Is lab automation right for your lab?

Robin A. Felder, PhD

On pages 46–57 is CAP TODAY's roundup of laboratory automation technology. There you'll find information, provided by automation vendors, on functionality and installed sites. The variety of clinical laboratory automation technologies on the market is greater than ever, but the divergence in technologies presented challenges in hardware and software interconnectivity. Thus, in-vitro diagnostics manufacturers, automation vendors, and laboratorians pooled their efforts to enhance and transform technology by supporting the NCCLS laboratory automation standards effort. NCCLS recently published the last document in its five-part automation standard (Auto 1-5, see below). CAP TODAY included in its survey of the vendors questions about NCCLS conformance for various system components.

Your justification for the purchase of laboratory automation must be based on a sound forecast of cost savings, turnaround and worker safety improvement, and reduction in errors. But how can you predict that automation will yield beneficial outcome for your laboratory? To suggest functional systems for their customers' laboratories, and to implement those systems properly, vendors will request operations data and use various tools. You need data that compare the function of each automation system (see the CAP TODAY survey), and you will want to have on hand data that summarize the hourly arrival rate and distribution of specimens (not tests) delivered to the laboratory. You will also have to know the types and models of instruments and analyzers you have in the laboratory, and the types of laboratory tests and number requested for each specimen each hour of the day. Also required will be labor utilization rates in the laboratory, including job duties, number of full-time-equivalents assigned to each task each hour, total hours worked, and skill level of each technologist. Designing an automation process and selecting automation technology are not necessarily intuitive. For example, if you purchase an automation system sized to your lab's peak demands, the lowvolume periods during the day will become more noticeable.

There are numerous systems on the market from which to choose. (For tips on selecting automated systems, log on to http://marc.med.virginia.edu/.) Performance evaluations of individual systems have been published (Dadoun R. Clinical Laboratory Management Review. 1998;12: 248-255; Seaborg RC, et al. MLO. 1999:31: 46-54; Markin RS, et al. AJCC. 46:5;764-771), but published comparisons of competing clinical laboratory automation systems (with the exception of CAP TODAY's side-by-side look at laboratory automation technology) are absent from the literature. Furthermore, the determination of ROI is still an inexact science, because, with test mix and labor needs differing so widely, efficiency improvements in one laboratory cannot be predicted on the basis of published reports from other labs. However, with computer methods you can attempt to model the many processes within a clinical laboratory. Indeed, computer simulation is gaining in popularity as a method to gather and analyze data regarding the prediction of productivity of clinical processes (Rosetti MD, Kumar A, Felder RA. Mobile robot simulation of mid-sized hospital delivery processes. Health Care Man Sci. 2000;3: 201–213). A trained simulation specialist will enter data and provide interpretations about implementing automation technologies. Make sure the simulation data are validated against the actual laboratory operation. One of the most important tasks of a simulation model is to ensure the laboratory that the automation technology is configured to avoid specimen bottlenecks.

One way to validate the performance of laboratory automation is to perform a clinical trial. For example, to measure the performance of a recently released commercial preanalytical processor, we performed a two-site comparison of a preanalytical processor that can accommodate a variety of commercial specimens

(Abbott-Tecan Partnership's Genesis FE500). Our studies focused on testing more than 3,000 bar-code-labeled specimens according to a protocol designed to test a breadth of capabilities of preanalytical processors (for example, aliquot number, fraction centrifuged, and platelet depletion studies). Mean system output performance varied between 93 and 502 total tubes per hour depending on the batch size, aliquot number requested, and percentage of tubes that required centrifugation. The preanalytical processor was operated by one fulltime-equivalent compared with the three FTEs required to perform the same tasks manually during peak hours, which yields a calculated return on investment of less than three years. Furthermore, there was a significant reduction in laboratory errors.

The costs of clinical lab automation technology have begun to decline as the production of technology has increased. However, only recently have automation tools become available for the smaller laboratory (sample throughput of less than 250 to 300 specimens per hour). Preanalytical workstations are now part of the clinical laboratory automation lineup and available from most of the in vitro diagnostics manufacturers.

The data on pages 46–57 serve as a useful tool to compare the features of various automation systems for an initial assessment of automation compatibility with your laboratory. Armed with information about each system's performance features, you can employ the services of a consultant who can develop a customized solution for your lab using specialized tools such as simulation modeling. Actual automation system performance must be evaluated, of course, following comprehensive clinical trials. Ultimately, laboratories with automation will be able to demonstrate remarkable increases in efficiency, quality, and safety. . .

Dr. Felder is director of the Medical Automation Research Center and professor of pathology at the University of Virginia, Charlottesville, and visiting professor of pathology at Johns Hopkins School of Medicine, Baltimore.

Laboratory automation systems & workcells

Laboratory auto	mation systems &	workcells
Part 1 of 7	Abbott-Tecan Partnership Donna Crook (Tecan) or Matthew Noble (Abbott)	A&T Corp. Akira Igarashi aigarashi@alice.aandt.co.jp
	donna.crook@tecan.com or matthew.noble@abbott.com	2-24-27 Sekido, Tama-shi, Tokyo 206-0011
	800-352-5128	www.aandt.co.jp
Please see accompanying article on page 42	www.abbott.com or www.tecan.com	
Name of system/First ever auto. sys. install	FE 500/2000	Clinilog/1993
Automation products that are available	vachua	100/100
Auto. centrifugation/Auto. input or accessioning	yes/yes yes/yes	yes/yes yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliguating	yes/yes/in development	yes/no/no no/ves
Instrument (analyzer) interfaces/Auto. recapping	no/in development	yes/no
System architecture % of staff dedicated to clinical automation sys.	open system 50%	open system 10%
% of budget dedicated to R&D for clin. auto. technology	15%	10%
Information systems technology for your automation system		LAS, analyzer (chemistry, serology), Lis, chinical reag
Database/Operating system/Server/User interface	Sybase SQL Anywhere/Windows NT/—/dynamic download, host query	Betrieve/Windows NT/—/—
Software features/functionality Patient demographics & insurance data/Rules-based architecture	n/a/I AS SW feature	LAS SW feature IS requirement/LAS SW feature IS
Supports data retrieval/Internet connectivity	LAS SW feature/n/a	LAS SW feature, LIS requirement/LIS requirement
 Online real-time help system/QC/Stats & management reports 	LAS SW feature/n/a/n/a	LAS SW feature/LAS SW feature, LIS requirement/LAS
 Evaluates validity and releasability of results from automated analyzers 	n/a	LAS SW feature, LIS requirement
 Specimen tracking/Priority processing/Random-access specimen movement Supports accession No. redundancy (duplicate specimen ID) 	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature	LAS SW feature/LAS SW feature, LIS requirement/LAS LAS SW feature
Supports specimen carrier and level identification	n/a	LAS SW feature
 Onique bar-code number per container required Specimen routing/Multistop routing (one tube to multiple workstations) 	n/a LAS SW feature/LAS SW feature	LIS requirement LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling Ruutes test to workstation/Automatic reflex, repeat, dilutions	n/a/n/a LAS SW feature/n/a	LAS SW feature/LAS SW feature
Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/n/a	LAS SW feature/LAS SW feature, LIS requirement
Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/—	LAS SW feature/LAS SW feature
LIS interfaces that are live/how LISs are interfaced w/auto. sys.	Sunquest, SCC, Cerner, Citation, HBOC, Triple G, Molis/ASTM	A&T, Triple G, Techni Data/based ASTM
No. of live sites installed in N. America/Outside N. America Transportation systems available	12/8 ves	0/40 ves
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Support outputs around the standards are standards and the standards are standards ar	conveyor/—/—	2.0/yes/~400
• Types of containers device can accommodate	— 16x100, 13x100, 16x75, 13x75	yes 16x100, 13x100, 16x75, 13x75
Modular hardware/Installed options/Device functions independent of track Benuired utilities/Benuired maintenance	—/—/— compressed air_electricity/—	no/floor & subfloor mounted/yes electricity/annually
Carrier type/Scalable system	single specimen container per carrier/—	multiple specimen container per carrier/yes
Automated centrifugation available	yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	—/—/300 @ 10-min spin time 16x100_13x100_16x75_13x75	—/yes/~240 16x100 13x100 16x75 13x75
• For multi-unit centrifuges, each cent. operates independently for rate and time		yes
 Automated input/accessioning available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* 	yes —/—/500	yes —/yes/~1.500
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, screw cap, rubber stopper, hemoguard	16x100, 13x100, 16x75, 13x75
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	-//500	/yes/~400
Types of containers device can accommodate Automated sorting available	16x100, 13x100, 16x75, 13x75 ves	16x100, 13x100, 16x75, 13x75
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	-//500	_
Types of containers device can accommodate Specimen integrity monitor available	16x100, 13x100, 16x75, 13x75, any manufacturer's rack in development	 no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*		<u> </u>
Automated aliquoting available	yes	 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	—/—/— 13x75 prepackaged secondary tubes	—/yes/~200 16x100 13x100 16x75 13x75
System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes	yes/yes
Instrument (analyzer) interfaces		
Rules-based instrument interface control subsystem Process control of instrument via control subsystem	Ξ	yes ves
Physical/hardware (instrument/specimen) interface		yco
Hematology/Chemistry/Coagulation	<i>— — </i> —	ptof-reference sampling/ptof-reference sampling/ sampling
• Immunoassay/Urinalysis	_/_	ptof-reference sampling/ptof-reference sampling
Instruments to which your system/product is interfaced	contact vendor	Hitachi 747, 7600; Toshiba 200 FR, DAX; Bayer Advia
		Gen-S; Abbott Aeroset i2000; Bayer Centaur; Tosoh A
Other robotic products/components to which system, product is linked	-	-
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave_throughout*	in development	no
• Types of containers device can accommodate	-	-
Automated storage and retrieval available	in development	no
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	contact vendor	nw is like module based and easy to add; SW is LAN, reduces necessary modification of software
Ave. time to install sys./Who provides service and support/Hrs support is available On-site biomedical engineer required/user group meets required/	3 weeks/Tecan-based service and support/24/7	1 week/A&T or subcontractor/depends on contract
	 \$450k	
Individual list prices for components	φτυν	-
Process control software/Transportation systems Auto contribution (Auto input accessioning	_	—/depends on system layout ~\$100k/~\$100k
* AULU, LEHU HUUdUUH/AULU, HUUH ALLESSUUUUH		
Auto. decapping/Auto. sorting/Auto. storage & retrieval	-	~\$160K/—/—
Auto: Centinugation/Auto: Input accessioning Auto: decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping		~\$160K/—/— —/~\$240k >\$80k/—

