes/yes/yes	yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed sizes simultaneously no — — yes Dimension sample transfer module/yes/480 (4 analyzers) 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation• Immunoassay/Urinalysis	yes yes depends on manufacturer of analyzer depends on manufacturer of analyzer	— — no/pt.-of-reference sampling/no pt.-of-reference sampling/pt.-of-reference sampling
Instruments to which your system/product is interfaced	Abbott: AxSym, Architect, Aeroset; Bayer: Centaur, Atlas; Beckman Coulter: Synchron LX20, Gen-S, STKS; J&J: Vitros; Roche: Modular, 747, 917; Stago Coag Analyzer	Dade Behring Dimension RxL Clinical Chemistry System
Other robotic products/components to which system, product is linked	CRS Arms, RoboCart	none
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	yes n/a/n/a/500 16x100, 13x100, 16x75, 13x75	no — —
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes n/a/n/a/300 16x100, 13x100, 16x75, 13x75 yes all systems may be upgraded (SW & HW) due to modular design 7–30 days, depends on config. of system/Beckman Coulter/24/7 no/yes	yes StreamLab/yes/300 16x100, 13x100, 16x75, 13x75 no modular systems can change/grow with user needs 5 days/Dade Behring/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	\$450k for standard configuration contact vendor contact vendor contact vendor contact vendor contact vendor	contact Dade Behring representative for all pricing information —/— —/— —/—/— —/— —/—
Distinguishing features	• system design, installation, training, technical support, and service provided by Beckman Coulter • totally open—connects to any manufacturer's analyzer • intelligent aliquoting—measures serum volume and transfers based on dead volume plus requested test volume	• StreamLab is a modular system providing alternatives to different size labs seeking a wide range of automated solutions, from small-scale, preanalytical workstations to complete preanalytical processing, testing, and post-test sample management
* Ave. throughput in specimen containers per hr per device		

