

# News

FROM THE FIELD

well as ways to verify information from computer models used in semiconductor design and manufacturing.

NIST publishes a variety of reports that outline various industry standards and measurements. It will do the same with findings from this most recent project, Hebner says.

"From [NIST's] point of view, it's going to be standards," he says, referring to the main thrust of the study. "You have to have the ability to measure, so that you can make the next-generation devices. We have to have the measurement technology in place in advance, so that the circuit designers and system designers can make circuits that they can build full scale."

"We have different missions from the government," agrees Alzheimer.

Sandia works mainly in the areas of development and design. NIST comes up with the measurements and Sandia, which works mainly in the areas of development and design, experiments to see if they work—a logical and practical combination, as Alzheimer puts it.

The third member of this marriage, of sorts—the semiconductor industry—may produce the suggested components. As Hebner puts it, industry input will yield the quickest and most concrete results toward improving the semiconductor arena and, ultimately, the U.S. economy.

"We're all focusing on what can and should be done to help the U.S. economy," says Hebner, "and to help U.S. companies be successful and competitive in the world market."

## LASER SYSTEMS TO SEE STRONGER GROWTH IN THE '90s

BY MARTY WEIL

**S**ignificant new applications will continue to emerge for different varieties of lasers, fueling a steady—if modest—growth rate in the laser systems market, states a recent report by Frost & Sullivan/Market Intelligence Research Corp. (Mountain View, CA).

According to the market research firm, the world laser systems market will experience an 8% annual growth rate throughout the the decade. The report predicts the \$1.4 billion laser industry will grow to more than \$2.2 billion by the end of 1999.

"In the aftermath of the recent worldwide recession, this report should come as very good news for the laser industry," says Ken Herbert, industry analyst for Frost & Sullivan/MIRC. "With the laser market so diverse, it's hard to predict what areas will see the most growth, but there is likely to be strong growth in some laser applications in the next two to three years."

Frost & Sullivan/MIRC contacted more than 75 leading laser, system, and component manufacturers, as well as end users, to formulate its

predictions. According to the report, share of revenue generated by industrial laser systems will increase from 88.5% of the total (in 1992) to 91% by the start of the 21st century. The share in scientific applications will correspondingly decline, the study says.

"Even though revenue share will decrease for scientific applications, this doesn't mean there won't be some growth in this area," says Herbert. "As the industrial market matures, we expect to see renewed efforts in areas of scientific research that could push the scientific laser market."

Frost & Sullivan/MIRC also expects the worldwide economic recovery to ease the severe price-cutting that has undermined profit margins in the laser market.

The report verifies the continuous consolidation shaping the laser industry worldwide. Many firms have been pushed toward mergers or partnerships to expand their product lines and capabilities. The industry will grow increasingly global, with firms throughout the world pushing for a stronger presence in other regions.

The emerging applications for different types of lasers described in the report include desktop manufacturing

and engraving for low-power, industrial CO<sup>2</sup> lasers; optical storage and retrieval for diode lasers; and industrial applications for tunable, solid-state lasers. And while new laser technologies open new markets and applications, the Frost & Sullivan/Market Intelligence findings report that they may come at the expense of existing laser technologies

## PLASTIC MOLDER GOES FOR SEMICONDUCTOR PRECISION

BY RICK COOK

**W**ith the help of six companies on three continents, Tech Medical (Tempe, AZ) can now mold plastic parts to tolerances of 15 microns. This past June, Tech Medical, a subsidiary of the Tech Group (Scottsdale, AZ), dedicated its new precision molding plant, which the company says can mold polypropylene and other plastics to previously unheard-of tolerances.

Simultaneously, the company announced the formation of an "Alliance of Continuing Technology Advancement" with Fanuc Corp. of Japan and Cincinnati Milacron (Cincinnati, OH) to continue to push the limits of precision plastic molding. The next goal is to get the process down to 10-micron tolerances and ultimately to 5 microns.

Outside of the semiconductor business, almost no one measures tolerances in microns, especially not for finished parts and particularly not in the plastics industry. Many plastics shrink after molding. Fifteen microns, which are a millionth of a meter or about 0.000039 of an inch, are about one-fifth the width of a human hair.

The key to Tech Medical's two-and-a-half-year drive to produce micron-size tolerances was the adoption of semiconductor-style manufacturing

shop floor—like recipe management, scheduling, statistical process control, instructions on routing—you have to have a network,” says Dick Deininger, director of Sematech. “Ethernet by itself is not adequate in a fully distributed way. For instance, one tool may be sending a lot of information, while others send only a little.

“Teknekron’s information bus takes the standard Ethernet highway, which I’ll call a two-lane highway, and makes it a 10-lane superhighway. It is a facilitating technology. TIB allows you to link older legacy systems like data structure and financials—you don’t want to have to change all of this over to a new system—and allows them to operate over the bus,” Deininger says. “TIB takes a network and gives it more capacity, allows it to run more sophisticated applications, and allows you to interconnect hundreds of pieces of process equipment.”