Survey editors: Rodney S. Markin, MD, PhD; Robin A. Felder, PhD; Raymond Aller, MD

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Laboratory autor	mation systems &	workcells
Part 2 of 7	Bayer Diagnostics Wayne O'Brien 511 Benedict Ave., Tarrytown, NY 10591	Bayer Diagnostics Wayne O'Brien 511 Benedict Ave., Tarrytown, NY 10591
Please see accompanying article on page 42	bayerdiag.com and labnews.com	bayerdiag.com and labnews.com
Name of system/First ever auto. sys. install	Advia LabCell/1998	Advia WorkCell (chemistry & immunoassay instrum
Automation products that are available		
 Process control software/Transportation systems Auto. centrifugation/Auto. input or accessioning 	yes/yes available 2002/yes (input)	yes/yes no/yes (input)
Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. alignoting	available 2002/yes/yes (storage & mapping) no/available 2002	no/yes/yes (storage & mapping) no/no
Instrument (analyzer) interfaces/Auto. recapping System architecture	yes/no	yes/no elecad system
% of staff dedicated to clinical automation sys.	—	—
Company's primary product category	 instruments	 instruments
Information systems technology for your automation system Database/Operating system/Server/User interface	SQL/Windows NT/Windows NT/Bayer-user interface (proprietary)	SQL/Windows NT/Windows NT/Bayer-user interface
Software features/functionality		
Patient demographics & insurance data/Rules-based architecture Supports data retrieval/Internet connectivity	LIS requirement/LAS SW feature LAS SW feature. LIS requirement/n/a	LIS requirement/LAS SW feature LAS SW feature/n/a
Online real-time help system/QC/Stats & management reports Evaluates wildlike and accessibility of evaluate former to be a set of the former of the former to be a set of the former of the f	LAS SW feature/LIS requirement/LAS SW feature	LAS SW feature/LIS requirement/LAS SW feature
Evaluates valuates valuated analyzers Specimen tracking/Priority processing/Random-access specimen movement	Lis requirement LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
 Supports accession No. redundancy (duplicate specimen ID) Supports specimen carrier and level identification 	n/a LAS SW feature	n/a LAS SW feature
Unique bar-code number per container required Specimen routing/Multiston routing (one tube to multiple workstations)	LAS SW feature LAS SW feature/LAS SW feature	LAS SW feature LAS SW feature/LAS SW feature
Specimen scheduling/Instrument scheduling Advise text to werketetion/Automatic reflex, report, dilutione	LAS SW feature/LAS SW feature (load balancing)	LAS SW feature/LAS SW feature (load balancing)
Routes test to workstation/Automatic renex, repeat, unutions Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/—	LAS SW feature/LAS SW feature
Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature (database mgmt)/	LAS SW teature (database mgmt)/—
LIS interfaces that are live/how LISs are interfaced w/auto. sys.	Sunquest 5.23, LMX, OSI/HL7, ASTM	PGP/ASTM
No. of live sites installed in N. America/Outside N. America Transportation systems available	1/3 yes	0/3 yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic recouring for reflex/repeat/dilutions	—/no/2,000 ves (no dilutions)	—/no/2,000 ves (no dilutions)
Types of automates device can accommodate Making by the second accommodate	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) 8
Required utilities/Required maintenance	compressed air, electricity/weekly, monthly, quarterly, annually	compressed air, electricity/weekly, monthly, quarte
Carrier type/Scalable system	single specimen container per carrier/yes	single specimen container per carrier/yes
Automated centrifugation available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	in late-stage development —	no
Types of containers device can accommodate For multi-unit centrifuges, each cent, operates independently for rate and time	 29V	_
Automated input/accessioning available	yes (input)	yes (input)
Types of containers device can accommodate	—/10/000 16x100, 13x100, 16x75, 13x75, 11.5–16.2 mm (diam.) & 75–100 mm (ht.)	
 Automated decapping available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* 	in late-stage development —	no
Types of containers device can accommodate Automated sorting available	 29V	 Ves
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	/	-/n0/600
Specimen integrity monitor available	10,100, 13,100, 10,73, 13,73, 11.3–10.2 IIIII (ulain.) & 73–100 IIIII (iii.) No	no
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*	in development	no
Types of containers device can accommodate System inspects samples for har code/Renorts clots/Renorts ONS specimene	Ξ	-
Instrument (analyzer) interfaces		
Rules-based instrument interfaces Rules-based instrument interface control subsystem	yes	yes
Physical/hardware (instrument/specimen) interface		no (iligii level olily)
Hematology/Chemistry/Coagulation	robotic arm interface/ptof-reference sampling/robotic arm interface	no/ptof-reference sampling/no
Immunoassay/Urinalysis	ptof-reference sampling & robotic arm interface (both avail.)/pt of-reference sampling	ptof-reference sampling/no
Instruments to which your system/product is interfaced	Bayer: Advia 120, 1650, & Centaur; Clinitek Atlas. Immuno1	Bayer: Advia 1650 & Centaur
Other robotic products/components to which system, product is linked	none	none
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no 	no
Types of containers device can accommodate	-	-
Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave throughout*	only software tracking available	only software tracking available
Types of containers device can accommodate Performance available		-
Longitudinal upgrade pathway or plan to protect users' investments	can contain as few as two interfaced modules/instruments & can be	future chemistry & immunochem systems from Bay
	expanded to include up to 16 interfaced modules; instruments open system allows for instrument exchanges	connect to the track and can be exchanged; designe upgraded to LabCell
Ave. time to install sys./Who provides service and support/Hrs support is available On-site biomedical engineer required/user group meets regularly	1 month/Bayer Diagnostics/24/7 no/no	1 month/Bayer Diagnostics/24/7 no/no
List price	varies by configuration	varies by configuration
Individual list prices for components Process control software/Transportation systems 		_/
		—/— / _ /
Auto. centrifugation/Auto. input accessioning Auto. docaming (Auto. centring (Auto. centring))		— <i>i</i> — <i>i</i> —
 Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting 	_/	—/ <u>—</u>
Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping		—/— —/—
Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping Distinguishing features	 -/ -/ • modularity—provides a menu of modules from which to design an individual solution 	—/ • instruments operate separately from track • pre- and postanalytical sorting capability