Laboratory automation systems & workcells

Part 4 of 9	Lab-InterLink Inc. Sheila Magnuson 1011 S. Saddle Creek Rd. Omaha, NE 68106-1943 800-449-2527/402-595-3767 www.labinterlink.com	MDS Laboratory Services Devon Piirto dpiirto@mdsintl.com 100 International Blvd. Toronto, Ontario M9W 6J6 Canada 416-675-6777 www.mdsdx.com
Please see accompanying article on page 88		
Name of system/First year installed	Lab-Frame/1996	AutoLab System/1994
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/yes yes/yes yes/yes open system 100% 15% laboratory automation systems Oracle/Unix/Compaq DS-10 or DS-20/Oracle Forms-GUI	yes/yes no/yes yes/yes/yes (software only) no/no yes/yes open system n/a n/a health & life sciences MS SQL server, relational/Windows NT server & workstation/Intel-based Enterprise servers/graphical Windows based
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/LAS SW feature LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature	LIS requirement/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature n/a LAS SW feature LAS SW feature LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/partially
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Sunquest 5.2 & 5.2.3, Cerner, SCC, Meditech, HBOC/ALG, Rubicon, Triple G, PGP, Philips, MIPS/HL7, ASTM	Meditech, Triple G, Rubicon, LabGem, Cerner (modified)/HL7
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	19/4 yes current/yes/800 yes 16x100, 13x100, 16x75, 13x75, 12x75 yes/floor, overhead, & subfloor mounted/yes electricity/quarterly single specimen container per carrier/yes	6-HW & SW; 7-SW only/0 yes II/partially/1,000 or 2,000 per hr yes 16x100, 13x100, 16x75, 13x75, 12x75 yes/floor mounted/yes compressed air, electricity/weekly single spec. cont. carriers that can be converted into multiple/yes
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate• For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	yes current/yes/200-500 16x100, 13x100, 16x75, 13x75 yes yes current/yes/800-1,000 16x100, 13x100, 16x75, 13x75 yes current/yes/250-400 16x100, 13x100, 16x75, 13x75, 12x75 yes current/yes/400 16x100, 13x100, 16x75, 13x75 yes alpha/yes/— 16x100, 13x100, 16x75, 13x75 yes current/yes/75 primaries per hr; 225 secondaries per hr; 1:3 ratio 16x100, 13x100, 16x75, 13x75 yes/yes, with aliquoter/yes, with aliquoter	no — — — yes II/partially/2,000 per hr 16x100, 13x100, 16x75, 13x75, 12x75 yes II/partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75 yes II/partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75 no — — no — — —/—/—
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation• Immunoassay/Urinalysis	yes yes robotic arm interface/pt.-or-reference sampling/robotic arm interface pt.-of-reference sampling, robotic arm interface/no	yes yes —/pt.-of-reference/— pt.-of-reference/—
Instruments to which your system/product is interfaced	Orthos Vitros 950AT & 250AT; Roche Hitachi 912; Bayer Centaur; Bayer Immuno-1; Abbott Architect 2000, Cell Dyn 4000; IL MLA 1600C; MDA 180; Sysmex HST; Diagnostica Stago STA-R; DPC Immulite 2000; Konelab 30; Advia 1650; Olympus AU-640, AU-2700	rules based interfaces: OCD Vitros 750/950; Dade Dimension RXL; Bayer Centaur; Abbott AxSym & Cell Dyn 3500/4000; Roche Integra; Coulter STKS/GEN-S; Physical Interfaces: Dimension RxL
Other robotic products/components to which system, product is linked	customizable to client's needs	n/a
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	yes current/yes/750 16x100, 13x100, 16x75, 13x75, 12x75	yes II/partially/1,000 16x100, 13x100, 16x75, 13x75, 12 x 75
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes current/yes/300 16x100, 13x100, 16x75, 13x75, 12x75 yes easily upgraded 2 weeks/Lab-Interlink/24/7 no/no	software only — — — SW upgrades provided annually under support agreements 4 weeks/MDS & local 3rd party/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	\$500k-\$2m, depending on modules, instruments, quantity \$25k-\$50k/\$15k-\$120k \$150k-\$230k/\$25k \$45k/\$125k/\$120-\$205k \$50k/\$75k \$40k-\$75k/\$45k	n/a n/a n/a n/a n/a n/a
