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Focus on Spare Parts to Help Reduce Cost of Ownership

Many chip makers think spares program may be better managed by equipment suppliers.

By Diane Norman

In a soft business climate, gross margins in the mid-to-high double digits are just about unattainable without substantial orders of new semiconductor production tools. So, semiconductor capital equipment suppliers are stepping up their efforts to reap strong margins from tools they've already sold.

Looking toward service programs to bolster cash flow, suppliers are sharpening their focus on managing their customers' spare parts needs while slicing off a piece of a market that is estimated at $7 billion for 2001 and expected to reach more than $10 billion in 2004.

More suppliers and chip makers are becoming aware that each sector has a mutual interest in spare parts management alliances. Many chip makers interviewed said they believe spare parts are better managed by equipment suppliers.

"We don't want the financial responsibility," said Jeff Helmandollar, purchasing director at Cypress Semiconductor's Bloomington, Minn., facility. Cypress plans to offload most of its spare parts management to its capital equipment suppliers, he said. "From the suppliers' point of view, times are tough, and they are looking for other sources of revenue."

Spare parts programs once were largely ignored by chip companies, but now, because of economic pressures, spare parts are gaining more attention and are being recognized as an important part of the industry, said Michael Taylor, vice president of marketing and business development at netMercury in Fremont, Calif.

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Editorial Board

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2001 Calendar of Events

October

16-17 SEMICON Southwest
Austin, Texas
Visit WWK at Booth 2209 for a demonstration of TWO COOL®, PRO COOL®, Factory Explorer®, Factory Commander®, and COOL FUSION™

December

5-7 SEMICON Japan
Makuhari Messe
Chiba/Japan
Visit WWK at the e-Mets Booth for a demonstration of TWO COOL®, PRO COOL®, Factory Explorer®, Factory Commander®, and COOL FUSION™

NetMercury's customers want to cut the resources, money and effort they have invested each year to manage their own spare parts inventory, Taylor noted. "Basically, they don't want to do it at all," he said. "They want the parts to be managed by their suppliers so they can concentrate on running their businesses. They are pushing back the management of these parts into their supply chain."

What's more, customers are continuing their efforts to simplify their operations by dealing with fewer suppliers and reducing the complexity and cost of doing business.

Jim Neroda, marketing director at Axcelis Technologies in Beverly, Mass., said its customers save as much as 20 percent in operating costs by entering spare parts agreements.

"When chip makers buy service from us, they get well-trained people dedicated to one equipment set, not spread out over the entire fab. Typically, they also will get lower prices on parts through a volume contract with the supplier," Neroda said. "As the industry continues to consolidate, and with competitive and stock market pressures, customers are more focused on operating expenses than ever before."

At the same time, Neroda added, margins for suppliers can reach as high as 55 percent, depending on parts usage, availability and design.

Cypress' Helmandollar said chip makers recognize that spare parts programs enable suppliers to lock in customer relationships. "Supplier-managed spare parts programs allow the OEMs to recapture market share lost to second sources," he said.

Cypress' interest is in helping to guarantee that the integrated device manufacturer can work with suppliers for continuous improvements in availability, quality and pricing, said Helmandollar. Suppliers are wrapping spare parts and service programs into one package to provide total support management, he noted.

Suppliers that are likely to win spare parts management contracts are those that sell modular pieces of equipment, said Dave Hemker, vice president of product development at Lam Research Corp., Fremont, Calif. "Ten years ago, we wouldn't have looked at it, but now we design our equipment with serviceability in mind," Hemker said. "Even with our older products, we are introducing systems that can be easily pulled out and replaced."

The idea is to lower the customers' cost of ownership, said Jim Goodrich, general manager of Lam's global spare parts business unit. "We collaborate with our customers, which allows us to better understand how they are using our parts in their fab," Goodrich said. "We think chip makers can expect more integration between suppliers and themselves, and the best way to move toward that is to have value-added agreements."

In addition to lowering the cost of ownership, customers are seeking more local availability and just-in-time delivery, especially on critical parts, said Dean Duffy, sales vice president at FSI International in Chaska, Minn.

"Vendor support will become more real-time and be provided from satellite locations closer to the use point, instead of long-haul shipments from central warehousing," Duffy said.

