

INSTRUMENT BUSINESS OUTLOOK

Strategic Information for the Analytical Instrument Industry

1997 IBO Industrial Design Award Winners

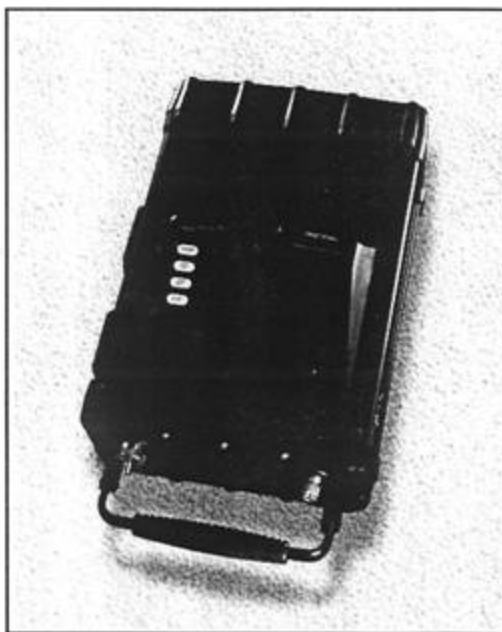
The Voyager, a portable gas chromatograph produced by PE-Photovac, is the Gold Award winner in the fourth annual IBO Design Awards for excellence in industrial design of analytical instruments. The Silver Award goes to the Mariner ESI-TOF from PerSeptive, and another TOF, the DYNAMO MALDI-TOF from Thermo BioAnalysis takes the Bronze Award.

To be eligible an instrument had to have begun shipping between August 1, 1996 and July 31, 1997. IBO sends representatives to numerous industry trade shows and looks at hundreds of new instruments to choose the products from which the final award winners are selected. IBO considers overall esthetics, ergonomics and how the instrument fits into and enhances the work area for which it is designed. Extra consideration is given to designs that overcome difficult design problems and depart from the typical pattern of instrument design in ways that show a company has brought an innovative spirit to the design process. IBO does not test the operational capabilities of these instruments and nothing in these awards should be considered an endorsement of their technical performance.

The Voyager is a good example of meeting these criteria. The look of the instrument, in its black plastic shell with red accents and stripes around it, is striking and not at all like one would expect a GC system to look. But the Voyager is not just another pretty face. It is the total approach to product design that

makes the Voyager stand out.

Mark Collins, product manager for the Voyager, told IBO that the design team began with a "quality function deployment model" to define very clearly what it was customers needed from the



PE-Photovac Voyager Gas Chromatograph

instrument. In this case, the product was to be a GC used primarily for accurate analysis of on-site health and environmental hazards. The company worked with customer focus groups to rank the desired features by priority. While this sort of market research has become fairly common, PE-Photovac designers went further. Design team members went to an actual hazard site, put on the layers of protective gear re-

quired and tested firsthand the limitations users of the system would face.

The research showed they needed to build a system with an extreme range of features. It had to be rugged enough to withstand extremely harsh conditions and rough use, light enough for a small woman to operate in the field but with controls that a large man wearing two pairs of gloves could easily work. It needed to be flexible enough to go up ladders, into confined spaces or anywhere else a hazard might exist. It had to be simple enough for workers with virtually no scientific education to operate, yet sophisticated enough to give Ph.D. chemists confidence that they know exactly what hazards they are dealing with. Finally, it had to go into the field under hazardous conditions, with the assurance that it would be intrinsically safe—i.e. nothing in the system would create a spark that could ignite flammable gases.

A tall order to say the least. According to Mark Bassett, a senior instrument designer at PE-Photovac

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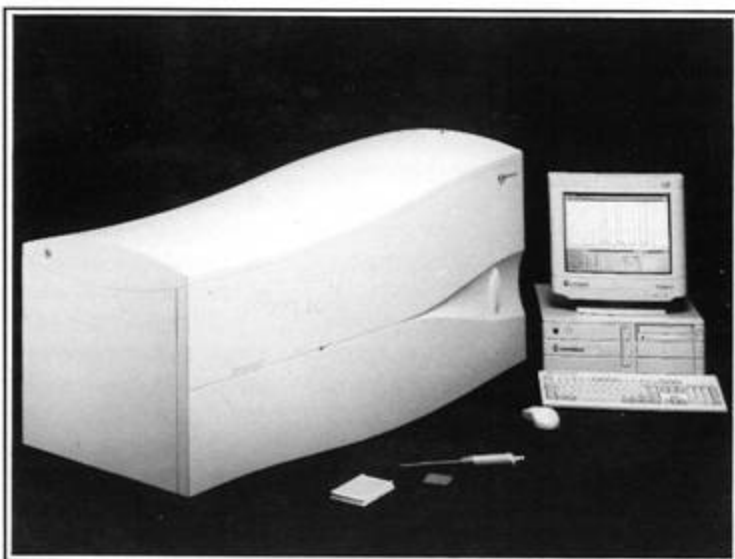
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who worked on the Voyager, the company had to develop several innovative technological solutions to create the smallest and most flexible GC in the world. Among these are a valve engine with twice the complexity of ordinary GCs and a miniaturized gas supply with extremely low flow rates. Much of the micro machining was done in-house because suppliers couldn't make small enough parts. To achieve intrinsic safety the system is built without ferrous materials and the electrical system uses four circuits of several low-power batteries to ensure voltages stay low enough to avoid sparks. The system also had to pass a durability test of being dropped six times from a height of one meter.