Distinguishing features	• Lab-Manager—advanced SW system yields process control for open-connectivity lab • long-term protection due to unbiased, open support from any manufacturer; convenient plug & play modularity	• specimen transport carriers (STC) snap together for use throughout client's operation • strong belief & focus in value & development of automation SW • auto. tools & lab mgmt. expertise to customize tools for client
* Ave. throughput in specimen containers per hr per device		

Tabulation does not represent an endorsement by the College of American Pathologists

Laboratory automation systems & workcells

Part 5 of 9	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com
Please see accompanying article on page 88		
Name of system/First year installed	Olympus OLA1500/2001	Olympus OLA2500/2001
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	no/no yes/yes yes/yes/yes yes/yes yes/no open system — — instruments/reagents	no/no yes/yes yes/yes/yes yes/yes yes/no open system — — instruments/reagents
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature, LIS requirement/LAS SW feature LAS SW feature/n/a LAS SW feature/LIS requirement/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature n/a n/a/n/a LAS SW feature/LIS requirement LAS SW feature/n/a LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature, LIS requirement LAS SW feature/n/a LAS SW feature/LIS requirement/n/a LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature n/a n/a/n/a LAS SW feature/LIS requirement LAS SW feature/n/a LAS SW feature/n/a n/a/n/a
LIS interfaces that are live/How LISs are interfaced with auto. sys.	—/RS232C, Olympus interface format	—/RS232C, Olympus interface format, conforms to ASTM 1381-91
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	0/3 no — — — — — —	0/40 no — — — — — —/standard config. expands to twin-sorter w/ 2x capacity of tandem
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	no — — — yes —/yes/1,500 16x100, 13x100, 16x75, 13x75 & 11.5-16 mm diam., 65-110 mm ht. yes —/yes/1,500 16x100, 13x100, 16x75, 13x75, BD Vacutainer, BD Hemoguard, Sarstedt monovette, screw top closures, all at same time	no — — — yes —/yes/800 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm ht. yes —/yes/— 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm ht., BD Vacutainer, BD Hemoguard, Sarstedt monovette, screw-top closures, all at same time, Terumo foil top w/ optional unit
Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate• System inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/yes/1,500 16x100, 13x100, 16x75, 13x75, sorting to any mfr's sample holder no — — no — — yes/no/yes	yes —/yes/800 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm ht. no — — yes —/yes/650 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm ht. yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation• Immunoassay/Urinalysis	yes yes sorts to any analyzer rack n/a/n/a/n/a n/a/n/a	no no sorts to any analyzer rack n/a/n/a/n/a n/a/n/a
Instruments to which your system/product is interfaced	can be interfaced w/ any automation transportation track	—
Other robotic products/components to which system, product is linked	—	—
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	no — —	no — —
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes —/yes/1,500 16x100, 13x100, 16x75, 13x75 no open, modular systems are compatible w/ most diagnostic instruments and automation systems 1 week/Olympus America Inc. Diagnostic Systems Group/24/7 no/—	yes —/yes/— 16x100, 13x100, 16x75, 13x75, 10-16 mm diam., 70-110 mm ht. no — 1–2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	\$250k n/a n/a n/a n/a n/a	\$350k — — — — —
Distinguishing features	<ul style="list-style-type: none">• fastest throughput of its kind currently in the market• cap color recognition & sample level detection modules• easy-to-change configurations, from sorter/decapper to archive preparation	<ul style="list-style-type: none">• fast throughput, high capacity, open system sorting to any manuf. racks• uninterrupted processing with access to output samples• expandable configuration to fit various needs
* Ave. throughput in specimen containers per hr per device		