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Automation systems & workcalls For 3 of 7 International systems & workcalls For a of 7 International systems & workcalls International systems & workcalls For a of 7			
Period of 7 Instance data Description Fears are accompanying stable to page 42 20.111111111111111111111111111111111111	Laboratory auto	mation systems &	workcells
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Atmos of system The net Product NM The multiplical Manual 2000 Advanced in products, the or excitable Prof. Proceed/101 Prof. Proceed/101 Advanced in products, the or excitable Prof. Proceed/101 Prof. Proceed/101 Advanced in products, the or excitable Prof. Proceed/101 Prof. Proceed/101 Advanced in products, the or excitable Prof. Proceed/101 Prof. Proceed/101 Advanced in prof. Pr	Please see accompanying article on page 42	714-961-4860 www.beckmancoulter.com	847-267-5300 www.dadebehring.com
Advances over strategy and yours yes yours ye	Name of system/First ever auto. sys. install	Power Processor/1994	StreamLab Analytical Workcell/2000
Process cained and hard Transporting systems Process Pr	Automation products that are available		
- Auto, scorego (Auto, scorego)	Process control software/Transportation systems Auto, centrifugation/Auto, input or accessioning	yes/yes ves/ves	yes/yes ves/ves
 Instrument (Langer of Langer Schwarz) Instrument (Langer Of Langer Schwarz)	Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimum integrity manitor/Auto alignation	yes/yes yes/yes	yes/yes/no
Spring and matchesis approximation of the second seco	Instrument (analyzer) interfaces/Auto. recapping	yes/yes	yes/no
* A display 7x	System architecture % of staff dedicated to clinical automation sys.	open system 5%	open system —
International production system Description Description <thdescription< th=""> <thdesc< td=""><td>% of budget dedicated to R&D for clin. auto. technology Company's primary product category</td><td>7% lab automation systems and instruments</td><td></td></thdesc<></thdescription<>	% of budget dedicated to R&D for clin. auto. technology Company's primary product category	7% lab automation systems and instruments	
Advance intervention Sector intervention 12.5 Str future 1.5 mp// instance - Support intervention 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support intervention 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance - Support instance 12.5 Str future 1.5 mp// instance 12.5 Str future 1.5 mp// instance <tr< td=""><td>Information systems technology for your automation system Database/Operating system/Server/User interface</td><td>SQL/Windows NT/—/GUI</td><td>proprietary file system/Windows NT/n/a/Labview t</td></tr<>	Information systems technology for your automation system Database/Operating system/Server/User interface	SQL/Windows NT/—/GUI	proprietary file system/Windows NT/n/a/Labview t
Plants de mongraphes, à lancauxes databilise-based authoriter Geographi data investidations (access per la construction of the second	Software features/functionality		
- Difference of the sector secto	Patient demographics & insurance data/Rules-based architecture Supports data retrieval/Internet connectivity	LAS SW feature, LIS requirement/LAS SW feature	LAS SW feature, LIS requirement/LAS SW feature
 constrained and members of the second constrained and years constrained year members of the second constrained and years constrained year members of the second constrained and years Support account in constrained years Support account in constrained years Support account in the second constrained of the second constrained constr	Online real-time help system/QC/Stats & management reports Suchasta validation of statement for the formula for the formula for the formula formula for the formula f	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/n/a
 Supports accession for reflecting spectra spectra control of the spectra spectra control of the spectra s	 Evaluates valuity and releasability of results from automated analyzers Specimen tracking/Priority processing/Random-access specimen movement 	LAS SW feature/LAS SW feature/LAS SW feature	LIS requirement LAS SW feature/LAS SW feature/LAS SW feature
I billing bar-cafe number per container regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Control Section regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Control Section regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Control Section regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Control Section regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Control Section regulated LLS 97 feature, LS regulated LLS 97 feature, LS regulated I Section regulated LS 97 feature, LS regulated LLS 97 feature, LS regulated LS 97 feature, LS regulated I Section regulated LS 97 feature, LS LS 97 featu	 Supports accession No. redundancy (duplicate specimen ID) Supports specimen carrier and level identification 	LAS SW feature n/a	n/a LAS SW feature
- Spectra setter schedungsvaranse schedungs varanse schedungs varanse schedungs varanse schedungsvaranse sc	Unique bar-code number per container required Specimen routing/Multiston routing (one tube to multiple workstations)	LAS SW feature, LIS requirement	LAS SW feature, LIS requirement
- Support instance and the support instance and the support instance instance is a support instance instance is a support instance	Specimen scheduling/Instrument scheduling Section and the scheduling	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
* Storage entrines al. despectation space of properties of ULS Structures Str	Routes test to workstation/Automatic renex, repeat, dilutions Supports multiple hardware config./Supports other proprietary transport. hardware	LAS SW feature/LAS SW feature LAS SW feature/n/a	LAS SW feature/LAS SW feature LAS SW feature/n/a
Lis Brancharden Bink and Michael Lis and Branchael Antonia Bink. America Ontaria Sec. Soc. 9, 40000, 4	Storage retrieval & disposal/Supports proposed NCCLS standards	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
No. of the sites installed in N. America' Database Number 10 Proceedings 10 Proceedings <t< td=""><td>LIS interfaces that are live/how LISS are interfaced w/auto. sys.</td><td>ADAC, Cerner, MEDITECH, Sunquest, SCC, SMS, Antrim, HBOC, Per Se Technology/direct, worklist consol. download or listen on analyzer line</td><td>none/ASIM</td></t<>	LIS interfaces that are live/how LISS are interfaced w/auto. sys.	ADAC, Cerner, MEDITECH, Sunquest, SCC, SMS, Antrim, HBOC, Per Se Technology/direct, worklist consol. download or listen on analyzer line	none/ASIM
 Provide the second scalar basis of the second scalar basecond scalar basis of the second scalar basis of the second	No. of live sites installed in N. America/Outside N. America	85/35	1/0
 Support automatic revealing or reflex/repair/fullifiers Support automatic revealing for reflex/repair/fullifiers Supp	Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*	n/a/yes/—	yes StreamLab/yes/300
Hodunit hardware/hastalo golos:Device functions independent of track Prequired utilize Required maintenance Prequired utilize Required maintenance Prequired utilize Required maintenance Prequired utilizes and electricity methods and electricity methods Prequired utilizes and electr	Supports automatic rerouting for reflex/repeat/dilutions Types of containers device can accommodate	yes 16x100, 13x100, 16x75, 13x75	yes 16x100, 13x100, 16x75, 13x75
- Carrier type/Scalable system angle spectmen container jor carrier/ys angle spectmen container jor carrier/ys angle spectmen container jor carrier/ys vers ve	 Modular hardware/Installed options/Device functions independent of track Required utilities/Required maintenance 	yes/floor, overhead & subfloor mounted/yes compressed air. electricity/monthly	yes/floor mounted/yes compressed air, electricity/weekly
Automatch contribugation available Yes Version/Conforms to NCLS Standards Auto 1-sf/kne. throughput* Yes Automatch contribugation available Yes Version/Conforms to NCLS Standards Auto 1-sf/kne. throughput* Yes Yes Version/Conforms to NCLS Standards Auto 1-sf/kne. throughput* Yes Yes Version/Conforms to NCLS Standards Auto 1-sf/kne. throughput* Nf/Yes Version/Conforms Version/Co	Carrier type/Scalable system	single specimen container per carrier/yes	single specimen container per carrier/yes
 Version/Conforms to NCDS Standards Auto 1-5/Ave. throughput* ruly yes of containers device an accommodate For multi-unit centrifuges, each cert. gentes independently for rate and time yes Automatic fing/carbon certain accommodate For multi-unit centrifuges, each cert. gentes independently for rate and time yes Version/Conforms to NCDS Standards Auto 1-5/Ave. throughput* Notypes of containers device an accommodate Types of containers device an accommodat	Automated centrifugation available	yes	yes
Per multi-unit contributes, such cardination international and the Automated Injugation Cardination Mathemated International Automated Injugation Cardination Control (1997) 1377 Proper of containers device an accommodate the Version/Conforms to MC2LS Standards Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Version/Conforms to MC2LS Standards Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Auto 1-6/Ave. throughput* Proper of containers device an accommodate the Proper Proper terms of the Proper	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	n/a/yes/300 16x100, 13x100, 16x75, 13x75	StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed siz
Particular Information Research and Participant Process and Participant Product Process Participant Product Process Participant Product Process Participant Product Process Participant Product Produc	For multi-unit centrifuges, each cent. operates independently for rate and time	yes	yes
 Types of containers device can accommodate Types of containers device can accommodate Version Conforms to NCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate <li< td=""><td>Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*</td><td>yes n/a/yes/900</td><td>yes StreamLab/yes/300</td></li<>	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes n/a/yes/900	yes StreamLab/yes/300
 Version/Conforms to NCCLS Standards Auto 1-6/Ave, throughput* Pypes of Containers device an accommodate Version/Conforms to NCCLS Standards Auto 1-6/Ave, throughput* Pypes of Containers device an accommodate Pypes of Cont	 Types of containers device can accommodate Automated decapping available 	16x100, 13x100, 16x75, 13x75 yes	16x100, 13x100, 16x75, 13x75, handles intermixed siz yes
Auforitated sorting available yes yes • version/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* n/s/sys500 • Yession/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* - • Pypes of containers device can accommodate - • Version/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* - • Pypes of containers device can accommodate - • Version/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-S/Ave. throughput* - • Pypes of containers device can accommodate - • System inspects samples for the code/Reports Clots/Reports Olds/Reports Olds/Reports/Reports Olds	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	n/a/yes/600 16x100_13x100_16x75_13x75	StreamLab/yes/300 16x100, 13x100, 16x75, 13x75, handles intermixed siz
 e isolucolimitation of bocks standards Auto 1-5/Ave. throughput* in a preside of mathematics service can accommodate instrument (analyzer) interfaces instrument (analyzer) interfaces instrument (analyzer) interfaces instrument (analyzer) interfaces instrument interface control subsystem instrument interface ontrol subsystem instrument interface ontrol subsystem instrument interface in	Automated sorting available	yes = ////////////////////////////////////	yes Streaml ab/was/200
Specimen integrity monitor available no no • Version/Conforms to MCLS Standards Auto 1-6/Ave. throughput* - - • Types of containers device can accommodate yes yes • Version/Conforms to MCLS Standards Auto 1-6/Ave. throughput* n/2/yes/500 Dimension sample transfer module/yes/40 (4 at 16/100, 13x100, 16275, 13x75 • System inspects samples for bar code/Reports clots/Reports QNS specimens yes - • Nulse-based instrument (nalyzer) interfaces - - • Nulse-based instrument threface control subsystem yes - • Physice/Anthrefaces - - • Nulse-based instrument threface control subsystem yes - • Provisce/Anthrefycogeniang interface yes - • Instruments to which your system/product is interface yes - Other robotic products/components to which system, product is interfaced Abbit: Asym, Architecture, Aeroset: Bayer: Centaur, Altas; Dade Behring Dimension accommodate Automated storage and retrieval available yes - - • Types of containers device can accommodate retrieval available - • Version/Conforms to McCLS Standards Auto 1-5/Av	Version/conforms to NGCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	n/a/yes/500 16x100, 13x100, 16x75, 13x75	16x100, 13x100, 16x75, 13x75, handles intermixed siz
