NUMERICAL TECHNOLOGIES INC
Form 10-K
February 19, 2002

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM 10-K

(Mark One)

x **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE FISCAL YEAR ENDED DECEMBER 31, 2001**

OR

¨ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO**

Commission file number: 000-30005

NUMERICAL TECHNOLOGIES, INC.

(Exact Name of Registrant as Specified in Its Charter)

Delaware	**94-3232104**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification Number)**
70 West Plumeria Drive San Jose, California	**95134-2134**
(Address of Principal Executive Offices)	**(Zip Code)**

Registrant s Telephone Number, Including Area Code:
(408) 919-1910

Securities registered pursuant to Section 12(g) of the Act:
Common Stock, par value $0.0001 per share.

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant s knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ¨

Aggregate market value of the voting common stock held by nonaffiliates of the registrant as of January 31, 2002: $357,318,646

Number of shares outstanding of the registrant s common stock, $0.0001 par value, as of January 31, 2002: 33,640,097

DOCUMENTS INCORPORATED BY REFERENCE:

Portions of the definitive Proxy Statement for Numerical Technologies, Inc. s Annual Meeting of Stockholders to be held on May 15, 2002 are incorporated by reference into Part III of this Form 10-K.

NUMERICAL TECHNOLOGIES, INC.

Form 10-K Annual Report
For the Fiscal Year Ended December 31, 2001

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UNLESS OTHERWISE INDICATED, REFERENCES TO COMPANY MEAN NUMERICAL TECHNOLOGIES, INC. AND ITS SUBSIDIARIES.

Certain information contained or incorporated by reference in this Annual Report on Form 10-K is forward-looking in nature. All statements included or incorporated by reference in this Annual Report on Form 10-K or made by management of Numerical Technologies, Inc. and its subsidiaries (collectively, Numerical , except as otherwise set forth herein), other than statements of historical fact, are forward-looking statements. Examples of forward-looking statements include statements regarding Numerical s future financial results, operating results, business strategies, projected costs, products, competitive positions and plans and objectives of management for future operations. In some cases, forward-looking statements can be identified by terminology such as may, will, should, would, expects, plans, anticipates, believes, estimates, predicts, potential, continue, or the negative of these terms or other comparable terminology. Any expectations based on these forward-looking statements are subject to risks and uncertainties and other important factors, including without limitation those discussed in the section entitled Item 7: Management s Discussion and Analysis Trends, Risks and Uncertainties . These and many other factors could affect Numerical s future financial and operating results, and could cause actual results to differ materially from current expectations.

PART I

Item 1: Business

We are a leading commercial provider of proprietary technologies and software products that enable the design and manufacture of subwavelength semiconductors. We offer a comprehensive solution that enables the production of smaller, faster and cheaper semiconductors using current generation equipment. We believe this solution enables our customers and industry partners to realize increased return-on-investment, and deliver new high-performance semiconductors more quickly than other commercially viable solutions.

Our patented phase-shifting technology, combined with our proprietary optical proximity correction (OPC) and process modeling technologies, form the foundation of our subwavelength solution. Our comprehensive subwavelength solution integrates these technologies into each key stage of semiconductor manufacturing to form an integrated design-to-silicon flow. We believe that our technology leadership and relationships with leading companies within the semiconductor industry will drive the adoption of our solutions as the industry standard.

We have currently licensed our proprietary technologies for production use to Intel, Fujitsu, Motorola, Texas Instruments and United Microelectronics Corporation (UMC). MIT Lincoln Laboratories (MIT), a research facility, has demonstrated the future potential of our proprietary technologies by producing 0.009-micron features. Our other industry partners and customers include Applied Materials, Cadence, Canon, Dai Nippon Printing, DuPont Photomask, KLA-Tencor, Nikon, Photronics, Simplex, Taiwan Semiconductor Corporation (TSMC), Toshiba and Zygo.

Industry Background

Businesses and individuals increasingly rely on electronic products and systems powered by semiconductors. These products and systems include desktop and portable personal computers, mobile phones, Internet appliances, video game consoles, and high-speed networking and communications products that serve as the backbone of the Internet. Growing recognition of the benefits of advances in electronics, including enhanced productivity and communications capability, drives demand for higher performance, lower cost, smaller and more power efficient products with greater functionality. To meet this demand, manufacturers of electronic products and systems require an increasing supply of faster, cheaper and more power efficient semiconductors. The Semiconductor Industry Association estimated, in its November 2001 report, that the worldwide market for semiconductors will grow from $141 billion in 2001 to $218 billion in 2004, or 55%. Delivering these advanced semiconductors will require rapid advances in integrated circuit (IC) design and manufacturing technologies.

The Historical March to Smaller Feature Sizes and Systems-on-a-Chip

The ability to produce advanced ICs depends on developing technology that enables the design and manufacture of semiconductors with smaller feature sizes. A semiconductor s feature size relates to the size of circuit components in the device and is measured in microns, or millionths of a meter. Advanced semiconductors today have feature sizes of 0.07 to 0.13 micron. To illustrate how small these features are, when placed side by side, one thousand 0.10 micron transistors can fit within the width of a single human hair. Smaller feature sizes significantly increase performance while decreasing the size, cost and power consumption of semiconductors. Smaller feature sizes also allow multiple components, such as microprocessors, memory, analog components and digital signal processors, to be integrated into a single semiconductor. The resulting complex semiconductor, commonly referred to as system-on-a-chip, offers significant performance, cost, power and reliability benefits over systems that require multiple semiconductors to perform the same tasks.

Advances in semiconductor design and manufacturing technologies enabled reductions in feature sizes from 3.0 micron in 1980 to 0.07 micron and smaller in today s advanced production fabrication facilities. These advances led to significant improvements in electronic systems and products. For example, today s cellular phones compared to those of a few years ago have a battery life of days instead of hours, weigh ounces instead of pounds and can be produced at a fraction of the price. In addition, today s cellular phones have many times the computing power of the most advanced personal computer in 1980.

To date, the semiconductor industry relied upon advances in semiconductor equipment to produce smaller feature sizes on semiconductors. However, to fully realize the benefits of smaller feature sizes, significant advances have also been required in each of the following key stages of the semiconductor design-to-silicon flow:

Semiconductor Design Tools. A variety of complex software programs used to design, simulate and verify semiconductor designs.

Photomasks. Templates used to transfer images of electronic circuits to silicon wafers.

Semiconductor Equipment. Sophisticated equipment used to manufacture semiconductors.

Semiconductor Manufacturing. Complex processes required to create semiconductors on silicon.

Historically, leading semiconductor companies designed, manufactured and tested their semiconductors in their own facilities using internally developed tools. The growing complexity of the design and manufacturing processes and the escalating cost of manufacturing facilities resulted in a disaggregation of the semiconductor industry into companies separately focusing on each individual stage of the design-to-silicon flow. This disaggregation is fueling the rapid growth of fabless semiconductor companies, which do not own or operate their own semiconductor fabrication facilities, design tool vendors, semiconductor equipment manufacturers and third-party semiconductor manufacturers, or foundries. Each of these industry markets faces significant challenges as feature sizes continue to decrease.

The Subwavelength Challenge

Semiconductor manufacturing equipment transmits light at a specific wavelength through a photomask to create images of IC patterns on a semiconductor. This process is referred to as photolithography or optical lithography. At feature sizes below 0.25 micron, the semiconductor industry reached a critical technology transition. At and above 0.25 micron, the wavelength of light used is smaller than the IC features. However, at 0.18 micron and below, the wavelength of light used in production semiconductor manufacturing equipment is significantly larger than the IC features, resulting in image quality that degrades rapidly. This is like trying to paint a one-inch line with a four-inch paintbrush. This growing disparity between feature sizes and wavelength of light is referred to as the subwavelength gap. As a result, manufacturers in the industry cannot produce semiconductors with feature sizes of 0.18 micron and smaller with acceptable yield levels using traditional

technologies. Furthermore, as the demand for reduced feature sizes continues to outpace the reduction in wavelengths used by available equipment, this subwavelength gap will widen.

In its 2001 International Technology Roadmap, the Semiconductor Industry Association predicted that the semiconductor industry would introduce microprocessors with 0.053 micron feature sizes for semiconductors by the end of 2002 and 0.070 micron random access memory chips, or DRAM, by the end of 2006. Advances in manufacturing equipment technology alone can no longer enable the progression to smaller feature sizes and we do not expect alternative, non-optical manufacturing processes to be commercially viable for many years. As a result, the semiconductor industry must develop and integrate new subwavelength solutions into all aspects of the design-to-silicon flow.

Our Solution

We are a leading commercial provider of proprietary technologies and software products that enable the design and manufacture of subwavelength semiconductors using existing design tools and semiconductor equipment. We know of no other commercially proven technology that can be used for volume production of semiconductors with feature sizes of .07 micron. Our comprehensive solution addresses each key stage of the design-to-silicon flow, including physical design, design verification, manufacturing data preparation, photomask manufacturing inspection and photolithography. By offering a subwavelength solution that is used in every stage of the semiconductor design and manufacturing process, we integrate the entire design-to-silicon flow for subwavelength ICs.

Our patented phase shifting and proprietary OPC and process modeling technologies serve as the foundation for our subwavelength solution. Our subwavelength solution leverages our expertise in semiconductor and photomask manufacturing processes, semiconductor equipment, IC design, software development and subwavelength technologies.

Our proprietary technologies and software products are designed to offer the following key benefits:

Proven Path to Smaller, Faster, Cheaper and Power Efficient Devices. Our industry partners and customers have demonstrated the success of our proprietary technologies and software products. For example, Motorola used our phase shifting technology and software to enable its 0.18 micron wafer fabrication facilities to produce 0.10 micron features. In January 2001, UMC announced plans to use our phase shifting technology for the production of 0.07 features. In April 2001, Intel licensed the rights to use our patented phase shifting technology in production. In May 2001, Fujitsu licensed the rights to use our patented technology in production. Further, in March 2001, MIT, a research facility, demonstrated the future potential of our technologies and products by successfully creating 0.009 micron features. MIT used our phase shifting technology and standard 0.25 micron semiconductor manufacturing equipment.

Accelerate Time to Market. In today s economy, semiconductor manufacturers can achieve a significant market advantage by being the first to introduce more advanced semiconductors. Introducing next generation semiconductors has historically required the semiconductor industry to install new equipment or to construct new

manufacturing facilities, which may take up to three years to complete. Our phase shifting technology and software products enable companies to use existing equipment to produce smaller, faster and more power efficient semiconductors, thereby enabling them to introduce new products more rapidly.

Increase Return on Capital Equipment Investment. We design our proprietary technologies and software products to enable existing semiconductor manufacturing equipment to produce subwavelength ICs. Using our technologies and products, semiconductor manufacturers will not be required to spend up to billions of dollars to produce ICs with smaller and smaller feature sizes. As a result, these semiconductor manufacturers can significantly increase their return on invested capital. Furthermore, we believe that the use of our proprietary technologies and software products results in higher manufacturing yields.