What's more, e-commerce will play a larger role by providing information such as pricing, freight charges, delivery status, favored routing and favored carriers, Duffy said. "Customers at varying degrees will be moving toward receiving support more in sync with real-time needs," he said.

Like its competitors, Applied Materials is using e-commerce to support its customers' spare parts requirements. The Santa Clara, Calif.-based equipment maker introduced its SparesSolutions database program last year that provides pricing, material availability and other information for better inventory management.

Joseph Bronson, Applied's chief financial officer, has said that the company expected to reap strong gains during the downturn from its service business because the 12-month warranties are expiring on many of the systems it sold during the strong part of the cycle last year.

While large equipment companies such as Applied are committed to spare parts programs, smaller companies such as Tegal Corp., which employs 200 worldwide, also are learning the value of spare parts relationships. The Petaluma, Calif.-based company supports its equipment and processes through its Spare Parts and Used Equipment Business Division.

Tegal's service contracts include warranty, technical and process support and field service capabilities. "We consider ourselves to be very small, compared to some of the large gorillas that are out there," said Jim McKibben, vice president of worldwide sales and marketing. "So we try to find opportunities to serve people who are being underserved by our competitors and who need support locally."

McKibben said he believes chip makers are being driven by the same dynamics as those of consumers who own cars or computers. "They are looking for fast response time, ready availability, high quality and reasonable prices," he said. "We've discovered the hard way that if we don't respond to their needs, then someone else will."

Obsolescence also is an issue for chip makers who are using spare parts programs as a way to avoid stocking costly out-dated parts, McKibben said.

"They expect us to support them with parts 18 to 20 years after they've bought the original equipment," McKibben said. "It becomes quite a challenge, and they beat us up for not supporting them on equipment that is old as the hills."

Ed Slomba, supply manager for National Semiconductor's South Portland, Maine, facility, said National is seeing a growing trend toward consignment-type programs where equipment suppliers manage spare parts at the customer's site, and chip makers purchase the parts on a need-to-use basis. "It minimizes costs, and it drives the supplier and chip maker to manage their parts better," he said.

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Wright Williams & Kelly Announces COOL FUSION™ Quick Draw Contest Winners

WWK's SEMICON West contest challenge was widely accepted by San Francisco attendees. The purpose of this contest was to show how easy COOL FUSION™ is to use and understand without having to go through extensive training.

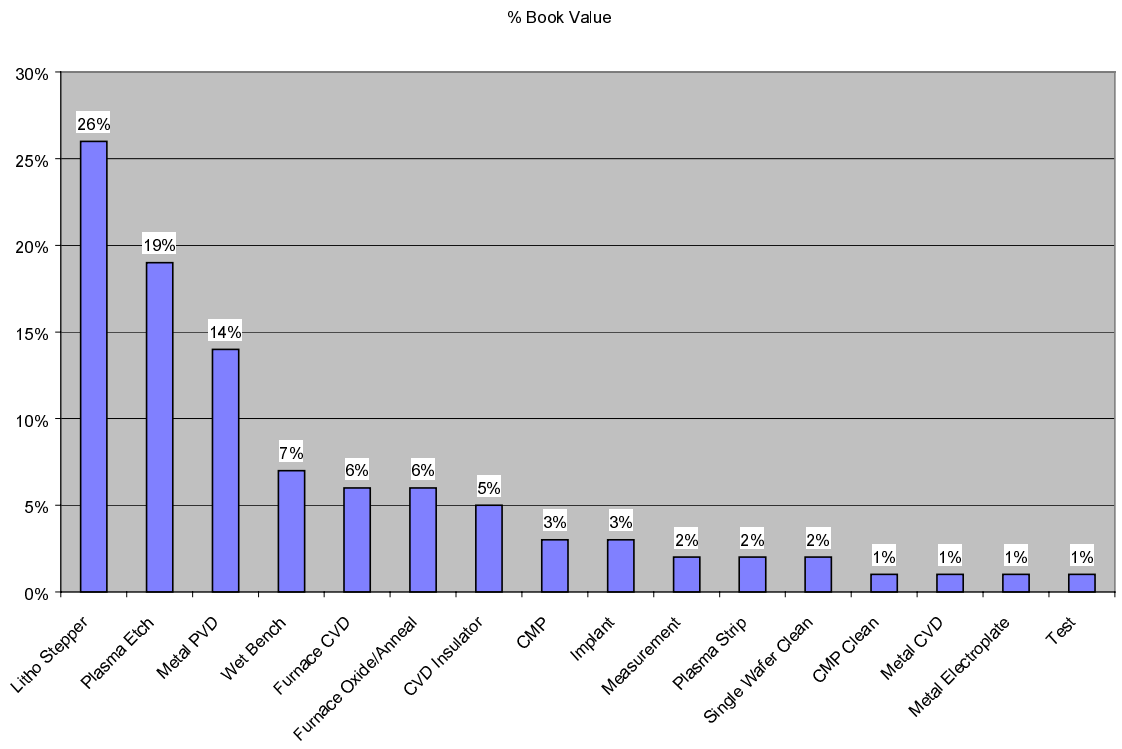
COOL FUSION™ is a sales force automation and product configuration software tool that provides these significant benefits:

