# MEASURE

Hey, we're
shrinking
the computer!

Life as we know it changed forever exactly one year ago. Hewlett-Packard—solid, stable, some say stuffy—suddenly turned radical.

The news began as an organizational announcement in March 1999 and continues today like waves routinely smacking the shore: Break up the company. Spin off the very roots of HP's business. Announce the CEO's retirement. Hire a new CEO (not a 50-year-old guy with two engineering degrees, but a 45-year-old woman with a degree in medieval history). Launch an extensive image advertising campaign. Change the company logo. Watch the stock soar to record levels. Reinvent the whole company.

Stuffy? Hardly. For the past year we've been as predictable as a slot machine.

*MEASURE* has gone through its own crapshoot. In the May–June edition, we announced that the print version of the magazine would end in November '99. In the July–August edition, we said that print would extend through May–June of 2000. By November–December, we posed the possibility that a new print magazine might replace *MEASURE* when it stops publishing after a commemorative May–June edition.

Now, I'm delighted to announce that print definitely will continue in July. The new magazine taking *MEASURE*'s place will be called *Invent*. You don't have to be a game-show-winning millionaire to guess how we arrived at that name. It's the perfect choice, given the organization's current effort to "brand" HP as the epitome of an inventive company.

We're in the thick of redesigning and reinventing the print magazine, so I can't tell you exactly what it's going to look like or contain. In stride with other changes, we plan to keep the best of *MEASURE* and reinvent the rest.

Which reminds me: The ultimate credit for keeping a print magazine goes to President and CEO Carly Fiorina. At a time when some HP communications professionals were advocating killing print and moving to Web-only vehicles, Carly talked about the "power of print" and its ability to convey some messages better than any other medium can. She believes that, even in the Internet Age, there's a need for both electronic and print communications.

I agree.

So, I hope you enjoy this last regular edition of *MEASURE*, as well as the special historical issue in May. Then in July, HP employees can look for the first edition of *Invent*. Agilent employees will see the debut of their new worldwide print publication in the third quarter.

Whew! If you like change, you've come to the right place. The past year may not have been very predictable, but it's seldom been boring. Stay tuned.

—Jay Coleman
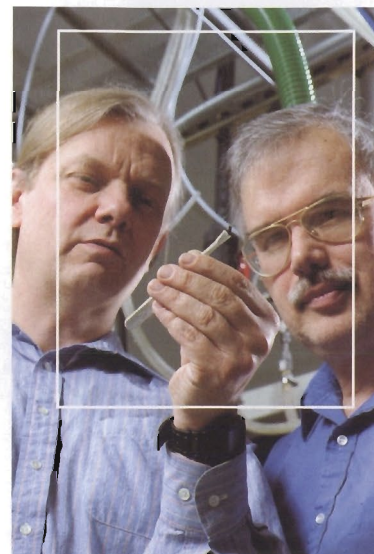
**On the cover:** HP Labs' Senior Principal Laboratory Scientist Dr. Stan Williams (left), and Computer Architect Phil Kuekes examine a slice of silicon. The slice contains wires only 10 atoms wide that have been grown by a team of HP Labs scientists using a chemical process. Such "nanowires" in an electronic circuit could yield a workstation chip the size of a speck of dust. Story begins on page 4.

**Cover photo by Anne Knudsen.**

# THE INSIDE STORIES
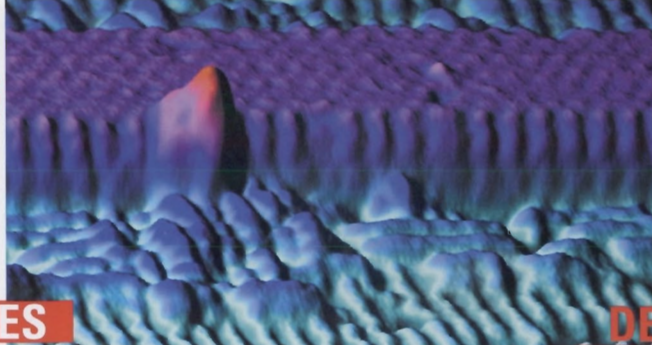
What appears to be an unusual mountain range is actually one of the first images of atoms that have been "grown" to form a wire (purple plateau running left to right). This heralds a new age of miniaturization.

Judy Quinn, HP Operations Bridge Level One Server manager, with Greg Young, Operations Bridge manager, help keep Ford moving.

Page 10

Page 24

Page 30

## MEASURE

*Agilent Technologies*
Innovating the HP Way

Selected articles from this and past editions of *MEASURE* are available on hpNOW at http://hpnow.hp.com/.

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*MEASURE* magazine is printed on recycled paper with vegetable-based inks.

Standing by the vacuum system used to grow and image various types of nanoscale objects, HP Labs researchers Phil Kuekes (left) and Dr. Stan Williams examine the chamber in which the structures are grown. The smaller chamber to the right (which looks like an old-style diving helmet) contains the scanning tunneling microscope used to obtain atomic resolution pictures of the objects.

# Making miracles, little by little

## Progress in the tiny world of nanotechnology could launch quantum advances in computing.

*By Karen O'Leary*
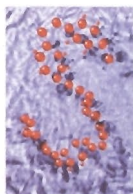
cientists at Hewlett-Packard Labs have garnered world-wide attention for their expedition into the new frontier of molecular technology—likely the foundation for the computer industry of the next century.

Dr. Stan Williams, director of the Quantum Structures Research Initiative (QSRI), and Phil Kuekes, a physicist and computer architect at HP Labs, along with colleagues from UCLA, are developing atom-sized wires and switches—the essential building blocks of computers—that could lead to machines that are a billion times more efficient than they are now.

The HP-UCLA team essentially is attempting to "grow" computers chemically, creating wires and switches that assemble themselves molecule by molecule. The chemically based components are mere billionths of a meter or "nanometers" wide in size. If the team's efforts are successful, the scientists believe the computational power of 100 workstations will be able to fit on a platform the size of a grain of sand.

At the threshold of nanotechnology —the process of manipulating matter at the scale of atoms or molecules to create new things—the HP-UCLA team believes it is working with a technology that could develop vastly more powerful computers at a fraction of the cost of silicon-based machines. The key is to create huge numbers of wires and switches together that will assemble themselves in a useful electronic circuit, rather than try to place each component in a precise location.

Nanocomputers could become so easy and cheap to make that they will be embedded in every man-made object.

The movie *Fantastic Voyage* conjures images of orange juice that contains cell-repairing nanorobots as the remedy for cancer; a "gnat" that lands on a person's lapel serving as surveillance equipment; and automobiles built from precisely arranged carbon atoms that will have the strength and lightness of a diamond at a fraction of the cost of metal and plastics.

Still in embryonic stages, nanotechnology was conceived in 1959 by Nobel laureate Richard Feynman, a physicist from CalTech, who posed the question, "What would happen if

ANNE KNUDSEN
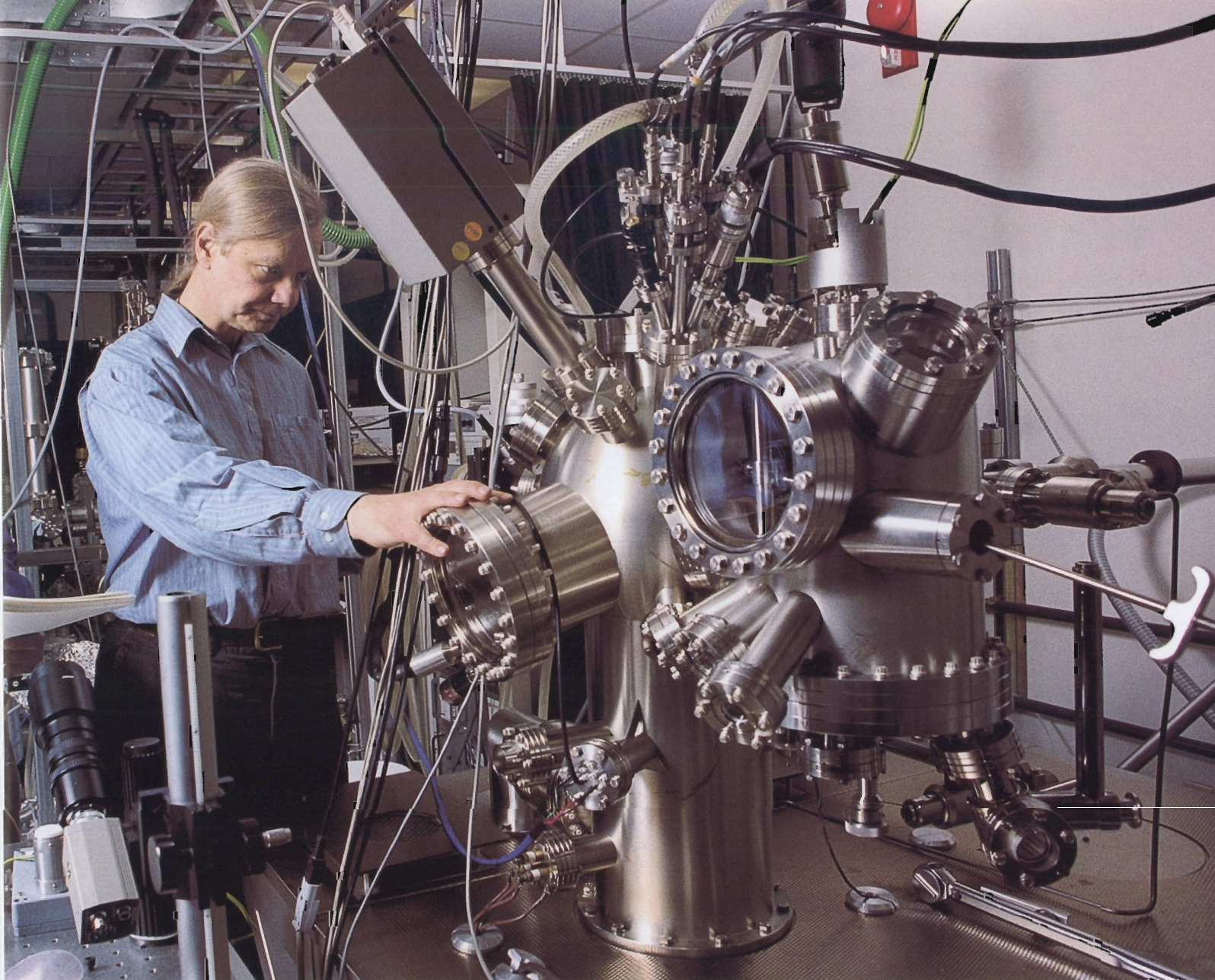
we could arrange atoms, one by one, the way we needed?"

"When I came to HP to start a group in nanoscale science, the first thing I tried to do was climb a tall tree and scout out the landscape," Stan says. "HP and Agilent are companies that are about information—gathering it, storing it, processing it and displaying it in a way that makes it useful.

"I wanted to understand the physical laws of information better," he adds. "Richard Feynman said that it's

*"What would happen if we could arrange atoms, one by one, the way we needed?"*

physically possible, according to the laws of relativity and thermodynamics, to compute a billion times more efficiently than the most advanced technology can now. That's a powerful thing to think about."

Though Stan recognized that it was physically possible to create vastly higher-performing computers, it was clear that the technology based on silicon was beginning to hit its limitations.

"There's been a lot of discussion in the newspapers lately that we're coming close to the end of silicon technology," he says. "We're almost to the point where silicon will not be able to

improve exponentially as time goes on. I put the year at 2010."