Integrate the Key Stages of the Design-to-Silicon Flow. We design our proprietary technologies and software products on a common platform and architecture, which are implemented in key stages of the design-to-silicon flow. Our software products utilize a common process modeling and simulation technique that allows the tools and equipment used in subsequent stages to understand and process the results generated by each of the prior stages. For example, the separate tools and equipment used to design, verify and manufacture semiconductors can coordinate with each other to ensure an accurate design-to-silicon flow. This coordination is particularly critical in the semiconductor industry, which has disaggregated into different companies that specialize in separate key stages of the design-to-silicon flow. We believe this is necessary to the successful production of subwavelength semiconductors.

Our Strategy

Our objective is to establish our proprietary technologies and software products as the industry standard for the design and manufacture of subwavelength semiconductors. Key elements of our strategy include the following:

Drive Continued Adoption of Our Subwavelength Solution

Expand Relationships with Our Industry Partners

Leverage Our Comprehensive Platform

Leverage Our Market Position in Manufacturing Data Preparation Products

Leverage Our Market Position in Standard Cell Layout Creation

Integrate Subwavelength Technology into the Design Automation Flow

Extend Technology Leadership Position

Maintain Time-Based Software and Intellectual Property Licensing Models

Drive Continued Adoption of Our Subwavelength Solution. We seek to proliferate our proprietary technologies and software products as the solution to the subwavelength gap problem. As part of this strategy, we intend to continue to expand our relationships with leading integrated device manufacturers, or IDMs, such as Motorola and Texas Instruments, and leading foundries such as TSMC and UMC. Due to the increasing proportion of semiconductors manufactured at foundries, we intend to increasingly focus our efforts on establishing our patented phase shifting technologies as the standard at TSMC, UMC and other foundries to further drive the adoption of our subwavelength solution by each of the other participants in the design-to-silicon flow. We believe that semiconductor manufacturers, including IDMs and foundries, must first adopt our proprietary technologies in order to drive adoption of our technologies by the other participants within the design-to-silicon flow. If these manufacturers do not perceive our proprietary technologies and software products as a viable solution to the subwavelength gap problem, our technologies and products may become more difficult to license to such manufacturers and this may limit the adoption of our subwavelength solution by the other participants in the design-to-silicon flow.

Expand Relationships with Our Industry Partners. We intend to strengthen and expand our industry partner relationships with the leading companies within each stage of the design-to-silicon flow. To date, we have developed relationships with semiconductor design tool vendors such as Cadence and Simplex, photomask manufacturers such as Dupont Photomask, Dai Nippon Printing and Photronics, and semiconductor equipment manufacturers such as Applied Materials, KLA-Tencor and Zygo. We believe that these broad-based industry relationships will help to proliferate our proprietary technologies and software products as the industry standard. We must expend significant management, sales and our other limited resources in order to expand and strengthen these relationships. Our ability to successfully do so is dependent upon our industry partners not developing their own solutions to the subwavelength gap problem, or our competitors offering better terms or pricing conditions to our industry partners.

Leverage Our Comprehensive Platform. We intend to leverage the common platform of our proprietary technologies and software products to aggressively market our products to each key market in the semiconductor industry. This common platform enables data and information regarding subwavelength designs to be shared by participants in each key stage of the design-to-silicon flow. Because our proprietary technologies and software products ensure the accurate and consistent communication of subwavelength design and process data, each participant in the design-to-silicon flow benefits from their use. In order for us to be successful in aggressively marketing our technologies and products to each key market of the design-to-silicon flow, we must continue to ensure that we design such technologies and products so that each key market can work efficiently with the other markets.

Leverage Our Market Position in Manufacturing Data Preparation Products. The vast majority of semiconductor, photomask and semiconductor equipment manufacturers and foundries use our manufacturing data preparation software as the essential link between the design and production stages of the design-to-silicon flow. We intend to build on this market position in manufacturing data preparation to market our subwavelength proprietary technologies and software products to these customers. Our manufacturing data preparation software competes with current and future products in this stage of the design-to-silicon flow. We may need to take various steps, including without limitation reducing prices, in order to remain competitive in the market for mask data preparation software.

Leverage Our Market Position in Standard Cell Layout Creation. We intend to strengthen and continue to build upon our position as the leading provider of automated layout creation technology for standard cell libraries used in semi-custom, and custom integrated circuits (ICs). Cell layouts are the primary means of transferring information about new process technology to the design flow. We believe the layout creation capability coupled with our subwavelength technologies will speed the mainstream adoption of our phase-shifting technology by the semiconductor industry.

Integrate Our Subwavelength Technologies into the Design Automation Flow. Through our acquisition of Cadabra Design, we acquired one of the most widely used solutions for the automated creation of the layouts for standard cells required for IC design. These cells communicate process information to automated design tools. We intend to integrate our proprietary technologies into the Cadabra solution in order to offer design teams fast access to the processes that incorporate our subwavelength technologies. In order to be successful in integrating our proprietary technologies with the Cadabra solution, we must focus our research and development efforts in order for the integrated solution to function correctly and efficiently. We must also focus our sales and marketing efforts to emphasize to semiconductor manufacturers the benefits of purchasing this integrated solution.

Extend Technology Leadership Position. We believe we were among the first to recognize that the subwavelength gap would represent a significant challenge to continued advances in semiconductor technology. To capitalize on this business opportunity, we engaged in significant research and development activities over the past six years, pioneering manufacturable phase shifting technologies that we believe are the key to bridging the subwavelength gap. We assembled a strong team of subwavelength experts, many of whom have graduate technical degrees, and we intend to continue expanding our research and development efforts to further enhance our proprietary technologies.

Maintain Time-Based Software and Intellectual Property Licensing Models. Our business model allows us to build on the sales and marketing efforts of our industry partners, which resell, market and promote our technologies and products. We seek to generate the majority of our future revenue through time-based license fees, intellectual property licensing agreements and other innovative, ongoing agreements with IDMs, foundries and reseller licensees. Our ability to generate this revenue depends on industry acceptance of such agreements and licensing models as well as our ability to protect our proprietary technologies.

Technology

As feature sizes decreased to dimensions smaller than the wavelength of light used in optical lithography equipment, phase shifting and OPC technologies became critical to the continued growth of the semiconductor industry. Widespread deployment of subwavelength technologies requires the industry to create an efficient and integrated IC design and manufacturing process and to introduce new technologies into several stages of the design-to-silicon flow. Our proprietary technologies and software products allow IC designers, as well as manufacturers of photomasks, semiconductor equipment and semiconductor devices, to successfully deploy phase shifting and OPC technologies. We believe we are the only company exclusively focused on delivering a comprehensive solution that enables the design and manufacture of subwavelength ICs.

Phase Shifting

The foundation of our subwavelength process technologies lies in our phase shifting technology, which manipulates light waves to produce high-resolution images of subwavelength IC features. Our phase shifting technology sequences positive and negative light wave patterns to prevent interfering waves from causing the image on silicon to blur or disappear entirely. This enables designers and manufacturers to create IC features that are less than half the size of those that can be produced using conventional optical lithography techniques. Our phase shifting technology also dramatically reduces sensitivity to variations in the manufacturing process such as focus deviations and lens imperfections, significantly improving manufacturing yields. We developed the industry s first production-worthy, commercial phase shifting technology by combining the multidisciplinary expertise of our scientists and engineers and investing significantly in joint research and development activities with leading photomask and semiconductor manufacturers.

Optical Proximity Correction

Our OPC technologies embed corrective features in the IC design and photomask to reduce image distortions caused by interfering light waves. We developed these technologies in close collaboration with photomask and semiconductor manufacturers to improve photomask manufacturability without sacrificing performance. Our OPC technologies focus on correcting distortions in semiconductor features that would most affect the semiconductor s performance. OPC makes it possible to obtain an IC pattern that more closely resembles the original desired design. However, as feature sizes continue to decrease, OPC is no longer sufficient to ensure acceptable manufacturing yields. At these smaller feature sizes, semiconductor manufacturers will employ both OPC and phase shifting process technologies.

Process Modeling and Simulation

Historically, the designed layout of a semiconductor, its representation on the photomask and the corresponding features on the semiconductor were essentially identical. At subwavelength feature sizes, this relationship no longer exists. As a result of distortions created during the manufacturing process and the application of phase shifting and OPC, the design of a semiconductor, its representation on the photomask and the pattern transferred to the semiconductor all look different. We developed proprietary process modeling and simulation technologies that recharacterize the relationship between device design, photomask pattern and semiconductor features. This recharacterized relationship allows designers and manufacturers to more accurately translate designs and photomasks to final semiconductors. Semiconductor manufacturers can calibrate our process models to more accurately characterize their specific processes and use them in our software products throughout the design-to-silicon flow. Manufacturers can use a common process model throughout the design-to-silicon flow to facilitate consistency in the communication of process and design data.

Automated Transistor Layout (ATL)

In the process of designing ICs, it is very important to effectively and automatically communicate process requirements into the IC design flow. Traditionally, this has been done through a library of cells for IC designs. These libraries have, in the past, been created through an intensive, manual process. With the advent of subwavelength processes, however, the design of libraries becomes much more complex. Phase shifting information and OPC effects must be considered in the library design process. Through our acquisition of Cadabra, we offer technology that automates the creation of layouts of these cells, saving both time and engineering resources.

Implementation Technologies

We developed or acquired several technologies necessary to implement the mainstream design and manufacturing use of phase shifting and OPC technologies. These include:

design automation algorithms for phase shifting and OPC;

hierarchical design data management technologies;

subwavelength design verification technologies;

photomask defect analysis technologies;

high-performance process simulation algorithms and process model calibration technologies;

algorithms for manufacturing data preparation; and

algorithms to automatically create and optimize layouts of the standard cells required for IC design.

Products

We offer technology products, software products and services that together provide a comprehensive subwavelength design-to-silicon solution.

Technology Products

Phase Shifting Technology. Our phase shifting technology licenses allow the licensee to produce subwavelength semiconductor devices using our proprietary technology. We offer limited use research and development licenses that allow the licensee to use our proprietary technology for pre-production purposes. We also offer production licenses of our phase shifting technology that are time based, or are licensed per fabrication facility or per device produced.

Subwavelength Process Development. We offer a comprehensive implementation package that includes a development plan, calibration and test photomasks and on-site customer assistance to develop advanced subwavelength manufacturing processes using our phase shifting and OPC technologies and software products. Our engineers and scientists work on-site at our customers fabrication facilities to develop these processes and generate design rules, calibrated models and associated design-to-silicon flows.

