



GC Connections

This month in "GC Connections," John Hinshaw presents a report about the new gas chromatography instruments and accessories exhibited at the 53rd Pittsburgh Conference.

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New GC Instruments and Accessories at the 53rd Pittsburgh Conference

From 17 March to 22 March 2002, more than 23,000 chemists, conferees, students, exhibitors, and others visited New Orleans, Louisiana, for the 53rd Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy — Pittcon 2002. This year's conference was the eighth Pittcon to take place in New Orleans since 1985. It was like homecoming week for those of us who attended all seven previous meetings there. The well-known exhibition and presentations at the Morial Convention Center and the familiar sights and sounds of the French Quarter gave many a feeling of comfort that helped reduce the stress of a week of conventioning. The conference migrates south to Orlando, Florida, in 2003, and then moves north to Chicago, Illinois, in 2004.

Despite recent cutbacks in travel, total attendance was 23,319, down only 6% compared with last year. This decrease in attendance is smaller than the one the conference saw from 2000 to 2001. Interestingly, all the attendance loss occurred among exhibitors, with a 14% drop, and the number of conferees — including all other registrants and media representatives — actually increased by 4%. The overall result was that attendance was split nearly 50:50 between exhibitors and conferees, which continues the trend of the past few years of exhibitors trimming their Pittcon lists as much as possible. Overall, it appears as if Pittcon's significance has outweighed conferees' reluctance to travel. This high attendance might be due, in large part, to the fact that people made their plans and submitted their papers by the August deadline — next year's conference will reveal whether the declining trend has bottomed out.

This annual "GC Connections" installment reviews new gas chromatography (GC) instrumentation and accessories shown at this year's Pittcon for the first time. For a review of new chromatography columns and accessories, please see "Col-

umn Watch" in the March and April 2002 issues of *LCGC* (1,2). The information presented in this column is based upon manufacturers' replies to questionnaires received up until a few weeks before the conference, as well as additional information from manufacturers' web sites and product literature. During the conference, I took time to traverse the convention aisles and see some of the new products firsthand and discover a number of items that weren't covered by the questionnaires. Every effort has been made to collect accurate information, but due to the preliminary nature of some of the material *LCGC* cannot be responsible for errors or omissions. This column cannot be considered a complete record of all new GC products shown at this year's Pittcon because not all manufacturers chose to respond to the questionnaire; nor is all of the submitted information included here because of the space limitations.

This year's new GC products are divided into five categories: GC instrument systems and add-ons, autosamplers and injection and sampling accessories, detectors and accessories, general accessories, and software and accessories. This categorization doesn't imply that the products listed are limited strictly to the chosen category — the categories simply are convenient ways to classify a large amount of information for clear presentation.

GC Instrument Systems and Add-Ons

Several companies exhibited new instrumentation that addresses trends toward smaller or faster gas chromatographs and that also works toward handling the resulting increased information flow in more effective ways. As described in Table I, Varian's CP-4900 Micro GC system accommodates as many as four plug-and-play column-detector modules, each of which includes its own flash memory that retains column and method information between

installations. An optional enclosure includes a carrier-gas cylinder and ancillary devices for the GC system.

The GC-2010 GC system from Shimadzu Scientific Instruments is a benchtop-sized instrument that incorpo-

rates a fast-heating column oven, support for as many as four detectors, and a third-generation automatic flow control pneumatic system.

Alpha Omega Technologies showed its new Geanna refinery gas analyzer, which

can separate through C_6 in as few as 100 s. Also in the fast GC vein, Restek introduced its GC Racer accessory for older Agilent Technologies gas chromatographs. The accessory boosts the maximum attainable temperature programming rates to a much