There are a lot of reasons for that, Stan adds. Things are getting so small that everything is more difficult. You have to exclude smaller and smaller dust particles, for example. And it's getting incredibly expensive.

But the computer revolution is based on the fact that computers have been getting exponentially more powerful on a regular, predictable basis.

"I started designing computers in the 1970s that did millions of operations per second," says Phil Kuekes. "In the '80s, I built machines that did

# Miracles

MADWORKS CONCEPT IMAGES

A. Stretch & flatten switch

B. Straighten & twist switch

## Little by little

There are several different mechanisms by which molecules can act as electronic switches for use in nanocircuits:

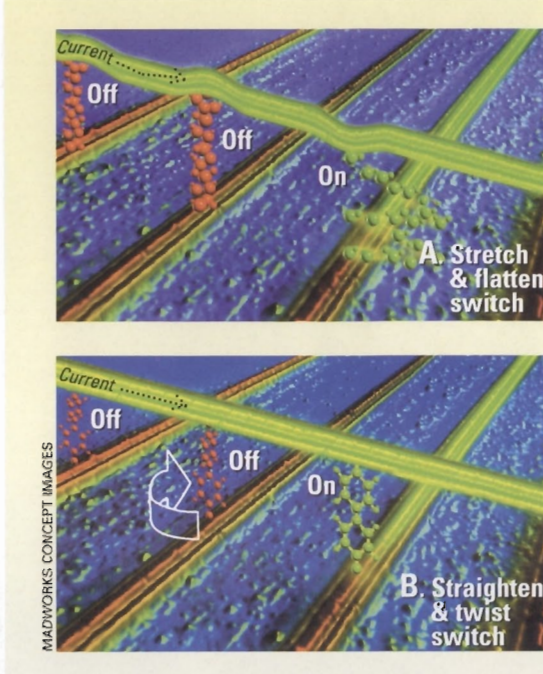**Figure A** illustrates how an interconnected molecule can switch on and allow current to flow from an overhead wire to lower wires. The molecule folds to pull the wires closer together and then switches off by stretching to push the wires apart.

**Figure B** illustrates how an interconnected molecule can switch on and switch off by rotating one of its components to be perpendicular to the other.

Scientists activate a switch by applying a voltage across the two wires holding the molecules. Smaller voltages are used for reading the state of the switch (low current is off, high current is on).

billions of operations per second; and in the '90s, I was involved with the Teramac machine, which did a trillion. Mega ops, giga ops and tera ops. But how do you keep up that kind of growth?"

Early in the 1960s, Gordon Moore, the co-founder of Intel, predicted that the number of transistors that could be incorporated onto a single integrated circuit chip would increase exponentially over time. His prediction held and came to be known as "Moore's Law."

Challenged by the limitations of silicon, Stan and his team set out to build systems with the size and density that could lead to an era of quantum mechanical computation that is a billion times what we have now.

"It would take us far beyond what silicon can do," Stan says. "It would allow us to continue the Moore's Law of continual improvement in computing technology for at least another 50

years. Our best Pentiums (chips) are no more than an abacus compared to what people will have in a few decades' time," Stan adds.

The now-world-famous collaboration began in a casual, inauspicious way.

"I wandered down to see Stan about three years ago, knocked on the walls of his cubicle and introduced myself," Phil says. "I had been thinking about the limitations of computing and I knew Stan was working on the scale of things. We had some of the same concerns."

At the same time, Jim Heath, a chemistry professor from UCLA, was working with Stan in the lab.

With a common desire to perpetuate the exponential growth of computing power, the three-person team began to put in time after hours to discuss the issues from each of their areas of expertise—physics, chemistry and computer architecture.

"After Jim was finished in the lab, Phil would come up from the 1501 Page Mill Road site (in Palo Alto) and we would either sit in one of the
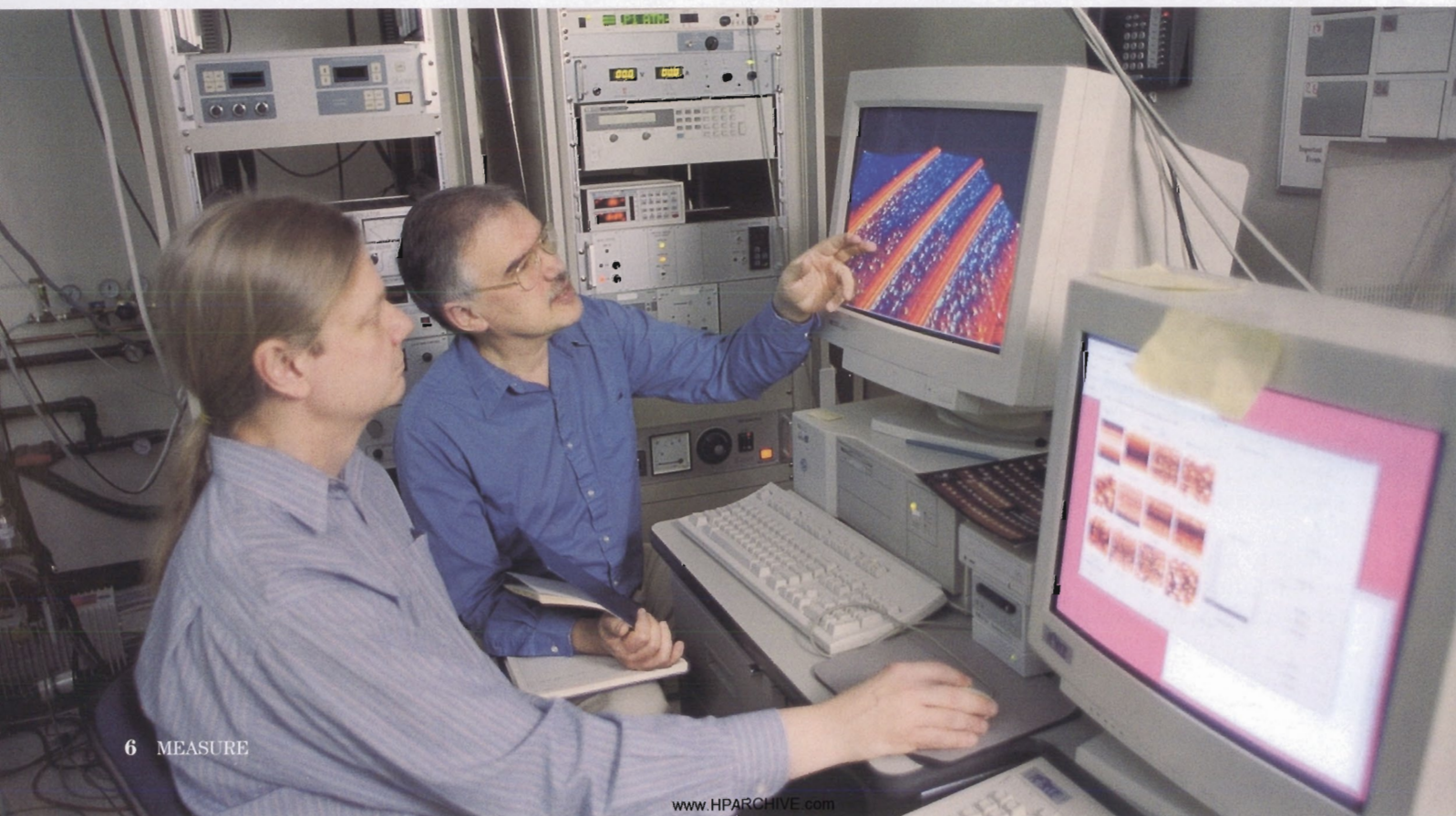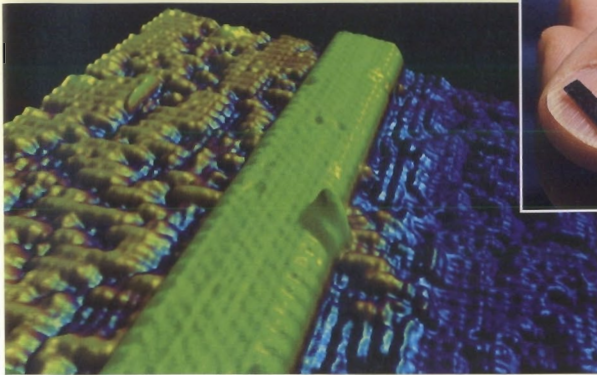
On Phil Kuekes' thumb sits an unassumingly small chip of silicon that has more than 1 mile (2 kilometers) of wire. Since the 8- to 10-atoms-wide wire is too small to photograph—the wires are smaller than $1/1000$ the wavelength of light—a special scanning tunneling microscope senses the presence of atoms that a computer ultimately makes into a color-enhanced image.

The ratio of the size of one atom to Phil's thumbnail is about the same as comparing his thumbnail to the island of Hawaii.

This image is of such a small area on a silicon substrate that actual atoms are visible as fuzzy bumps. The wire is made by chemicals that assemble themselves in a straight line, 8 to 10 atoms wide, across the silicon.

The small spike sticking up from the wire is an imperfection that could make the equivalent of a diode in the wire. In other words, controlling the formation of the wire can result in the creation of circuit components at the atomic level.

ANNE KNUDSEN PHOTOS

coffee rooms here or we would go out for pizza and beer and we would just talk. This went on periodically for almost 18 months."

An "ah-hah" moment occurred for the team when Phil told them he had a computer design that could be imperfect and still work.

"What interested Stan the most was the Teramac's defect tolerance," says Phil, who had been the project manager of the 400-pound, multi-architecture computer that contained 220,000 defects yet still operated perfectly.

The Teramac, it turned out, provided the HP-UCLA team with the groundbreaking insight that there existed a computer architecture that was both high-performing and defect tolerant— just what they needed to work in the realm of chemically based components.

"In a standard computer, any one of the Teramac's 220,000 defects would have killed it," Stan says.

Phil Kuekes (right) indicates the remarkable, colored topographic detail revealed in the image of the three rows of wires—8 to 10 atoms wide—grown in HP Labs' vacuum chamber. The image reveals order and imperfection at the atomic level. Stan Williams displays the labs' custom-software image derived from the raw-data images seen on the right monitor.

But its defect-tolerant architecture outperformed today's best high-end workstations by 100 to 1 in some applications, proving that defect tolerance—rather than the absence of defects—can provide the architecture for a powerful and reliable machine.

"Jim and I understood very well that it was impossible using chemical means to make something perfect," Stan says. "It can't be done. That was the thing that was holding people back from all this."

Computers made of silicon are complicated and must be perfect, while anything made chemically is simple and inevitably has defects.

"At that point, Jim Heath came to me and said, 'This is the most valuable course I've ever taken,'" Stan says. "It was the idea that these discussions were a class and that Phil was somehow the professor of the class. We decided we had to write a term paper just to make sure we really understood it."

Once the paper was written, Jim mentioned it casually to an editor at the journal *Science*.

"To our absolute horror, the editor sent it out for review to three computer scientists," Stan reports. "Then to our shock, we got back three critical but encouraging reviews. We were still in the exploring and playing mode and these three people took it all very, very seriously.

"After rewriting it for publication," Stan adds, "we sent it back, the three reviewers took another look, they loved it and—boom—it got published."

One of the results that the published paper generated was interest at the Pentagon.