Tabulation does not represent an endorsement by the College of American Pathologists

Laboratory automation systems & workcells

Part 6 of 9	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-223-0125 www.olympus.com	Ortho-Clinical Melissa Heard 1001 US Hwy 202, Raritan, NJ 08869 908-218-8480 www.ortho-clinical.com
Please see accompanying article on page 88		
Name of system/First year installed	Olympus OLA4000/2001	enGen Series Automation Systems, designed and built by Lab-Interlink Inc./1996
Automation products that are available <ul style="list-style-type: none">Process control software/Transportation systemsAuto. centrifugation/Auto. input or accessioningAuto. decapping/Auto. sorting/Auto. storage and retrievalSpecimen integrity monitor/Auto. aliquotingInstrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	no/no yes/yes yes/yes/yes yes/yes yes/no open system — — instruments/reagents	yes/yes yes/yes yes/yes/yes no/yes yes/yes open system — — instruments/reagents Oracle/Unix/Compaq/GUI
Software features/functionality <ul style="list-style-type: none">Patient demographics & insurance data/Rules-based architectureSupports data retrieval/Internet connectivityOnline real-time help system/QC/Stats & management reportsEvaluates validity and releasability of results from automated analyzersSpecimen tracking/Priority processing/Random-access specimen movementSupports accession No. redundancy (duplicate specimen ID)Supports specimen carrier and level identificationUnique bar-code number per container requiredSpecimen routing/Multistop routing (one tube to multiple workstations)Specimen scheduling/Instrument schedulingRoutes test to workstation/Automatic reflex, repeat, dilutionsSupports multiple hardware config./Supports other proprietary transport. hardwareStorage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature, LIS requirement/LAS SW feature, LIS requirement LAS SW feature/n/a LAS SW feature/LAS SW feature/n/a LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature, LIS requirement LAS SW feature LIS requirement LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/LAS SW feature LIS requirement LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature — LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	—/—	Cerner, Sunquest, SCC, HBOC, Meditech/HL7, ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*Supports automatic rerouting for reflex/repeat/dilutionsTypes of containers device can accommodateModular hardware/Installed options/Device functions independent of trackRequired utilities/Required maintenanceCarrier type/Scalable system	0/0 no — — — — — —/can be configured with any combination of two AU640 and/or AU2700 analyzers	17/2 yes current/yes/800 yes 16x100, 13x100, 16x75, 13x75, 12x75 yes/floor mounted/yes electricity/quarterly single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	yes —/yes/400 16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht. n/a yes —/yes/— 16x100, 13x100, 16x75, 13x75 yes —/yes/— 16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht. yes —/yes/— 16x100, 13x100, 16x75, 13x75, 13-16 mm diam., 70-110 mm ht., for any manufacturer's sample rack no — no — — yes/yes/yes	yes current/yes/300–500 16x100, 13x100, 16x75, 13x75 yes yes current/yes/500 16x100, 13x100, 16x75, 13x75 yes current/yes/300 16x100, 13x100, 16x75, 13x75 yes current/yes/300 16x100, 13x100, 16x75, 13x75, 12x75 yes alpha/yes/— 16x100, 13x100, 16x75, 13x75 yes current/yes/75 primary, 225 secondary 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">Rules-based instrument interface control subsystemProcess control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">Hematology/Chemistry/CoagulationImmunoassay/Urinalysis	yes yes no/robotic arm interface/no robotic arm interface/robotic arm interface	yes yes robotic arm interface/pt.-of-reference sampling/robotic arm interface pt.-of-reference sampling/no
Instruments to which your system/product is interfaced	Olympus AU640, Olympus AU2700	Vitros 950 AT, 250 AT; Advia Centaur; DPC 2000; Cell Dyn 4000; Stago STA-R; Abbott Architect i2000
Other robotic products/components to which system, product is linked	n/a	experienced in facilitating development of OEM interfaces
Automated recapper available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodate	no — —	yes current/yes/750 16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available <ul style="list-style-type: none">Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*Types of containers device can accommodateRefrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	no — — — — 1–2 weeks/Olympus America Inc. Diagnostic Systems Group/24/7 no/no	yes current/yes/— 16x100, 13x100, 16x75, 13x75, 12x75 yes interchangeable components throughout, common software and transport for all products, adherence to NCCLS, HL7, & ASTM 2 weeks/Ortho-Clinical Diagnostics & Lab-Interlink/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">Process control software/Transportation systemsAuto. centrifugation/Auto. input accessioningAuto. decapping/Auto. sorting/Auto. storage & retrievalSpecimen integrity monitor/Automated aliquotingInstrument (analyzer) interfaces/Automated recapping	\$500k — — — — —	\$500k–\$2M, depends on configuration available upon request available upon request available upon request available upon request available upon request
Distinguishing features	<ul style="list-style-type: none">complete flexible workcell automation system with output sorting to any analyzer rackcentral processing unit for complete sample and data management of multiple analyzers	<ul style="list-style-type: none">autoprocessing/most advanced software design and user benefitsflexibility, upgradeable, versatilemodularity, open architecturestand-alone preanalytics through total lab automation
* Ave. throughput in specimen containers per hr per device		

