

AXCELIS TECHNOLOGIES INC
Form 10-K
March 15, 2007

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2006

**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 000-30941

AXCELIS TECHNOLOGIES, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation or organization)

34-1818596
(IRS Employer Identification No.)

**108 Cherry Hill Drive
Beverly, Massachusetts 01915**

(Address of principal executive offices) (zip code)

(978) 787-4000

(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

| Title of each class | Name of each exchange on which registered |
|---------------------------------|---|
| Common Stock, \$.001 par value | The Nasdaq Stock Market LLC |
| Preferred Share Purchase Rights | |

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

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Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

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 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.

Indicate by check mark whether the registrant is large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of accelerated filer and large accelerated filer in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer Accelerated filer Non-accelerated filer

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

Aggregate market value of the voting stock held by non-affiliates of the registrant as of June 30, 2006: \$511,545,240.

Number of shares outstanding of the registrant's Common Stock, \$0.001 par value, as of March 13, 2007: 101,543,129.

Documents incorporated by reference:

Portions of the definitive Proxy Statement for Axcelis Technologies, Inc.'s Annual Meeting of Stockholders to be held on May 9, 2007 are incorporated by reference into Part III of this Form 10-K.

Forward Looking Statements

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 Axcelis Technologies, Inc., other than statements of historical fact, are forward-looking statements. Examples of forward-looking statements include statements regarding Axcelis future financial results, operating results, business strategies, projected costs, product development or future sales, competitive positions and plans and objectives of management for future operations. We use terminology such as anticipates, believes, plans, expects, future, intends, will, should, estimates, predicts, potential, continue, and similar expressions to identify such forward-looking statements. Our actual results could differ materially from the results contemplated by these forward-looking statements due to a number of important factors, including those discussed in Item 1A. of this Form 10-K and elsewhere in this Form 10-K. This Form 10-K also contains forward-looking statements attributed to third parties relating to their estimates regarding the growth of our markets. Forward-looking statements are subject to known and unknown risks, uncertainties, and other factors that may cause our actual results, as well as those of the markets we serve, levels of activity, performance, achievements and prospects to be materially different from those expressed or implied by the forward-looking statements. The Company undertakes no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

PART I

Item 1. Business.

Overview of Our Business

Axcelis Technologies, Inc. (Axcelis, we, us, or our) designs, manufactures and services ion implantation, dry strip, thermal processing and curing equipment used in the fabrication of semiconductor chips. We sell to all of the top 20 semiconductor chip manufacturers worldwide. The ion implantation business comprised approximately 74.3% of our revenues in 2006 with the remaining 25.7% of revenues derived from dry strip, thermal processing and curing businesses. In addition to equipment, we provide extensive aftermarket service and support, including spare parts, equipment upgrades, maintenance services and customer training. We also own 50% of the equity of SEN Corporation, an SHI and Axcelis Company, or SEN , the leading producer of ion implantation equipment in Japan, based on market data reported by Gartner Dataquest. SEN licenses technology from us for certain ion implantation products and has exclusive rights to market these products in the territory of Japan.

Axcelis is headquartered in Beverly, Massachusetts. We maintain an Internet site at <http://www.axcelis.com>. We make available free of charge on and through this website our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission. Our website and the information contained therein or connected thereto shall not be deemed to be incorporated into this Form 10-K.

Industry Overview

Semiconductor chips, also known as integrated circuits, are used in personal computers, telecommunication equipment, digital consumer electronics, wireless communication products and other applications. Types of semiconductor chips include memory chips (which store and retrieve information), microprocessors (logic devices which process information) and system on chip devices (which have both logic and memory features). Most semiconductor chips are built on a wafer of silicon ranging from 200mm (8 inches) to 300mm (12 inches) in diameter. Each semiconductor chip is made up of millions of tiny transistors or switches to control the functions of the device. Transistors are created in the silicon wafer by introducing various precisely placed impurities into the silicon in specific patterns. The process steps where transistors are formed are traditionally referred to as Front-End-of-Line (FEOL). The Back-End-of-Line (BEOL) process steps connect the transistors and other components together through several overlapping layers of metal wires, known as interconnect, creating a complete circuit. Each layer of metal interconnect must be separated by a non-conductive or insulating material called inter-level dielectric. Each layer that is added is selectively patterned to all previous layers through a process called photolithography.