Software Products

We offer a comprehensive suite of complex integrated software products that all of the key markets within the semiconductor industry can use. These markets use our software products independently or integrate them with IC design tools, and photomask and semiconductor manufacturing equipment. Our products address the needs of subwavelength design and manufacture in five key sectors of the design-to-silicon flow:

Sector	Products	Applications
Library Development	Cadabra	Automate the creation and optimization of standard cells layouts used for IC design
Physical Design and Post-Layout Data Processing	iNPhase SiVL iNTandem	Ensure compatibility of semiconductor designs with subwavelength processes Create phase shifted and OPC device design layout Verify silicon performance of designs Hybrid OPC software to enable manufacturability of semiconductor designs Generate calibrated process models and design rules for phase shift and OPC processes
Manufacturing Data Preparation and Photomask Manufacturing	CATS Photolynx	Process design data required to fabricate and inspect photomasks Verify input data, manufacturing processing and photomask layout Convert photomask design data to formats required by specific photomask manufacturing equipment Verify photomask and wafer manufacturability Hybrid OPC software integrated in a data preparation environment to enable manufacturability of semiconductor designs Optimize mask and wafer fabrication process parameters
Photomask Inspection and Measurement	Virtual Stepper i-Virtual Stepper	Characterize located photomask defects Transcribe and transfer design data to photomask and wafer inspection and measurement equipment
IC Fabrication and Process Development	IC Workbench SiVL	Optimize fabrication process parameters Verify silicon performance of designs

Each of these products is described below.

Library Development

Cadabra. Our Cadabra product line automates the creation and optimization of standard cell layouts used in IC design. These cells act as the communication vehicle for manufacturing process requirements to design tools. These Cadabra products allow us to integrate our proprietary subwavelength technologies into the design flow in a manner that is transparent to designers.

Physical Design and Post-Layout Data Processing Products

iNPhase. Our iNPhase product automates and integrates the design, verification and OPC functions of our phase shifting technology. iNPhase also verifies that the semiconductor design is free of phase conflicts, or design configurations that could result in manufacturing failures.

SiVL. Our silicon-versus-layout product utilizes our proprietary process simulation technologies to verify that conventional, phase shifting and OPC designs produce printed IC patterns within specified tolerances. By predicting silicon level failures, SiVL reduces or eliminates the need to repeat the design and manufacturing process. SiVL integrates with tools used to verify that the IC patterns are within specified tolerances.

iNTandem. Our iNTandem product automatically corrects designs for process-induced distortions or subwavelength features. iNTandem combines the application of our rule-based OPC engine with our model-based OPC engine into a Hybrid OPC use model.

Manufacturing Data Preparation and Photomask Manufacturing Products

CATS. This family of products includes products that automatically create different photomask layers by sizing and combining design layers. Our CATS products allow users to view the input and output data of the manufacturing data preparation process and verify photomask design accuracy using a combination of graphical algorithmic and query analyses. The CATS product line includes modules that automatically transcribes photomask layout data into input data formats for specific photomask manufacturing equipment. This line supports leading photomask equipment manufacturers, including Etec, Hitachi and Leica. The data is checked for variations from manufacturing requirements, including minimum widths, spacing and layer to layer errors.

Photolynx. Our Photolynx product integrates our OPC engine (available also in iNTandem) with CATS manufacturing data preparation environment to offer a combination of both our rule-based OPC technology as well as our model-based OPC technology as part of the mask data preparation step. Photolynx also includes Silicon vs. Layout verification capability to ensure mask data output produce printed IC patterns within specified tolerances. Furthermore, Photolynx includes our process simulation engine, which is used to simulate the final IC features corresponding to the mask as well as the capability to analyze and optimize IC manufacturing processes.

Photomask Inspection and Metrology Products

Virtual Stepper. This product allows photomask manufacturers to assess the impact of photomask defects on the silicon wafer. Photomask manufacturers using Virtual Stepper can determine photomask quality, improving their productivity and yield. The Stepper takes direct input from defect inspection and review equipment manufactured by leading equipment companies including Applied Materials, KLA-Tencor and Zygo.

i-Virtual Stepper. This product is the internet-enabled version of Virtual Stepper. By using i-Virtual Stepper, photomask manufacturers can determine photomask quality and improve their yield regardless of where the inspection equipment is located and regardless of where the other members of their team are located.

Semiconductor Fabrication and Process Development

IC Workbench. IC Workbench is an interactive process simulation, analysis and optimization tool. This product includes a graphical user interface, design data viewer and editor with real-time simulation feedback. This allows users to evaluate the impact of design and process parameters on the final silicon results while optimizing subwavelength processes.

Services

Design Services. We assist our industry partners and customers with semiconductor designs that use our phase shifting and OPC technologies. Our design services include creating phase shifted designs, applying OPC technology to designs and verifying the final design layout. Our design services help industry partners and customers adopt our technologies.

Technology Integration Services. We offer technology integration services to allow our industry partners to integrate our software products with their products for marketing to their customers. We develop software interfaces to semiconductor design tools and equipment to enable the necessary data communication to integrate the operation of the combined products.

Customers and industry partners

We license our proprietary technologies and software products to companies in key markets within the semiconductor industry. Our customers include licensees of our phase shifting technology and software, manufacturing data preparation software and silicon verification, photomask verification and automated layout creation software. Our industry partners integrate our technologies and software into their products and act as resellers. The following customers and/or industry partners accounted for annual license, maintenance and technical service revenue of at least $250,000 in either 2001, 2000 or 1999:

IDMs and Foundries
Agilent
Cypress Semiconductor
Delco
Hitachi
Hoya
Intel
Infineon
IBM
LSI Logic
Macronix
Matsushita
Motorola
NEC
Phillips
Qualcom
Samsung
Silicon Integrated Systems
SMIC
ST Microelectronics
Texas Instruments
Toshiba
TSMC
UMC
VLSI Technology

Design Tool Vendors
Cadence Design Systems
Synopsys

Semiconductor Equipment Manufacturers
Applied Materials
KLA-Tencor
Leica Micro
Zygo

Photomask Manufacturers
DuPont Photomask
Photronics
Toppan

Cadence and Intel represented 23% and 20%, respectively, of our total revenue for 2001. Cadence represented 24% of our total revenue for 2000. KLA-Tencor, Zygo and Cadence represented 23%, 17% and 16% of our total revenue for 1999, respectively. No other customer accounted for 10% or more of our revenue in 2001, 2000, or 1999.

Research and Development

Our future success will depend to a large extent on our ability to rapidly develop and introduce new proprietary technologies and software products and enhancements to our existing products. We have made and expect to continue to make substantial investments in research and development. We invested $16.2 million (33% of revenue) in 2001 in R&D for product development and engineering programs to improve or sustain existing product lines. The complexity of phase shifting and OPC technologies requires expertise in physical IC design and layout, photomask manufacturing, optical lithography, numerical algorithms and software development. We believe that the multidisciplinary expertise of our team of scientists and engineers will continue to advance the market and technological leadership. Our ability to advance the market and technological leadership is dependant upon our ability to retain our current team of scientists and engineers, as well as recruit new scientists and engineers with the requisite skill set to advance our proprietary technologies and software products. We must compete for some of these individuals in the very competitive Silicon Valley market, where our headquarters are located.

As of December 31, 2001, our engineering group consisted of 116 employees. These employees are focused on the following objectives:

Product Development. Our product development group is organized in teams around the different products we offer. A separate team within this group develops our common core technology and ensures that each product fits into this common architecture.

Advanced Research. Our advanced research group works independently from our product development group to assess and develop new technologies that meet the evolving needs of subwavelength design and manufacturing.

Product Engineering. Our product engineering group is primarily focused on product release, platform support, quality assurance and product documentation.

Sales and Marketing

We rely on our direct sales force and on our industry partner relationships to penetrate each key market of the semiconductor industry. Domestically, our direct sales force operates primarily out of our headquarters in California. We also employ sales personnel in Oregon, Virginia, Minnesota, and Texas. In addition, we have subsidiaries in Canada, Korea, Japan, Taiwan and The Netherlands, which work closely with resellers and partners. We intend to continue to expand our sales and support personnel both domestically and internationally. In order to do so, we must compete for some of our personnel in the very competitive Silicon Valley market where our headquarters are located. As of December 31, 2001, we had 64 employees involved in sales and marketing.

Our marketing personnel focus on developing our relationships with industry partners. Our industry partners include leading semiconductor equipment manufacturers, such as Applied Materials and KLA-Tencor, and design tool companies, such as Cadence. We also entered into joint-marketing relationships with leading photomask manufacturers, such as Dupont Photomask and Photronics. Our direct sales efforts have focused primarily on licensing to foundries and IDMs. To date, we have concentrated our sales and marketing efforts on selling research and development licenses. We have already entered into production licenses with leading semiconductor manufacturers. We expect to extend these efforts to generate production licenses as semiconductor manufacturers move into production of subwavelength ICs. However, in order to further extend our research and development licenses to production licenses, we must expend significant marketing resources, with no guarantee of success.

See Note 9 to the Financial Statements and Management s Discussion and Analysis of Financial Condition and Results of Operations for information regarding the geographic distribution of our revenue for 2001, 2000, and 1999. We are subject to risks associated with economic and political instability in certain foreign countries.

Competition

The semiconductor industry is highly competitive and characterized by rapidly changing design and process technologies. The market for phase shifting and OPC solutions is rapidly evolving and we expect competition to continue to increase. Our software products face direct competition from other providers of software tools for phase shifting, OPC and manufacturing data preparation and automated layout creation solutions, including Avant!, Mentor Graphics and Prolific, Inc. We also compete with companies that have developed or have the ability to develop their own proprietary phase shifting and OPC enabling solutions, such as IBM. Many of these companies are larger than we are, have greater financial or other resources than we do and therefore can withstand adverse market or economic conditions more readily than we can. We may also face competition from alternatives to current photolithography systems. In addition, commercially viable manufacturing processes that provide alternatives to our subwavelength solution may be developed in the future by existing or potential competitors. We believe that the principal competitive factors in our market include technology viability, product availability, performance, reliability, functionality, cost and customer service. We believe we compete favorably with respect to each of these factors. Our phase shifting, OPC, manufacturing data preparation and automated layout creation software products compete with existing and future products in the semiconductor manufacturing market. Recently, a competitor has introduced a mask data preparation software product. We may continue to take various steps, including without limitation reducing prices, in order to remain competitive in the market for data preparation software.

Business Combinations

On January 1, 2000, we acquired Transcription Enterprises Ltd. (Transcription), a company incorporated in California. Under the terms of the acquisition, we issued approximately 3,810,000 shares of Series E Convertible Preferred Stock and $40.0 million in notes payable for all of the outstanding stock of Transcription. The total purchase price was approximately $86.0 million, including acquisition costs of approximately $250,000. The Transcription acquisition was accounted for under the purchase method of accounting.

On October 27, 2000, we acquired Cadabra Design Automation, Inc. (Cadabra), a Nova Scotia limited liability company. Under the terms of the acquisition, we issued approximately 3,200,000 shares of our common stock and options to purchase our common stock for all of the outstanding stock and options of Cadabra, of which approximately 2,641,000 shares are actually exchangeable shares. The exchangeable shares are exchangeable for shares of our common stock, on a one-for-one basis, at the option of the holder thereof. Such shares, if not exchanged earlier, will generally automatically convert to our common stock on October 27, 2005. The total purchase price was approximately $110.6 million, including acquisition costs of approximately $3.0 million. The Cadabra acquisition was accounted for using the purchase method of accounting.