For flexibility, this GC, weighing only fifteen pounds, can be carried by a handle or a harness that can hang the system on the users' back, front or side. A six-foot long telescoping probe allows it to take samples in hard to reach places, and the Voyager can also be placed on the ground even in the worst weather, according to the makers. Mr. Collins says the simple controls and software allow workers with minimal training to gather samples in the field, then download the data onto a PC to render full chromatographs for analysis by chemists. The photograph with this article gives a general idea of the look of the system, but the product literature, showing the Voyager in a variety of work situations, gives a much clearer view of the design's simplicity and flexibility. Hopefully PE-Photovac will put some of these pictures on the Voyager's web page so more people can get an idea of the real strength of the design.

When it introduced the Mariner, PerSeptive Biosystems put the first benchtop EIS-TOF into the market. According to Steve Martin, a member of the Mariner design team, the company already had an ESI-TOF in alpha versions for some three years before the Mariner's introduction, but the alpha systems were much larger. Mr. Martin told *IBO* that to create the Mariner, PerSeptive designers began with the dimensions of the average chemists workbench and the idea that they would create a high performance mass selective detector to work alongside HPLC and CE systems.

With a general idea of the image and ergonomics they wanted for the system, PerSeptive hired Product Insight, a design firm, to create the look. The designers came up with



The DYNAMO MALDI by Thermo BioAnalysis

four different possible configurations. In addition to making a pleasing shell, the curved face of the system and the two-tone color scheme of the design that was chosen serve a double purpose. First they create a slight optical illusion that makes the system appear even smaller than it actually is. Secondly, they echo the look of other products in the PerSeptive line.

On the inside of the Mariner, the company had to do some engineering to make the benchtop concept work. To reduce the size of the TOF without seriously diminishing the analytical power of the system, engineers used a reflectron to double the length of the flight tube. They also had to work closely with the designers of the exterior to make sure housings for interface points would be sturdy and allow for firm interfaces that would not damage the instrument. Features such as a top plate that can accommodate a syringe pump were included to increase the flexibility and accommodate the ways chemists like to work.

In creating the DYNAMO MALDI-TOF, Thermo BioAnalysis built on the pioneering wave-like designs of its sister company, Finnigan, which created the GCQ and the LCQ, both of which won *IBO* Gold Awards for design in previous years. The DYNAMO takes the wave motif one step further, and creates a veritable sculpture with almost no visible external markings to interrupt the smooth, flowing surface of the instrument. With its lines that look as if they came more from nature than a drafting table, one could argue that scientists, particularly the biologists who are the prime users of MALDI, should be readily attracted to such an organic form, and the company has reportedly had very positive response to the design.

Designers at Thermo BioAnalysis knew they wanted something similar to the lines of the LCQ, and hired design firm Ideo to be involved with the project from the earliest stages. The designers, although they were unfamiliar with the instrument, created sketches for the exterior. Then Thermo BioAnalysis engineers worked with the designers to marry the shell with the technology inside. Mr. Cottrell reports there were very few compromises necessary and the final product looks very



PerSeptive's Mariner Biospectrometry Workstation

much like the designers' early sketches.

Since the DYNAMO is often sold with the LCQ, the two make a matched set. This is true of the Mariner as well, which is designed to match other PerSeptive products. There is a perception—not unjustified—that instruments interface more successfully when they come from a common maker. By making instruments look as though they belong together, that perception could be reinforced and brand loyalty increased. The success of such marketing techniques may be hard to quantify, but they are certainly not without precedent.

The design award selection process is always somewhat agonizing, since in the family of analytical instruments there is such a range that comparing the designs of instruments based on different technologies and with different purposes is extremely difficult. Because of this, *IBO* is awarding honorable mentions to four instruments showing outstanding design in addition to the three award winners.

The honorable mentions go to the P/ACE System MDQ automated CE system from Beckman, the Phoenix 8000 UV-Persulfate TOC analyzer from Tekmar-Dohrmann, the PFX190 Electronic Tintometer from Lovibond, and the PCR Express from the Hybaid subsidiary of Thermo BioAnalysis.