Table I: GC Instrument Systems and Add-Ons Exhibited at Pittcon

Product	Company	Comments
CP-4900 Micro GC system	Varian	Incorporates as many as four channels of micromachined injectors and detectors and narrow-bore columns to deliver rapid separations of permanent gases and vapors; each GC channel is a complete miniaturized gas chromatograph with a narrow-bore column for high-efficiency separations; pneumatics for microelectronic gas control and flash memory to store current method parameters are integrated with the GC module to create plug-and-play GC channels; a time-programmable backflush function helps reduce analysis times and remove high-boiling-point contaminants.
GC-2010 GC system	Shimadzu Scientific Instruments	Designed for fast separation applications such as food, pharmaceutical, and petrochemical analyses; includes a self-diagnostic function, a fast-heating oven with rates as high as 250 °C/min, and support for as many as four detectors; according to the manufacturer, the third-generation automatic flow control system can deliver retention time standard deviations of 0.2%; compatible with the company's model AOC-20i autoinjectors and model AOC-20s autosamplers.
Geanna high-speed refinery gas analyzer	Alpha Omega Technologies	Performs refinery gas analysis of hydrocarbons as large as C_6 in as few as 100 s; modular design permits extended analysis for hydrocarbons larger than C_6 with hydrogen sulfide present with a slight increase in analysis time; compatible with Agilent Technologies and Varian gas chromatographs; according to the company, it would not be compromised by a liquid sample.
GC Racer temperature programmer	Restek	Provides rapid temperature programming for greater GC sample throughput; works with a gas chromatograph's microprocessor to maintain heating rates as high as 70 °C/min at oven temperatures as high as 350 °C; compatible with any inlet-detector combination on Agilent 5890 gas chromatographs, according to the manufacturer.
Microwave GC capillary column oven	Antek Instruments	Designed to perform simulated distillation in less than 3 min; can accommodate columns as long as 60 m; compatible with laboratory and process GC systems; according to the company, the system provides six ramps with heating rates as high as 10 °C/s and cools at rates greater than 300 °C/min using an external controller module; several common column dimensions and phases can be used with the oven system.
Model 1115 refinery gas analyzer	PerkinElmer Instruments/Arnel	Can analyze hydrogen, helium, fixed gases, hydrogen sulfide, paraffinic and olefinic hydrocarbons through C_5 , and composite hydrocarbons larger than C_6 in less than 15 min; meets or exceeds the American Society for Testing and Materials (ASTM) D2597 standard and the requirements of UOP 539 and ASTM D1946; can be upgraded to include pressurized liquid sampling, on-line sampling, and multistream sampling capabilities.
Pegasus 4D TOF GC-MS system	Leco	TOF GC-MS system has a comprehensive GC \times GC multidimensional separation system with full-range mass spectral acquisition rates as high as 500 spectra/s; operates with the company's ChromTOF software (see Table V), which provides mass spectral deconvolution algorithms for target-analyte identification and quantification.
PolarisQ ion-trap GC-MS system	Thermo Finnigan	Includes a variable-damping gas option that reportedly provides a 10-fold improvement in analyte detection in the MS-MS mode; operates under complete data-system control, including automatic system tuning; other options include an MS^2 chemical ionization feature and a probe for solid samples.
QP-2010 GC-MS system	Shimadzu Scientific Instruments	Integrates a sensitive MS detector with the company's GC-2010 gas chromatograph; has a scan sensitivity of greater than 200:1 for 1 pg of octafluoronaphthalene, a 1.5–1024 Da mass range, and a maximum scan rate of 6750 Da/s and 50 scans/s; available ion sources include electron-impact ionization and positive and negative chemical ionization; the sources have dual rhenium coil filaments; the system vacuum is provided by dual-differential turbomolecular pumps; a concurrent direct-inlet probe operates from a separate ion source.
Trace GC gas analyzer	Thermo Finnigan	This gas analysis package has an isothermally heated valve oven that accommodates as many as four valves and two more unheated valves; the valve actions can be controlled locally or through the company's ChromQuest data system; suitable for natural and refinery gas analysis configurations, as well as quality control, semiconductor, and medical gas applications.
UltraFast Trace GC system	Thermo Finnigan	Performs direct column heating that generates oven temperature programming rates as fast as 1200 °C/min for higher sensitivity and rapid throughput with shorter cooldown times than those of conventionally heated columns; the heating system can perform fast GC when used with short, narrow-bore columns (0.1-mm i.d.).

higher temperature range than what standard instruments can achieve.