- Types of containers device can accommodate yes uncontacil allogiouting available yes version/Conforms to NCCLS Standards Auto 1-G/Ave. throughput* version/Conforms to NCCL	Specimen integrity monitor available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no 	no
• Version/Conferns to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • System imposed samples for har code/Reports ONS specimens version/Conferns to NCLS Standards Auto 1-5/Ave. throughput* if x100, 13x100, 16x75, 13x75 version/Conferns to NCLS Standards Auto 1-5/Ave. throughput* if x100, 13x100, 16x75, 13x75 version/Conferns to NCLS Standards Auto 1-5/Ave. throughput* version/Conferns to NCLS Standards Au	 Types of containers device can accommodate Automated aliquoting available 		
Types of containers device can accommodate System inspace yes	Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	n/a/yes/500 16×100 12×100 16×75 12×75	Dimension sample transfer module/yes/480 (4 ana
Instrument (analyzer) interfaces	System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes	yes/yes
Process control of instrument via control subsystem Prysical/hardware (instrument/specimen) interface Hematology/Chemistry/Coagulation immunoassay/Urinalysis depends on manufacturer of analyzer definite of analyse/ and the system on the system on thelex system	Instrument (analyzer) interfaces Rules-based instrument interface control subsystem 	yes	_
Hematology/Chemistry/Coagulation depends on manufacturer of analyzer no/ptof-refence sampling/no depends on manufacturer of analyzer no/ptof-refence sampling/no depends on manufacturer of analyzer notptof-refence sampling/no depends on manufacturer of analyzer none depends on manufacturer none depends depends on manufacturer no/se depends depends	 Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface 	yes	-
Instruments to which your system/product is interfaced Abbott: AxSym, Architecture, 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: Modular, 747, 917; Stago Coag Analyzer Other robotic products/components to which system, product is linked CRS Arms, RoboCart none Automated recapper available yes no • Version/Conforms to NCLS Standards Auto 1-5/Ave. throughput* n/a/yes/500 - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* yes yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Performation available yes no modular systems can change/grow with user ne Longitudinal upgrade pathway or plan to protect users' investments all systems may be upgraded (SW & HW) due to modular design modular systems can change/grow with user ne Ave: time to install sys./Who provides service and support/Hrs support is available contact vendor -/- List price S450k for standard configuration contact Dade Behring representative for all price Individual list prices for components contact vendor	 Hematology/Chemistry/Coagulation Immunoassay/Urinalysis 	depends on manufacturer of analyzer depends on manufacturer of analyzer	no/ptof-refence sampling/no ptof-refence sampling/ptof-refence sampling
Modular, 74, 917; Stago Coag Analyzer Other robotic products/components to which system, product is linked CRS Arms, RoboCart none Automated recapper available yes no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/500 - Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 - Automated storage and retrieval available yes yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 • Refrigeration available yes nodular systems can change/grow with user ne Ave. time to install sys./Who provides service and support/Hrs support is available 7-30 days, depends on config. of system/Beckman Coulter/24/7 no/no On-site biomedical engineer required/user group meets regularly contact vendor -/- - • Proceass control software/Transportation systems	Instruments to which your system/product is interfaced	Abbott: AxSym, Architecture, Aeroset; Bayer: Centaur, Atlas; Beckman Coulter: Synchron LX20, Gen-S, STKS; J&J: Vitros; Roche:	Dade Behring Dimension RxL Clinical Chemistry Sy
Automated recapper available yes no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/500 - • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 - Automated storage and retrieval available yes yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 • Refrigeration available yes yes no Longitudinal upgrade pathway or plan to protect users' investments all systems may be upgraded (SW & HW) due to modular design modular systems can change/grow with user ne Ave. time to install sys./Who provides service and support/Hrs support is available 7-30 days, depends on config. of system/Beckman Coulter/24/7 5 days/Dade Behring/24/7 On-site biomedical engineer required/user group meets regularly no/yes - - List price \$450k for standard configuration contact Dade Behring representative for all prici Individual list prices for components contact vendor -/- -/- • Process control software/Transportation systems contact vendor -/- -/- • Au	Other robotic products/components to which system, product is linked	mouular, 147, 917; Stago Goag Analyzer CRS Arms, RoboCart	none
• Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 - Automated storage and retrieval available yes yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 • Refrigeration available yes 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 Longitudinal upgrade pathway or plan to protect users' investments all systems may be upgraded (SW & HW) due to modular design modular systems can change/grow with user ner Ave: time to install sys./Who provides service and support/Hrs support is available 7-30 days, depends on config. of system/Beckman Coulter/24/7 5 days/Dade Behring/24/7 On-site biomedical engineer required/user group meets regularly no/yes no/no List price \$450k for standard configuration contact Dade Behring representative for all pricin Individual list prices for components contact vendor -/ • Process control software/Transportation systems contact vendor -/ • Auto. decapping/Auto. sorting/Auto. storage & retrieval contact vendor -/ • Auto. decapping/Auto. sorting/inter/accesioning contact vendor -/<	Automated recapper available	yes n/a/ves/500	no
Automated storage and retrieval available yes yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* n/a/yes/300 StreamLab/yes/300 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 16x100, 13x100, 16x75, 13x75 • Refrigeration available yes no Longitudinal upgrade pathway or plan to protect users' investments all systems may be upgraded (SW & HW) due to modular design modular systems can change/grow with user new Ave. time to install sys./Who provides service and support/Hrs support is available 7-30 days, depends on config. of system/Beckman Coulter/24/7 5 days/Dade Behring/24/7 On-site biomedical engineer required/user group meets regularly no/yes no/no List price \$450k for standard configuration contact Dade Behring representative for all pricin Individual list prices for components -/ -/ • Process control software/Transportation systems contact vendor -/ • Auto. centrifugation/Auto. input accessioning contact vendor -/ • Auto. decapping/Auto. sorting/Auto. sorting & retrieval contact vendor -/ • Specimen integrity monitor/Automated aliquoting contact vendor -/ • Instrument (analyzer) interfaces/Automated regraming	Version/contorns to receasization and a Auto 1-3/Ave. an oughput Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75	_
 Types of containers device can accommodate 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/Hrs support is available On-site biomedical engineer required/user group meets regularly List price Individual list prices for components Process control software/Transportation systems Auto. centrifugation/Auto. input accessioning Auto. centrifugation/Auto. sorting/Auto. storage & retrieval Contact vendor 	Automated storage and retrieval available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes n/a/yes/300	yes StreamLab/yes/300
Longitudinal upgrade pathway or plan to protect users' investments all systems may be upgraded (SW & HW) due to modular design modular systems can change/grow with user ner Ave. time to install sys./Who provides service and support/Hrs support is available 7-30 days, depends on config. of system/Beckman Coulter/24/7 modular systems can change/grow with user ner On-site biomedical engineer required/user group meets regularly no/yes 5 days/Dade Behring/24/7 List price \$450k for standard configuration contact Dade Behring representative for all pricin Individual list prices for components contact vendor -/- • Process control software/Transportation systems contact vendor -/- • Auto. centrifugation/Auto. input accessioning contact vendor -/- • Auto. decapping/Auto. sorting/Auto. storage & retrieval contact vendor -/ • Specimen integrity monitor/Automated aliquoting contact vendor -/ • Instrument (analyzer) interfaces/Automated recapping contact vendor -/	Types of containers device can accommodate Befrigeration available	16x100, 13x100, 16x75, 13x75 ves	16x100, 13x100, 16x75, 13x75 no
Ave. une to instan sys./who provides service and support/Hrs support is available On-site biomedical engineer required/user group meets regularly /-30 days, depends on contig. of system/Beckman Coulter/24/7 no/yes 5 days/Dade Behring/24/7 no/no List price \$450k for standard configuration contact Dade Behring representative for all pricin Individual list prices for components contact vendor -/- • Process control software/Transportation systems contact vendor -/- • Auto. centrifugation/Auto. input accessioning contact vendor -/- • Auto. decapping/Auto. sorting/Auto. storage & retrieval contact vendor -/- • Specimen integrity monitor/Automated aliquoting contact vendor -/- • Instrument (analyzer) interfaces/Automated recapping contact vendor -/-	Longitudinal upgrade pathway or plan to protect users' investments	all systems may be upgraded (SW & HW) due to modular design	modular systems can change/grow with user need
List price \$450k for standard configuration contact Dade Behring representative for all pricin Individual list prices for components entrifugation/Auto. input accessioning contact vendor -/ • Auto. centrifugation/Auto. input accessioning contact vendor -/ -/ • Auto. centrifugation/Auto. storage & retrieval contact vendor -/ -/ • Auto. decapping/Auto. sorting/Auto. storage & retrieval contact vendor -/ -/ • Specimen integrity monitor/Automated aliquoting contact vendor -/ -/ • Instrument (analyzer) interfaces/Automated recomping contact vendor -/	Ave. ume to install sys./who provides service and support/Hrs support is available On-site biomedical engineer required/user group meets regularly	r−su uays, uepenas on contig. or system/Beckman Coulter/24/7 no/yes	o days/dade Benring/24/7 no/no
Process control software/Transportation systems Contact vendor Auto. centrifugation/Auto. input accessioning Contact vendor Auto. decapping/Auto. sorting/Auto. storage & retrieval Contact vendor Specimen integrity monitor/Automated aliquoting Contact vendor Interviewent (analyzer) interfaces/Automated recomping	List price	\$450k for standard configuration	contact Dade Behring representative for all pricing
Auto. centritugation/Auto. input accessioning Contact vendor Auto. decapping/Auto. sorting/Auto. storage & retrieval Contact vendor Specimen integrity monitor/Automated aliquoting Contact vendor Instrument (analyzer) interfaces/Automated recapping	Process control software/Transportation systems	contact vendor	_/
Specimen integrity monitor/Automated aliquoting contact vendor	 Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval 	contact vendor contact vendor	/ //
	Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recaming	contact vendor contact vendor	—/— —/—
		provided by Beckman Coulter • totally open—connects to any manufacturer's analyzer	size labs seeking a wide range of automated solu scale, preanalytical workstations to complete pre-
provided by Beckman Coulter size labs seeking a wide range of automated sol		a intelligent alignating a macaurae partum volume and transfere	source, province tool workstations to complementation