"The people at DARPA (the Defense Advanced Research Projects Agency) essentially threw the gauntlet at our feet and challenged us to build a 16-bit memory that would fit inside a square that's 100 nanometers on a side," Stan says. "And they wanted us to do that in two years." That's currently one of their endeavors. In the process of writing the DARPA proposal, they developed six other technologies for which they have submitted patent applications.

Asked if the constant demands of the press have inhibited their ability to make progress, Phil says, "On the contrary. We potentially have a very interesting new technology and we alone are not remotely going to think of all the applications.

*"We're looking at possible creative collaborations with people who can do things with molecular electronics that we haven't even imagined."*

"When combined with other people's creativity, it's a technology that will become much more powerful. We're looking at possible creative collaborations with people who can do things with molecular electronics that we haven't even imagined. There's a lot of creativity out there, so it's important to get the word out."

"Are we at a pinnacle in computing or are we still at the beginning, at the bottom of the mountain?" Stan asks. "My own view is that we're at the beginning. As cool as we think everything has been in the 20th century, we haven't seen anything yet." **M**

*(Karen O'Leary is a freelance writer based in Palo Alto, California.— Editor)*

# Heeding the call to action

How can we improve customer loyalty? Here's how one HP organization made an impressive turnaround.

*By Peggy Waldman*

What a difference a year makes. In 1998, too many of HP's North American system-support customers were frustrated. They felt that HP no longer lived up to its promises. Employees added that organizational barriers kept them from meeting customer needs.

Today, HP's Customer Service and Support Americas (CSSA) organization faces a much rosier picture. While still not back to the sunshine days of the early 1990s—when HP stood head and shoulders above its competitors as best-in-class service provider—the group has come a long way during the past year.

Customer loyalty—measured by customers who are very satisfied with HP and would definitely recommend and repurchase its products— jumped from 28 percent in 1998 to 41 percent in '99, according to a blind survey of HP's North American systems customers by independent consultants. And most HP employees believe that customer service is improving, and management is doing what needs to be done, according to a recent Web survey.

"Customer loyalty survey results in 1998 were our call to action, and we've made a fantastic turnaround," says Bob Floyd, interim general manager of CSSA, which spans 7,000 people in the United States, Canada and Latin America.

Recently, the customer loyalty gap between HP and some of its closest competitors—IBM and Sun Microsystems—has closed dramatically.

"Today, HP faces extraordinary pressure to maintain profit margins, while keeping costs competitive," Bob says. "As products become less differentiated, customer loyalty depends more on delivering flawless customer service and building solid personal relationships."

In February 1999, CSSA set up a Web site for employees to identify barriers to customer loyalty. Management analyzed the results and CSSA launched an initiative to make HP clearly No. 1 in customer loyalty again. "As our CSSA vision states, 'In the new millennium, we want the industry to rate HP first in customer loyalty year after year,' " Bob says.

To redefine the customer service organization's vision and values, CSSA introduced the HP Services Standard. Then, to make the standard attainable, management laid out a strategy to break down internal barriers to customer satisfaction. "Both IBM and Sun had made system investments that we hadn't, and Sun had done a much better job of managing customer relationships," Bob says.

In 1999, a CSSA Customer Loyalty Initiative went a long way toward eliminating the production metrics and lack of empowerment that employees targeted as top barriers to meeting the HP Services Standard. Before, HP evaluated call agents based

**Mike Deluca, district customer engineering manager for HP in Edmonton, Alberta, Canada, discusses customer loyalty issues with Peter van Naarden, LaserJet Systems Group marketing director.**

Feeding and nurturing good customer relationships sometimes extends through the dinner hour, as this scene in Edmonton, Alberta, Canada, illustrates. The dinner provided a face-to-face meeting with Dave and Val Trufen (far right), owners and managers of Printer World International, one of HP's top resellers and support providers. Attendees included (from left), Craig Slavin, chairman of Franchise Architects, an HP consultant company; Brian Pietrzyk, customer service manager for consumer, PC and peripheral products—Canada; Barry McDonald, vice president and general manager for HP's Customer Support—Canada; and Peter van Naarden, marketing director for HP's LaserJet Systems Group.

DAVID FOLEY PHOTOS

*"As products become less differentiated, customer loyalty depends more on delivering flawless customer service and building solid personal relationships."*

on how many calls they handled and the length of each call. Now, CSSA makes measurements on a group basis, and agents spend more time with customers.

A fall '99 survey showed that employees felt significantly more empowered. As a result, people went the extra mile for customers.

Sometimes that meant making small, spontaneous gestures. Tony Lipari delivered pizza to a hungry New York customer getting his internal tape drive replaced.

Other times, CSSA launched highly orchestrated crisis offensives. After a fire damaged computers at United Airlines' World Operations Control Center, HP troops rallied to install hundreds of new UNIX® workstations, PCs and servers within 72 hours.

Solution Center Manager Craig Parker says that now more issues are resolved with only one customer call. During the past year, Parker's group added employees so call volumes no longer outrun staffing levels, enhanced systems to give customers faster answers and put more technical information on the Web.

Response Center engineer Ron Zander's group also added staff last year to provide immediate 24-hours-a-day, 7-days-a-week support, eliminating delays caused by after-hours call dispatchers. "We're now logging our own calls, which reduces bouncing customers around," Ron says.

Support Agreement Specialist Laura Erlandson says her organization revised performance standards and is working to improve internal communication and contract accuracy. "Before, priorities focused solely on meeting metrics based on internal business needs," she says.

Nonetheless, HP still isn't out of the woods. "IBM is right behind us in customer loyalty, and Sun is gaining rapidly," Bob says. "In many areas, Sun and Dell matched or exceeded HP's 1999 performance."

This year, HP's Europe and Asia Pacific regions will introduce the HP Services Standard. In the Americas, management will focus on streamlining cumbersome processes and knocking down organizational silos.

"We're investing heavily in new systemwide customer relationship management and workflow management systems for our hardware and software response centers," Bob says. "The result should be greatly improved internal communications that will enhance team-building and help us give customers seamless HP contacts."

To show employees that the HP Services Standard is alive and well, CSSA has mounted a no-holds-barred communications campaign. Last spring, CSSA launched the Customer Loyalty Initiative by visiting some 3,000 employees at major U.S., Canadian and Latin American offices. "We saw a lot of frustration and skepticism," Bob says.

In December 1999, CSSA followed up with a second road tour to U.S. and Canadian offices, meeting with some 2,000 people. The team conducted a second Latin American visit in early February 2000. "This time there was minimal frustration, and people said much had changed for the better," Bob says.

CSSA has posted results of the 1999 customer loyalty and employee surveys and road-tour materials on its intranet site (**http://cssa.atl.hp.com**). "We've enhanced our customer focus dramatically, and employees have driven the key changes," Bob says. **M**

*(Peggy Waldman is a freelance writer living in Oakland, California. —Editor)*

# HP helps power Ford's global strategy

The No. 2 *Fortune* company relies on HP infrastructure so it can focus on its core strength—consumer auto sales.

*By Todd Shapera*

DEARBORN, Michigan—From the boulevard, the unnamed, one-story office building here appears unassuming. Deceptively so.

Inside, though, more than 30 workstations form Hewlett-Packard's new command center for Ford Motor Company's global network of more than 2,000 servers and its wide-area network. These systems handle the auto maker's mission-critical functions from auto design to purchasing and billing.

On a recent morning, a crew scans 19-inch monitors with the calm intensity of air-traffic controllers. "When an icon goes red, we have the ability to drill right into it and troubleshoot," explains Greg Young, an HP manager at the site. Typically, such events happen 400 to 500 times a day throughout Ford's global network. And HP responds to each outage within 15 minutes, beginning to diagnose the problems and performing triage.

In the fall of 1999, HP began providing the auto maker with blanket, round-the-clock service through a U.S. $150 million, five-year partnership with Ford dubbed GINESS. The acronym may sound like an Irish stout, but it stands for Global Infrastructure Networks and Enterprise Server Support. And it's a leading-edge partnership for both companies.

"Being able to tell the industry that we manage the infrastructure of the No. 2 *Fortune* company is extremely valuable," says Mike Needham, HP's global client business manager for Ford.

By any standard, the auto maker is a high-tech company. Ford invests U.S. $1.2 billion on IT annually. Ford's CEO Jacques Nasser has called IT "the bloodstream that feeds the business process." And the Gartner Group, a leading high-tech consulting firm, ranks Ford as second in cost efficiency, support and quality among the thousands of companies Gartner follows.

"Ford is giving HP a high level of responsibility with GINESS," says Doug Chapin, who was vice president and general manager of HP's Operations Services Division when the GINESS deal was made. "It has to have a great deal of respect and trust in HP to pursue a partnership of this nature."

For Ford, hiring HP to manage its proliferating, mission-critical IT network is part of a companywide strategy to concentrate on becoming more consumer focused. With HP's systems management, Ford frees itself from building growing layers of its own in-house IT expertise and from the burden of daily troubleshooting, focusing resources instead on the core auto business.

Dodging raindrops, HP's Greg Young (far left) and Randy Roberts (far right) head for a luncheon meeting with their Ford counterparts, Ken Halibozek and George Sipos.

"The Internet
has changed
the hearts
and minds of
our business
partners."

Similarly for HP, "GINESS plays to our strongest capabilities—infrastructure management services—but on a larger scale than anything we have attempted before," says John Crowther, general manager of the Ford account.

In ramping up the account, John says that HP has filled nearly 100 positions on the new GINESS team, partly by recruiting "war heroes from other parts of HP who have the scars to prove they've been through difficult times with customers." Some technicians will be based in Ford data centers in the United Kingdom and Germany.

In the future, the partnership may evolve beyond GINESS into something even more visionary, says George Surdu, Ford's director of Technical Services. In fact, he challenges HP to evolve into an IT "utility" that would serve Ford in a similar manner to the telephone company. George explains that just as one doesn't buy more phone lines when making more calls, Ford hopes "to stop buying HP boxes" and instead access "HP's capacity on demand, when Ford needs it, and then pay HP based on the level of services it uses."

The radical notion, George says, is borne out of necessity. "The Internet has changed the hearts and minds of our business partners. They expect deliveries within days, not weeks, and they want limitless capacity and perfect reliability. We need to embrace that or get swept away." The notion also is being driven by management's mantra inside Ford's world headquarters here: "cost, quality and speed, speed, speed."

George is well aware that the changing business model may add cost and risk for HP. But he's confident that the opportunity to become a select IT utility for Ford is an offer no future-minded firm would refuse. "We want to establish for the supplier a revenue stream that will make them happy and, for Ford, a capacity stream that will make our business partners happy. We want to do all that and pay less."

"Ford is pushing HP where HP has been talking about wanting to go as a company—only they want us to be there today," says Jim Otanicar, HP's representative for Global Services Solution Sales at Ford.

Dave Shore, HP's global services account manager, says this utility model is appealing because "it aligns

At the news conference announcing HP as the hardware supplier to Ford are (from left) John Olmstead, V.P. of UUNET; Bob Weis, HP V.P. and G.M of the North American Consumer Business Organization; James A. Yost, Ford Motor Company V.P.; Nick Grouf, chair, PeoplePC, Inc.; and Bill Stevenson, UAW-Ford Joint Programs.

*"There's no clear roadmap for us. We have to have an entrepreneurial spirit."*

with HP's computing vision and e-services initiatives. Both Ford and HP can focus on what they do best."