For further details of Transcription and Cadabra business combinations, see Note 2 of Notes to Consolidated Financial Statements.

Intellectual Property

Our future success and competitive position depend upon our continued ability to develop and protect proprietary technologies. We rely significantly on a combination of patents, copyrights, trademarks and trade secrets to protect our proprietary technologies and prevent competitors from using our technologies in their products. In the future, we may seek additional patent protection when we feel it is necessary.

Our existing or future patents may be circumvented, blocked, licensed to others or challenged as to inventorship, ownership, scope, validity or enforceability. Third parties have advised us of literature which they believe to be relevant to our patents. It is possible that this literature or literature we may be advised of in the future could negatively affect the scope or enforceability of either our present or future patents. We may not receive competitive advantages from the rights granted under our patents. In addition, our future patent applications may not be issued with the scope of the claims sought by us, if at all. Furthermore, others may

develop technologies that are similar or superior to our proprietary technologies, duplicate our proprietary technologies or design around the patents owned or licensed by us. We are aware of and are evaluating certain patents with which our products, patents or patent applications may conflict. If any of these patents are found to be valid, and we are unable to license such patents on reasonable terms, or if our products, patents or patent applications are found to conflict with these patents, we could be prevented from selling our products, our patents may be declared invalid or our patent applications may not result in issued patents. Additionally, changes in the patent laws, including the interpretation or enforcement of patents, may adversely affect the scope, validity or enforceability of our patents. In addition, in foreign countries, we may not receive effective patent and trademark protection. We cannot be sure that steps we take to protect our proprietary technologies will prevent misappropriation of our technologies.

In addition, we generally enter into confidentiality agreements with our employees, industry partners and customers, as well as generally control access to and distribution of our documentation and other proprietary information. Despite this protection, unauthorized parties may copy aspects of our current or future software products or obtain and use information that we regard as proprietary.

The semiconductor industry is characterized by vigorous protection and pursuit of intellectual property rights or positions. There are also numerous patents in the semiconductor industry and new patents are being issued at a rapid rate. This often results in significant and often protracted and expensive litigation. From time to time third parties may notify us of intellectual property infringement claims. If it is necessary or desirable, we may seek licenses under these third party patents or intellectual property rights. However, we cannot be sure that third parties will offer licenses to us or that we will accept the terms of any offered licenses.

If we fail to obtain a license from a third party for proprietary technologies that we use, we could incur substantial liabilities, or suspend sales of our software products or our use of processes requiring the technologies. Litigation could cause us to incur significant expenses, harm our sales of the challenged technologies or software products and divert the efforts of our technical and management personnel, whether or not a court decides the litigation in our favor. In the event we receive an adverse result in any litigation, we could be required to pay substantial damages, cease sales of infringing products, expend significant resources to develop or acquire non-infringing technology and discontinue the use of processes requiring the infringing technology or obtain licenses to the infringing technology. We may not be successful in the development or acquisition of intellectual property, or the necessary licenses may not be available under reasonable terms, and any development, acquisition or license could require us to expend a substantial amount of time and other resources. Any of these developments would harm our business.

Employees

As of December 31, 2001, we employed 215 employees worldwide, of which 154 individuals were located in the United States and 42 individuals were located in Canada. In the Silicon Valley, where our headquarters is located, competition for highly skilled employees is intense. We believe that our future success is highly dependent upon our continued ability to attract and retain qualified employees. We must also deal internationally with labor and employment laws with which we are not familiar. None of our employees is represented by a labor union or is subject to a collective bargaining agreement. We believe that our relationship with our employees is good.

EXECUTIVE OFFICERS OF THE REGISTRANT

The following table and notes set forth information about our executive officers as of January 31, 2002:

Name	Age	Position
Y. C. (Buno) Pati	37	President and Chief Executive Officer
Yao-Ting Wang	38	Chief Technology Officer
Richard Mora	55	Chief Operating Officer and Chief Financial Officer
Atul Sharan	42	Senior Vice President, Marketing and Business Development
Fabio Angelillis	40	Senior Vice President, Engineering

Dr. Y. C. (Buno) Pati has served as our President and Chief Executive Officer since he co-founded our company in October 1995. From October 1995 to December 1996, Dr. Pati served as an assistant professor of electrical engineering and computer science at Harvard University. From October 1992 to October 1995, Dr. Pati conducted research efforts in computational and system sciences applied to integrated circuit manufacturing at Stanford University. Dr. Pati has published numerous articles in signal processing, communications, fast lithography simulations and automated phase shifting photomask design. Dr. Pati received a B.S., an M.S. and a Ph.D. in electrical engineering from the University of Maryland at College Park.

Dr. Yao-Ting Wang has served as our Chief Technology Officer since he co-founded our company in October 1995. From October 2000 until November 2001, Dr. Wang also served as our Senior Vice President, Engineering. Dr. Wang s doctoral dissertation research was on automated design of phase shifting photomasks using fast algorithms and signal processing techniques. Dr. Wang is active in the areas of fast lithography simulations and automated advanced photomask designs, with specific interests in communications, signal processing and lithographic techniques. Dr. Wang received a B.S. degree from National Taiwan University and a Ph.D. in electrical engineering from Stanford University.

Richard Mora has served as our Chief Operating Officer and Chief Financial Officer since October 2001. Mr. Mora served as our Chief Financial Officer from October 2000 to October 2001. From May 1999 to October 2000, Mr. Mora served as our Chief Financial Officer and Vice President, Operations. From August 1994 to April 1999, Mr. Mora was Chief Financial Officer and Vice President of Finance at Mattson Technologies, Inc., a semiconductor equipment manufacturer. From June 1998 to May 1999, Mr. Mora was also Vice President and General Manager of the High Temp Products Division at Mattson. From September 1988 to August 1994, Mr. Mora served as Chief Financial Officer and Vice President of Finance at Actel Corporation, a semiconductor manufacturer. From June 1985 to August 1988, Mr. Mora was Chief Financial Officer and Vice President of Finance at HHB Systems. Mr. Mora received a B.S. in accounting from Santa Clara University and is a Certified Public Accountant.

Atul Sharan has served as our Senior Vice President, Marketing and Business Development since October 2000. From October 1998 to October 2000, Mr. Sharan served as our Vice President, Marketing and Business Development. From April 1997 to October 1998, Mr. Sharan was director of strategic business development at Ambit Design Systems. From May 1991 to March 1997, Mr. Sharan held senior sales and marketing management positions at Compass Design Automation. From December 1984 to May 1991, Mr. Sharan worked in semiconductor manufacturing operations at VLSI Technology and Integrated Device Technology (IDT). Mr. Sharan received an M.B.A. from the University of California at Berkeley, an M.S. in engineering from the University of Houston, Texas and a B.Tech. degree in engineering from the Indian Institute of Technology in Kanpur, India.

Fabio Angelillis has served as our Senior Vice President of Engineering since November 2001. From September 2000 to November 2001, Mr. Angelillis was Executive Vice President of Engineering at KANA.

From October 1990 to September 2000, Mr. Angelillis held various management positions, including Vice President of Research and Development and Operations at Cadence Design Systems, a provider of electronic design automation software, for their Custom IC product line. From January 1988 to October 1990, Mr. Angelillis served as Engineering Manager at Teradyne, Inc., a manufacturer of automatic test equipment and related software for the electronics and communications industries. Mr. Angelillis holds a B.S. degree in computer engineering from the University of Florida.

Item 2: Properties

Our executive offices and principal operations are currently located in approximately 39,300 square feet of office space in San Jose, California under a lease that expires in July 2004. We also lease approximately 4,500 square feet of office space in Los Gatos, California under a lease that expires in January 2006 and 15,200 square feet of office space in Canada under a lease that expires in February 2002. In addition, we currently sublease approximately 11,000 square feet of office space in San Jose, California to a third party. This lease and sublease expire in December 2004.

We lease office space for sales, customer support and research and development offices in six locations throughout the world: two in North America, three in Asia and one in The Netherlands.

We consider the above facilities suitable to meet our requirements and believe that suitable or substitute space will be available as needed to accommodate expansion of our operations.

Item 3: Legal Proceedings

None

Item 4: Submission of Matters to a Vote of Security Holders in Fourth Quarter ended 2001.

No matters were submitted to a vote of security holders of the registrant during the fourth quarter of the year ended December 31, 2001.

PART II

Item 5. Market For Registrant s Common Equity and Related Stockholder Matters

Our common stock is traded on the Nasdaq National Market System under the symbol of NMTC. The following table sets forth, for the periods indicated, the low and high bid prices per share for our common stock as reported by the Nasdaq National Market.

	Low	High
Year Ended December 31, 2001		
First Quarter	$ 9.000	$ 28.750
Second Quarter	7.875	26.150
Third Quarter	13.100	29.820
Fourth Quarter	13.910	38.650
Year Ended December 31, 2000		
Second Quarter (beginning April 7, 2000)	$ 22.000	$ 56.250
Third Quarter	26.750	67.313
Fourth Quarter	9.125	35.250

As of January 31, 2002, there were approximately 303 holders of record of our common stock. Since many holders shares are listed under their brokerage firms names, the actual number of shareholders is estimated by the Company to be approximately 11,000.

No dividends have been paid on the common stock in 2001, 2000 and 1999. We currently intend to retain all future earnings, if any, for use in our business and do not anticipate paying any cash dividends on our common stock in the foreseeable future.

Recent Sales of Unregistered Securities

There were no sales of unregistered securities during the quarter ended December 31, 2001. However, during the quarter ended December 31, 2001, 572,469 exchangeable shares of Cadabra Design Automation Inc. (Cadabra), which were issued in connection with our October 2000 acquisition of Cadabra, were exchanged for an equal number of shares of our common stock. We did not receive any consideration in connection with such exchanges. These shares were exchanged pursuant to Regulation D or Regulation S of the Securities Act of 1933.

Item 6. Selected Consolidated Financial Data

The following selected consolidated financial data should be read in conjunction with, and are qualified by reference to, the consolidated financial statements and related notes and Management s Discussion and Analysis of Financial Condition and Results of Operations appearing elsewhere in this Form 10-K. The consolidated statements of operations data for the years ended December 31, 2001, 2000 and 1999, and the consolidated balance sheet data at December 31, 2001 and 2000 are derived from our audited consolidated financial statements included in this Form 10-K. The consolidated statements of operations data for the years ended December 31, 1998 and 1997, and the consolidated balance sheet data at December 31, 1999, 1998 and 1997 are derived from our audited consolidated financial statements not included in this Form 10-K. The historical results are not necessarily indicative of future results.