May 2001

Laboratory auto	mation systems &	workcells
	· · · · ·	
Part 4 of 7	Lao-InterLink, Inc. Sheila Magnuson 1011 S. Saddle Creek Rd. Omaba, NE 68106-1043	MUS Laboratory Services Devon Piirto dpiirto@mdsintl.com 100 International Blvd. Toronter, Ontario Canada MOW 6 16
Please see accompanying article on page 42	800-449-2527/402-595-3767 www.labinterlink.com	416-675-6777 www.mdsdx.com
Name of system/First ever auto. sys. install	Lab-Frame/1996	AutoLab System/1994
Automation products that are available	vestres	veeluee
Process control software/ iransportation systems Auto. centrifugation/Auto. input or accessioning	yes/yes yes/yes	yes/yes no/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliguoting	yes/yes ves/ves	yes/yes (software only) no/no
Instrument (analyzer) interfaces/Auto. recapping	yes/yes	yes/yes
System architecture % of staff dedicated to clinical automation sys.	open system 100%	open system n/a
% of budget dedicated to R&D for clin. auto. technology	15%	n/a
Company's primary product category Information systems technology for your automation system	laboratory automation systems	health & life sciences
Database/Operating system/Server/User interface	Oracle/UNIX/Compaq DS-10 or DS-20/Oracle Forms-GUI	MS SQL server, relational/Windows NT server & w based Enterprise servers/graphical Windows bas
Software features/functionality Patient demographics & insurance data/Bules-based architecture 	I AS SW feature/I AS SW feature	LIS requirement/LAS SW feature
Supports data retrieval/Internet connectivity	LAS SW feature/LAS SW feature	LAS SW feature/n/a
Online real-time help system/QC/Stats & management reports Evaluates validity and releasability of results from automated analyzers	LAS SW feature/LIS requirement/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature
Specimen tracking/Priority processing/Random-access specimen movement	LAS SW feature/LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
 Supports accession No. redundancy (duplicate specimen ID) Supports specimen carrier and level identification 	LAS SW feature	n/a LAS SW feature
Unique bar-code number per container required	LAS SW feature	LAS SW feature
 Specimen routing/Multistop routing (one tube to multiple workstations) Specimen schedulina/Instrument schedulina 	LAS SW feature/LAS SW feature LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature n/a/n/a
Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
 Supports multiple hardware config./Supports other proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards 	LAS SW feature/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 w/auto. sys.	Sunquest 5.2 & 5.2.3, Cerner, SCC, MEDITECH, HBOC/ALG, Rubicon,	MEDITECH, Triple G, Rubicon, Cerner (modified)/H
No. of live sites installed in N. America/Outside N. America	17/2	6-HW & SW: 7-SW only/A
Transportation systems available	yes	yes
Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Supports automatic rerouting for reflex/repeat/dilutions	current/yes/800 ves	ll/partially/1,000 or 2,000 per hr ves
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	16x100, 13x100, 16x75, 13x75, 12x75
 Modular hardware/Installed options/Device functions independent of track Required utilities/Required maintenance 	yes/floor, overhead, & subfloor mounted/yes electricity/guarterly	yes/floor mounted/yes compressed air_electricity/weekly
Carrier type/Scalable system	single specimen container per carrier/yes	single spec. cont. carriers that can be converted i
Automated centrifugation available	Ves	no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	current/yes/200–500	<u> </u>
 Types of containers device can accommodate For multi-unit centrifuges, each cent, operates independently for rate and time 	16X100, 13X100, 16X75, 13X75 ves	_
Automated input/accessioning available	yes	yes
 version/conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 	current/yes/800–1,000 16x100. 13x100. 16x75. 13x75	ll/partially/2,000 per hr 16x100, 13x100, 16x75, 13x75, 12x75
Automated decapping available	yes	yes
 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 	current/yes/250–400 16x100. 13x100. 16x75. 13x75. 12x75	ll/partially/1,000 16x100. 13x100. 16x75. 13x75. 12x75
Automated sorting available	yes	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	current/yes/400 16x100, 13x100, 16x75, 13x75	II/partially/1,000 16x100, 13x100, 16x75, 13x75, 12x75
Specimen integrity monitor available	yes	no
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	alpha/yes/— 16x100, 13x100, 16x75, 13x75	_
Automated aliquoting available	yes	no
 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 	current/yes/75 primaries per hr; 225 secondaries per hr; 1:3 ratio 16x100, 13x100, 16x75, 13x75	_
System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/yes, with aliquotter/yes, with aliquotter	_/_/_
Instrument (analyzer) interfaces Rules-based instrument interface control subsystem Process control of instrument via control subsystem 	yes	yes
Physical/hardware (instrument/specimen) interface Hematology/Chemistry/Coagulation	robotic arm interface/ptor-reference sampling/robotic arm interface	, —/ptof-reference/—
Immunoassay/Urinalysis	ptof-reference sampling, robotic arm interface/no	ptof-reference/—
instruments to which your system/product is interfaced	Urthos Vitros 950AT & 250AT; Roche Hitachi 912; Bayer Centaur; Bayer Immuno-1; Abbott Architect 2000, Cell Dyn 4000; IL MLA	rules based interfaces: OCD Vitros 750/950; Dade Bayer Centaur; Abbott AxSym & Cell Dyn 3500/400 Coulter ST/C/CFN 0, Direct Market Cell Dyn 3500/400
	тьоос; мыда 180; Sysmex HST; Diagnostica Stago STA-R; DPC Immulite 2000	counter STKS/GEN-S; Physical Interfaces: Dimensi
Other robotic products/components to which system, product is linked	customizable to client's needs	n/a
Automated recapper available • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes current/yes/750	yes Il/partially/1,000
Types of containers device can accommodate	16x100, 13x100, 16x75, 13x75, 12x75	
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Times of containing during and	yes current/yes/300	SUILWAIE UIIIY —
Iypes of containers device can accommodate Refrigeration available	16x100, 13x100, 16x75, 13x75, 12x75 yes	_
Longitudinal upgrade pathway or plan to protect users' investments	- easily upgraded 2 wooks (1 ab. Interlink /24/2	SW upgrades provided anually under support agreed works (MDS & local 2nd parts (2017)
On-site biomedical engineer required/user group meets regularly	2 wccx5/2a3-111(111111)/24/7 NO/NO	A MEEKSIMUS & IOCAI STU PARTY/24/7 NO/yes
List price Individual list prices for components	\$500k-\$2m, depending on modules, instruments, quantity	n/a
Process control software/Transportation systems	\$25k-\$50k/\$15k-\$120k	n/a
Auto. centritugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval	\$150k-\$230k/\$25k \$45k/\$125k/\$120-\$205k	n/a n/a
Specimen integrity monitor/Automated aliquoting	\$50k/\$75k	n/a
Instrument (analyzer) interfaces/Automated recapping	\$4UK-\$75K/\$45K	n/a
		a anagiman transmart garriers (CTO) onen taratha
Distinguishing features	 AutoProcessing—advanced SW system yields process control for open-connectivity lab 	 Specimen transport carriers (STC) snap together client's operation
Distinguishing features	 AutoProcessing—advanced SW system yields process control for open-connectivity lab long-term protection due to unbiased, open support from any 	 specimen transport carriers (STC) shap togethe client's operation strong belief & focus in value & development of