The Microwave GC capillary column oven from Antek Instruments represents the most interesting GC accessory at this year's conference. A prototype was shown unofficially at last year's Pittcon, but the device appears to be ready for prime time this year. The add-on device's external controller can operate one or two of the small, saucer-shaped oven cavities simultaneously at very high programming rates or isothermally, apparently with very good temperature control for GC applications. The microwave column oven cools rapidly because of its small mass; this ability makes it ideal for high-speed, high-throughput applications. Several capillary columns with common stationary phases in lengths as long as 30 m will be available for the

device when it starts shipping in the near future.

Also standing out in the fast lane was Thermo Finnigan's UltraFast Trace GC system, which has a direct capillary-column-heating arrangement. The system can provide very high programming rates and fast cool down times because of the low thermal mass of the column assembly. In combination with narrow-bore capillary columns (0.1-mm i.d.), it can deliver fast chromatographic separations. In total, six new products addressed high speeds and small sizes in GC.

In a different vein, the Pegasus 4D time-of-flight (TOF) GC-mass spectrometry (MS) system from Leco concentrates on extracting data from very complex chromatograms. The system uses a comprehensive GC \times GC system with two columns and a thermal modulator in combination with the company's ChromTOF software (see Table V) to deconvolute coeluted peaks and generate pure mass spectra for highly complex samples that could not be resolved completely on a single-column GC-MS system. In one sense, this instrument also is a fast GC system because it delivers large amounts of information in a much shorter time than conventional instrumentation would.

From Arnel and PerkinElmer Instruments, the model 1115 refinery gas analyzer can perform robust analyses of samples that include hydrogen sulfide and hydrocarbons larger than C₆ while complying with various international standards. Based upon the well-known bench-top AutoSystem-XL gas chromatograph, the system can be upgraded easily with options for pressurized liquid sampling, online sampling, and multistream sampling.

The Trace GC gas analyzer from Thermo Finnigan adds a four-valve heated oven and two unheated valves to the company's Trace GC system and valve control from its ChromQuest data system. The analyzer can be configured for typical gas applications such as refinery or natural gas analysis and applications in quality control, semiconductor, and medical areas.

Thermo Finnigan also showed an updated version of its PolarisQ ion-trap GC-MS system, which can include a variable damping gas option for the MS-MS mode that delivers 10-fold greater sensitivity. The entire system is data-system controlled. Additional options include an MSⁿ chemical ionization feature and a probe for solid samples.

Companies Mentioned in This Column

Advanced Chemistry Development,
Toronto, Ontario, Canada
Agilent Technologies Inc., Palo Alto,
California
Alltech Associates, Inc., Deerfield, Illinois
Alpha Omega Technologies, Inc., Brielle,
New Jersey
Antek Instruments, Inc., Houston, Texas
Arnel Inc., Parlin, New Jersey
CDS Analytical, Inc., Oxford, Pennsylvania
DETector Engineering & Technology,
Walnut Creek, California
Gow-Mac Instrument Co., Bethlehem,
Pennsylvania
Infometrix, Inc., Woodinville,
Massachusetts
Labtronics, Guelph, Ontario, Canada
Leco Corp., St. Joseph, Michigan
MicroLiter Analytical Supplies, Inc.,
Suwanee, Georgia
PerkinElmer Instruments, Shelton,
Connecticut
Quadrex Corp., Woodbridge, Connecticut
Restek Corp., Bellefonte, Pennsylvania
Scientific Software, Inc., Pleasanton,
California
Shimadzu Scientific Instruments, Inc.,
Columbia, Maryland
SRI Instruments, Inc., Las Vegas, Nevada
Supelco, Inc., Bellefonte, Pennsylvania
Thermo Finnigan, San Jose, California
Thermo LabSystems Inc., Beverly,
Massachusetts
Varian, Inc., Palo Alto, California

Autosamplers and Injection and Sampling Accessories

In the autosampler and inlet area, companies displayed an array of products ranging from complete automated sampling systems to some interesting inlet accessories (Table II). Two products from CDS Analytical enhance the company's offerings in headspace and sample concentration systems. The model 8000 sample concentrator is a multifunctional device that collects volatile organic compounds from various sources, concentrates them in a trap, and then releases them rapidly for transfer to a gas chromatograph for subsequent separation. It accepts samples with diameters as large as 4 in., as well as pyrolysis and purge-and-trap samples. The company's model 8400 dynamic headspace sampler accommodates four 140-mL sample vessels

at temperatures as high as 300 °C for sequential headspace analysis.