The P/ACE System MDQ is notable for its enclosed operations, good ergonomics and handsome overall appeal. The Phoenix 8000 is an innovative departure in instrument design with a clear front shell from which a blue glow emanates, giving it the look of a science fiction movie prop. The PFX190 combines simple elegance with an excellent subdued use of color and clear, simple layout of controls. The PCR Express advertises itself with a photograph of a bobsled, which it resembles with sleek lines and bright colors.

This is an industry that is beginning to pay more attention to design but it still lags behind similar industries. Anyone doubting this can look at the designs of clinical instruments and compare them to similar analytical products. It will be readily clear that analytical systems, on average, are much more likely to be gray boxes with little or no attention paid to design. It appears, however, that industry executives have realized this and are devoting more attention to creating products that not only work well technically, but are easy to use and pleasant to have in one's work environment.

Last fall *IBO* conducted a survey which indicated that instrument companies are paying much more attention to design issues now than they did a few years ago. Of executives responding to the survey, 69% said design was a more important factor in creating instruments for their companies than it was five years earlier. Even more, 80%, said their companies had increased emphasis on design, and 21% indicated that the increase in attention to design was substantial.

As industrial design gets more attention one trend emerging in instrument design is a movement away from boxes and toward curved lines, pioneered by companies like Finnigan, but now visible in a wide array of new instruments such as Bio-Tek's new microplate reader and new Dionex products. Micromass, while its systems tend to be basic boxes, has made them much more attractive with interesting use of colors and the company's hummingbird logo. And the list could go on much further. Clearly companies in the analytical instruments industry are making efforts to compete in every way possible, including the sometimes neglected discipline of industrial design. ➤

Random Samples

BioSeptra S.A., a French subsidiary of BioSeptra, **British Biotech**, **Oxford Asymmetry**, and **Upfront Chromatography** formed a consortium to develop purification technology to simplify biopharmaceutical production. BioSeptra will coordinate the consortium. The European Community's **Eureka** Organization and the ministries of research of France, UK, and Denmark will fund 50% of the research budget, about \$8.25 million, for the next 42 months...**Amersham International** and **Pharmacia & Upjohn** completed their previously announced merger of their subsidiaries **Amersham Life Science** and **Pharmacia Biotech** into **Amersham Pharmacia Biotech Limited** (see *IBO* vol 6, no 5, page 2)...**AMETEK** acquired **Frode Pedersen and Company**, a Danish manufacturer of hand-held test equipment and temperature sensors and transmitters, which will be aligned with **AMETEK Denmark A/S**. The company also completed its previously announced merger of its water filtration business with **Culligan Water Company** (see *IBO*, vol 6, no 6)...**Santa Barbara Research Center** has introduced an unmanned version of its Smog Dog system, a remote emissions sensor housed in a roadside utility enclosure...A US Court of Appeals reaffirmed the judgement that **Tekmar-Dohrmann** does not infringe on a patent of **OI Corporation**...**Industrial Scientific Corporation** and **Heilongjiang Sensor Technology Group Enterprise Ltd.** signed a contract establishing a 50/50 equity joint venture company, which will be called **GEG Industrial Scientific Ltd.** and import gas monitoring products made by Industrial Scientific into China for sell in the domestic market...**ThermoSpectra** has acquired **Sierra Research and Technology**, manufacturer of systems for the repair of printed circuit boards that will complement the company's Nicolet Imaging Systems...**Hyseq**, developer of gene-based therapeutic product candidates and diagnostic products and tests, completed its IPO of 3 million shares of common stock at \$14 per share...Reorganizing, **Conductus** will sell product rights and associated assets of its NMR spectroscopy probe business to **Bruker Instruments**. Consolidating its magnetic sensor-based instrument business, Conductus will also seek purchasers for several of its laboratory instrumentation and custom system product lines...**Chiron Diagnostics**, a business unit of **Chiron Corporation**, announced FDA's clearance of its premarket notification for its ACS: Centaur Chemiluminescent Immunoassay System. Chiron plans to launch the instrument in late 1997 and hopes it will "increase the overall productivity of the laboratory by providing fast reliable diagnostic information while minimizing operator's hands-on-time"...**International Remote Imaging Systems** has signed a memorandum of understanding with **TOA Medical Electronics**, a Japanese company, to distribute Sysmex UF-100, TOA's new urine cell counter, to the North American market. The system will provide an alternative to the IRIS family of imaging-based urinalysis workstations for certain laboratories...**Reuter Manufacturing** and **Hill Bioscience** have entered into an agreement to produce a family of laboratory micro-centrifuges for the medical research market. Reuter will develop and manufacture the products, and Hill Bioscience will sell and market them to medical schools and the pharmaceutical industry...