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Laboratory auto		
	mation systems &	workcells
	mation systems a	WORKCEIIS
Part 5 of 7	Olympus America Inc. Hiroshi Sekiya hiro.sekiya@olympus.com Two Corporate Center Dr., Melville, NY 11747-3157 800-232-0135	Ortho-Clinical Diagnostics Kathryn Parra 1001 US Hwy 202, Raritan, NJ 08869 008-319-9823
Please see accompanying article on page 42	www.olympus.com	www.ortho-clinical.com
Name of system/First ever auto. sys. install	0LA1500/2000	Lab-Frame Select Series/1996
Automation products that are available		
 Process control software/Transportation systems Auto. centrifugation/Auto. input or accessioning 	no/no no/yes	yes/yes yes/yes
Auto. decapping/Auto. sorting/Auto. storage and retrieval Specimen integrity monitor/Auto. aliquoting	yes/yes yes/yes	yes/yes no/ves
Instrument (analyzer) interfaces/Auto. recapping	no/no	yes/yes
System architecture % of staff dedicated to clinical automation sys.	open system —	open system —
% of budget dedicated to R&D for clin. auto. technology Company's primary product category	 instruments	
Information systems technology for your automation system		Areale /INIV/Armor /All
	microsoft Access/windows N1/—/touch-screen, Keyboard, touch-pad	Uracie/UNIX/Compaq/GUI
Software features/functionality Patient demographics & insurance data/Rules-based architecture	LAS SW feature, LIS requirement/LAS SW feature	LAS SW feature/LAS SW feature
 Supports data retrieval/Internet connectivity Online real-time help system/QC/Stats & management reports 	LAS SW feature/n/a LAS SW feature/LIS requirement/n/a	LAS SW feature/LAS SW feature LAS SW feature/LIS requirement/LAS SW feature
Evaluates validity and releasability of results from automated analyzers Section 1	LIS requirement	LIS requirement
 Supports accession No. redundancy (duplicate specimen ID) 	LAS SW leature/LAS SW leature/II/a	LAS SW feature/LAS SW feature/LAS SW feature
Supports specimen carrier and level identification Unique bar-code number per container required	LAS SW feature n/a	LAS SW feature
Specimen routing/Multistop routing (one tube to multiple workstations) Specimen acheduling (Multistop routing (one tube to multiple workstations)	LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature
Routes test to workstation/Automatic reflex, repeat, dilutions	LAS SW feature/n/a	LAS SW feature/LAS SW feature
 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/n/a LAS SW feature/LAS SW feature
LIS interfaces that are live/how LISs are interfaced w/auto. sys.	/RS232C, Olympus interface format	Cerner, Sunquest, SCC, HBOC, MEDITECH/HL7, ASTM
No. of live sites installed in N. America/Outside N. America	0/1	8/—
Transportation systems available Version/conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no 	yes current/yes/800
Supports automatic rerouting for reflex/repeat/dilutions Types of containers device can accommodate	_	yes 16x100 13x100 16x75 13x75 12x75
Modular hardware/Installed options/Device functions independent of track	_	yes/floor mounted/yes
Required utilities/Required maintenance Carrier type/Scalable system	_	electricity/quarterly single specimen container per carrier/yes
Automated centrifugation available	no	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_	current/yes/300–500 16x100 13x100 16x75 13x75
For multi-unit centrifuges, each cent. operates independently for rate and time	-	yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/1,500	yes current/yes/500
 Types of containers device can accommodate Automated decapping available 	16x100, 13x100, 16x75, 13x75 & 11.5-16 mm diam., 65-110 mm ht. ves	16x100, 13x100, 16x75, 13x75 ves
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	-/yes/1,500 16×100 13×100 16×75 13×75 RD Vacutainer RD Hemoquard	current/yes/300 16×100 13×100 16×75 13×75
	Sarstedt Monovette, screw top closures, all at same time	10,100, 10,100, 10,10, 10,10
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/1,500	current/yes/300
 Types of containers device can accommodate Specimen integrity monitor available 	16x100, 13x100, 16x75, 13x75, sorting to any mftr's sample holder no	16x100, 13x100, 16x75, 13x75, 12x75 yes
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_	alpha/yes/— 16x100 13x100 16x75 13x75
Automated aliquoting available	no	Yes
version/Contorms to NUCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	Ξ	current/yes/75 primary, 225 secondary 16x100, 13x100, 16x75, 13x75
System inspects samples for bar code/Reports clots/Reports QNS specimens	yes/no/yes	yes/yes/yes
Instrument (analyzer) interfaces Rules-based instrument interface control subsystem 	yes	yes
Process control of instrument via control subsystem Physical/hardware (instrument/specimen) interface	yes	yes
Hematology/Chemistry/Coagulation Immunassav/Irinalveis	_/_/	robotic arm interface/ptof-reference sampling/robo
Instruments to which your evetem/product is interfaced	,	Vitroe 950 AT 250 AT: Advis Contains DDC 2000- 0-1
Ather robotic products/components to which system, product is linked	can be interfaced w/ any automation transportation track	Stago Star experienced in facilitating development of OEM into
Automated recapper available	no	
Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate	_	current/yes/750 16x100, 13x100, 16x75, 13x75
Automated storage and retrieval available	yes	yes
 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate 	—/yes/1,500 16x100, 13x100. 16x75. 13x75	current/yes/— 16x100, 13x100, 16x75, 13x75, 12x75
Refrigeration available Longitudinal upgrade pathway or plan to protect upgra/ investments	NO non modular systems are compatible w/ most discrete	yes interchangeable componente throughout componente
Ave, time to install sys /Who provides service and support/Hrs support is available	instruments and automation systems 1 week/(I)ympii: America Inc. Diagnostic Systems Group/24/7	transport for all products, adherence to NCCLS, HL7 2 weeks/Ortho-Clinical Diagnostics & Lab-Interliable
On-site biomedical engineer required/user group meets regularly	no/—	no/no
List price Individual list prices for components	\$225k	\$500k-\$1.5M, depends on configuration
Process control software/Transportation systems Auto controling (Auto insult occasioning	n/a	available upon request
- Auto, centringauon/Auto, input accessioning	11/a n/o	available upon request available upon request
 Auto. decapping/Auto. sorting/Auto. storage & retrieval 	li/d	aranasie apon requeet
Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting Instrument (analyzer) interfaces/Automated recapping	n/a n/a	available upon request available upon request