A key advantage of the TIB platform is that manufacturers can utilize

this new technology without having to substantially reinvest in new equipment. Teknekron has already made adapters available that integrate products such as Promis by Promis Systems Corp. (Santa Clara, CA) and WorkStream by Consilium Inc. (Mountain View, CA) into the TIB system. More product-specific adapters are on the way, according to JoMei Chang, vice president and general manager of manufacturing systems at Teknekron. She also points out that the Manufacturing WorkBench application is actually a visual programming tool for users.

“One important aspect about TIB is that it provides users with a migration path from their existing technology into the future,” says Chang. “It is very seldom that, when we go into an environment, the customer can afford to start from scratch. TIB can integrate the old technology, and at the same time provide the customer with a way to get into new developments.”

and electrical engineering laboratory. “At the same time, the government is coming together with its funded programs to say, ‘This is what the industry broadly thinks it needs. How do our programs match those needs?’”

The plan was devised to bring practical information to the semiconductor industry, as well as to solicit its help in defining areas that need work. Both NIST and Sandia already have semiconductor projects in place, and participate with the industry in cooperative research and development agreements. Many research findings are made available through a voluntary standards system.

“So far, we haven’t identified duplication [between NIST and Sandia],” says Bill Alzheimer, Ph.D., director of Sandia’s Advanced Manufacturing Technology Center. “I think it’s going to be more strengthening. Not every company can afford to do all of the research.”

The initial phase of the project will concentrate on microelectronics research. This will deal with two key areas: semiconductor packaging and manufacturing process control. Both were cited in an industry “road map,” put together by the Semiconductor Industry Association (San Jose, CA). The plan identifies packaging and process control as segments pivotal to industry success over the next 15 years. Both NIST and Sandia participated in putting that plan together.

Future plans for this cooperative venture include research into the characterization of lithography tools, as

## NIST AND SANDIA JOIN FORCES WITH THE SEMICONDUCTOR INDUSTRY

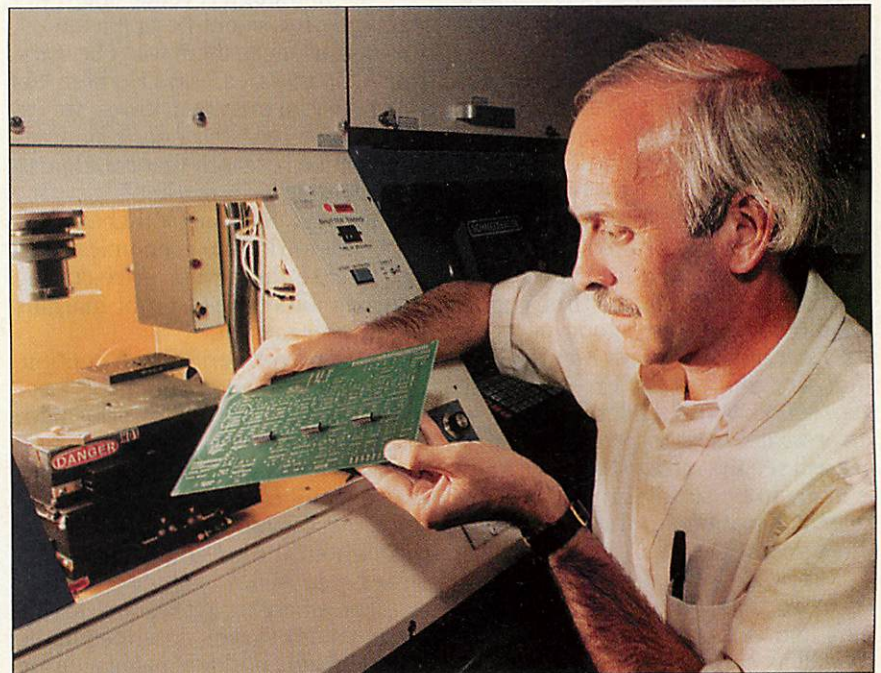
BY MICHELE O’KEEFE

Strategic alliance isn’t just a catch phrase in the private sector—now it’s affecting government agencies, as well. In an effort to boost industry strength, the U.S. Department of Commerce, the Energy Department, and the semiconductor industry recently announced a joint research project in microelectronics, advanced manufacturing, materials, and standards.

The project will bring together the National Institute of Standards and Technology (NIST, Gaithersburg, MD), which is the Commerce department’s research facility, and the Energy Department’s Sandia National Laboratories (Albuquerque, NM). The effort has been characterized as one that will be beneficial to both laboratories and to private industry.

“We have an almost spontaneous effort by the industry to come to-

gether by itself to say, ‘What technology do we need and how are we going to get it?’,” says Robert Hebner, Ph.D., NIST’s deputy director of electronics



*NIST and Sandia will share research with manufacturing and materials industries to aid U.S. industrial competitiveness.*

Photo courtesy: Sandia National Laboratories