In e-commerce, for example, Ford has signaled its intention to emphasize Web-based auto sales, as well as shift much of its U.S. $80 billion in supplier transactions to the Web. Although this specific business is not part of HP's current work for the auto maker, under the utility model, Ford no longer would buy the servers for its Web businesses, but would pay an IT utility to run the operation, with rates based on Web-site use and e-mail volume.

Linda Kruger, the GINESS global account operations manager, who is a liaison with many levels of Ford management, says that she and others are passionate about rising to the challenge. "There's no clear roadmap for us," she says. "We have to have an entrepreneurial spirit."

For now, while HP and Ford contemplate the dimensions of a new utility partnership, HP already is adopting the GINESS model elsewhere in the auto industry. And HP's Dearborn team continues to ramp up from fewer than 500 HP servers in October 1999 to eventually incorporating more than 2,000 by year-end. Even as Ford's George Surdu wants precision, he concedes that, initially, GINESS is a daunting undertaking. "You don't flip a switch and simply have the operation in place to take on the second-largest industrial operation in the world."

Even so, account manager John Crowther, who was lured to Dearborn from an HP post in the United Kingdom, remains upbeat, saying, "Everything is aligned for us to be successful." George Surdu seems to concur, saying, "We want this relationship to blossom." **M**

*(Todd Shapera is a freelance writer based in New York's Hudson Valley.—Editor)*

Mike Needham (right), HP's global account manager for Ford, discusses customer loyalty aspects with HP team members (from left) Wendy Porter, Sue Ruby (foreground), Don Fohey and Jeff Bara.

## The Ford deal

**D**EARBORN, Michigan—HP's relationship with Ford shifted into high gear in February when the automaker chose HP as the hardware supplier for an innovative deal to put HP Pavilion PCs and HP DeskJet printers into the homes of all 345,000 Ford employees—hourly and salaried—worldwide.

For $5 a month for three years, Ford employees can have an HP PC and printer, software, services and Internet access. Reseller PeoplePC helped arrange the deal, which includes connection to the Web through UUNET.

It's a profitable deal for HP, which expects many Ford employees will "buy up" and pay the difference to receive higher-performance models.

The speedy deal came together within two months of the companies' first meeting in late November. An HP team that included Mike Needham, HP's global account manager for Ford, James Bailey from the Vancouver (printer) Division and John Benardino from the Home Products Division worked through the Christmas holiday to hammer out the details.

"This was a 100 percent Dell account from the PC perspective until we won the deal," says Rene Aquilina, principal consultant from HP's Ford consulting group.

Ford CEO Jacques Nasser (left) is making this major investment to improve employees' computer skills and understanding of the Internet, and as a way of communicating directly with them. Ford expects to start delivering equipment in the second quarter and complete distribution within a year.

# Bites and bytes in the land of milk and honey

**HP is establishing a track record in Israel for both its sales and Labs' accomplishments.**

*By Harvey Gotliffe*

Haifa

Tel Aviv

Israel

DAVID RUBINGER

TEL AVIV, Israel—Dan Propper, managing director and CEO of Osem, Israel's leading food manufacturer, maneuvers between scurrying forklifts in the company's massive Tel Aviv warehouse as products are being shipped worldwide. When he approaches a worker with Downs Syndrome, they exchange hearty hugs. "We are like family here," Dan says.

**Dan Propper (right), CEO of Osem, Israel's leading food manufacturer and a major HP customer, reviews his business plans with HP Israel G.M. Gil Weiser in January. Gil recently left HP.**

Osem began as a seven-family operation in 1942, with primitive machines, manual labor and the shortages brought about by World War II. Osem's early struggles paralleled Israel's own, and today Osem, Israel and Hewlett-Packard Israel Ltd. (HPI) are inextricably connected by

R&D engineers (from left) Danny Barash, Darryl Greig and Michael Elad are three of the newest recruits to join HP Labs-Israel, which now has 13 employees.

the country's technological revolution (see sidebar below).

With sales of U.S. $500 million annually, Osem produces everything from snacks to processed poultry. When Nestle acquired a 47.5 percent interest in 1995, Dan was elated. "We have big goals, and now we can achieve them."

Since 1996, HP has worked closely to help Osem achieve those goals, first bidding and winning against Digital and IBM for platforms and solutions. Gil Weiser, former general manager of HP Israel, says, "We ran after the project day and night, working with our European headquarters in Geneva."

"We had lots of problems at the start," Dan adds, "but I know that I can trust HP."

That trust was best exemplified when Osem's system crashed. To bring the system back up, Gil and Dan worked side-by-side with HP's team through the night. The relationship has continued to flourish. "We just changed hardware and software. It was successful because of the important contributions on HP's part," Dan says.

HP started its activity in Israel in 1957. Motorola Israel was HP's representative until 1984. Then a company called CMS—operating under Motorola Israel's umbrella—was established as HP's Israeli representative. HP acquired CMS on July 1, 1998, and the operation became a fully owned subsidiary known as Hewlett-Packard Israel.

Along with Osem, some of HP Israel's top clients include Bezeq, Israel's national telecom company; Paz Oil, which uses HP infrastructures; and the Israel Electric Corporation, the largest corporation in the country, which has a systems command control based on HP's platform. With a force of 200 employees, and annual sales at $200 million, Hewlett-Packard Israel has passed Compaq and now ranks second behind IBM.

G.M. Shaull Aviram heads HP Israel's Enterprise Accounts Organization. The Commercial Channel Organization, led by Gil Rosenfeld, has 300 distributors, including Office Depot, the largest seller of HP products in Israel. To service the growing number of purchasers, HP's outsource

service center in Herzliya has a staff of 40 that responds to calls within 12 seconds.

HP Israel's long-term goal is to convince people that they can merge technology developed in Israel with the needs of HP and its customers. "The intelligence is here in Israel," Gil says. "People dare to take the risky start on their own, trying to figure out how to do something differently."

In the land of milk and honey, doing something different is a way of life. Whether it involves negotiating for peace with its neighbors, absorbing countless immigrants or becoming the world's second most electronically aimed country after the United States, the unexpected is the norm in Tel Aviv or high on the hills of Haifa.

HAIFA, Israel—On these hills is the Technion Institute of Technology, Israel's equivalent of MIT. In his office on the campus, Dr. Abraham Lempel, director of Hewlett-Packard Labs Israel (HPL-I), recently asked one of Israel's most renowned photographers to autograph one of his famous shots in an old issue of *Life* magazine. In reality, an exchange of autographs would have been appropriate.

Abraham has authored or co-authored more than 100 refereed articles and gained international recognition for the discovery along with Jacob Ziv of the Lempel-Ziv algorithm, which concerns the compression technology used in computers, printers, tape storage, telecommunications and software media.

The important research conducted by HPL-I includes projects on color

*HP Israel's long-term goal is to convince people that they can merge technology developed in Israel with the needs of HP and its customers.*

## Israel's high-tech revolution

- Population: **6.2** million
- Gross domestic product: U.S. **$98.5** billion (1998)
- IT market: **$2.6** billion (1999 est.)— **10–12** percent a year growth rate
- Scientists and technical workers per 10,000 employees

  | | | |
  |---|---|---|
  | **140** Israel | **80** USA | **75** Japan |
  | **55** Germany | **35** Korea | |

- Cellular phones: **4** of **10** Israelis own one
- Birthplace of **15** percent of all worldwide Internet technologies
- Israel's Silicon Valley: **60** percent is located in Tel Aviv and suburbs
- Online purchases: **$21** million (1999), up **1,300** percent from 1998
- Startup companies: 1982—**50** 1999—**3,000**

printing algorithms, computer vision algorithms, compression and coding algorithms, and document processing and understanding.

HPL-I began in January 1994 as the Hewlett-Packard Israel Science Center on the Technion campus. Abraham took a leave from the department of computer science to serve as the first director, a position he still holds. The initial staff consisted of faculty consultants from both computer science and electrical engineering. A year later, the first full-time researchers were hired, and in June 1997, the Science Center was upgraded to a full-fledged lab.

With Abraham still serving on various Technion committees, he can survey and hire the best and brightest graduates, faculty members and current students for HP. "We look for young Ph.D. graduates to build up a permanent core of highly competent researchers," he says.

"We don't go after them," Abraham admits. "They apply to us. HPL-I is *the* employment place of choice for fresh graduates. We look for talent, rather than past experience."

HPL-I continues to recruit faculty with outstanding research backgrounds as consultants, convincing them to commit much of their free time. In turn, the consultants work for HP one day a week during the school year in Israel and two-and-a-half months in the summer at HP Labs in Palo Alto, California. HPL-I also hires bright, highly motivated Technion students as temporary employees, who become a source of potential recruits after graduation.

Those graduates come not only from Technion, but also from wherever the talent lies. R&D engineer Darryl Grieg is an Australian who graduated from the University of Melbourne. Recent hire Danny Barash is an Israeli who graduated in June 1999 from the University of California at Davis. The lab, which rents space on the Technion campus, has grown to 13 people and has facilities to expand to 25.

One of HPL-I's goals is to continue to establish itself as a center of excellence. Much of its work is done in close collaboration with HP Labs' partners from the Printing and Imaging Technologies Program and with other product divisions. Other HPL partners come from the Printing Systems and Solutions Program, the Information Theory and Algorithms group of the Computer Products Program and HPL Japan.

Abraham believes the lab has flourished by "staying close and integrated with the main headquarters, some 8,000 miles away." HPL-I is looking forward to playing a larger and more meaningful role in HPL's worldwide R&D effort, having already savored the sweet taste of success. **M**
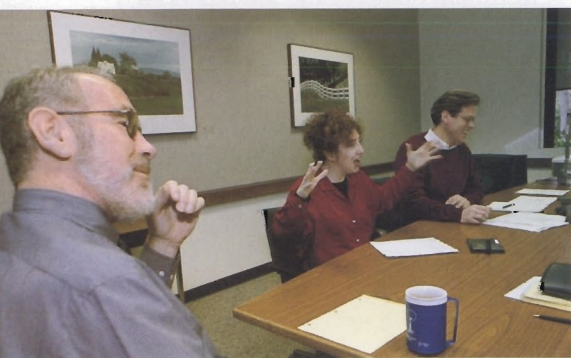
## STRATEGY

# Building a framework for the future

**With $8 billion in business and 80 product lines, Agilent uses sound portfolio management to determine its strategic direction.**

*By Marcie Lynn Smith*

**How does Agilent manage its portfolio of businesses? That's the key topic of discussion among (below, from left) John Eaton, Agilent V.P. of Strategic Planning; Rachel Wagner, Strategic Planning director; and Anders Fahlander from the Boston Consulting Group. At right, Rachel meets with Agilent Controller Dotty Hayes, Anders and Art Peck of the Boston Consulting Group.**

How does Agilent Technologies deteremine the strategic direction of its vast array of businesses?

Rachel Wagner, Agilent's director of Strategic Planning, says the key is a process known as "portfolio management."

The goal of portfolio management, Rachel explains, is to answer several basic questions from the enterprise (or corporate) perspective:

- Where are we starting from?
- What are our strong and weak points?
- How do the businesses compare in growth and earnings potential?
- What are the alternatives for future investments?
- What are the tradeoffs between investments?
- What is the best path for Agilent as a whole?

"Agilent is unique in the breadth and diversity of its businesses, and that makes managing it more complex," Rachel suggests. "Some businesses are in hot markets with growth rates exceeding 30 percent. Others are long-standing players in slow-moving industries. Still others are struggling to create entirely new markets for products and services we haven't even seen yet.