Laboratory automation systems & workcells

Part B of 7 Product Disputcies Provide of 7 Provide Disputcies Provide Disputcies Provide Disputcies Provide Disputcis Provide Disputcies		
Part 6 of 7 Pack 5 and 7 Plant 6 of 7 Description Descripion Descripion Des	systems &	workcells
Please see accompanying article on page 42 six Biblystexacture.org Name of system/First ever auto. sys. Install Modular Pressubject/1997, Hit Actomation products that are swallable	₽roche.com s, IN 46250	Roche Diagnostics Chris Demiris chris.demiris@roche.com 9115 Hague Rd., Indianapolis, IN 46250
Name of system/First ever auto, sys. Instill Medial rheamiptics/1927, HI Automating products that are available yea/yes > Auto. Castification/Auto. Imput or accessioning yea/yes > Auto. Castification/Auto. Scring/Auto. Scring and retrieval yea/yes > Specimen indigity monitor/Auto. Scring and retrieval yea/yes > Auto. A		317-576-3908 us.labsystems.roche.com
Advantation products that are available Process control software Transportation system Database/Operating System/Server/User interface Process Control System Server/User interface Process Control System Process Control System Pathol System Transportation Control System Database Coperating System/Server/User interface Process Control Server/User interface Process Control Server/User interface Process Control Server/User interface Process Control Server/User interface Process Control Server/	Hitachi 1990	PSDI, 1997; VSII, 1999
Process control software // ransportation systems waves wave waves		
Adds. Geographic/Antio. science/adds. Adds. Tecape ind retrieval performant individual adjustion performant individual individual adjustindividual adjustion performant individual adjustion perf		yes/no
 apecimen integrity monitor Auto. aliquoting by entremark (analyze) interfaces/Auto.recepting by eta aligned and a submation sys. comparison of the submation of the submation system Databac/Dperating system/Sever/User interface -/Windows IT, UKU-/ Stranger eta aligned and another submation system - Aligned and another submation and analyzers - Aligned another submation and another submation and analyzers - Aligned another submation and another submation and analyzers - Aligned another submation and another submation and another submation and analyzers - Aligned another submation another submation and another submation		PSDI I (yes), VSII (no)/yes/no
System architecture System architecture % of Langed decilicated to RRA D or clin. auto. Sectionalogy Company's primary product category % of Langed decilicated to RRA D or clin. auto. Sectionalogy Company's primary product category information systems technology for your automation system Database/Dystem/Sectionalogy for methods Pathent decompanying primary Sectional Companying Patheness Patheness technology for your automation system Database/Dystem/Sectionalogy Famous Sectional Companying Patheness Patheness technology for transits from automated analyzers Patheness validity and releasability of results from automated analyzers Paperimen tracking/Inforting processing/Bandom-access spacinem movement LAS SW feature-LAS W featur Paperimen tracking/Inforting processing/Bandom-access spacinem movement LAS SW feature-LAS W featur Paperimen tracking/Inforting processing/Bandom-access spacinem movement LAS SW feature-LAS W featur Paperimen tracking/Infortung results for multiple workstations) Paperimen tracking/Infortung results for multiple workstations) Paperimen stacking/Infortung results for multiple workstations) Paperimen stacking/Infortung results for multiple workstations) Paperimen stacking/Infortung results for population for propering transport Papering stacking/Papering proposed MCCLS Standards Particle Market SW featur - JAS SW feature-LAS W featur LS Interfaces that are live/new LLS are interfaced w/auto. sys. W feature-LAS W featur - JAS SW feature-LAS W fe		PSDI (no), VSII (yes)/PSDI (no), VSII (yes) no/no
************************************	tems)	open system
Company's primary product category instruments, regards Instruments, regards //introvert1, UNUC-/- Stablesch/Decrafing system/Decrafing system/Decrafing system/Decrafing system/Decrafing system/Decrafing system/DC/Stables functionated analyzers LAS SW fasture/LAS SW fastur - Painten functionality LAS SW fasture/LAS SW fasture/LA		n/a
Tabbase/Operating system/Server/Jaser interface —/Windows HT, UNIX/—/— Software features/functionality LAS SW feature/LAS Wifestur Patient demographics & insurance data/Rules-based architecture LAS SW feature/LAS Wifestur Patient demographics & insurance data/Rules-based architecture LAS SW feature/LAS Wifestur Patient demographics & insurance data/Rules-based architecture LAS SW feature/LAS Wifestur Patient demographics & insurance data/Rules-based architecture LAS SW feature/LAS Wifestur Patient demographic relative Relative Patient demographic relative Relative Patient demographic relative Relative Patient demographic relative Relative		instruments, reagents
Software features/functionality - Patient demographics & insurance dataPulse-based architecture - Supports stature help system/CSTstats arenagement reports - Software features/functionality and releasability of results from automated analyzers - Software Software (specime Carlot ALS SW feature - SUS SW feature - ALS SW feature - ALS SW feature - SUS SW feature - SW SW feature - SW SW feature - SW		—/Windows NT, UNIX/—/—
 Communication and a standard a data control of the standard and a control of the standard and to the standard and		LAS SW feature/LAS SW feature
Online real-time help system/UC/Stats & management reports Sectioner tracking/Priority processing/Random-access specimem movement Sectioner tracking/Priority processing/Random-access specimem movement Supports accessing/Random-access specimem movement Supports specime carrier and level identification Supports specime routing/Multistop routing (one tube to multiple workstations) Supports accessing/Random/automatic reflex; repeak, dimens Surage retrieval & disposal/Supports proposed NCCLS standards Surge retrieval & disposal/Supports Surge retrieval & disp	ture	LAS SW feature/LAS SW feature
 Specimen tracking/Priority processing/Fandom-access specimen by movement Supports accession No. redundance, (duplicate specimen D) Supports specimen cariter and level identification Specimen scheduling/Instrument scheduling Poole number per contract scheduling Poole test to workstätion/Jutomatic reflex, repeat, dilutions Supports multiple artivity accessing and the to multiple workstations; Supports multiple hardware config. Supports the proprietary transport. hardware Storage retrieval & disposal/Supports proposed NCCLS standards Center v. 3, Samuest 52, 523 Waber-Yas, Sub Cells, Sub Ce	feature	LAS SW feature/n/a/LAS SW feature n/a
• supports accession No. redundancy (duplicate specimen ID)	ture/LAS SW feature	LAS SW feature/LAS SW feature/LAS SW feature
 Unique bari-code number per container required Specimen routing/Muttistop routing (one tube to multiple workstations) Specimen scheduling/Instrument scheduling Specimen scheduling/Instrument scheduling Supports multiple hardware config/Supports other proprietary transport. hardware Storage retrieval & disposal/Supports other proprietary transport. hardware Storage retrieval & disposal/Supports other proprietary transport. hardware Storage retrieval & disposal/Supports other proprietations Storage retrieval & disposal/Supports other proprietations Storage retrieval & disposal/Supports other proprietations Speciment outing systems available Version/conforms to NGCIS Standards Auto 1-5/Ave. throughput* No. of live sites installed in N. America/Outside N. America Speciment outing retrieval as disposal/Supports Supports autorized mainter acting to reflex/repeat/Ultitoris Speciment outing retrieval per disposal d		LAS SW feature LAS SW feature
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Fourise test to vorkstanon/Automatic reliex, repeat, diutions Supports multiple hardware comf. Symports broposed NCCLS standards -/ LS interfaces that are live/how LISs are interfaced w/auto, sys. Commer v. 3, songest 5.2, 5.23 Vo BMCP-Vists, DOO CMS CAR Per-Se, Omnitech, BOOC AWAR	ture	n/a/n/a
 Storage retrieval & disposal/Supports proposed NGCLS standards —/LAS W feature US interfaces that are live/how LISs are interfaced w/auto. sys. Cerner v. S, Panguest 52, 523 Va DREC-Mana Ellevent, HZ 21 serial, ASTM No. of live sites installed in N. America/Dutside N. America of <i>Ti aunoph15</i> yres version/conforms to NGCLS Standards Auto 1-5/Ave, throughput* MP Aystem 3 or 7/yes/500 regulard utilities device an accommodate regulard atilities regulard atilitie	lure	LAS SW feature/n/a LAS SW feature/LAS SW feature
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Transportation systems available yes Versin/conforms to NCCLS Standards Auto 1-5/Ave. throughput" MP system 3 or 7/yes/600 Propes of containers device can accommodate Pequired utilities/Required maintenance Pequired utilities/Required maintenance Persin/conforms to NCCLS Standards Auto 1-5/Ave. throughput" yes Versin/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Versin/Conforms to NCCLS S		PSDI 27/51; VSII 8/20
 Supports automatic rerouting for reflex/repeat/ditutions Supports automatic recurrence accommodate Modular hardware/installed options/Device functions independent of track Required utilities/Required maintenance Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/250 Strotto, 13:200, 16:75, 13:7		no —
 Program Contrainers device Carl accoundate functions independent of track Required utilities/Required maintenance Carrier type/Scalable system Version/Conforms to NCCLS Standards Auto 1-5/Ave, throughput* System 3 or 7/yes/500 per functions in the system of the system 3 or 7/yes/500 per function in the system 3 or 7/yes/500 per function is to NCCLS Standards Auto 1-5/Ave, throughput* Version/Conforms to NCCLS Standar	75 rubbar ar homoguard	
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Automated centrifugation available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/250 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* yes, 2 can run at 500 per hr. • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* yes, 2 can run at 500 per hr. • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/600 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/600 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/600 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Process control of instrument via co	water (for analyzers)/weekly r per carrier (5 positions)/yes	compressed air, electricity/weekly multiple specimen container per carrier (5 positio
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* Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 * Version/Conforms to NCCLS Can accommodate * Process control of instrument via control subsystem * Process control of instrument via control subsystem yes Physical/hardware (instrument/specimen) interface/no, ptof-reference sampling/ * Immunoassay/Urinalysis no, ptof-reference sampling/ * Instruments to which your system/product is interfaced Mother system 3 or 7/yes/500 * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* * Types of containers device can accommodate Automated recapper available * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* * Types of containers device can accommodate * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* * Types of containers device can accommodate * Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* * Types of containers device can accommodate * Version/Conforms to NCCLS Standards Au		PSDI/yes/900–1,200; VSII/yes/340 w/ 1 aliquot pe
 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/400 Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System inspects samples for bar code/Reports clots/Reports QNS specimens Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System inspects samples for bar code/Reports clots/Reports QNS specimens Process control of instrument via control subsystem Process control of instrument via control subsystem Immunoassay/Urinalysis Instruments to which your system/product is interfaced Mematology/Chemistry/Coagulation Immunoassay/Urinalysis Not CLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Mutomated recapper available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Process control NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Refrigeration available	75	16x100, 13x100, 16x75, 13x75, hemoguard, rubbe ves
 Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Specimen integrity monitor available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Specimen integrity monitor available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 System 3 or 7/yes/500 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System inspects samples for bar code/Reports clots/Reports QNS specimens Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System inspects amples for bar code/Reports clots/Reports QNS specimens Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System inspects amples for bar code/Reports clots/Reports QNS specimens Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Instrument (analyzer) interfaces Rules-based instrument via control subsystem Process control of instrument visecimen) interface Hematology/Chemistry/Coagulation Instruments to which system, product is linked Immunoassay/Urinalysis No, ptof-reference sampling/ Netromet available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate - Automated storage and retrieval available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Non- Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Version/Conforms to NCCLS Standards	75	PSDI/yes/900–1,200
 Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Specimen integrity monitor available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* 	10	yes
Specimen integrity monitor available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* -Automated aliquoting available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 • System inspects samples for bar code/Reports clots/Reports QNS specimens yes/yes/yes • Rules-based instrument interface • Rules-based instrument/specimen) interface • Process control of instrument/specimen) interface • Hematology/Chemistry/Coagulation /no, pt-of-reference sampling/ Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* <	75	PSDI/yes/900–1,200; VSII/yes/340 w/ 1 aliquot pe 16x100, 13x100, 16x75, 13x75, hemoguard, rubbe
 Version/Loniomis to NUCLS standards Auto 1-5/Ave. throughput" Types of containers device can accommodate Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System inspects samples for bar code/Reports clots/Reports QNS specimens Version/Conforms to NUCLS Standards Auto 1-S/Ave. throughput* System inspects samples for bar code/Reports clots/Reports QNS specimens Process control of instrument via control subsystem Process control of instrument/specimen) interface Hematology/Chemistry/Coagulation Immunoassay/Urinalysis Torpes of containers device can accommodate Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System 3 or 7/yes/500 Types of containers device can accommodate No Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System accommodate No Version/Conforms to NUCLS Standards Auto 1-5/Ave. throughput* System accommodate No System accommodate No System accommodate No System accommodate No		yes
Automated aliquoting available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 • System inspects samples for bar code/Reports clots/Reports QNS specimens • Rules-based instrument interface control subsystem • Process control of instrument via control subsystem yes • Hematology/Chemistry/Coagulation /no, ptof-reference sampling/- • Immunoassay/Urinalysis no, ptof-reference sampling/- Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • System insers device can accommodate • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*		von/yes/— level sensing & clot detection
• Types of containers device can accommodate 16x100, 13x100, 16x75, 13x75 • System inspects samples for bar code/Reports clots/Reports QNS specimens yes/yes/yes Instrument (analyzer) interfaces - • Rules-based instrument interface control subsystem - • Process control of instrument via control subsystem - • Process control of instrument via control subsystem - • Hematology/Chemistry/Coagulation -/no, ptof-reference sampling/ • Instruments to which your system/product is interfaced -/no, ptof-reference sampling/ Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Version/Conforms to NCCLS Standards auto 1-5/Ave. throughput* - • Types of containers device can accommodate - • Refrigeration available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Types of containers device can accommodate - • R		yes VSII/yes/340 w/ 1 aliquot ner nrimary tube
- gystem inspects samples for ball code/neports circs/neports circs/neportex circs/neports circs/neports circs/neports circs/neports circs/	75	16x100, 13x100, 16x75, 13x75
Instrument (attralyzer) interfaces		y cə/ y cə/ y cə
Process control of instrument/via control subsystem yes Physical/hardware (instrument/specimen) interface -/no, ptof-reference sampling/ • Hematology/Chemistry/Coagulation -/no, ptof-reference sampling/ • Immunoassay/Urinalysis no, ptof-reference sampling/ Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked - Automated recapper available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate - Automated storage and retrieval available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Types of containers device can accommodate - • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* - • Types of containers device can accommodate - • Types of containers device can accommodate - • Refrigeration available no Longitudinal upgrade pathway or plan to protect users' investments customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available -2 0n-site biomedical e		no
 Hematology/Chemistry/Coagulation Immunoassay/Urinalysis Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked Automated recapper available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 Types of containers device can accommodate Automated storage and retrieval available Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Types of containers device can accommodate Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Refrigeration available No Longitudinal upgrade pathway or plan to protect users' investments customers can place modules -2 weeks/Roche/24/7 on-site biomedical engineer required/user group meets regularly no/no List price Process control software/Transportation systems Process control software/Transportation systems Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval N/a Auto. decapping/Auto. storage & retrieval		
Instruments to which your system/product is interfaced Roche/Hitachi Modular System Other robotic products/components to which system, product is linked — Automated recapper available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate — Automated storage and retrieval available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* — • Types of containers device can accommodate — • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* — • Types of containers device can accommodate — • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* — • Types of containers device can accommodate — • Types of containers device can accommodate — • Types of containers device can accommodate — • Sterigeration available no Longitudinal upgrade pathway or plan to protect users' investments Customers can place modules: Ave. time to install sys./Who provides service and support/Hrs support is available <2 weeks/Roche/24/7	pling/— g/—	no/no/no no/no
Automated recapper available yes • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* system 3 or 7/yes/500 • Types of containers device can accommodate Automated storage and retrieval available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* Automated storage and retrieval available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* • Types of containers device can accommodate • Refrigeration available no Longitudinal upgrade pathway or plan to protect users' investments customers can place modules: Ave. time to install sys./Who provides service and support/Hrs support is available <2 weeks/Roche/24/7	ems Clin Chem & Immunoassay	none
Automated storage and retrieval available no • Version/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* — • Types of containers device can accommodate — • Refrigeration available no Longitudinal upgrade pathway or plan to protect users' investments customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available <2 weeks/Roche/24/7		
Types of containers device can accommodate Refrigeration available Customers can place modules Refrigeration available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Customers can place modules Ave. time to install sys./Who provides service and support/Hrs support is available Varies from \$300k-\$1M Individual list prices for components Process control software/Transportation systems Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval N/a Specimen integrity monitor/Automated aliquoting n/a		yes PSDI/ves/1 200: VSII/ves/240 w/ 1 aliment per min
 Reirigeration available no customers can place modules can plac		16x100, 13x100, 16x75, 13x75, hemoguard, rubbe
Ave. time to install sys./Who provides service and support/Hrs support is available <2 weeks/Roche/24/7	es to increase capacity & functionality	ito (uses a special archive rack) can be easily configured to meet changing worklo
List price varies from \$300k-\$1M Individual list prices for components n/a • Process control software/Transportation systems n/a • Auto. centrifugation/Auto. input accessioning n/a • Auto. decapping/Auto. sorting/Auto. storage & retrieval n/a • Specimen integrity monitor/Automated aliquoting n/a		3 days PSDI; 4 weeks for VSII/Roche/24/7 no/no
Individual list prices for components n/a • Process control software/Transportation systems n/a • Auto. centrifugation/Auto. input accessioning n/a • Auto. decapping/Auto. sorting/Auto. storage & retrieval n/a • Specimen integrity monitor/Automated aliquoting n/a		PSDI: \$240k; VSII: \$300k
Auto. centrifugation/Auto. input accessioning Auto. decapping/Auto. sorting/Auto. storage & retrieval Na Specimen integrity monitor/Automated aliquoting n/a		_
Auto. decapping/Auto. sorting/Auto. storage & retrieval Specimen integrity monitor/Automated aliquoting n/a		-
		_
Instrument (analyzer) interfaces/Automated recapping n/a		
Distinguishing features • fully integrated & designed to	d to work with analytics	PSDI: stand-alone archiving; low-cost easy imp porting decomposed archiving; low-cost easy imp