Laboratory automation systems & workcells		
Part 7 of 9	Roche Diagnostics Peter Stegger peter.stegger@roche.com 9115 Hague Rd., Indianapolis, IN 46250 317-521-4033 us.labsystems.roche.com	Roche Diagnostics Peter Stegger peter.stegger@roche.com 9115 Hague Rd., Indianapolis, IN 46250 317-521-4033 us.labsystems.roche.com
Please see accompanying article on page 88		
Name of system/First year installed	Modular Pre-analytics/1997; Hitachi/1990	PSD 1/1997; VS II/1999
Automation products that are available • Process control software/Transportation systems • Auto. centrifugation/Auto. input or accessioning • Auto. decapping/Auto. sorting/Auto. storage and retrieval • Specimen integrity monitor/Auto. aliquoting • Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/no yes/yes yes/yes closed system (modular systems) 15 employees n/a instruments, reagents —/Windows NT, Unix/—/—	yes/no no/yes PSD 1 (yes), VS II (no)/yes/no PSD 1 (no), VS II (yes)/PSD 1 (no), VS II (yes) no/no open system 15 employees n/a instruments, reagents —/Windows NT, Unix/—/—
Software features/functionality • Patient demographics & insurance data/Rules-based architecture • Supports data retrieval/Internet connectivity • Online real-time help system/QC/Stats & management reports • Evaluates validity and releasability of results from automated analyzers • Specimen tracking/Priority processing/Random-access specimen movement • Supports accession No. redundancy (duplicate specimen ID) • Supports specimen carrier and level identification • Unique bar-code number per container required • Specimen routing/Multistop routing (one tube to multiple workstations) • Specimen scheduling/Instrument scheduling • Routes test to workstation/Automatic reflex, repeat, dilutions • Supports multiple hardware config./Supports other proprietary transport. hardware • Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/—/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature — LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature —/— —/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/n/a/LAS SW feature n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/n/a LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner v3.x, Sunquest v5.2 w/o SMART, Sunquest v5.23 w/o SMART, Sunquest v5.3 w/o SMART, Sunquest v5.3 w/ SMART, VA Vista/DHCP, Soft v2.x, Per Se, McKesson Starlab, Department of Defense (CHCS), ASTM/Ethernet, ASTM/serial, HL7 2.4/Ethernet, HL7 2.4/serial	Cerner v3.x, Sunquest 5.2 w/o SMART, Sunquest v5.23 w/o SMART, Sunquest v5.3 w/o SMART, Sunquest v5.3 w/SMART, Soft v1.x, Soft v2.x, Per Se, Antrim 3.x, Antrim (Common Cents), McKesson Starlab, McKesson AdvAntage, Homegrown Systems, TopLab, Omnitech, ASTM/Ethernet, ASTM/serial, HL7 2.4/Ethernet, HL7 2.1/Ethernet, HL7 2.4/serial
No. of live sites installed in N. America/outside N. America Transportation systems available • Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Supports automatic rerouting for reflex/repeat/dilutions • Types of containers device can accommodate • Modular hardware/Installed options/Device functions independent of track • Required utilities/Required maintenance • Carrier type/Scalable system	8/62 yes MPA system 3 or 7/yes/600 yes 16x100, 13x100, 16x75, 13x75, rubber or hemoguard yes/floor mounted/no, fully integrated automation & analytics electricity, water (for analyzers)/weekly multiple specimen container per carrier (5 positions)/yes	PSD 1 37/58; VS II 20/40 no — — 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap —/—/— compressed air, electricity/weekly multiple specimen container per carrier (5 positions)/yes
Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated decapping available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated sorting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Specimen integrity monitor available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate Automated aliquoting available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	yes system 3 or 7/yes/250 16x100, 13x100, 16x75, 13x75 yes, 2 can run at 500 per hr. yes system 3 or 7/yes/600 16x100, 13x100, 16x75, 13x75 yes system 3 or 7/yes/400 16x100, 13x100, 16x75, 13x75 yes system 7/yes/500 16x100, 13x100, 16x75, 13x75 yes n/a 16x100, 13x100, 16x75, 13x75 yes system 7/yes/500 16x100, 13x100, 16x75, 13x75 yes/yes/yes	no — — — yes PSD 1/yes/900–1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap yes PSD 1/yes/900–1,200 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap yes PSD 1/yes/900–1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap VS II/yes n/a 16x100, 13x100, 16x75, 13x75 yes VS II/yes/340 w/ 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75 yes/yes/yes
Instrument (analyzer) interfaces • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface • Hematology/Chemistry/Coagulation • Immunoassay/Urinalysis	— yes —/no, pt.-of-reference sampling/— no, pt.-of-reference sampling/—	no no no/no/no no/no
Instruments to which your system/product is interfaced	Roche/Hitachi Modular Systems Clin Chem & Immunoassay	none
Other robotic products/components to which system, product is linked	—	none
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate	yes System 7/yes/500 —	no — —
Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	no — — no customers can place modules to increase capacity & functionality <2 weeks/Roche/24/7 no/no	yes PSD 1/yes/1,200; VS II/yes/340 with 1 aliquot per primary tube 16x100, 13x100, 16x75, 13x75, hemoguard, rubber, screw cap no (uses a special archive rack) can be easily configured to meet changing workloads & demands 3 days to 1 week/Roche/24/7 no/no
List price Individual list prices for components • Process control software/Transportation systems • Auto. centrifugation/Auto. input accessioning • Auto. decapping/Auto. sorting/Auto. storage & retrieval • Specimen integrity monitor/Automated aliquoting • Instrument (analyzer) interfaces/Automated recapping	\$300–\$800k, depending on system configuration n/a n/a n/a n/a n/a	PSD 1: \$240k; VS II: \$300k — — — — —
Distinguishing features	• fully integrated & designed to work with analytics • easy implementation, no hassles with 3rd party analyzers & interfaces • total hands-off results driven by reliability • high level LIS expertise	• PSD 1: stand-alone archiving; low-cost easy implementation; sorting, decapping, exception handling, archiving; VS II: archiving, aliquoting & sorting; fast, easy setup & install.; except. notification & separation • Task Targeted Automation
* Ave. throughput in specimen containers per hr per device		