"We've got an exceptionally broad range of businesses within the four segments (Healthcare Solutions, Chemical Analysis, Semiconductor Products, Test and Measurement), and they need different kinds of goals and different kinds of structure around them."

Today, Rachel adds, Agilent does U.S. $8 billion worth of business in roughly 80 product lines in more than 100 countries. Agilent products show up everywhere, from cardiac wards and oil fields to research labs, semi-conductor fabs and to the inside of your cell phone. "It's complicated to wrap your mind around so many different markets," she says, "and we have to consider all of those differences in our baseline assessment and our strategy moving forward."

Recognizing the differences means setting different performance metrics. "As they develop, businesses go through several stages, and the emphasis shifts," Rachel says. "A new business needs to find a success formula that works for customers. An emerging one needs to grow and establish a foothold in the marketplace. An established business needs to capture returns on its earlier investments. A mature business either needs to contract and get out of the business, or start over and refresh it.

"Being able to harvest assets from mature businesses can provide the resources we need to start new businesses," Rachel notes. "The portfolio-management process allows us to say, 'Your goal is different from their goal' and tailor performance requirements to each business."

Portfolio management also involves comparing Agilent to both peers and competitors through benchmarking. How does the company stack up against other highly diversified companies (like Johnson & Johnson and General Electric) in the way it is run? How do the individual businesses compare to their particu-

lar competitors in terms of performance? What best practices can Agilent emulate?

President and CEO Ned Barnholt and his senior-management team are driving the portfolio-management initiative. The key participants include the six group general managers and the senior functional staff members who head up Finance, Strategic Programs, Manufacturing and Agilent Labs. Agilent has hired the Boston Consulting Group to assist in setting the portfolio framework and benchmarking, and establishing appropriate metrics.

"Agilent's senior managers are deeply experienced in running their businesses, but haven't had the opportunity, until now, to take an enterprisewide perspective," Rachel says. "The first step in portfolio management is to get a common view of the landscape—to take a helicopter up 5,000 feet so that everybody sees the same terrain. The portfolio-management process gives the management team a common framework for making decisions about strategic direction, focus and resource allocation.

Rachel adds, "The most exciting thing is that everyone is coming at this with a fresh perspective. There's more openness to change. We're a whole new company. We have a wonderful opportunity to streamline, do things differently and set different goals."

It's important to note that while portfolio management helps to guide the overall strategy of the company, the individual businesses still have a lot of authority and self-determination. "It isn't about concentrating all the decision-making at the top; it's more about ensuring that each business is focused on the right goals and that we set a clear strategic course at the Agilent level," Rachel emphasizes.

Although Agilent inherited a decentralized structure from HP, Wall Street expects Agilent to be a high-growth, high-tech enterprise that actively coordinates what all of its businesses are doing and sets an overall direction for the company as a whole.

"Wall Street wants to know that this company has a strategic direction at the enterprise level—not just within the individual businesses," Rachel says. "They're looking for consistent, predictable results and a clear, credible strategy for growth and profitability.

"That's why portfolio management is so critical," she concludes. "It kicks off strategic planning for the company, helping us determine how we're going to create the best value for shareholders, the best jobs for employees and the best products for customers." **M**

*(Marcie Lynn Smith is a freelance writer based in Cupertino, California. —Editor)*

> *"It isn't about concentrating all the decision-making at the top; it's more about ensuring that each business is focused on the right goals and that we set a clear strategic course at the Agilent level."*

# Creating the tools for the pioneers

Agilent Technologies' Semiconductor Products Group is in the right place at the right time with the right devices.

*By Sam Lightman*

Welcome to the age of ubiquitous computing and connectivity.

Joel Birnbaum, retired senior vice president of R&D and director of HP Labs and HP's chief scientist, says: "We are rapidly approaching an era in which computing and communications between computers and people will be available to everyone, everywhere, always."

Wagiuh Isaacs, from Agilent Labs, says, "I call it the Tera Era—terabit networks, teraflop computers, terabyte storage and terahertz instrumentation."

And Bill Sullivan, senior V.P. and G.M. of Agilent Technologies' Semiconductor Products Group (SPG), adds, "To make these visions a reality, we have to be able to deliver the technology to the marketplace. To be successful, we have to be there first."

Bill's vision is clear: Provide logic to light solutions for the wired communications arena; be the premier supplier for CDMA radio solutions in the wireless space; and create the eyes of the Internet with low-cost, high-quality, image-capture technology.

His credo: Empower the exchange of information.

In every area it addresses, SPG is in the right place at the right time with precisely the right

**Bill Sullivan, senior V.P. and G.M. of the Semiconductor Products Group, says that Agilent must be first to the marketplace to be successful.**
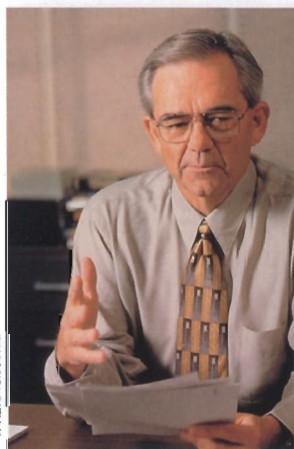
JIM KERAGEORGE

*Empower the exchange of information.*

devices, Bill says. With its fiber optics and communications ICs, imaging technology and wireless chips, SPG is creating the tools for the pioneers of the information revolution.

To keep his innovation momentum on track, Bill has created a roadmap of the information revolution and deployed his forces at every important juncture along the way. From digital imaging to wired and wireless communications, SPG is No. 1 or running a close second in every market it addresses. And it's handing the information pioneers' new tools at every turn. (See the illustration on page 19.)

Take digital-imaging technology. SPG has developed a CMOS (complementary metal oxide semiconductor) alternative to the conventional analog CCD (charge-coupled device) previously used in most digital cameras and scanners. From manufacturing techniques to circuit integration, CMOS provides advantages across the board. While CMOS can be used at every level of resolution, SPG has focused on entry-level digital cameras as well as imaging solutions for embedded camera applications.

The result: SPG customer Logitech is now supplying a U.S. $49.99 camera to one major computer manufacturer who is bundling it into every home computer it sells. "We announced our first product in October 1998," says division Marketing Manager Neal Carney, "and shipped our one millionth CMOS sensor in October 1999. Our orders will continue to increase dramatically as people expand their use of images to communicate."

As Bill notes, "This is also great for Hewlett-Packard, because all those digital camera owners will want to print their photos and Web pages,

and that's going to sell a whole lot of printers and ink." HP, of course, is Bill's biggest and most valued customer.

Along the information transport route, fiber optics provide the magic on the wired side of data networking. SPG manufactures a huge array of transceivers and integrated circuits that serve as interconnects for the Information Age.

SPG's next challenge is to be first to market with high-volume solutions for 10-gigabit-per-second Ethernet. SPG is investing in three approaches to achieve that speed, including SpectraLAN, a technique that SPG plans to drive as an industry standard.

The Semiconductor Products Group also manufactures complex ICs that enable high-speed transport of information from mass storage systems to a server or workstation network in a storage-area network (SAN). SPG's Tachyon architecture is the de facto standard for fiber-channel storage networking, and SPG supplies the market with Tachyon protocol ICs, as well as complete host adapter solutions that make it easier for vendors to implement SAN solutions.

SPG is leading the industry in wireless communications as well. "We're focusing our investment on complete RF (radio frequency) chip sets for CDMA (the cellular protocol standard)," says SPG Business Development Manager Gary Carr, "as well as continuing to produce a broad family of RF semiconductors used in other standards. We're one of the leaders in ultra-miniature packaging of RF semi-

*"SPG and Agilent are in the right markets at the right time to help people get connected."*

conductors, so we get designed into a lot of the new miniature handsets."

In application-specific integrated circuits (ASICs) for information processing and storage, SPG provides graphics chips and core electronic chip sets to HP for use in high-end workstations and servers. SPG also is the leading supplier of ASICs for HP printers. "We want to continue to maintain our position as the No. 1 ASIC supplier to Hewlett-Packard and really enable them to be successful," Bill says.

Where is all this leading? Allen Owen, SPG marketing communications manager, says, "There is virtually no limit to the amount of data that people want to move or the speed at which people want to move it. SPG and Agilent are in the right markets at the right time to help people get connected. From systems that provide a faster Internet, to portable communications through inexpensive wireless appliances, most of them will be powered by Agilent semiconductors and tested by Agilent test systems."

"Few companies understand better than Agilent Technologies how to make, test and ship these enabling technologies that will help make this connected world a reality," Bill Sullivan says. "That's a pretty exciting world to look forward to." **M**

*(Sam Lightman is a freelance writer based on Salt Spring Island, British Columbia, Canada.—Editor)*

## Semiconductor Products Group (SPG) market focus on communications

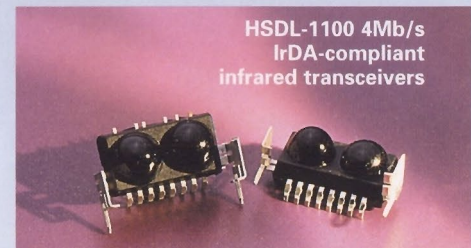**Wired Communications**
- Storage Area Network (SAN)
- Local Area Network (LAN)
- Metro/Wide Area Network (MAN/WAN)

Mini-MT transceiver

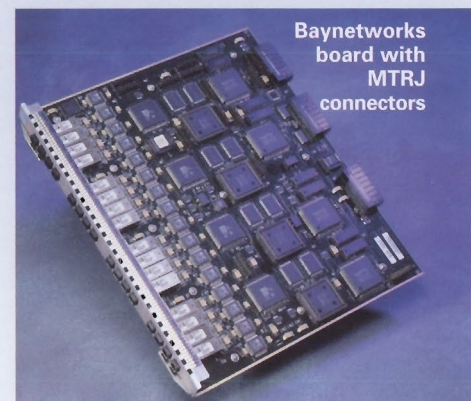**Mobile Communications**
- Radio Solutions
- Infrared Solutions
- Embedded Imaging Solutions

HSDL-1100 4Mb/s IrDA-compliant infrared transceivers

**HP ASIC Solutions**
- Hardcopy
- UNIX Workstation/Servers

Baynetworks board with MTRJ connectors

## BUSINESS

# Building a "culture of performance"

*"We need to create new organizations and initiatives to move Agilent forward. As we build our new culture, what I call a 'culture of performance,' it will be built on the best of HP while incorporating the new values of speed, focus and accountability."*

*Ned Barnholt*
*Senior Managers' Meeting*
*September 1999*

*By Michele Drake*

Long before Agilent Technologies began operating as a separate company, Agilent's leadership team began talking about building a "culture of performance." How would Agilent be different as an independent company? What would this culture be? And what could employees expect?

The picture of "what it will look like when we get there" is still being painted. However, Agilent President and CEO Ned Barnholt has outlined a clear message—Ned calls it his mantra: speed, focus and accountability are the core elements of the new company's culture.

The reason Agilent is building a culture of performance is simple: to succeed. Agilent wants to be recognized as an innovative growth company that's a leader in virtually every market in which it operates. To achieve this, Agilent needs to anticipate and satisfy customer needs, attract and retain the best employees, and meet expectations of its shareholders. And it must do all of this while being scrutinized by Wall Street.

It's a very different environment for a group of businesses that were so hidden under the HP umbrella that their performance typically didn't budge the stock price one way or the other. Now, Agilent's overall performance—as well as that of each of its four businesses—gets widespread visibility. To see how well the company is meeting investor expectations, one need only look at the daily stock price listings.