* Ave. throughput in specimen containers per hr per device

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Laboratory auton	nation systems & v	vorkcells	Ê.A.
t 7 of 7	Sysmex Corp. or America	Thermo Clinical Labsystems]
	Gilmer Road, 6699 RFD, Long Grove, IL 60047 847-726-3500	Ruukintie 18 FIN-02330 Espoo Finland +358 9 802 766	
ase see accompanying article on page 42	www.sysmex.com	www.labsystems.fi	
e of system/First ever auto. sys. install	Sysmex Systemization—HST, CST/1990	Thermo Clinical Automation/2000	
mation products that are available ocess control software/Transportation systems	ves/ves	ves/ves	
to. centrifugation/Auto. input or accessioning to decembra/Auto. sorting/Auto. storage and retrieval	no/yes	yes/yes wes/wes	
ecimen integrity monitor/Auto. aliquoting	yes/no	no/yes	
trument (analyzer) interfaces/Auto. recapping em architecture	yes/no closed system	yes/no open system	
staff dedicated to clinical automation sys. budget dedicated to R&D for clin. auto. technology	25% 		
pany's primary product category	lab automation systems, instruments, information systems	lab automation systems and instruments	
abase/Operating system/Server/User interface	SYBASE/Windows 98, NT, UNIX/—/—	object database/Windows NT/—/GUI	
vare features/functionality tient demographics & insurance data/Bules-based architecture	I AS SW feature/I AS SW feature	LIS requirement/—]
pports data retrieval/Internet connectivity	LAS SW feature/LAS SW feature	LIS requirement/—	
aluates validity and releasability of results from automated analyzers	LAS SW leature/LAS SW leature/LAS SW teature LAS SW feature	LAS SW feature	
ecimen tracking/Priority processing/Random-access specimen movement pports accession No. redundancy (duplicate specimen ID)	LAS SW feature/LAS SW feature/n/a n/a	LAS SW feature/LAS SW feature/LAS SW feature LAS SW feature	
ports specimen carrier and level identification	LAS SW feature	LAS SW feature	
ecimen routing/Multistop routing (one tube to multiple workstations)	LAS SW feature/n/a	LAS SW feature/LAS SW feature	
ecimen scheduling/Instrument scheduling utes test to workstation/Automatic reflex, repeat, dilutions	n/a/n/a LAS SW feature/LAS SW feature	LAS SW feature/LAS SW feature LAS SW feature/LIS requirement	
poorts multiple hardware config./Supports other proprietary transport. hardware rage 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	
nterfaces that are live/how LISs are interfaced w/auto. sys.	Cerner, Sunquest, SCC, HBOC, Triple G, Antrim/ASTM, TCP IP	_/_	1
f live sites installed in N. America/Outside N. America	180/700	_/_	-
sportation systems available sion/conforms to NCCLS Standards Auto 1-5/Ave. throughput*	yes —/yes/config. dependent; max. 600 samples per hr	yes —/yes/500	
oports automatic rerouting for reflex/repeat/dilutions bes of containers device can accommodate	yes 16x100, 13x100, 16x75, 13x75	yes 16x100, 13x100, 16x75, 13x75, 11–16.8 mm diam., 110 mm ht.	
dular hardware/Installed options/Device functions independent of track quired utilities/Required maintenance	yes/floor mounted/yes compressed air, electricity/daily, weekly, monthly for analyzers;	yes/floor mounted/— compressed air, electricity/—	
rrier type/Scalable system	quartery, annually for automation multiple specimen container per carrier/yes	single specimen container per carrier/yes	
mated centrifugation available sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no	yes n/a/ves/500	
pes of containers device can accommodate	-	16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.	
mated input/accessioning available	yes	yes	
sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput* les of containers device can accommodate	1.08/yes/150 per device per hr x 4 13x100, 13x75	—/yes/500 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.	
mated decapping available sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*	no 	yes —/ves/500	
es of containers device can accommodate		16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.	
sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*		/yes/500	
bes of containers device can accommodate imen integrity monitor available	no	16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht. no	
sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughput*			
mated aliquoting available	no	yes	
sion/conforms to NGCLS Standards Auto 1-5/Ave. throughput	_	—/yes/300 secondary tubes 16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.	
stem inspects samples for bar code/Reports clots/Reports QNS specimens	-	yes/yes/yes	-
ument (analyzer) interfaces les-based instrument interface control subsystem	yes	-	
ical/hardware (instrument/specimen) interface	yes	_	
natology/Chemistry/Coagulation nunoassay/Urinalysis	ptof-reference sampling/—/ptof-reference sampling —/—	—/—/— —/—	
uments to which your system/product is interfaced	Sysmex XE-2100, SE-9500, R-3500, SP-100, CA-1500, & CA-6000	Roche Modular, Konelab, Sysmex & systems capable of picking up	
robotic products/components to which system, product is linked	none		
mated recapper available	no	no	
sion/contornis to Noola Standards Auto 1-5/Ave. throughput^ bes of containers device can accommodate			
nated storage and retrieval available sion/Conforms to NCCLS Standards Auto 1-5/Ave. throughout*	yes PCDPS 1.08/ves/150 per device per hr x 4	yes —/ves/500	
es of containers device can accommodate	13x100, 13x75	16x100, 13x100, 16x75, 13x75, 11–16.8 mm in diam., 110 mm ht.	
itudinal upgrade pathway or plan to protect users' investments	all upgrades for Sysmex hematology & coagulation analyzers were		
ime to install sys./Who provides service and support/Hrs support is available te biomedical engineer required/user group meets regularly	compatible with the automation and PC-DPS 1 week/Roche Diagnostics/24/7 no/ves	2–3 days/local distributor/24/7 no/no	
rice	depends on system configuration	_	-
idual list prices for components cess control software/Transnortation systems		_	
o. centrifugation/Auto. input accessioning	_	-	
o. aecapping/Auto. sorting/Auto. storage & retrieval scimen integrity monitor/Automated aliquoting	Ξ	<u> </u>	
rument (analyzer) interfaces/Automated recapping		-	1
inguishing features	 able to take collected data & turn into usable information proven implementation within 90 days of receiving purchase order. 	 modularity—the system can be extended to meet customer needs; both workcell and preanalytical part can be upgraded and linked as 	
	on-site implementation is successfully completed in one week	needed • multitube carrier with programmable chip	
e. throughput in specimen containers per hr per device	hematology for over 10 years	 open—can be linked to a variety of different analyzers 	