PerkinElmer Instruments displayed the Multiwave 3000 microwave sample digestion system, which includes a U.S. Environmental Protection Agency (EPA) library of sampling, data collection, and calibration functions. The system uses an optional dual thermal-sensor arrangement to ensure accurate temperature profiling and to prevent overheating or boiling.

In conjunction with its updated GC systems, Thermo Finnigan also updated its GC autosamplers with the series 3000 samplers. The AI 3000 autoinjector is an eight-position sampling system that can be controlled integrally by any of the company's GC or GC-MS instrument systems. The AS 3000 autosampler provides a 105-vial capacity in a design that produces no

cross-contamination. The revolving turret mechanism reduces thermal stress on the syringe and engenders simplified sample transfer from vial to syringe to inlet.

In the sampling valve category, SRI Instruments added a 6- or 12-port sampling valve to the optional equipment available for its GC systems. Restek introduced a series of gas-sampling valves that are passivated with the company's Sulfinert deactivation treatment for use with samples that contain low levels of sulfur-containing gases.

Companies also exhibited several gadgets and convenience accessories at Pittcon. Restek makes some new GC inlet tools — an inlet liner removal tool, an inlet liner packing tool, and an inlet fitting rethreading tool — that facilitate routine operation and maintenance. MicroLiter Analytical

Table II: GC Autosamplers and Injection and Sampling Accessories Exhibited at Pittcon

Product	Company	Comments
GC inlet tools	Restek	Three tools that facilitate routine GC inlet operation and maintenance: an inlet-liner removal tool, an inlet-liner packing tool, and a rethreading tool; the inlet-liner removal tool is made from high-temperature silicone and facilitates inlet liner removal and installation; the inlet-liner packing tool consistently positions glass wool inside an inlet liner and promotes more consistent results; the rethreading tool refurbishes damaged or worn threads on inlets and detectors to avoid expensive parts replacement.
MicroLiter limited-volume inserts	MicroLiter Analytical Supplies	Provide a high level of consistent performance; have larger tubing diameters and smaller conical points for less dead volume; useful for applications in which only small sample volumes are available.
Model 8000 sample concentrator	CDS Analytical	Collects volatile organic compounds from solid, liquid, or gaseous samples at temperatures as high as 350 °C; permits dynamic headspace analysis of large samples using vessels with diameters as large as 4 in.; also performs pyrolysis and purge-and-trap sampling; interfaces with a gas chromatograph for subsequent contaminant separation and detection.
Model 8400 four-position dynamic-headspace autosampler	CDS Analytical	Performs sequential analysis of four dynamic-headspace vessels with automatic transfer of trapped analytes to a gas chromatograph; available sample vessels have 36-mm diameters and 140-mL total volumes; the system heats the vessels to temperatures as high as 300 °C.
Multiwave 3000 microwave digestion system	PerkinElmer Instruments	Designed for high-throughput microwave-assisted sample preparation; the system's software includes a method library with EPA procedures and process control, data collection, and calibration functions; features include a dual-temperature sensor design with a remote infrared sensor and immersed sensor options.
Six- or 12-port gas sampling valve	SRI Instruments	This gas sampling valve accessory is electrically actuated in 6- or 12-port configurations for the company's line of gas chromatographs.
AI 3000 autoinjector and AS 3000 autosampler	Thermo Finnigan	The 3000 series sample injector is available in two configurations: the AI 3000 autoinjector and the AS 3000 autosampler; the AI 3000 autoinjector is an eight-position, single-module sampling system that incorporates a plug-and-play concept for integrated control with any of the company's GC or GC-MS instruments; the AS 3000 autosampler is a high-throughput sampling system that has a capacity of 105 samples per tray with zero cross contamination, unobstructed access to the injector, and elimination of complicated vial-transfer procedures; AS 3000 design has a revolving turret that minimizes thermal stress on the syringe and simplifies sample transfer from the vials.
Sulfinert gas sampling valves	Restek	Gas sampling valves coated with the company's proprietary Sulfinert deactivation treatment, which passivates wetted surfaces and enables low parts-per-million by volume analyses of sulfur compounds.
Vespel-ring inlet seals	Restek	Stainless steel seal for Agilent gas chromatographs; incorporates a Vespel ring embedded into its face that forms a leak-free seal between the injector and reducing nut; the soft ring will not harm the critical seal on the bottom of the injector body, and it remains outside the sample flow path; the seals also are available in Silcosteel-coated stainless steel or gold.