"Being an independent, publicly held company is certainly the big driver," says Bob Walker, Agilent's chief financial officer. "If you look at why the board of directors split us off, it

was to enhance the value to shareholders. Part of that is an expectation that we will perform even better as an independent, publicly held company than we did as a part of Hewlett-Packard."

While speed, focus and accountability are certainly its "critical success factors," Agilent's culture of performance will have many other characteristics. An openness to new ideas. Pragmatism. A bias for action. Rapid prototyping—invent it, try it and revise it quickly. A willingness to look for good ideas in unconventional places. A focus on results, not effort. An agreement to deliver only what is needed—less is more. A less formal, less structured approach to work. Making and meeting commitments that are driven increasingly by external expectations rather than internal. A less egalitarian reward system—top performers who produce outstanding results. And finally, an understanding that change is constant, and a willingness on the part of employees to embrace it, adapt quickly and move on.

"Speed means that you spend no more time, and look no further than is required to deliver results,"

a better job in fewer areas.

Closely related to focus is the understanding each Agilent employee must have of his or her role in the organization. "No longer are we Renaissance people or Renaissance organizations where we will do everything," explains Bob. "When I joined the company, a product division was a self-contained operation. We did OK with that concept then, but today we need to bring world-class expertise to each integrated function."

Accountability is delivering the results you commit to produce. "Accountability involves stretch goals and clear metrics, and both upside and downside rewards based on whether or not you meet your objectives," Bill explains.

Agilent's senior managers are quick to point out that while the spotlight may be on speed, focus and account-

explains Jean Halloran, Agilent's senior V.P., Human Resources. Bill Hahn, senior V.P. of Strategic Programs, notes that speed touches all aspects of the business. "It's speed of decisions, speed of getting products to market and speed of responding to customers. Everyone must move more quickly."

Part of speed is the notion Ned has put forth regarding "the 80-percent solution." Essentially, this means that Agilent

people need to make more decisions where they don't have all of the information they might ideally like to have. "If you have enough information to proceed, you're better off moving forward," Bob says. "It's going to feel different and we have to get used to it."

Focus is defined simply as prioritization. It's the ability to say "no," to limit ourselves to a few key things that are going to make a competitive difference, Bob adds. It's doing

> *"No longer are we Renaissance people or Renaissance organizations where we will do everything."*

## Culture



DOUGLAS L. PECK

ability, the values brought forward from HP are still critically important. They include innovation and contribution; trust, respect and teamwork; and uncompromising integrity.

"It's a balancing act," Bob explains. "Sure we need to have a culture of performance, but in the process, we can't lose sight of the way we treat one another and our customers, and we must actively maintain our commitment to doing business with the utmost integrity."

Innovation is one of the reasons that PriceWaterhouseCoopers' (PWC) George Bailey is so intrigued with Agilent. George has consulted with

Ned and Jean on how to help Agilent grow and build its own, unique culture of performance.

"Your heritage, your business fundamentals, your lifeblood are all based on innovation, inventing, coming up with new things," says George, whose business card reads "Chief Innovation Zealot" and whose boss is PWC's chairman. "You have to be very, very conscious of the culture that you build because there are plenty of performance-driven cultures that are not innovative. If you sacrifice innovation for accountability, or innova-

*"Change happens with one person at a time."*

tion for speed, you're dead. Innovation is the central business proposition for Agilent."

In a consulting career spanning some 20 years, George has helped more than 100 firms wrestle with changing their culture. What does he see as Agilent's biggest hurdles?

"Often the companies that are the most successful are the hardest to change," he says. "People here are used to winning, proud of the way they do things. If you tell them they have to do things differently, they may not see why. Don't let yourself become a victim of your past success.

"Agilent is on track to make business history by building a culture that supports fast growth and faster decision-making while valuing innovation and the people who make it happen," George adds. "Agilent will be a great place to work and a great place in which to invest."

Another challenge that many firms face is that everyone agrees change has to happen, but they believe it should happen to the other person. "Change happens with one person at a time," George says. "When it comes to living in the new world of Agilent—in this culture of performance—there probably isn't anyone who doesn't have some changing to do." **M**

*(Michele Drake is a program manager in Agilent's Internal Communications department.*

*For more information on how Agilent is establishing its culture, check the internal Web site* **http:// agilent.hp.com***—Editor)*

## Tips for success in a culture of performance

- Recognize that building a culture of performance is a core business issue for Agilent and a core career issue for each and every employee. Speed, focus and accountability are more than platitudes.
- Ask yourself, "What do I need to do differently?" (This means you—not the finance department or the person down the hall.)
- Make a list of your priorities. Then write down how you've handled these in the past. Capture how you need to do them differently if you're really

going to embody the spirit of speed, focus and accountability. (Maybe it means you cancel those two extra meetings you used to hold to get buy-in. Just do it!)
- Not sure what your priorities are? Too much on your plate? Try looking ahead to the end of the year, quarter or even the end of the week. What objectives really are important to achieve during that time to make a difference? Now, focus on these two or three things and say "no" to the rest.

# LETTER FROM NED BARNHOLT

**Agilent Technologies' president and CEO discusses the company's new culture and what this means to employees.**

One of the most important things for me as Agilent's CEO is to create a vision for our new company that can be shared by every employee. That's why, at every opportunity, I talk about speed, focus and accountability. These values are new for us, but they are at the heart of how we all need to function at Agilent.

My vision is that Agilent is seen as an innovative growth company that is a leader in virtually all of our market segments. We want to focus on innovation and leadership. We want to be a great place to work and a company that truly can satisfy customers and have a strong following.

To realize this vision, we must anticipate customer needs, get products to market rapidly and make decisions quickly. This is what I mean by speed.

We must identify the top few things that will make the greatest contribution and focus on these. We are not carrying forward everything from HP. We can't afford to because we are a much smaller company. We must focus only on what we really need to accomplish our vision.

And we must take personal accountability for our decisions and our actions.

To focus our efforts, I have four priorities for FY2000:

• complete our transition from HP;
• ensure strategies are in place to achieve our growth aspirations;
• drive for new levels of performance in cost structure and asset management; and
• expedite the change to a performance-based culture.

Let me say more about the last item.

We need to instill a culture of performance in Agilent.

In a culture of performance, every employee would have a sense of urgency around what he or she is working on. Everyone would be focused on accomplishments, on getting the job done. Every one of us would be committed to Agilent's success.

In a culture of performance, results are rewarded, not just effort and hard work. This contrasts with a more egalitarian culture, where everyone shares equally, regardless of his or her contribution. For example, innovative, high-performance growth companies use the potential of stock options—in sizable grants—as well as challenging work to motivate their

> *In a culture of performance, every employee would have a sense of urgency around what he or she is working on.*

people. Agilent is doing this, too.

As my staff and I make other decisions about Agilent's programs and policies, we are thinking about how we can build this culture of performance.

The incentive to perform, to deliver on expectations, becomes even more compelling as we near distribution day. This is when HP distributes Agilent shares to shareholders who hold HP stock and when we become a totally independent company, no longer an HP subsidiary.

At that point, Agilent will have thousands of new shareholders and, unlike ever before, be under scrutiny to meet the expectations we have set. I know we can deliver. Together we can achieve great success.

*Ned*



Agilent President and CEO Ned Barnholt (center) conducts an employee coffee talk in Böblingen, Germany, in February, then joins board member Walter Hewlett (left) and Chairman Jerry Grinstein during a question-and-answer session.

MARCO CRISTOFORI

# Pushing the limits

**Two HP employees combine a creative idea with HP digital-printing technology in an innovative new business.**

*By Paul Murray*

GENEVA, Switzerland—Didier Philippe is that rarest of creatures, a businessman with an artist's soul.

As marketing manager of the Commercial and Consumer Finance Division at HP Geneva, he devotes his time to putting together finance and leasing deals for PC and printer customers. However, as co-founder of Swiss-based Images Sans Frontières —literally "Images Without Limits"— he and partner Daniel Fustier hope to open the eyes of the general public to the artistic possibilities of digital printing technology.

The concept behind Images Sans Frontières is simple: create a chain of retail spaces where people feel free to walk in with a holiday snap or image on a disc and watch while staff digitally transform it into a truly original poster, artistic montage or customized publicity sign for a home business, club or association. No work spaces hidden behind closed doors, no "do-not-touch" signs on machines; customers will be right beside the graphic artists as they work their magic and will be involved in every step of the process.

"Our objective is to give pleasure through the image and help bring an added artistic value to people's pictures," Didier explains. "People already can print out images at home if they have their own PC, but this takes it to the next level."

The idea for Images Sans Frontières came to Didier when he helped arrange financing for a leading U.K. reseller of HP large-format printers. Amazed by all that the machines were capable of doing, he also spotted what seemed to be a gap in the market that neatly matched his own artistic interests. Didier was president of a Geneva art-appreciation society for four years and his mother is a professional painter in Paris.

"I could see that the business was really taking off for the reseller," Didier says. "When he told me that there was a huge demand from consumers and business customers for print services that he couldn't meet, the idea just took root."

Meanwhile, work colleague Daniel Fustier, who's based in Pinewood, England, was seeking the opportunity to open a direct-service retail activity. It was the perfect match, so the pair put together a business plan and took it to the management team at HP's Large-format Printing Division in Barcelona, as well as two other major printer manufacturers. Company loyalties aside, Didier insists, it was HP

MICHEL BLANC PHOTOS

that offered the best deal.

"They had by far the best grip of digital printing issues and, most importantly, they had no links to existing print outlets," he explains. "It really was a case of them needing us as much as we needed them."

The HP InkJet Commercial Division (ICD) gave Didier and Daniel six-month loans on an HP DesignJet 2500CP large-format printing system and three HP Kayak PC workstations to get them started. In November 1997, the pair opened their first Images Sans Frontières boutique in a shopping mall in Signy, a Geneva suburb.

"HP has a long history of loaning equipment to start-up enterprises and we carefully select companies where HP technology will complement their overall business strategy," says Ignacio Fonts, general manager of HP's InkJet Commercial Division, which designs and manufactures HP DesignJet printers. "When Didier and Daniel approached us with their idea of Images Sans Frontières, we knew that we had the correct fit. The loaned HP DesignJet 2500CP large-format printers and HP Kayak PC workstations provided them with the tools to get their business up and running. This arrangement provided HP with a means to showcase our technology in a real-world digital printing and production environment. Ultimately, it was a win-win situation."

With its open, accessible environment, it rapidly attracted consumer interest, as well as small-business and commercial customers. Because Didier and Daniel are full-time HP employees, they rely heavily on their employees and managers to keep Images Sans Frontières running smoothly.

Additionally, Didier and Daniel dedicate several hours after work and on weekends to oversee business growth and plan for future endeavors. To date, the boutique has clocked an estimated 6,000 visitors, won more than 2,000 customers and employs a team of four graphic artists. A second outlet has just opened in Lausanne, a third is slated for Paris sometime this year and the pair plan to open two more outlets after that before moving to a franchise model. The final objective is 300 stores worldwide.

The commercial objectives are daunting, but Didier has no intention of compromising the artistic ideals behind Images Sans Frontières.

"It's true that we could stick to purely commercial stuff, such as corporate posters and reports, but I wouldn't enjoy it nearly as much," Didier admits. "The reason we are different is that we try to bring artistry to everything we do, and the interesting thing is that even commercial customers are increasingly interested in how things look."