- Increase valuable customer face time
- Increase sales credibility
- Quickly build value propositions for your customers
- Reduce product configuration and pricing errors
- Reduce COO support requirements in Marketing

The winning times were from employees of New Vision Systems, Emcore, Dow Corning, Novellus, DNS, and Nikon. All of the winning times were under 3 minutes and all entries were under 5 minutes.

Semiconductor Manufacturing Tool Investment

Semiconductor manufacturing tools account for about 80% of the investment in a new wafer fab. This percentage is growing as manufacturing and device technologies become more complex. The following figure shows the relative distribution of investment by tool group.



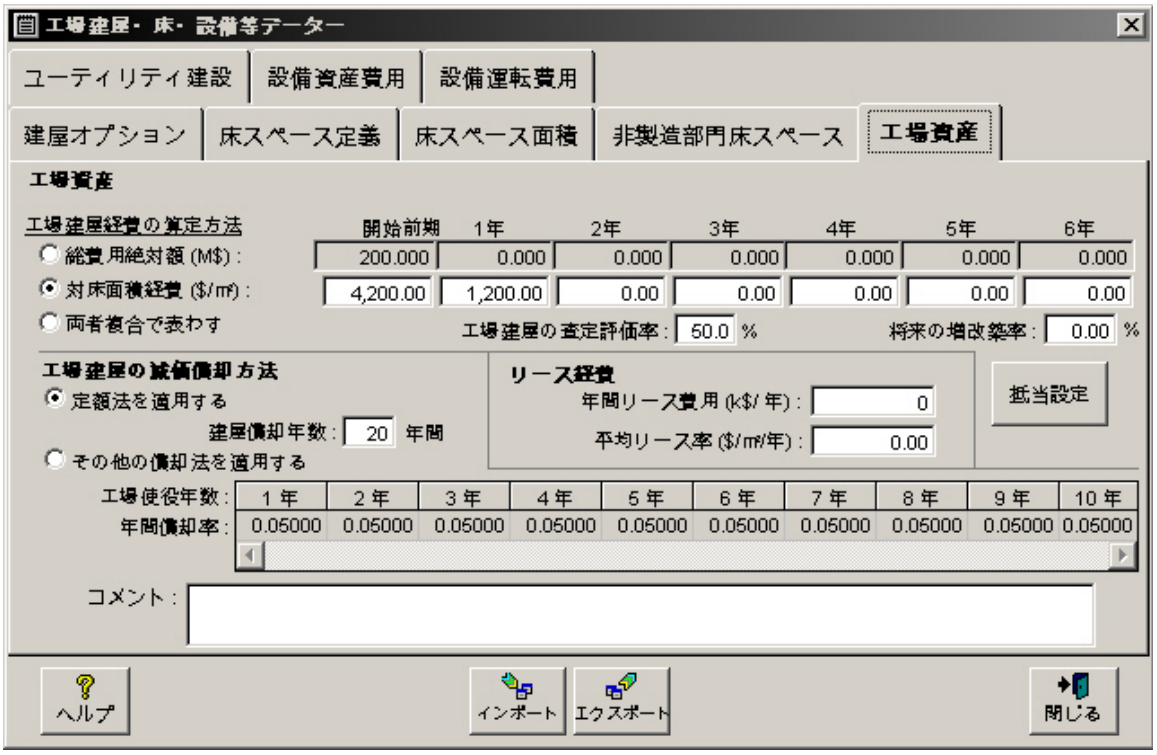
This investment distribution was estimated using a Factory Commander® model of a 300-mm wafer fab. The model assumes 6 layers of copper interconnect wiring. This ranking is highly dependent on tool processing rate and tool cost assumptions. Other manufacturing processes will result in different tool group investment rankings. Older processes will use more Wet Bench and Furnace processes, with less Chemical/Mechanical Polishing (CMP) and Electroplate processes. Newer processes will require more CMP and Implant investment.