Supplies introduced a new line of low-volume autosampler vial inserts with small conical points that have less dead volume than previous designs. Restek also showed a new stainless steel inlet seal for Agilent Technologies' gas chromatographs that has a Vespel ring embedded in its face; according to the company, this ring seals to the bottom of the inlet more reliably than do the standard all-metal seals.

Detectors and Accessories

I didn't observe a lot of activity in the detector area this year (Table III). The two most notable detector product enhancements were from Thermo Finnigan. The company has upgraded its Tempus TOF MS detector with a chemical ionization option that offers automatic switching between electron-impact and positive or

negative chemical ionization. For its Trace MS Plus quadrupole MS detector, Thermo Finnigan upgraded the electronics and data-acquisition systems with a digital signal processor and a universal serial bus (USB) interface that boosts system performance to more than 6000 amu/s for centroided spectra. Various options and accessories also are available for the system.

SRI Instruments showed an interesting reduction gas detector that uses a stable mercuric oxide bead to selectively detect hydrogen and carbon monoxide in the parts-per-billion range. To accompany its extensive line of thermionic and other ionization detectors, DETector Engineering & Technology introduced a constant-current power supply that provides bead-heating current and a range of polarization voltages.

General Accessories

This category is the catchall for items that don't quite fit into a specific area but represent very useful or interesting products. This year all but one of these products addresses various issues surrounding gas supplies (Table IV). Alltech, for example, introduced a unique indicating hydrocarbon trap for GC carrier or combustion gas supplies that gives a warning before the trap becomes saturated. The model 30-200 Gas Saver unit from Gow-Mac is a time-programmable device that automatically reduces gas flow within a gas-delivery system during instrument standby periods to reduce gas consumption while maintaining a minimum gas flow to protect components and to minimize restart times. A new leak detector, the Leak Detective II from Restek, incorporates microchip technology

Table III: GC Detectors and Accessories Exhibited at Pittcon

Product	Company	Comments
Constant-current power supply	DETector Engineering & Technology	Provides heating current and polarization voltages for the ion sources used in GC nitrogen-phosphorus and thermionic detectors; the module is designed to provide a heating current of 0–4 A and polarization voltages of 25, 215, and 245 V.
Reduction gas analyzer	SRI Instruments	The reduction gas analyzer uses a mercuric oxide bead to detect hydrogen and carbon monoxide catalytically in the parts-per-billion range.
Tempus TOF MS detector	Thermo Finnigan	New chemical ionization capability; the system can switch automatically between electron-impact ionization and positive or negative chemical ionization modes; has a dynamic range of five orders of magnitude and spectral acquisition rates as high as 100 full-scale spectra/s.
Trace MS Plus quadrupole MS detector	Thermo Finnigan	Features include improved electronics and a new user interface; instrument control and data acquisition have been upgraded to state-of-the-art digital signal processor and USB systems that can produce scanning rates greater than 6000 amu/s for centroided spectra and a dynamic range in excess of five orders of magnitude; available accessories include a direct insertion probe, a direct chemical injection probe, and a chemical ionization feature.

Table IV: General GC Accessories Exhibited at Pittcon

Product	Company	Comments
AT-Indicating hydrocarbon trap	Alltech Associates	According to the company, this unique indicating hydrocarbon gas trap has a multiadsorbent bed that includes a high-capacity hydrocarbon trap and an indicating bed that changes color from yellow to brown when the trap is nearly exhausted; suitable for GC carrier-gas and other inert gas streams.
Cap Kit	Supelco	Includes one of the company's capillary columns and a selection of high-performance accessories such as inlet liners, septa, ferrules, inlet seals, O-ring seals, and column nuts.
H ₂ -50 hydrogen generator	SRI Instruments	Produces as much as 50 mL/min hydrogen at 30 psig from drinking-quality distilled or tap water; generator will produce its rated flow for 30 h on one filling of 160 mL water; a pair of generators can be grouped together to produce 100 mL/min output.
Leak Detective II leak detector	Restek	This newly designed leak detector uses microchip technology to provide improved sensitivity and response time in a compact unit; includes an autozero feature; responds in less than 2 s to trace gas leaks with an audible alarm and light-emitting diode display.
Model 30-200 Gas Saver device	Gow-Mac Instrument	Automatically reduces the flow of gas within a gas-delivery system for nighttime, weekend, or holiday standby operation; users can program as many as eight separate on-off cycles per week; compatible with noncorrosive gases at pressures as great as 100 psig.
Peak hydrogen generator	Quadrex	Delivers 99.99999% pure hydrogen gas for flame ionization detector, GC carrier gas, and other industrial applications; 200–600 mL/min output flow rates, depending upon the model.