A quick look at some of the works in progress at the Geneva boutique reveals the variety of projects carried out there. Certainly, there are glossy publicity posters produced for corporate customers, but also stunning abstract images and beautiful photographic works that have been digitally created or enhanced.

"The printing is also really crucial to the overall effect," Didier says. "All the creative work is ruined if the output is bad, and we have to have pho-

*"People don't bring us pictures, they bring us memories."*

tographic quality. We have two HP DesignJet 2500CP printers now, and they are excellent."

Rapid print speeds and a wide range of materials for printing onto are also essential to keeping this a while-you-wait service and being able to offer customers original finishes for their artworks.

Equally fascinating are the scores of old family snapshots that people bring in to be scanned, digitally "repaired" and turned into personalized posters or prints.

"People don't bring us pictures, they bring us memories," Didier says. "I have never had any doubts that this concept would work, but I have to say that it has also been a lot of fun and I'll always take huge pleasure in creating beautiful pictures."

For more information about Images Sans Frontières, go to http://www.imagsf.com. **M**

*(Paul Murray is a writer living in Grenoble, France.—Editor)*

**HP's president and CEO discusses what HP must do to win—and win big—in the Internet Age.**



HP CEO Carly Fiorina discusses the global business climate with King Abdullah II of Jordan prior to a meeting at the World Economic Forum in Davos, Switzerland, in February.

Two questions lie at the heart of the reinvention of HP: "How can we create a company that wins—and wins big—in the Internet Age, a company that dazzles customers and shareowners quarter after quarter?" and, at the same time, "How do we remain a company that captures people's hearts as well as challenges their minds?"

These two questions are woven together in everything the new HP is about. Great performance sustained over time requires inspiration as well as aspiration. The new HP must become a competitive, aggressive e-company with a shining soul, an e-company that makes a difference and a contribution through our character as well as our capability.

Our Business Reinvention teams are asking: How do we change from being internally focused to a company that responds to customers quickly, accountably and creatively? How do we make the total customer experience so engaging and rewarding that customers not only buy from us again and again, but also unreservedly rec-

ommend us to others? How do we redesign our marketing function so that it becomes the envy of the Web world? How do we deliver superbly every day on the promise of "invent" and our brand?

What about our behavior? To be perceived as an Internet company, we must act like an Internet company. What does that mean for us at HP? What kind of environment do we need to create to react quickly to changing external conditions, become market leaders and delight customers and shareowners?

How should our reward systems change? The Rules of the Garage Reinvention team is working on these questions.

The Infrastructure Reinvention team is helping to answer the question of what an e-company really is. It's working on creating a world-class infrastructure capability at competitive costs in all our support functions—using the products, services and solutions that we sell to customers. If we don't prove that our own technology and capabilities can make us more productive, how can we expect our customers to be convinced these capabilities will make them more competitive?

Despite all the great work of our reinvention teams, however, the accountability for both the preservation of the best and reinvention of the

*I am betting the future of this great company on the people of HP.*

rest ultimately lies with each and every one of us. Each of us must ask the question, "How will I personally, today and every day, contribute to the new HP? How can I help us become an e-company with a shining soul?

The people of HP, and all we represent, are our most potent asset. The people of HP are our winning edge. People are the business. And so I am betting the future of this great company on the people of HP.

It is my fundamental trust in our character and our capabilities that gives me such confidence. We face many challenges and the journey is just beginning. But if we journey together, we will not fail.

*Carly*

# Dr. Cyberspace
ASK

**Dr. Cyberspace reports on HP's e-speak technology—software that will "change the world."**

On my side of the planet, the three w's—as in www.—dominate and everybody's got an angle: some that are right, some not so 90 degrees.

Here are the ones that raise HP's blood pressure (although nothing this fine doctor can't fix):

IBM's e-business. Sun's dot in dot-com. Dell's "be direct."

All and sundry are jockeying for position in the lucrative Internet world.

But the unsung hero of the next e-generation might well be e-speak—developed at HP Labs in Palo Alto, California—an open software plat-form that is at the heart of HP's own Internet angle: e-services.

To understand e-speak you have to "get" e-services. Here you go: An e-service is any asset that is made available via the Web, to either drive new revenue streams or create new efficiencies. International Data Corporation, the research firm that specializes in the IT industry, predicts that e-services revenues will hit U.S. $50 billion in 2003.

In an e-services world, you tell the computer what job you want done and it does it. Need more storage? Buy it online at the best price. Have a one-time software need? Use the Web-based version and pay as needed.

Now, where does e-speak fit into this scheme?

E-speak is "open," Internet-standards-based software that will make it easier and faster to create, deploy, broker, manage and connect these e-services. Open, of course, means that the software is non-proprietary—the source code is available to the public for use. The e-speak service engine itself is open source—a first for a *Fortune* 500 company.

The best things about e-speak are that it's simple to use and robust, scalable and secure, useful and dynamically extensible, open and accessible, groundbreaking and standard. It's the universal language that will enable millions of devices—from mobile phones to infor-mation appliances to super-computers—to work together to conduct billions of transactions.

"We're going to change the world," claims Rajiv Gupta, general manager of the e-speak operation in the Software and Solutions Organization, which is part of HP's Computing Systems organization.

Move over Bill Gates, buddy of mine. Rajiv and his team believe e-speak will revolutionize the indus-try, doing for e-services what HTTP (hypertext transfer protocol) and HTML (hypertext markup language) did for Web pages.

Rajiv says, "E-speak moves the Internet from an open data economy to an open service economy."

If e-services are gonna be the next wave to hit the Internet shores—as HP and others profess—then the e-speak team might truly be revolutionaries.

For you developers out there, get more info and the e-speak source code for free at **http://www.e-speak.hp.com**. **M**
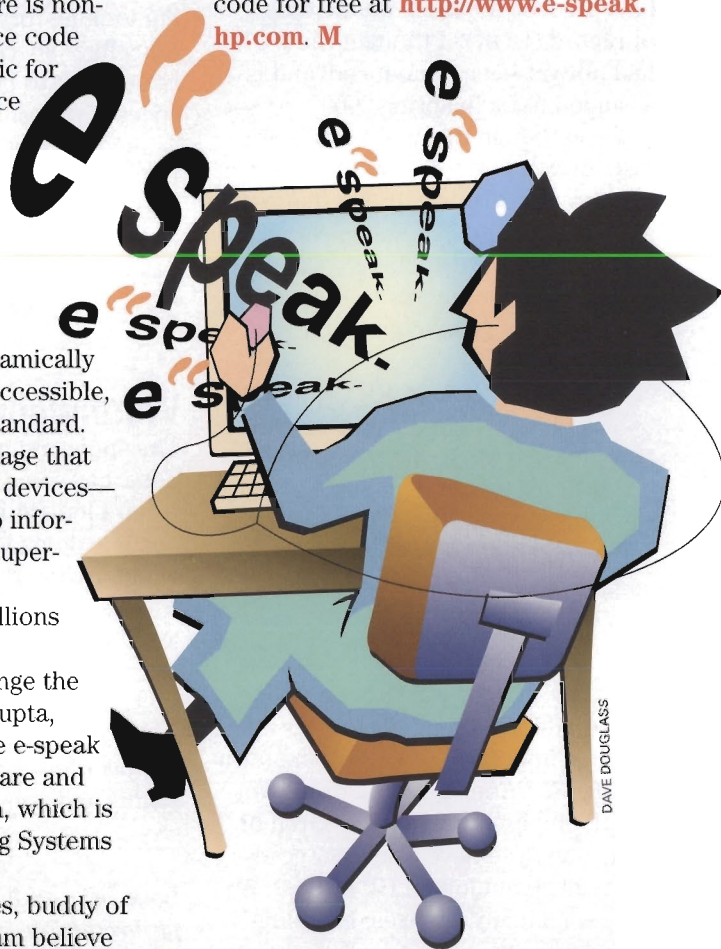
DAVE DOUGLASS

*MEASURE* readers share their views on matters of importance.

## For the record

The January–February 2000 *MEASURE* states, "If you owned HP stock prior to the IPO and hold it until the distribution date...you will receive Agilent shares when they are distributed to HP shareholders." Don't you only have to own HP stock on the date of record (DOR)? I thought the DOR had not yet been announced, and is assumed to be in spring 2000.

Even though the qualification for distribution is stated correctly later in the paragraph, this wording makes it a little confusing. The statement makes it sound like you would have had to purchase HP stock last year and hold it until spring 2000 to qualify for Agilent shares.

MIKE CALDWELL
Santa Clara, California
*You're right, Mike. All HP shareholders as of the record date for eligibility (spring 2000) will receive Agilent stock, regardless of whether they bought the stock prior to or after the IPO.—Editor*

## On the same page

I must add my strong comments that I feel it is important to keep some form of *MEASURE* magazine in print. Not all HP employees who are retired or even employed have computer access.

My husband joined HP in 1983. We have seen many changes, including temporary pay cuts and ups and downs. Through it all, *MEASURE* has done a lot to help me understand these changes. Now our children are old enough to read and enjoy the magazine. I feel it is a very important part of their education and understanding of HP.

We are going through a period of great change in the HP family. This would be the wrong time to cut the link that helps us understand President and CEO Carly Fiorina's thinking. Let us keep this small perk for the HP family so we can all try to stay on the same page!

DEBI FERGUSON
Marietta, Georgia

## What's going on

I'm looking forward to seeing sections like "success stories" in future issues, just to bring the recent market success to readers. Also "tie-ups" or "initiative" sections would help share HP's alliances with other companies, particularly in e-services. This definitely will help us understand what's going on around us.

VENKAT SUBRAMANIAN
Richardson, Texas

## Worthwhile sponsorships?

The sponsorship of the sailing, I suppose, has some merit to someone, but when I look at what a small donut chain is doing in Canada, I stop and wonder what that merit is.

This chain sends 5,000 underprivileged children to one of three camps for two weeks every summer. Is HP or Agilent doing anything this worthwhile? I wonder sometimes where our priorities are after hearing about sailing and race car sponsorships.

DAVE VINCENT
Calgary, Alberta, Canada
*Both HP and Agilent have active philanthropic programs in addition to marketing sponsorships. Check out the philanthropy stories on pages 29 and 31 in this issue.—Editor*

## The HP "barn"?!

Given the massive publicity using the HP garage recently, I had to laugh, when there were HP garage "menu cards" in the staff restaurant on the launch date in January.

While queuing at the sandwich bar, someone (don't know whether customer or internal) commented to the restaurant staff, "What's all this about then?" The assistant replied, "I don't know, but it's got something to do with a barn."

A barn?!!

Whoever was listening could have interpreted that one of two ways: wondering about the significance of a "barn" in HP or that the company hadn't bothered to cascade the information to all staff—contractors or otherwise.

The best response of all would have been, "Without that garage, we wouldn't *all* be here today." That at least would have provoked a higher level of interest and perhaps even delivered the right message.

I was tempted to step in, but decided to smile and let the costly media do the job for me!

VIVIENNE FITZPATRICK
Amen Corner, England

## They're still employees

In the January–February "From the Editor" section, you refer to Ned Barnholt and Bob Walker as "non-employees." All Agilent Technologies employees are Hewlett-Packard employees through distribution date, per the terms of the Employee Matters Agreement associated with the split.