Tabulation does not represent an endorsement by the College of American Pathologists

Laboratory automation systems & workcells

Part 8 of 9	Sysmex Corp. or America Tammy Kutz mktcom@sysmex.com Gilmer Road, 6699 RFD Long Grove, IL 60047 847-726-3500 www.sysmex.com	Tecan-Abbott Partnership Donna Crook (Tecan) or Brian Syverson (Abbott) donna.crook@tecan.com or brian.syverson@abbott.com Research Triangle Park, NC 800-352-5128 www.tecan.com or www.abbott.com
Please see accompanying article on page 42		
Name of system/First year installed	Sysmex Systemization—HST, CST/1990	FE 500/2000
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquoting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes no/yes no/no/yes yes/no yes/no closed system 25% — lab automation systems, instruments, information systems Sybase/Windows 98, NT, Unix/—/—	yes/yes yes/yes yes/yes/in development in development/yes no/in development open system 50% 15% lab automation systems Sybase SQL Anywhere/Windows NT/—/dynamic download, host query
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature/LAS SW feature/n/a n/a LAS SW feature LAS SW feature LAS SW feature/n/a n/a/n/a LAS SW feature/LAS SW feature LAS SW feature/n/a LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature	n/a/LAS SW feature LAS SW feature/n/a LAS SW feature/n/a/n/a n/a LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature n/a n/a LAS SW feature/LAS SW feature n/a/n/a LAS SW feature/n/a LAS SW feature/n/a LAS SW feature/—
LIS interfaces that are live/How LISs are interfaced with auto. sys.	Cerner, Sunquest, SCC, HBOC, Triple G, Antrim/ASTM, TCP IP	Sunquest, SCC, Cerner, Citation, HBOC, Triple G, Molis/ASTM
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance • Carrier type/Scalable system	180/700 yes —/yes/config. dependent; max. 600 samples per hr yes 16x100, 13x100, 16x75, 13x75 yes/floor mounted/yes electricity/daily, weekly, monthly for analyzers; quarterly, annually for automation multiple specimen container per carrier/yes	28/20 yes conveyor/—/— — 16x100, 13x100, 16x75, 13x75 —/—/— compressed air, electricity/— single specimen container per carrier/—
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate• For multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquoting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate • System inspects samples for bar code/Reports clots/Reports QNS specimens	no — — — yes 1.08/yes/150 per device per hr x 4 13x100, 13x75 no — — no — — no — — no — — — —	yes —/—/300 @ 10—min spin time 16x100, 13x100, 16x75, 13x75 — yes —/—/500 16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard yes —/—/500 16x100, 13x100, 16x75, 13x75 yes —/—/500 16x100, 13x100, 16x75, 13x75, any manufacturer's rack in development — level sensing & clot detection yes —/—/— 13x75 prepackaged secondary tubes yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation• Immunoassay/Urinalysis	yes yes pt.-of-reference sampling/—/pt.-of-reference sampling —/—	— — —/—/— —/—
Instruments to which your system/product is interfaced Other robotic products/components to which system, product is linked	Sysmex XE-2100, SE-9500, R-3500, SP-100, CA-1500, & CA-6000 none	contact vendor —
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	no — —	in development — —
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate• Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes PCDPS 1.08/yes/150 per device per hr x 4 13x100, 13x75 no all upgrades for Sysmex hematology & coagulation analyzers were compatible with the automation and PC-DPS 1 week/Roche Diagnostics/24/7 no/yes	in development — — — contact vendor 6 weeks/Tecan-based service and support/24/7 no/—
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/Auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquoting• Instrument (analyzer) interfaces/Automated recapping	depends on system configuration — — — — —	\$450k — — — — —
Distinguishing features	• able to take collected data & turn into usable information • proven implementation within 90 days of receiving purchase order, on-site implementation is successfully completed in one week • successfully provided islands of automation in coagulation & hematology for over 10 years	• flexibility, footprint, completely configurable
* Ave. throughput in specimen containers per hr per device		