to increase sensitivity and reduce response time and instrument size.

Two companies showed new hydrogen generators. Quadrex had the Peak hydrogen generator, which delivers very-high-purity hydrogen that is suitable for both combustion and carrier-gas applications, in models with flow ranges from 200 to 600 mL/min. The H₂-50 hydrogen generator from SRI Instruments produces as much as 50 mL/min of hydrogen at 30 psig from drinking-quality distilled or tap water.

The Cap Kit from Supelco is a set of accessories sold with the company's capillary columns. These accessories include a selection of inlet liners, septa, ferrules, inlet seals, O-ring seals, and column nuts.

Software and Accessories

The software category continues to be an area of rapid growth. This year, as in previous years, many companies announced enhanced versions of existing software packages for various applications (Table V). Scientific Software's EZChrom Elite, for example, seems to continue to expand and improve. This year's version 2.8.3 includes support of workstation or client-server configurations with control and support for more than 186 instruments and devices. LIMSLink version 3.1 software from Labtronics adds identity challenges through electronic signatures for selected operations, run-time automation for one-click procedure activation from any workstation, enhanced data archiving,

method validation and versioning, and a secure application launcher. Thermo LabSystems' eRecord Manager software stores and retrieves spectral and chromatographic data from more than 150 data formats. The latest version of Pirouette pattern-recognition software from Infometrix provides automatic interpretation of chromatograms using results files or whole profiles with quantitative and qualitative analyses and retention-time drift correction.

Varian showed two new chromatography software products at this year's show. The Galaxie chromatography data system has simple user interfaces and universal instrument control for multiple manufacturers' chromatographs in a client-server configu-

Table V: GC Software and Accessories Exhibited at Pittcon

Product	Company	Comments
ChromaTOF software	Leco	Includes an automated Peak Find algorithm that uses both mass spectral and comprehensive GC × GC information to deconvolute peaks that would be coeluted on a single-column system; provides integrated control of the Agilent 6890 gas chromatograph, the GC × GC thermal modulator, and the company's Pegasus III TOF MS system.
ChromManager software	Advanced Chemistry Development	Software has an applications database with more than 2900 separations; users can store chromatograms and search them by structure, substructure, chromatographic parameter, and user-defined data.
DACS chromatography data-handling software	Gow-Mac Instrument	PC-based chromatography data software designed for student chromatographers to use with minimal effort; students can create methods, design custom reports, view calibration curves, and acquire and process data; includes an external 12-bit analog-to-digital interface; runs under Microsoft Windows 98 (2nd ed.), NT, XP, or 2000 operating systems.
eRecord Manager data-management and archiving software	Thermo LabSystems	Oracle-based data-management and archiving program is designed to store spectral and chromatographic data from more than 150 data formats; supported on Microsoft Windows 2000, NT4, and 98; 21 CFR Part 11 compliant.
EZChrom Elite Enterprise data system version 2.8.3	Scientific Software	Newest version of EZChrom software is a scalable enterprise data system that supports workstation or full client-server configurations; can control many types of chromatographic instruments from major manufacturers with support for more than 186 types of GC, high performance liquid chromatography, photodiode-array, and capillary electrophoresis modules; includes 21 CFR Part 11 compliance tools; the company's SmartSequence technology enables automated response to one or more suitability or performance criteria.
Galaxie chromatography data system	Varian	Client-server based data system that provides simple user interfaces and universal instrument control for multiple manufacturers' GC and liquid chromatography instruments; 21 CFR Part 11 compliant; allows network users to initiate sample sequences, control instruments, monitor acquisitions, and review results from any location on a network; uses the compact Star 800 Module Interface Box to replace multiple PC workstations.
LIMSLink version 3.1 software	Labtronics	New features include identity challenges through electronic signatures for selected operations, run-time automation for one-click procedure activation from any workstation, enhanced data archiving, method validation and versioning, and a secure application launcher.
Matchcompare software	Varian	Peak-matching and comparison plug-in component for the company's Galaxie chromatography data-handling software; identifies similar chromatographic peaks between two chromatograms and compares areas against predetermined ranges; can handle peak distortion, scaling, column aging, and changes in experimental conditions with a single reference chromatogram.
Model 302 USB data system	SRI Instruments	Connects with a PC running under Windows 98, ME, 2000, or XP with a USB cable and provides plug-and-play capabilities; can acquire results from as many as six data channels at rates as high as 50 Hz per channel; has four individual time bases to control as many as four gas or liquid chromatographs; includes the most recent version of PeakSimple data-handling software.
Pirouette version 3.02 software	Infometrix	Performs automatic interpretation of chromatograms by interpreting results files or whole profiles; performs both quantitative and qualitative analyses and corrects for retention-time drift; compatible with most data-handling systems; runs under Windows 2000, NT, or 98; can be operated as a stand-alone application or can process data automatically as part of a method.