KAREN SCUSSEL
Palo Alto, California

## Agilent takes center stage

Here's a peek into the varied events happening in Agilent Technologies:

• CUPERTINO, California—Thousands of science enthusiasts—including Agilent employees—jammed the Flint Center at DeAnza College in January to listen to world-renowned physicist Dr. Stephen W. Hawking. The Agilent-sponsored event was a sellout, and Agilent President and CEO Ned Barnholt gave an introductory speech.

Although he has lost his voice and the use of most of his body to Lou Gehrig's disease, Stephen captivated fans of all ages with his talk of the cosmos by tapping words into a computer with his hand. After his lecture, "The Universe in a Nutshell," Stephen continued answering questions from the enthusiastic crowd.

For more information about Stephen, check out his Web site at **http://www. pbs.org/wnet/hawking/ html/ home.html**.

• EAST PALO ALTO, California—Agilent announced its first Silicon Valley grant of $250,000 in January to "Plugged In"—the oldest and most successful community science and technology center serving at-risk populations in East Palo Alto, California. Bill Hahn, Agilent's senior vice president of Strategic Programs, declared that donations will be used for an "Agilent science lab" in a new Plugged In facility. The announcement was made at a special showing of the Walt Disney movie *Fantasia 2000*, hosted by Agilent Community Relations and *Discover* magazine at the Tech Museum of Innovation in San Jose, California.

To find out more about Plugged In, visit its Web site at **http://www. pluggedin.org**.

JIM DAVIS

JEAN MANUEL DASSONVILLE

• PARIS, France—Crowds of visitors are swarming to Agilent's Test & Measurement Solutions Roadshow in Europe. The eight-week tour through France, Italy, Switzerland, Germany, the United Kingdom, Denmark, Sweden, Finland and the Netherlands until mid-March includes 80 presentations at 45 sites. And the truck's logo, Agilent: Dreams Made Real, gives the company a lot of visibility in Europe.

### Customer spotlight

**Sample feedback from HP customers**

I read the letter "Light my rocket" in the latest issue and had to chuckle.

I'd had my scanner for nearly a year when it began to act up. Loud noises, imperfect scans. Finally it just quit working. I called the service center and was advised to "jiggle the back switch" to get it going again. I did this and to my amazement, it worked. But my thought was "Is this really HP?" Yes, jiggling the switch worked for about a month, then it died completely. I called the service center a second time and within 5 minutes of conversation, had a 5200C on its way to me, no charge for anything! It arrived here in Montrose, Colorado, the next day!

Then I said to myself, "THIS is HP!" I'm reasonably certain the poor fellow who had to advise me to jiggle the switch was grinding his teeth, probably knowing that I would be calling again with a dead scanner. I believe that I may be one of the first customers to experience the "new" customer-first policy.

John H. (Pete) Ross
Montrose, Colorado

The HP-sponsored Mitsubishi team of driver Jean-Pierre Fonteney and co-pilot Gilles Picard raced into third place during the 2000 Paris-Dakar-Cairo Rally in January.

MITSUBISHI PHOTOS

## Racing into the 21ˢᵗ century

By racing through Paris and then crossing Africa, driver Jean-Pierre Fontenay, co-pilot Gilles Picard and Hewlett-Packard started the year 2000 the best way they knew how—with a totally new adventure.

For the first time, Hewlett-Packard was the principal technology partner of Mitsubishi Sport for the famous rally—the Paris-Dakar-Cairo 2000.

HP supported Mitsubishi with equipment and services for design, navigation and race planning. The HP logo was visible on the main car (the Mitsubishi Pajero/Montero) as well as the backup trucks.

Gilles says that using the HP Omnibook during the race significantly improved the team's tactical navigation approach and provided them with the best road research. "It was a real advantage for us against our competitors," he says.

The HP-sponsored Mitsubishi team raced into third place during the most grueling car rally in the world in January.

Check out the 2000 Paris-Dakar-Cairo Rally at **http://www.mitsubishi-motors.co.jp/motorsports/00dakar_e/**.



Hewlett-Packard was the principal technology partner of Mitsubishi Sport for the Paris-Dakar-Cairo 2000. HP provided Mitsubishi with equipment and services for design, navigation and race planning.

## People

**Giles Bouchard** has been named to lead the Personal Computer Organization's new worldwide geographic operation.

**Mark Turner** has been appointed new chief financial officer for the Consumer Business Organization.

Agilent has named **Alain Couder** as chief operating officer. Couder was chairman, president and CEO of Packard Bell.

**Doug Thompson** will assume the responsibilities for the new Global HR Operations and Services.

## Joint Venture

HP and Eastman Kodak have formed a global joint venture that will develop **retail photofinishing solutions** to offer retail customers a wide range of digital-imaging capabilities for both traditional photographic film and digital files.

## Internet Deal

Ford Motor Company, in partnership with HP, PeoplePC and UUNET, will provide its **global workforce of 345,000 employees** with Internet access at home, and the hardware, software and services necessary to allow them to communicate via the Internet.

## Financing Package

HP is providing New Media Venture Partners with a **$17 million financing package** to help the Internet media corporation fund, incubate and develop proprietary technology, digital content and e-commerce start-ups. The agreement is one of many that HP is establishing with companies focused on targeted Internet areas.

## President's Award

Twelve organizations have been chosen winners of the 1999 President's Quality Award. **HP's recipients are:** Inkjet Imaging Solutions, Asia Pacific; Greeley Hardcopy; International Procurement Operation; Iberia Customer Services & Support; Inside Sales Organization, North America; Italy Customer Services & Support; Puerto Rico Manufacturing; and Workstation Systems Division.

**Recipients from Agilent are:** Healthcare Solutions Group Andover IT Infrastructure; China Test & Measurement Organization; Lightwave Division; and Optical Communication Measurement Division.

For more information, search Newsgrams at **http://hpnow.hp.com/news/newsgram/nghome.htm**.

www.HPARCHIVE.com

Dibasen Junior Secondary School students in Namibia, Africa, are excited about the new computer lab opening in March—thanks to Hewlett-Packard.

## HP helps the far corners of the world

NAMIBIA, Africa—All Laura Wilson needed was a computer and access to the Internet—the rest was up to Hewlett-Packard.

Laura, a Peace Corps English teacher residing in Namibia, asked her brother Doug, HP's order manager in the Enterprise Application group of the e!now organization, how she could get a product donation from HP. Doug pointed her to HP's Philanthropy Web site.

She discovered that donations in Africa are handled in Europe, and e-mailed HP's Franz Lorber in South Africa. Laura requested 15 computers and two printers so that a class of 30 students could sit two to a computer.

A few months later, Franz informed Laura that her request had been granted by HP's K-12 Program.

## An HP team effort on a global scale

SAN FRANCISCO—For HP, Microsoft's February launch of Windows 2000 became the centerpiece in a team effort where nine divisions spoke in one unified voice.

HP Alliance managers learned about Microsoft's launch plans in October 1999 and quickly assembled an HP-wide team. "We realized the opportunity was there to work together in a unified HP way—one that would showcase fully the clout and power of HP," said Michael Noble, outbound marketing manager for HP's Microsoft Services Operation.

The project involved nine organizations, plus sales and marketing groups worldwide, including the Network Server Division, Business Desktop Division, Mobile Computing Division, OpenView Business Unit, Microsoft Services Operation, PC Organization, HP Education, and LaserJet Imaging Systems. Jan McDaniel, worldwide brand communication manager of the PC Organization, led the team.

The team produced localized flyers, marketing events and advertisements, and collaborated on the "Delivering on the Promise" ad campaign that debuted February 17. It also combined efforts on Web-site exposure and on weekly news releases that underscored what each division brought to the Windows 2000 table.

## Nothing to wear?

The Hewlett-Packard Company Store is stocking up on a collection of merchandise featuring both the new HP logo and Agilent Technologies' logo.

You can order merchandise online at http://www.hpstore.com/home.jsp. If you're in the San Francisco Bay Area, you can visit the store Monday through Friday from 10 a.m. to 6 p.m. at 505 Pastoria Avenue, Suite 30, Sunnyvale, California.
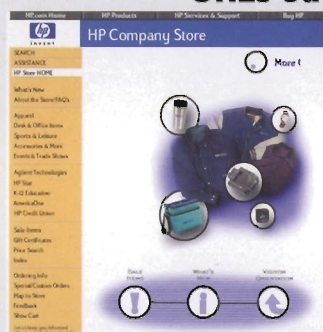


## URLs inside HP

This issue's related Web addresses:

http://cssa.atl.hp.com
CSSA internal site

http://agilent.hp.com
Information about Agilent's culture

## URLs outside HP

This issue's related Web addresses:

http://www.imagsf.com
Images Sans Frontieres

http://www.e-speak.hp.com
Information about e-speak and free source code

http://www.pbs.org/wnet/hawking/html/home.html
Dr. Stephen Hawking's official Web site

http://www.pluggedin.org
Information about Plugged In

http://www.mitsubishi-motors.co.jp/motorsports/00dakar_e/
The 2000 Paris-Dakar-Cairo Rally

http://www.mitsubishi-motors.co.jp/MMC_Homepage00.html
Mitsubishi Motors Corporation's official Web site

http://www.hp.com/go/grants
HP's Corporate Philanthropy Web site

http://www.hpstore.com/home.jsp
The HP Company Store

http://www.geocities.com/TheTropics/Reef/2406/
Randy Azarian's world photo tour



BRANT WARD

The spotlight may have been on Microsoft Chairman Bill Gates (left) and actor Patrick Stewart during the Windows 2000 event, but HP represented itself well with a unified effort by nine HP divisions at the Windows 2000 Expo, where Sebastien Schikora discusses HP OpenView software with a customer at the HP booth.

## A French view of life

PARIS, France—When photo buff Randy Azarian decided to visit the Notre Dame Cathedral in Paris in January, he had no idea he'd have such a spectacular view.

"As I got in line to go to the top, a security guard came out and said there were too many people inside and he would have to cut the line short," says Randy, an R&D engineer in Grenoble, France. "The guard drew the line after the single woman standing in front of me. Then the guard looked at me and asked, 'Are you with her?' Quickly, even though I didn't know her, I said, 'Yes.' So, I was the last one to the top that day!"

Randy says most people only stayed a few minutes so after a short time he had the tower all to himself.

With camera in hand, he pounced at the chance to snap a shot of this French view of life. Randy used a Canon EOS RebelG with a Tamron 28–220mm lens, 100 ASA Fuji film and a focal length of 28mm.

"The top of the tower is extremely narrow, and ordinarily there would be far too many people there," Randy says. "But I was able to take advantage of the fact that I was alone to use my tripod and shutter release."

This photo features the Seine River (Les Quais de la Seine). The Champs Elysées in the center is the ceremonious avenue aiming toward the Arc de Triomphe, which was built in memory of Napoleon's Great Army. And to the right, at the end of the Champs Elysées is a large Ferris wheel that was constructed specifically for the year 2000 celebration. The 21st century skyscrapers in the back are part of La Defense, the new business district erected outside the western city limits of Paris. The Eiffel Tower (not shown) is to the left of the Seine.

"I was so glad to get to go to the top of the tower because I'd never done that before," Randy says. "And with each photograph that I take, I learn which settings work better than others."

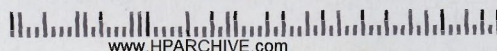To see more images of Europe, Africa, the Middle East, Asia, North America and South America, check out Randy's Web site and photo tour section at http://www.geocities.com/TheTropics/Reef/2406/. **M**

For U.S. address changes, use Change of Address form in Personnel on the Web at http://persweb.corp.hp.com.
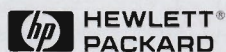
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