Laboratory automation systems & workcells

Part 9 of 9	Thermo Clinical Labsystems Klas Vuorinen klas.vuorinen@thermoclinical.com Ruukintie 18 FIN-02330 Espoo Finland +358 9 802 766 www.thermoclinical.com
Please see accompanying article on page 88.	
Name of system/First ever auto. sys. install	Thermo Clinical Automation/2000
Automation products that are available <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input or accessioning• Auto. decapping/Auto. sorting/Auto. storage and retrieval• Specimen integrity monitor/Auto. aliquotting• Instrument (analyzer) interfaces/Auto. recapping System architecture % of staff dedicated to clinical automation system % of budget dedicated to R&D for clin. auto. technology Company's primary product category Information systems technology for your automation system Database/Operating system/Server/User interface	yes/yes yes/yes yes/yes/yes no/yes yes/yes open system — — lab automation systems and instruments object database/Windows NT/—/GUI
Software features/functionality <ul style="list-style-type: none">• Patient demographics & insurance data/Rules-based architecture• Supports data retrieval/Internet connectivity• Online real-time help system/QC/Stats & management reports• Evaluates validity and releasability of results from automated analyzers• Specimen tracking/Priority processing/Random-access specimen movement• Supports accession No. redundancy (duplicate specimen ID)• Supports specimen carrier and level identification• Unique bar-code number per container required• Specimen routing/Multistop routing (one tube to multiple workstations)• Specimen scheduling/Instrument scheduling• Routes test to workstation/Automatic reflex, repeat, dilutions• Supports multiple hardware config./Supports other proprietary transport. hardware• Storage retrieval & disposal/Supports proposed NCCLS standards	LIS requirement/— LIS requirement/— LAS SW feature/—/— LAS SW feature LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature LAS SW feature LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature LAS SW feature/LIS requirement LAS SW feature/— LAS SW feature/LAS SW feature
LIS interfaces that are live/How LISs are interfaced with auto. sys.	—/—
No. of live sites installed in N. America/outside N. America Transportation systems available <ul style="list-style-type: none">• Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Supports automatic rerouting for reflex/repeat/dilutions• Types of containers device can accommodate• Modular hardware/Installed options/Device functions independent of track• Required utilities/Required maintenance• Carrier type/Scalable system	0/11 yes —/yes/500 yes 16x100, 13x100, 16x75, 13x75, 11–16.8 mm diam., 110 mm ht. yes/floor mounted/— compressed air, electricity/— single specimen container per carrier/yes
Automated centrifugation available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate for multi-unit centrifuges, each cent. operates independently for rate and time Automated input/accessioning available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated decapping available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated sorting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Specimen integrity monitor available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Automated aliquotting available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate System inspects samples for bar code/Reports clots/Reports QNS specimens	yes n/a/yes/400 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. yes yes —/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. yes —/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. yes —/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. no — — yes —/yes/300 secondary tubes 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. yes/yes/yes
Instrument (analyzer) interfaces <ul style="list-style-type: none">• Rules-based instrument interface control subsystem• Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface <ul style="list-style-type: none">• Hematology/Chemistry/Coagulation• Immunoassay/Urinalysis	— — —/—/— —/—
Instruments to which your system/product is interfaced	Roche Modular, Konelab, Sysmex & systems capable of picking up samples from the lane on request
Other robotic products/components to which system, product is linked	—
Automated recapper available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate	yes —/—/500 13x75
Automated storage and retrieval available <ul style="list-style-type: none">• Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*• Types of containers device can accommodate Refrigeration available Longitudinal upgrade pathway or plan to protect users' investments Ave. time to install sys./Who provides service and support/Hours support is available On-site biomedical engineer required/User group meets regularly	yes —/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. no — 2–3 days/local distributor/24/7 no/no
List price Individual list prices for components <ul style="list-style-type: none">• Process control software/Transportation systems• Auto. centrifugation/Auto. input accessioning• Auto. decapping/auto. sorting/Auto. storage & retrieval• Specimen integrity monitor/Automated aliquotting• Instrument (analyzer) interfaces/Automated recapping	— — — — — —
Distinguishing features	• modularity—the system can be extended to meet customer needs; both workcell and preanalytical part can be upgraded and linked as needed • multitube carrier with programmable chip • open—can be linked to a variety of different analyzers
* Ave. throughput in specimen containers per hr per device	

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