	Year Ended December 31,				
	2001	2000	1999	1998	1997
	(In thousands, except per share data)				
Consolidated Statement of Operations Data (1)(2):					
Revenue	$ 49,032	$ 23,340	$ 5,492	$ 736	$ 620
Depreciation and amortization	48,950	24,820	340	99	24
Acquired in-process research and development		1,930			
Amortization of deferred stock-based compensation	15,856	18,766	3,990	862	
Total costs and expenses	106,175	73,965	14,693	7,469	1,239
Loss from operations	(57,143)	(50,625)	(9,201)	(6,733)	(619)
Net loss	(53,433)	(48,811)	(8,828)	(6,551)	(584)
Loss per share, basic and dilutive (3)	$ (1.76)	$ (2.27)	$ (1.26)	$ (0.89)	$ (0.08)
Shares used in per share calculation, basic and dilutive (3)	30,445	21,827	7,019	7,373	7,397

	At December 31,				
	2001	2000	1999	1998	1997
	(In thousands)				
Consolidated Balance Sheet Data (1)(2):					
Cash and cash equivalents	$ 38,964	$ 30,607	$ 13,486	$ 4,973	$ 656
Working capital	64,799	47,912	10,499	2,320	377
Total assets	212,062	240,974	17,605	6,611	1,081
Total stockholders equity	189,187	219,134	12,405	2,815	474

(1) We acquired Transcription Enterprises, Inc. (Transcription) on January 1, 2000 in a transaction accounted for as a purchase. The consolidated statement of operations and other data includes the results of operations of Transcription subsequent to January 1, 2000.

(2) We acquired Cadabra Design Automation, Inc. (Cadabra) on October 27, 2000 in a transaction accounted for as a purchase. The consolidated statement of operations and other data includes the results of operations of Cadabra subsequent to October 27, 2000.

(3) Share and per share amounts for all historical periods have been restated to reflect the three-for-two stock split for stockholders of record as of April 6, 2000.

Item 7. Management s Discussion and Analysis of Financial Condition and Results of Operations

The following commentary should be read in conjunction with the consolidated financial statements and related footnotes that appear beginning on page 39.

Overview

We develop and market proprietary technologies and software products that enable the design and manufacture of semiconductors with subwavelength feature sizes. We derive revenue from intellectual property and software licenses, maintenance and related technical services. To date, we have derived a significant portion of our revenue from production and research and development licenses to integrated device manufacturers, or IDMs, and foundries of our phase shifting attendant subwavelength technologies and software licenses, as well as licenses of photomask verification software to semiconductor equipment resellers. To date, we have entered into production licenses with five semiconductor manufacturers. We expect to enter into additional production licenses as semiconductor manufacturers adopt our proprietary technologies for production. Production licenses grant licensees the right to use our phase shifting intellectual property and software to design and manufacture subwavelength integrated circuits, or ICs. In order for semiconductor manufacturers to enter into production licenses with us, these manufacturers must continue to embrace our proprietary technologies and not enter into agreements with our competitors in this regard. We must also expend significant sales and marketing resources on these manufacturers with no guarantee of success.

In January 2000, we acquired Transcription for approximately $45.7 million in Series E preferred stock and $40.0 million in notes payable, resulting in goodwill of $65.8 million, which was being amortized on a straight-line basis over five years and other intangible assets of $26.1 million, which are being amortized on a straight-line basis over two to five years. In compliance with Statement of Financial Accounting Standards (SFAS) No. 142 Goodwill and Other Intangible Assets , goodwill and intangible assets with indefinite lives will no longer be amortized effective January 1, 2002. We have accounted for the acquisition under the purchase method of accounting and, as a result, our historical results of operations do not include the results of operations of Transcription prior to January 1, 2000.

On October 27, 2000, we completed the acquisition of Cadabra for approximately $120 million in common stock and options to purchase our common stock, as well as approximately $3.0 million in acquisitions costs, resulting in goodwill of $97.2 million, which was being amortized on a straight-line basis over four years and other intangibles assets of $9.8 million, which are being amortized on a straight-line basis over two to five years. In compliance with SFAS No. 142, goodwill and intangible assets with indefinite lives will no longer be amortized effective January 1, 2002. We accounted for the acquisition under the purchase method of accounting and, as a result, our historical results of operations do no include the results of operations of Cadabra prior to October 27, 2000.

As a result of the acquisitions of Transcription and Cadabra, at December 31, 2001, we have goodwill and intangible assets of $128.7 million, net of associated amortization. Such assets are evaluated for impairment when events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable through the estimated undiscounted future cash flows resulting from the use of the assets. At December 31, 2001, we do not consider goodwill and intangible assets to be impaired.

Because of the significance of these acquisitions, we do not believe the discussion and analysis of our historical financial condition and results of operations set forth below are indicative, nor should they be relied upon as an indicator, of our future performance.

In April 2000, we sold a total of 6,364,100 shares of common stock at $14.00 per share through our initial public offering. The net proceeds, after underwriters commission and fees and other costs associated with the offering, totaled approximately $81.2 million. In April 2000, we paid the balance of principal and accrued interest under the notes payables issued in connection with our January 2000 acquisition of Transcription with a portion of the net proceeds. The remaining proceeds have been used for working capital and general corporate purposes.

We recognize revenue in accordance with the provisions of Statement of Position (SOP) 97-2, Software Revenue Recognition , as amended by SOP 98-4 and SOP 98-9. Our revenue is derived from intellectual

property and software licenses and maintenance and technical services. Revenue is recognized for the various contract elements based upon vendor-specific objective evidence (VSOE) of fair value of each element. If VSOE of fair value does not exist but post-contract customer services (PCS) is the only undelivered element, we recognize the fee, including up-front payments for licenses, under the arrangement ratably over the contractual PCS period. To date, we have not established VSOE for the service or annual maintenance elements of many of our products. License revenue, including up-front fees, is recognized when persuasive evidence of an arrangement exists, the product has been delivered, no significant post-delivery obligations remain, the license fee is fixed or determinable and collection of the fee is probable. Revenue for technical services is recognized as the services are performed or on a percentage-of-completion method of accounting, depending on the nature of the project. Under the percentage-of-completion method, revenue recognized is that portion of the total contract price equal to the ratio of costs expended to date to the anticipated final total costs, based on current estimates of the costs to complete the project. If the total estimated costs to complete a project exceed the total contract amount, indicating a loss, the entire anticipated loss would be recognized currently. Maintenance services are typically priced based on a percentage of the license fee and have a one-year term, renewable annually. Services provided to customers under maintenance agreements include technical product support and unspecified product upgrades. Deferred revenue includes billings in excess of recognized revenue and payments received in advance of revenue recognition.

We have adopted SFAS No. 131, Disclosures about Segments of an Enterprise and Related Information. This statement requires enterprises to report information about operating segments in annual financial statements and selected information about reportable segments in interim financial reports. It also establishes standards for related disclosures about products, geographic areas and major customers. The method for determining what information to report is based upon the management approach, which requires us to report certain financial information related to continuing operations that is provided to our chief operating decision-maker for the purpose of evaluating financial performance and resource allocation. Our chief operating decision-maker reviews revenue by both geography and customer. We are not organized into business units nor do we capture expenses or allocate resources based on segmentation of our business. Therefore, we believe that we operate in a single segment.

Results of Operations

Revenue. Revenue was $49.0 million for 2001, compared to $23.3 million and $5.5 million in 2000 and 1999, respectively, representing increases of 110% and 325% for the respective periods. Our 2001 revenue increase was due primarily to increased production license revenues, increased revenue related to technical services and increased revenue due to a full year s revenue from our acquisition of Cadabra, as well as continued adoption of our software and proprietary technology solution by companies throughout the design-to-silicon flow. Approximately 80% of our 2000 revenue increase was due to our acquisitions of Transcription and Cadabra in 2000 and the remaining 20% was from the continued adoption of our software and technology.

The breakdown of revenue by geographic regions in which our proprietary technologies and software products and services are delivered, as a percentage of our total revenue, is as follows:

	Year Ended December 31,		
	2001	2000	1999
North America	69%	57%	78%
Asia	24	33	22
Europe	5	9	
Other	2	1	
	100%	100%	100%

The increase of revenue in 2001 to North America as a percentage of total revenue is primarily a result of increased production license revenues and increased revenue related to technical services from domestic

customers. Revenue increased in amount in all other geographic regions, but decreased as a percentage of total revenue due to the relative greater increase in North American revenue. The increase of revenue in 2000 to Asia and Europe as a percentage of total revenue is primarily a result of our acquisition of Transcription, which led to increased access to international markets and customers for our products.

We expect that revenue will continue to increase due to the continued adoption of our technologies and expanded product offerings. Our actual revenue is substantially dependent on, among other factors, the adoption by semiconductor manufacturers, and other participants in the design-to-silicon flow, of our proprietary technologies and software products, and not those of our competitors or those developed internally. Our revenue is also subject to the impact of economic conditions in various geographic regions.

Costs and Expenses

Cost of revenue. Cost of revenue includes primarily salary and related costs for engineers associated with maintenance and technical services. Cost of revenue was $4.3 million for 2001 compared to $2.2 million and $307,000 for 2000 and 1999, respectively. The increase in 2001 was primarily due to increased cost for engineers associated with providing technical services to customers, as well a full year s cost of additional engineers associated with maintenance added as a result of our acquisition of Cadabra. The increase in 2000 was primarily due to increased cost for engineers associated with maintenance and technical services, which resulted from an increased customer base related to our acquisitions of Transcription in January 2000 and Cadabra in October 2000. As a percent of revenue, cost of revenue was 9% for 2001 compared to 9% and 6% for 2000 and 1999, respectively. Our cost of revenue is dependent in part on our revenue. To the extent our revenue increases or decreases due to, among other factors, those described above, our cost of revenue may increase or decrease.

Research and development. Research and development expenses consist primarily of personnel and related costs. Research and development expenses were $16.2 million for 2001 compared to $12.6 million and $4.6 million in 2000 and 1999, respectively. The increase in 2001 was primarily due to a full year s cost of personnel added as a result of our acquisition of Cadabra, and to a lesser degree, increased costs associated with additional personnel in our expanding research and development efforts. The increase in 2000 was primarily due to increased costs associated with additional personnel in our expanding research and development efforts and, to a lesser degree, to cost of personnel added as a result of our acquisitions. As a percent of revenue, research and development expenses were 33% in 2001 compared to 54% and 84% for 2000 and 1999, respectively. We anticipate that we will continue to commit substantial resources to research and development in the future and expect that research and development expenses will continue to increase in dollar amounts to support increased research and development efforts, but decline as a percentage of revenue in the long term. Our research and development expenses, as a percentage of revenue, are dependent in part on our revenue. To the extent our revenue increases or decreases due to, among other factors, those described above, our research and development expenses as a percentage of revenue may increase or decrease.