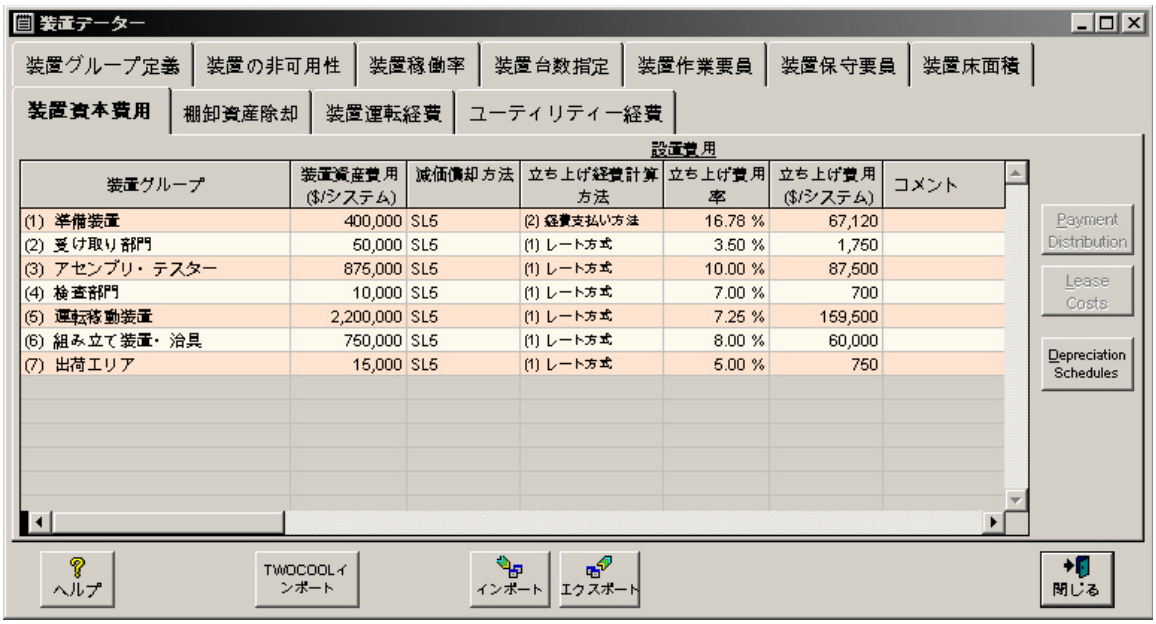
Karen Brown, acting director of NIST, warned at the 2001 SPIE Microlithography Convention in reference to "Moore's Second Law" which cites the exponential rise in the cost of a new fab, ***"If we fix the physics but we don't fix the cost equation, we don't have a solution."***

Wright Williams & Kelly Adopts Multi-Lingual Development Environment

WWK has enhanced its software development environment to include integration of multiple languages into a single code set. WWK has decided to implement this new technology initially with the next release of Factory Commander®. In the v2.6 release, full Japanese language capabilities will be integrated into the software. This feature will enable the program to be operated in either of two language modes, Japanese or English, based on a user selection. In Japanese mode, text consisting of Katakana and Kanji characters will be displayed in place of English. This applies to the entire Factory Commander® program including all input screens, reports, dialog messages, menus, and all other language-specific objects.

The following figures are examples of screens when the program is run in Japanese.





This initial implementation is intended to support our growing client base in Japan. The Japanese market is a very dynamic one for Factory Commander®. Japanese companies are determined to make sure their technology strength translates into business strength. Factory Commander® has created a high level of excitement in Japan due to its unique capability to work both technology and business decisions concurrently. The industry is in a transitional period and our Japanese customers are aggressively using this capability. One key is that customers are looking to WWK for ways to speed up their implementation cycle. A native language version of this application will be a significant step in achieving the broader and faster implementations that our customers require.