ration. It is *21 CFR Part 11* compliant and allows network users to initiate sample sequences, control instruments, monitor acquisitions, and review results from any location on a network. The system uses the compact Star 800 Module Interface Box to replace multiple PC workstations. The other Varian software product is Matchcompare, a peak-matching and comparison plug-in component for the Galaxie chromatography data-handling software. Matchcompare identifies similar chromatographic peaks between two chromatograms and compares areas against predetermined ranges. It can handle peak distortion, scaling, column aging, and changes in experimental conditions with a single reference chromatogram.

The new version of Leco's ChromaTOF software accommodates comprehensive GC \times GC data from the company's Pegasus III TOF MS system, and it provides integrated control of the Agilent 6890 gas chromatograph. An automated Peak Find algorithm uses both mass spectral and comprehensive GC \times GC information to deconvolute otherwise difficult-to-resolve peaks.

Ease-of-use can be an issue when chromatographers who have only a few instruments don't need a high-end data system. Gow-Mac introduced a simplified chromatography data-handling system named DACS, which is designed for student chromatographers to use with minimal effort. Students can create methods, design custom reports, view calibration curves, and acquire and process data. SRI Instruments showed the model 302 USB data system, which connects to a PC with a USB interface and provides as many as six data channels at 50 Hz per channel. The system uses SRI's PeakSimple data-handling software. ChromManager software from Advanced Chemistry Development has an applications database with more than 2900 separations. Users can store chromatograms and search them by structure, substructure, chromatographic parameter, and user-defined data.

Conclusion

Once again, Pittcon has proven to be a major event in the GC world. If the conference's significance to gas chromatographers can be measured by the number of

new or improved product introductions, then this year's conference with a total of 40 items compares favorably with last year, which had 44 product introductions. Of course, these statistics completely ignore the multiplicity of existing products — which unfortunately must be omitted simply because of the limited number of pages available — shown at the conference, and they give no credit to the many authors who presented papers and posters. However, it is clear to me that GC continues to play a major role in analytical laboratories and in the field and that important new developments gradually will gain acceptance.

The trend toward performing faster GC with easier-to-use instruments and software and reducing data to understandable reports, while maintaining the ability to look at those data in different ways, continues. This year brought new levels of understanding and capability in high-speed and comprehensive GC, and these relatively new developments moved closer to general acceptance. The simplification of chromatographic user interfaces continues, and more sophisticated postanalysis tools continue to become available.

I expect these trends to continue next year in Orlando, and, who knows, maybe something truly revolutionary will appear.

References

- (1) R.E. Majors, *LCGC* **20**(3), 248–266 (2002).
- (2) R.E. Majors, *LCGC* **20**(4), 332–344 (2002).

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For an ongoing discussion of GC issues with John Hinshaw and other chromatographers, visit the Chromatography Forum discussion group at <http://www.chromforum.com>.