Sales and marketing. Sales and marketing expenses consist primarily of salaries and related costs for sales and marketing personnel, sales commissions, tradeshows and other marketing activities. Sales and marketing expenses were $14.1 million for 2001 compared to $9.2 million and $4.2 million for 2000 and 1999, respectively. The increase in 2001 was primarily due to a full year s cost of personnel added as a result of our Cadabra acquisition and costs associated with our expansion of foreign sales operations. The increase in 2000 was primarily due to additional sales and marketing personnel, increased sales commissions and higher tradeshow expenses, and, to a lesser degree, to costs of personnel added as a result of our acquisitions. As a percent of revenue, sales and marketing expenses decreased to 29% for 2001 compared to 39% and 76% for 2000 and 1999, respectively. We expect that sales and marketing expenses will increase in dollar amounts to support increased sales efforts, but decline as a percentage of revenue in the long term. Our sales and marketing expenses, as a percentage of revenue, are dependent in part on our revenue. To the extent our revenue increases or decreases due to, among other factors, those described above, our sales and marketing expenses as a percentage of revenue may increase or decrease.

General and administrative. General and administrative expenses consist primarily of salaries and related costs for operations and finance employees and legal and accounting services. General and administrative expenses were $6.8 million for 2001 compared to $4.5 million and $1.3 million for 2000 and 1999, respectively. The increase in 2001 was primarily the result of a full year s cost of personnel added as a result of our acquisition of Cadabra and increased spending in legal and professional fees. The increase in 2000 was primarily the result of increased spending in personnel, personnel-related costs and professional fees and, to a lesser degree, to cost of personnel added as a result of our acquisitions of Transcription and Cadabra. As a percent of revenue, general and administrative expenses were 14% for 2001 compared to 19% and 23% for 2000 and 1999, respectively. We expect that general and administrative expenses will increase in dollar amounts to support increased administrative efforts, but decline as a percentage of revenue in the long term. Our general and administrative expenses, as a percentage of revenue, are dependent in part on our revenue. To the extent our revenue increases or decreases due to among other factors, those described above, our general and administrative expenses as a percentage of revenue may increase or decrease.

Depreciation and amortization. Depreciation and amortization expense consists of depreciation of property and equipment and amortization of acquired goodwill and intangible assets. In 2000, our acquisitions generated approximately $199.4 million in identified intangibles and goodwill, which are currently being amortized over periods ranging from two to five years. Depreciation and amortization expenses were $49.0 million in 2001 compared to $24.8 million and $340,000 for 2000 and 1999, respectively. The increase in 2001 was primarily the result of a full year s amortization of goodwill and other intangibles associated with the acquisition of Cadabra in October 2000. The increase in 2000 was primarily the result of amortization of goodwill and other intangibles associated with the acquisitions of Transcription in January 2000 and Cadabra in October 2000. We expect amortization and depreciation expense, as calculated under the provisions of newly adopted SFAS No. 142, to be approximately $9.0 million in 2002. Amortization and depreciation expense could be affected by other acquisitions or impairment of existing identified intangible assets in future periods.

In-process research and development. In 2000, we recorded charges of $1.9 million or 8% of revenue for acquired in-process research and development primarily resulting from the acquisition of Cadabra (see Note 2 of Notes to Consolidated Financial Statements). This amount was expensed on the acquisition date because the acquired technology had not yet reached technological feasibility and had no future alternative uses.

Amortization of deferred stock-based compensation. Amortization of deferred stock-based compensation is comprised of the amount of amortization related to: (i) the difference between the exercise price of options granted and the estimated fair market value of the underlying common stock on the date of the grant, (ii) the fair value at the date of the acquisition of employee escrow shares issued to executives of Cadabra in connection with the acquisition of Cadabra, (iii) compensation expense related to certain restricted stock deemed to be variable as prescribed by FASB interpretation No. 44 and (iv) stock-based compensation related to stock options granted to consultants. We recognized stock-based compensation of $15.9 million for 2001 compared to $18.8 million and $4.0 million for 2000 and 1999, respectively. We are amortizing deferred stock-based compensation over the vesting periods of the applicable options and restricted stock, using the multiple option method.

The stock-based compensation expense relating to certain restricted stock and consultant options are remeasured by the Company until the shares or options are fully vested. As a result, the stock-based compensation expense will fluctuate as the fair market value of the Company s common stock fluctuates. In addition, amortization of deferred stock-based compensation could increase or decrease in future periods as a result of future grants or cancellations of options whose exercise prices are less than estimated fair market value on the date of grant, future grants or cancellation of restricted stock or future grants or cancellation of stock options to consultants.

Interest expense. Interest expense was $0 for 2001 compared to $893,000 and $0 for 2000 and 1999, respectively. Interest expense in 2000 relates to the notes payable associated with the acquisition of Transcription in January 2000. In April 2000, we paid the remaining principal and interest due under these notes with proceeds from our initial public offering.

Interest income. Interest income was $2.6 million for 2001 compared to $3.0 million and $373,000 for 2000 and 1999, respectively. The decrease in 2001 is attributable to lower interest rates in 2001 compared to 2000, partially offset by higher average cash and short-term investment balances. The increase in 2000 was primarily due to higher average cash and short-term investment balances as a result of proceeds from our initial public offering in April 2000. We expect interest income to decrease in 2002 due to lower interest rates. Interest income could increase or decrease in future periods as a result of future changes in interest rates or changes in levels of investment balances.

Provision for (benefit from) income taxes. Benefit from income taxes was $1.1 million for 2001 compared to provisions for income taxes of $253,000 and $0 for 2000 and 1999, respectively. Our effective tax rate benefit for 2001 was only 2% primarily due to goodwill and deferred stock-based compensation amortizations which are not deductible for tax purposes. Our effective tax rate, excluding the impact of amortization of goodwill and other intangible assets from our acquisitions and amortization of deferred stock-based compensation, for 2001 was 31%. The provision for income taxes in 2000 was due to provisions for foreign taxes associated with foreign subsidiaries established in 2000. We expect our tax rate for 2002 to be approximately 36%, excluding the impact of amortization of intangible assets from our acquisitions and amortization of deferred stock-based compensation. This estimate is based on current tax law, our current estimate of earnings and our expected distribution of income among various tax jurisdictions, all of which are subject to change.

Liquidity and Capital Resources

As of December 31, 2001, we had cash and cash equivalents and short-term investments of $67.6 million. As of the same date, we had working capital of $64.8 million, including deferred revenue of $9.0 million.

Net cash provided by operating activities was $9.5 million during 2001, compared with $4.8 million used in 2000. Net cash provided by operating activities in 2001 primarily reflects a net loss of $53.4 million, offset by amortization and depreciation expenses of $48.9 million, amortization of deferred stock-based compensation of $15.9 million and increases in deferred revenue of $2.7 million. Net cash used in 2000 primarily reflects a loss of $48.8 million, partially offset by amortization and depreciation expense of $24.8 million and amortization of deferred stock-based compensation of $18.8 million.

Net cash used in investing activities was $7.0 million during 2001, compared with $21.5 million in 2000. Net cash used in 2001 consisted of net purchases of $5.3 million in short-term investments and $1.7 million in purchases of computer hardware and software, office furniture and equipment and leasehold improvements. Net cash used in 2000 consisted of net purchases of $23.3 million in short-term investments and $2.0 million in purchases of computer hardware and software and office furniture and equipment, offset by $3.7 million provided in our acquisition of Cadabra.

Net cash provided by financing activities was $6.0 million during 2001, compared with $43.5 million in 2000. Net cash provided in 2001 primarily consisted of $3.2 million of net proceeds from common stock option activity, $2.3 million of net proceeds from employee stock purchase plan activity, and $517,000 from repayment of notes receivable for preferred and common stock. Net cash provided in 2000 primarily consisted of $81.2 million net proceeds from our initial public offering and $1.5 million of net proceeds from common stock option activity, partly offset by the principal payment of $40.0 million under notes issued in connection with the acquisition of Transcription.

We expect to experience continued growth in our operating expenses, particularly research and development and sales and marketing expenses, for the foreseeable future in order to execute our business strategy. As a result, we anticipate that such operating expenses, as well as planned capital expenditures, will constitute a material use of our cash resources. Our expenses are dependent in part on our level of revenue. In addition, we may utilize cash resources to fund acquisitions of, or investments in, complementary businesses, technologies or product lines. We believe that the existing cash will be sufficient to meet our working capital and capital expenditure

requirements for at least the next 12 months. Thereafter, we may find it necessary to obtain additional equity or debt financing. In the event additional financing is required, we may not be able to raise it on acceptable terms or at all.

Recent Accounting Pronouncements

In July 2001, the Financial Accounting Standards Board issued SFAS No. 141, Business Combinations, and SFAS No. 142, Goodwill and Other Intangible Assets . Under SFAS No. 141, all business combinations initiated after June 30, 2001 must be accounted for using the purchase method. Under SFAS No. 142, goodwill and intangible assets with indefinite lives are no longer amortized but are reviewed annually (or more frequently if there are indicators such assets may be impaired) for impairment. Separable intangible assets that are not deemed to have indefinite lives will continue to be amortized over their useful lives (but with no maximum life). The amortization provisions of SFAS No. 142 apply to goodwill and intangible assets acquired after June 30, 2001. With respect to goodwill and intangible assets acquired prior to July 1, 2001, we are required to adopt SFAS No. 142 effective January 1, 2002. We believe that these Statements will not have a material impact on our financial position or results of operations other than from the cessation of goodwill amortization. For year ended December 31, 2001, amortization of goodwill amounted to approximately $37.9 million.

In October 2001, the Financial Accounting Standards Board issued SFAS No. 144, Accounting for Impairment or Disposal of Long-Lived Assets. SFAS No. 144 supercedes SFAS No. 121, and addresses financial accounting and reporting for the impairment or disposal of long-lived assets. The statement is effective for fiscal years beginning after December 15, 2001. We are required to adopt SFAS No. 144 on January 1, 2002. We believe that adoption of this Statement will not have a material impact on our financial position or results of operations.

Our future results of operations and the other forward-looking statements contained in this section, in particular the statements regarding our goals and strategies, revenue, costs of revenue, capital spending, depreciation and amortization, research and development expenses, sales and marketing expenses and general and administrative expenses, interest income and the tax rate, involve a number of risks and uncertainties. Our future revenue, expenses and operating results are all influenced by a number of factors, including those discussed above and those below, all of which are inherently difficult to forecast.

Trends, Risks and Uncertainties

Additional Factors Which May Affect Our Future Results

If the key markets within the semiconductor industry, especially semiconductor manufacturers, do not adopt our proprietary technologies and software products, we may be unable to generate sales of our products.

If the four key markets within the semiconductor industry, which we believe are semiconductor manufacturing, semiconductor equipment manufacturing, photomask manufacturers and design, do not adopt our proprietary technologies and software products, our revenue could decline. We believe we design our technologies and products so that each key market within the semiconductor industry can work efficiently with the other markets. For example, if designers do not adopt our technologies and products, it will be more difficult for them to design semiconductors that are understood and processed efficiently by mask manufacturers that do adopt our technologies and products.