Additional benefits of this multi-lingual approach are the removing of ASCII character set limitations. This will allow users to input non-English characters and symbols and enable user-defined text within a model using a preferred or native language. For instance, process steps, equipment groups or materials can be defined in the language of choice and the output from the software (reports, graphs, spreadsheets, etc.) will reflect these language specifications. This applies not just to Japanese but also to any other major language: Chinese, Korean, German, French, Spanish, etc.

For more information, please contact WWK at 925-485-5711

Cost of Ownership: A Value Proposition

"Cost of ownership analyses helped us to identify optimal preventative maintenance schedules, resulting in annual savings of $20 million worldwide…"

"Cost of ownership is one of the key factors in our decision matrix. Cost reductions and avoidances greater than $2 million for a single purchase have been documented. Similar cost savings are achievable for upgrades, process changes, and materials changes."

"Cost of ownership software tools help us to effectively manage our multi-billion dollar capital asset portfolio."

These are just a few of the public comments that have been made by Fortune 500 firms regarding the value that cost of ownership (COO) has brought to their organizations.

Over the past ten years, cost of ownership has migrated from an evangelical topic at a select few firms to a highly integrated part of corporate cultures. The driving force that propelled COO into the lime light was the severe disadvantage U.S. manufacturers faced during the 1980's in their cost of capital. They needed a tool to help them employ their higher cost assets more efficiently. Cost of ownership proved itself successful and has since been adopted by many major manufacturers and suppliers regardless of geographic location.

COO is an implementation of Activity-Based Costing (ABC) that helps in understanding all costs associated with a decision. It improves decisions by relating costs to the products, processes, and services that drive the cost. Without such a linkage, it is difficult for organizations to understand the full impact of their decisions on their operating cost structure. With this linkage, COO provides a consistent data-driven method for arriving at important strategic and operational decisions.

Cost of ownership provides an objective analysis method for evaluating decisions. First, it provides a clear estimate of the life-cycle cost. The analysis highlights details that might be overlooked, thus reducing decision risk. COO can also evaluate processing and design decisions. Finally, COO provides communication between suppliers and users. They are able to speak the same language, comparing similar data and costs using the same analysis methods. Both suppliers and manufacturers can work from verifiable data to support a purchase or implementation plan.

Developing a COO analysis strategy and reengineering business processes identifies opportunities for using COO results to support management decisions. While the perspectives may differ for the manufacturer and their suppliers, both can benefit greatly from using COO analyses in a "win-win" manner. The supplier who provides the most value will ultimately win in the marketplace. The following questions identify some business decision opportunities for applying COO analyses:

- Which supplier provides the most cost-effective tool or consumable?
- Should we purchase a higher capacity tool to support future production?
- What is the impact of a change in materials at a process step?
- What is the impact of a component change or upgrade in a process tool?
- Does the equipment upgrade provide a positive return on investment?
- Which yield improvement project has the highest overall value?
- What is the impact of process parameter changes?
- What is the impact of changes to equipment operating conditions?

- What are the costs of idle time, down time, and setup time?
- Should we replace an existing tool with a new tool?

Cost of ownership can be applied to many different situations involving equipment, processes, and materials. The benefit of these analyses is applicable to both suppliers and manufacturers. The areas typically examined from a COO perspective are:

- Product benchmarking
- Competitive analysis
- Materials, components, and subsystem impacts
- Project prioritization
- Technology evaluation and manufacturing approach
- Process and manufacturing optimization
- New factory planning

In the end, cost of ownership proves a highly leveraged value to both the supplier and end use communities by tying their technical, operational, and strategic decisions to the bottom line.

Will the Last Person Off the Test Floor Please Turn Off the Lights!

By Paul M. Sakamoto
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Almost 30 years ago, while on a visit to Seattle, Wash., home of the suffering Boeing Corp., I saw a billboard inscribed, "Will the last person leaving Seattle please turn out the lights?"

A severe recession, paired with a local economy totally dependent on aerospace, had gutted the Seattle economy. Two local businessmen, with a touch of irony in their humor," suggested in this billboard that it would be nice if the citizenry didn't leave any extra energy bills as they exited the city.

Today, many of us live in places like Hsinchu, Taiwan, and Silicon Valley, Calif., where the local economy has been booming for years, but is now totally stagnant due to its dependence on semiconductors and high technology.