Semiconductor chip manufacturers utilize many different types of process tools in the making of integrated circuits. There are over 300 process steps utilizing over 50 different types of process tools required in the making of a single device like a microprocessor. Semiconductor chip manufacturers seek efficiency improvements through increased throughput, equipment utilization and higher manufacturing yields. Capacity is added by increasing the amount of manufacturing equipment in existing fabrication facilities and by constructing new fabrication facilities. Periodically, and historically every seven or eight years, the semiconductor industry adopts a larger silicon wafer size to achieve lower manufacturing costs. Semiconductor manufacturers can produce more chips on a larger wafer, thus reducing the overall manufacturing cost per chip. The majority of wafer fabrication facilities today are using wafers with a diameter of 200mm (8 inches). Certain newer fabrication facilities process 300mm wafers. In 2006, Axcelis derived 58% of total systems revenue from sales of 300mm equipment.

The customer base is also changing. Given the magnitude of the investment needed to build a new wafer fabrication facility (often referred to as a fab), which today exceeds \$1 billion and can be as high as \$3 billion for a new 300mm fab, many customers are entering into partnerships to offset the cost of technology development and manufacturing. In addition, many chip developers source all or part of their chip manufacturing requirements to contract manufacturers, otherwise known as foundries. Foundries are predominantly located in Asia (historically Taiwan and Singapore) and are significant purchasers of semiconductor manufacturing equipment. China has seen the construction of many new foundries, which is expected to continue.

Traditionally, the semiconductor industry has grown about 9% annually. However, due to the nature of the industry, cyclicity is inherent. Chip manufacturers' periodic aggressive capitalization has historically led to overcapacity, excess chip inventories, softening chip prices and finally muted capitalization, which in turn results in lower demand for equipment. Therefore, a successful semiconductor equipment manufacturer must not only provide some of the most technically complex products manufactured in the world, but also must design its business to thrive during the inevitable low points in the cycle.

Axcelis Strategy

Our mission and vision is to:

- Ensure our customers' success by providing enabling semiconductor manufacturing and support solutions and services that deliver the best performance at the lowest total cost of ownership.
- Achieve and maintain market share leadership (#1 or #2) in all served product market segments.
- Deliver profitability and positive cash flow through the industry cycles to maximize shareholder and employee value.

In the late 1990s, Axcelis expanded its product offering beyond implant. In addition to implant, Axcelis offers dry strip, curing, and thermal processing systems. Our revenues from these products and related services represented 25.7% of our total 2006 revenues. We intend to continue to maximize the opportunity for these additional product lines, while maintaining our leadership position in ion implantation. Our dry strip, curing and thermal processing products serve process steps in both the FEOL and BEOL semiconductor manufacturing. We believe the use of new materials for interconnects, such as copper conductors and new insulating materials called low-k dielectrics, will increase the demand for our dry strip and curing products for back-end-of-line applications.

Operationally, we manage our business based on three main tenets:

- technology leadership,
- operational excellence, and
- customer partnerships.

We have continued to invest in research and development through the industry cycles to assure our products meet the needs of our customers. We continue to add to our portfolio of patents and unpatented proprietary technology to ensure that our investment in technology leadership is translated into unique product advantages. We take pride in our staff of scientists and engineers that comprise over one-third of our workforce. We strive for operational excellence by focusing on ways to lower our manufacturing and design costs and to improve our delivery times to our customers. Finally, we have grown and improved our customer support infrastructure and have established Global Customer Teams and a focused account management structure to strengthen our customer relationships and increase customer satisfaction.