In addition, we believe semiconductor manufacturers need to adopt our proprietary technologies and software products first in order to drive adoption by the other three markets. Semiconductor manufacturers define and develop the manufacturing process. While designers, mask manufacturers and equipment manufacturers are not required to adopt our technologies and products in order to work with semiconductor manufacturers that do

adopt them, we believe the efficiency of the manufacturing process with respect to such designers, mask manufacturers and equipment manufacturers is diminished if they do not. If each key market of the semiconductor industry does not perceive our proprietary technologies and software products as the industry standard, our technologies and products could become less valuable and more difficult to license. Factors that may limit adoption of our subwavelength solution within the markets include:

- our current and potential industry partners and customers may fail to adopt our technologies and products;
- the semiconductor industry may not need subwavelength processes if there is a slowdown in semiconductor manufacturing or a decrease in the demand for smaller semiconductor feature sizes; and
- the industry may develop alternative methods to produce subwavelength features with existing capital equipment due to a rapidly evolving market and the likely emergence of new technologies.

If we fail to protect our intellectual property rights, competitors may be able to use our technologies which could weaken our competitive position, reduce our revenue or increase our costs.

Our success depends heavily upon proprietary technologies, specifically our patent portfolio. The rights granted under our patents and patent applications may not provide competitive advantages to us. In addition, litigation may be necessary to enforce our intellectual property rights or to determine the validity and scope of the proprietary rights of others. As a result of any such litigation, we could lose our proprietary rights and incur substantial unexpected operating costs. Litigation could also divert our resources, including our managerial and engineering resources. We rely primarily on a combination of patents, copyrights, trademarks and trade secrets to protect our proprietary rights and prevent competitors from using our proprietary technologies in their products. These laws and procedures provide only limited protection. Our pending patent applications may not result in issued patents, and our existing and future patents may not be sufficiently broad to protect our proprietary technologies. In addition, patent protection in foreign countries may be limited or unavailable where we have filed for and need such protection. Furthermore, if we fail to adequately protect our trademark rights, this could impair our brand identity and ability to compete effectively. If we do not successfully protect our trademark rights, this could force us to incur costs to re-establish our name or our product names, including significant marketing activities.

If third parties assert that our proprietary technologies and software products infringe their intellectual property rights, this could injure our reputation and limit our ability to license or sell our proprietary technologies or software products.

Third parties, for competitive or other reasons, could assert that our proprietary technologies and software products infringe their intellectual property rights. These claims could injure our reputation and decrease or block our ability to license or sell our software products. For example, on March 14, 2000, ASML MaskTools, Inc. filed a complaint alleging we infringe two U.S. patents and have committed unfair or fraudulent business practice under the California Business and Professions Code. In the fourth quarter 2001, we entered into a binding letter of intent with ASML to settle the litigation. However, until a final agreement is reached, the litigation will not be completely settled. The defense of these claims could divert management s attention from the day to day operations of our company, as well as divert resources from current planned uses, such as hiring and supporting additional engineering personnel. Litigation is inherently uncertain, and an adverse decision could limit our ability to offer some features in our OPC product.

In addition, third parties have advised us of literature that they believe to be relevant to our patents. It is possible that this literature or literature we may be advised of in the future could negatively affect the scope or enforceability of our present or future patents and/or result in costly litigation. In addition, we are aware of and are evaluating certain patents with which our products, patents or patent applications may conflict. If any of these patents are found to be valid, and we are unable to license such patents on reasonable terms, or if our products,

patents, or patent applications are found to conflict with these patents, we could be prevented from selling our products, our patents may be declared invalid or our patent applications may not result in issued patents.

Furthermore, a company could invite us to take a patent license. If we do not take the license, the requesting company could contact our industry partners or customers and suggest that they not use our software products because we are not licensed under their patents. This action by the requesting company could affect our relationships with these industry partners and customers and may prevent future industry partners and customers from licensing our software products. The intensely competitive nature of our industry and the important nature of our technologies to our competitors businesses may contribute to the likelihood of being subject to third party claims of this nature.

We depend on the growth of the semiconductor industry and the current economic slowdown in this industry may cause a decrease in the demand for our proprietary technologies and software products and revenue.

We are dependent upon the general economic cycles of the semiconductor industry. Our ability to increase or even maintain our current revenue is largely dependent upon the continued demand by semiconductor manufacturers and each other key market within the semiconductor industry for integrated circuits, or ICs, and IC-related technologies. The semiconductor industry has from time to time experienced economic downturns characterized by decreased product demand, production over-capacity, price erosion, work slowdowns and layoffs. We believe the semiconductor industry is currently experiencing such an economic downturn and, as a result, the sales of some of our proprietary technologies and software products have decreased and may continue to decrease.

Defects in our proprietary technologies and software products could decrease our revenue and our competitive market share.

If our industry partners and customers discover any defects after they implement our proprietary technologies and software products, these defects could significantly decrease the market acceptance and sales of our software products, which could decrease our competitive market share. Any actual or perceived defects with our proprietary technologies and software products may also hinder our ability to attract or retain industry partners or customers, leading to a decrease in our revenue. These defects are frequently found during the period following introduction of new products or enhancements to existing products. Despite testing prior to introduction, our software products may contain software errors not discovered until after customer implementation. If our software products contain errors or defects, it could require us to expend significant resources to alleviate these problems, which could result in the diversion of technical and other resources from our other development efforts.

We rely on a small number of customers for a substantial amount of our revenue, and if our contracts with such customers were terminated, or if the revenues we expect to receive are otherwise reduced, we would need to replace this revenue through other sources.

Approximately 43% of our revenue for 2001 is derived from two customers. If any of the contracts with these customers were to be terminated or not extended or renewed, or if the revenues we expect to receive are otherwise reduced, we could lose a material portion of our revenue. We would need to replace this revenue with revenue from other customers by increasing the sale of our proprietary technologies and software products to our current customers and industry partners, or by entering into new contracts with new customers either of which would result in an unexpected diversion of management efforts and possible increases to operating expenses, with no immediate increase in revenue.

The market for software solutions that address the subwavelength gap problem is new and rapidly evolving. We expect competition to intensify in the future, which could slow our ability to grow or execute our strategy.

We believe that the demand for solutions to the subwavelength gap problem may encourage many competitors to enter into our market. As the market for software solutions to the subwavelength gap problem proliferates, if our competitors are able to attract industry partners or customers on a more accelerated pace than we can and retain them more effectively, we would not be able to grow and execute our strategy as quickly. In addition, if customer preferences shift away from our technologies and software products as a result of the increase in competition, we must develop new proprietary technologies and software products to address these new customer demands. This could result in the diversion of management attention or our development of new technologies and products may be blocked by other companies patents. We must offer better products, customer support, prices and response time, or a combination of these factors, than those of our potential competitors.

In order for potential industry partners and customers to adopt, and expend their own resources to implement, our technologies and products, we must expend significant marketing resources, with no guarantee of success.

Our proprietary technologies and software products involve a new approach to the subwavelength gap problem. As a result, we must employ intensive and sophisticated marketing and sales efforts to educate prospective industry partners and customers about the benefits of our technologies and products. Our sales and marketing expenses increased to $14.1 million in 2001 from $9.2 million in 2000. In addition, even if our industry partners and customers adopt our proprietary technologies and software products, they must devote the resources necessary to fully integrate our technologies and products into their operations. This is especially true for our industry partners so that they can begin to resell and market our solution to their customers. If they do not make these expenditures, establishing our technologies and products as the industry standard to the subwavelength gap problem will be difficult.

We have a history of losses, we expect to incur losses in the future and we may be unable to achieve profitability.

We may not achieve profitability if our revenue increases more slowly than we expect or not at all. In addition, our operating expenses are largely fixed, and any shortfall in anticipated revenue in any given period could cause our operating results to decrease. For example, for the year ended December 31, 2001, revenues from Cadabra Design Automation, Inc, a corporation that we recently acquired, were less than anticipated.

We have not been profitable in any quarter, and our accumulated deficit was approximately $119.2 million as of December 31, 2001. We expect to continue to incur significant operating expenses in connection with increased funding for research and development and expansion of our sales and marketing efforts. In addition, we expect to incur additional non-cash charges relating to amortization of intangibles and deferred stock-based compensation. As a result, we will need to generate significant revenue to achieve and maintain profitability. If we do achieve profitability, we may be unable to sustain or increase profitability on a quarterly or annual basis.

Due to the nature of our customer contracts, our revenue may fluctuate greatly in any given quarter or year, making predictions as to future revenues highly uncertain.

We generate revenues through a variety of types of customer contacts, including production licenses, software licenses and research and development agreements. The specific terms of these customer contracts may permit great variation in the amount of revenues that is generated under any one contract. Accordingly, our revenues may increase or decrease significantly in any given quarter or year based on the terms of our existing or future customer contracts. Thus, a contract may generate a material portion of our revenues in one quarter or year

and not in the next. Factors that could affect the timing and amount of revenues recognized under our existing and future customer contracts could include:

- the start date and volume of wafer production using our technology;
- the timing and amount of purchases of initial and additional software by our customers;
- the timing of customer roll-out of new fabrication facilities using our technology;
- the completion date of research and/or development milestones;
- scheduled increases or decreases in payment amounts over the life of a given contract; and
- issues relating to renewal of the contracts including whether the contract is renewed, and changes to payment amounts at renewal of the contract.

Any potential dispute involving our patents or other intellectual property could include our industry partners and customers, which could trigger our indemnification obligations with them and result in substantial expense to us.

In any potential dispute involving our patents or other intellectual property, our licensees could also become the target of litigation. This could trigger our technical support and indemnification obligations in some of our license agreements which could result in substantial expense to us. In addition to the time and expense required for us to supply such support or indemnification to our licensees, any such litigation could severely disrupt or shut down the business of our licensees, which in turn could hurt our relations with our customers and cause the sale of our proprietary technologies and software products to decrease.

If we do not continue to introduce new technologies and software products or product enhancements ahead of rapid technological change in the market for subwavelength solutions, our operating results could decline and we could lose our competitive position.

We must continually devote significant engineering resources to enable us to introduce new technologies and software products or product enhancements to address the evolving needs of key markets within the semiconductor industry in solving the subwavelength gap problem. We must introduce these innovations and the key markets within the semiconductor industry must adopt them before changes in the semiconductor industry, such as the introduction by our current and potential competitors of more advanced products or the emergence of alternative technologies, render the innovations obsolete, which could cause us to lose our competitive position. These innovations are inherently complex, require long development cycles and a substantial investment before we can determine their commercial viability. Moreover, designers, mask manufacturers and equipment manufacturers must each respond to the demand of the market to design and manufacture masks and equipment for increasingly smaller and complex semiconductors. Our innovations must be viable and meet the needs of these key markets within the semiconductor industry before the consumer market demands even smaller semiconductors, rendering the innovations obsolete. We may not have the financial resources necessary to fund any future innovations. In addition, any revenue that we receive from enhancements or new generations of our proprietary technologies and software products may be less than the costs of development.

Because of our limited operating history and our dependence on new technologies, any predictions about our future revenues and expenses may not be as accurate as they would be if we had a longer business history, and it is difficult to evaluate trends that may affect out business.