Instead of waiting until the situation is so bad that we all have to leave, however, someone is already turning out the lights. And, the lights that are staying on are costing a lot more to keep lit.

What does this have to do with IC testing?

Changing Concerns

Until now, the cost of test has been dominated by the cost of acquisition and unit throughput. On the second tier were issues of floor space requirements. Finally, and of least importance in generating a test cost model, were items like the cost of electricity. This cost includes not only the amount consumed, but also the initial costs of routing power and air conditioning during an ATE installation.

Today, I would suggest, this is changing in a dramatic way. The cost of power can double in a short time if demand runs up tight against supply. And for some users, power has done worse than double.

What does this mean? For high-power ATE, greater than 20-kilowatt systems, for example, energy costs can suddenly become a top-level concern.

The price of high-power ATE hides costs outside of direct consumption. Don't forget that a more power-hungry system emits more heat than a lower-power piece of equipment, which therefore adds to the power draw of the associated air-conditioning systems in the facility. Even if the system is liquid-cooled, it still needs a support system that conducts the heat away.

The countermeasure against all this new-age energy expense is the use of lower-power equipment. Simply put, the savings can be dramatic.

For instance, a memory tester of the mid-to-late '80s vintage consumes between 20-25 kilowatts. That tester can handle about eight memories in parallel. Today, a 32-site modern memory tester consumes about eight kilowatts. That's right! It's more than 12X more energy efficient. And don't forget, the modern tester is also twice as fast.

There are similar gains available in logic and mixed-signal test. In addition, because these newer machines can test many more devices in parallel, they need fewer high-temperature handlers with their resulting high energy consumption and heat emissions.

Combine the impact of lower power consumption and higher density on the floor space needed (and the associated power for environmental control of a smaller area), and there is a very compelling argument for newer, higher-efficiency equipment.

Bottom-Line Costs

What this all means to bottom-line costs is that the use of older ATE equipment makes sense only in the cost of acquisition. The real running cost is probably unsatisfactory, at best, and possibly very bad with today's high cost of energy.

So, the next time the power on your test floor blacks out, and the testers shut down, leave the power-hungry ones off when the lights come back on. And if the recession continues too long, will the last one off the test floor please turn out the lights!

Mr. Sakamoto is vice president and general manager of the Memory Products Division at Credence Systems Corp., Fremont, Calif.

Strategic Marketing Associates Releases More Powerful Version of World Fab Watch

(Santa Cruz, CA) - Strategic Marketing Associates has announced that it is shipping an enhanced version of World Fab Watch, the semiconductor industry's database of new and existing wafer fabs. World Fab Watch does not present information as just a list but also presents it in easy to read charts and tables of analyses. The questions industry insiders need answered are now preformatted for instantaneous review: Where are the new fabs being built? How much 300mm capacity will be on line by the end of this year? How much capacity are the foundries adding?

"Our job at Strategic Marketing Associates is to obtain accurate fab information and transmit it to the semiconductor industry," states George Burns, President of Strategic Marketing Associates. "Our fab database, World Fab Watch, which is distributed both by Strategic Marketing Associates and SEMI has set new standards for what a database can provide."

"All of this information, and more, is now in one Excel spreadsheet. Thanks to the software design work by Wright Williams & Kelly, we now spend much less time, significantly less time, moving and formatting data. Once we get the information from our chip company contacts, all we do is put it in the database, push a button and it all comes out formatted and ready for our customers to use. Finally, software that performs as promised."

"Our custom software consulting group is very pleased to have been associated with this project. World Fab Watch is a fundamental part of the decision making processes in the semiconductor industry," stated David Jimenez, President of Wright Williams & Kelly. "Our mission on both standard products, like our industry standard cost of ownership software TWO COOL®, and with custom software is to positively impact our customers' business processes by increasing their productivity and lowering their cost base. I am very glad to see that we have been able to accomplish this once again with Strategic Marketing Associates."

Strategic Marketing Associates' clients include the major semiconductor manufacturers, fabless semiconductor companies, fab builders, equipment companies, materials companies, development agencies, and financial institutions. The fab is where it all comes together. For the wafer fabrication information you need, Strategic Marketing Associates brings it all together and brings it all to you.