We were incorporated in October 1995, and in February 1997, we shipped our initial software product, IC Workbench. Our limited operating history makes financial forecasting and evaluation of our business difficult. Since we have limited financial data, any predictions about our future revenues and expenses may not be as accurate as they would be if we had a longer business history. Because of our dependence on our development and industry acceptance of new technology, it is difficult to evaluate trends that may affect our business.

Many of our current competitors have longer operating histories and significantly greater financial, technical, marketing and other resources than we do and as a result, they may acquire a significant market share before we do.

Our current competitors, or alliances among these competitors, may rapidly acquire significant market share. These competitors may have greater name recognition and more customers which they could use to gain market share to our detriment. We encounter direct competition from other direct providers of phase shifting, optical proximity correction, or OPC, manufacturing data and automated layout creation technologies. These competitors include such companies as Avant!, Mentor Graphics and Prolific, Inc. We also compete with companies that have developed or have the ability to develop their own proprietary phase shifting and OPC solutions, such as IBM. These companies may wish to promote their internally developed products and may be reluctant to purchase products from us or other independent vendors. Our competitors may offer a wider range of products than we do and thus may be able to respond more quickly to new or changing opportunities, technologies and customer requirements. These competitors may also be able to undertake more extensive promotional activities, offer more attractive terms to customers than we do and adopt more aggressive pricing policies. Moreover, our competitors may establish relationships among themselves or with industry partners to enhance their services, including industry partners with which we may desire to establish a relationship.

We intend to pursue new, and maintain our current, industry partner relationships, which could result in substantial expenditures of management attention and resources, with no guarantee of success.

We expect to derive significant benefits, including increased revenue and customer awareness, from our current and potential industry partner relationships. In our pursuit to maintain and establish partner relationships within each of the key markets in the semiconductor industry, we could expend significant management attention, resources and sales personnel efforts, with no guarantee of success. To establish and maintain our partner relationships, we expend our limited financial resources on increasing our sales and business development personnel, trade shows and marketing within trade publications. If we did not have to pursue potential industry partners, we could focus these resources exclusively on direct sales to our customers. In addition, through our partner relationships, our partners resell, market, either jointly with us or unilaterally, and promote our technologies and products. If these relationships terminate, such as due to our material breach of the contracts or the partners election to cancel the contract, which generally is permissible with prior notice to us, we would have to increase our own limited marketing and sales resources for these activities. Further, we may be unable to enter into new industry partner relationships if any of the following occur:

- current or potential industry partners develop their own solutions to the subwavelength gap problem; or
- our current or potential competitors establish relationships with industry partners with which we seek to establish a relationship.

We have only recently entered into many of our current partner relationships. These relationships may not continue or they may not be successful. We also may be unable to find additional suitable industry partners.

We may be unable to consummate other potential acquisitions or investments or successfully integrate them with our business, which may slow our ability to expand the range of our proprietary technologies and software products.

To expand the range of our proprietary technologies and software products, in 2000 we acquired Transcription and Cadabra, and we may acquire or make investments in additional complementary businesses, technologies or products if appropriate opportunities arise. We may be unable to identify suitable acquisition or investment candidates at reasonable prices or on reasonable terms, or consummate future acquisitions or investments, each of which could slow our growth strategy. If we do acquire additional companies or make other types of acquisitions, we may have difficulty integrating the acquired products, personnel or technologies. These difficulties could disrupt our ongoing business, distract our management and employees and increase our

expenses. In addition, any amortization of other intangible assets or impairment of goodwill or other assets or other charges resulting from the costs of acquisitions could harm our operating results.

We rely on the services of our founders and other key personnel, whose knowledge of our business and technical expertise would be difficult to replace.

Our future success depends to a significant extent on the skills, experience and efforts of our senior management. In particular, we depend upon the continued services of our co-founders Y. C. (Buno) Pati, our President and Chief Executive Officer and Yao-Ting Wang, our Chief Technology Officer, whose vision of our company, knowledge of our business and technical expertise would be difficult to replace. We do not have long-term employment agreements with our senior management and we do not maintain any key person life insurance policies on their lives. If any of our key employees left or was seriously injured and unable to work and we were unable to find a qualified replacement, it could slow our product development processes or we could otherwise have difficulty executing our business strategy. During the period October 2001 to January 2002, Roger Sturgeon, one of our directors and a senior executive of Transcription; Kevin MacLean, Senior Vice President and General Manager of Transcription; and Martin Lefebrve, a member of our Office of Technology and senior executive of Cadabra, left the Company. We have entered into consulting agreements with Mr. MacLean and Mr. Lefebrve under which they will assist us during the transition process and we have instituted various changes in our organizational structure to mitigate the impact of their departures. Mr. Sturgeon will continue to be a member of our Board of Directors. There can be no assurance that we would be able to enter into similar arrangements if our key employees were to terminate their employment.

Fluctuations in our quarterly operating results may cause our stock price to decline.

It is likely that our future quarterly operating results may fluctuate from time to time and may not meet the expectations of securities analysts and investors in some future period. As a result, the price of our common stock could decline. Historically, our quarterly operating results have fluctuated. We may experience significant fluctuations in future quarterly operating results. The following factors may cause these fluctuations:

- our recent acquisition of Transcription and Cadabra, as well as future potential acquisitions by us;
- the timing and structure of our technology and/or product license agreements; and
- changes in the level of our operating expenses to support our projected growth.

The market price of our common stock has been and may continue to be volatile and could decline.

The market price of our common stock has fluctuated in response to factors, some of which are beyond our control, including:

- changes in market valuations of other technology companies;
- conditions or trends in the semiconductor industry;
- actual or anticipated fluctuations in our operating results;
- any deviations in net revenue or in losses from levels expected by securities analysts;
- announcements by us or our competitors of significant technical innovations, contracts, acquisitions or partnerships;
- volume fluctuations, which are particularly common among highly volatile securities of technology related companies; and
- departures of key personnel.

General political or economic conditions, such as recession or interest rate or currency rate fluctuations in the United States or abroad, also could cause the market price of our common stock to decline.

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The fluctuations in our stock price could result in securities class action litigation, which could result in substantial costs and diversion of our resources.

Volatility in the market price of our common stock could result in securities class action litigation. Any litigation would likely result in substantial costs and a diversion of management s attention and resources. The share prices of technology companies stocks have been highly volatile and have recently traded well below their historical highs. As a result, investors in these companies often buy the stock at high prices only to see the price drop a short time later, resulting in a drop in value in the stock holdings of these investors. Our stock may not trade at the same levels as other technology stocks, or at its historical prices.

The accounting rules regarding revenue recognition may cause fluctuations in our revenue independent of our booking position.

The accounting rules we are required to follow require us to recognize revenue only when certain criteria are met. As a result, for a given quarter it is possible for us to fall short in our revenue and/or earnings estimates even though total orders are according to our plan or, conversely, to meet our revenue and/or earnings estimates even though total orders fall short of our plan, due to revenue produced by deferred revenue. Orders for software support and professional services yield revenue over multiple quarters, often extending beyond the current fiscal year, or upon completion of performance, rather than at the time of sale. The specific terms agreed to with a customer and/or any changes to the rules interpreting such terms may have the effect of requiring deferral of product revenue in whole or in part or, alternatively, of requiring us to accelerate the recognition of such revenue for products to be used over multiple years.

We face operational and financial risks associated with international operations.

We derive a significant portion of our revenue from international sales. For 2001, compared to 2000, the breakdown of our revenue by geographic region, as a percentage of our total revenue, was North America, 69% and 57%, Asia, 24% and 33%, Europe, 5% and 9%, and other, 2% and 1%, respectively. In addition, as a result of our acquisition of Cadabra, a Nova Scotia limited liability company, 42 of our 215 employees as of December 31, 2001 were located in Ontario, Canada. We have only limited experience in developing, marketing, selling and supporting our proprietary technologies and software products, and managing our employees and operations, internationally. We may not succeed in maintaining or expanding our international operations, which could slow our revenue growth. We are subject to risks inherent in doing business in international markets. These risks include:

- fluctuations in exchange rates which may negatively affect our operating results;
- export controls which could prevent us from shipping our software products into and from some markets;
- changes in import/export duties and quotas could affect the competitive pricing of our software products and reduce our market share in some countries;
- compliance with and unexpected changes in a wide variety of foreign laws and regulatory environments with which we are not familiar;
- greater difficulty in collecting accounts receivable resulting in longer collection periods; and
- economic or political instability.

We may be unable to continue to market our proprietary technologies and software products successfully in international markets.

We may need to raise additional funds to support our growth or execute our strategy and if we are unable to do so, we may be unable to develop or enhance our proprietary technologies and software products, respond to competitive pressures or acquire desired businesses or technologies.

We currently anticipate that our available cash resources will be sufficient to meet our presently anticipated working capital and capital expenditure requirements for at least the next 12 months. However, we may need to raise additional funds in order to:

- support more rapid expansion;
- develop new or enhanced products;
- respond to competitive pressures; or
- acquire complementary businesses or technologies.

These factors will impact our future capital requirements and the adequacy of our available funds. We may need to raise additional funds through public or private financings, strategic relationships or other arrangements.

We are growing rapidly and must effectively manage and support our growth in order for our business strategy to succeed.

We have grown rapidly and will need to continue to grow in all areas of operation. If we are unable to successfully integrate and support our existing and new employees, including those employees added as a result of our acquisition of Cadabra, into our operations, we may be unable to implement our business strategy in the time frame we anticipate, or at all. In addition, building and managing the support necessary for our growth places significant demands on our management as well as our limited revenue. These demands have, and may continue to, divert these resources away from the continued growth of our business and implementation of our business strategy. Further, we must adequately train our new personnel, especially our technical support personnel, to adequately, and accurately, respond to and support our industry partners and customers. If we fail to do this, it could lead to dissatisfaction among our partners or customers, which could slow our growth.

We must continually attract and retain engineering personnel or we will be unable to execute our business strategy.

We have experienced, and we expect to continue to experience, difficulty in hiring and retaining highly skilled engineers with appropriate qualifications to support our rapid growth and expansion. We must continually enhance and introduce new generations of our phase shifting and OPC technologies. As a result, our future success depends in part on our ability to identify, attract, retain and motivate qualified engineering personnel with the requisite educational background and industry experience. If we lose the services of a significant number of our engineers, it could disrupt our ability to implement our business strategy. Competition for qualified engineers is intense, especially in the Silicon Valley where our headquarters are located.

Online security breaches could result in harm to our business operations and expose us to risk of loss, litigation or liability.

The secure transmission of confidential information over computer networks is essential to the success of our business. Because the techniques used by computer hackers to access or sabotage networks change frequently and generally are not recognized until launched against a target, we may not be able to anticipate attacks against us in advance. We incur substantial expense to protect against and remedy security breaches and their consequences, but we may not be able to prevent all such security breaches. Moreover, our insurance policies may not be adequate to reimburse us for losses caused by such security breaches. Any misappropriation of confidential information, whether during the transmission of data or while it is stored on our servers could harm us in the following ways:

- we may have to indemnify clients for loss of their confidential information;