Ion Implantation Systems

Ion implantation is a principal step in the transistor formation cycle of the semiconductor manufacturing process. An ion implanter is a large, technically advanced machine that injects dopants such as arsenic, boron or phosphorus, into a silicon wafer. These dopants are ionized and therefore have electric charges. With an electric charge they can be manipulated, moved and accelerated with electric and magnetic fields. Ion implanters use these fields to create a beam of ions with a precisely defined amount of energy (ranging between several hundred and three million electron-volts) and with a precisely defined amount of beam current (ranging from microamps to milliamps). Certain areas of the silicon wafer are blocked off by a polymer material known as photoresist which acts as a stencil to pattern devices so that the dopants will only enter the wafer where needed. The dopants change the electrical properties of the silicon wafer to create the active components of a chip, called the transistors. Typical process flows require twenty implant steps with the most advanced processes requiring thirty or more. Each implant step is characterized by four key parameters: dopant type, dose (amount of dopant), energy (depth into the silicon) and tilt (angle of wafer relative to the ion beam).

In order to cover the required range of implant steps, traditionally three different types of implanters have been developed, designed to cover a specific range of applications, primarily defined by dose and energy. The three traditional implanter types are referred to as medium current, high current and high energy:

- Medium current (mid dose) implanters are the original model of ion implanter, with mid-range energy and dose capability. These implanters are single wafer systems in which only one wafer at a time is slowly moved in front of the ion beam.
- High current (high dose) implanters were the second type of implanter to emerge, having low energy capability and high dose range. High current implanters were initially designed as multi-wafer or batch tools for maximum productivity. In these tools, thirteen wafers are placed on a high speed spinning disk, which is exposed to the ion beam. To address smaller geometries and provide high tilt, single wafer high current implanters have been introduced in recent years. We expect that single wafer high current implanters will be used for most leading edge chip production in the future.
- High energy implanters emerged to address the need for deeper implants, with a high energy range and low dose. High energy implanters are available in both multi-wafer and single wafer architectures.

Axcelis is the only company to offer a complete line of high energy, high dose (high current) and mid dose (medium current) implanters for all application requirements. Axcelis has been a market leader with its multi-wafer high current and high energy ion implanters and will continue to sell these tools for many years. The years 2005 and 2006 were transition years in implant products and technology. While customers continue to buy multi-wafer tools, many customers have shifted primarily to single wafer tools for high current applications. Because we did not have a single wafer high current product we experienced a significant loss of market share in 2005. We introduced our single wafer Optima MD product in 2005 and our single wafer Optima HD product in 2006. Throughout 2005 and 2006 we began shipping these products for medium and high current applications. Our single wafer tool for high energy applications is scheduled to be released in the second half of 2007. We expect these new single wafer products to enable us to regain market share in 2007 and future years.

As mentioned above, Axcelis introduced in 2005 a new line of single wafer implanters, known as the Optima platform. Optima products are designed to meet current and future application requirements of our customers by combining high productivity, excellent process performance, technical extendibility and maximum applications overlap. The three Optima products are:

- **The Optima MD**, which was released in 2005. We refer to this product as mid dose or MD, because it has energy and dose capabilities which extend beyond the traditional medium current space into traditional high current and high energy spaces. With the introduction of the Optima MD, Axcelis re-entered the medium current market segment, in which we had not participated since 2001.
- **The Optima HD**, which was released in early 2006. We use the term high dose or HD in connection with this product because the Optima HD fulfills all traditional high current requirements while extending beyond traditional high current energy and dose ranges. In order to maximize utilization and flexibility, the Optima HD can process some traditional mid current implants. In addition, the Optima HD is extendable into ultra-low energy applications to satisfy future process requirements. The Optima HD also supports molecular and hydrogen implants for emerging dual poly gate and silicon-on-insulator applications to improve device speed and performance.
- **The Optima HE** is scheduled for release in 2007. Our multi-wafer high energy tools continue to meet the current market demand, but we anticipate that interest in a single wafer high energy tool will emerge.

We believe the Optima products will meet customer demand for advantages in productivity, simplicity, process performance and technical extendibility. As a result, we expect that the Optima products will supplement Axcelis multi-wafer implanters to continue Axcelis leadership in ion implant.

Dry Strip and Curing Systems

In the process steps prior to ion implantation, a light sensitive, polymer-based liquid, called photoresist is spread in a uniformly thin film on the wafer. Through a process known as photolithography, the photoresist is developed into a pattern like a stencil. Curing (also known as photostabilization) uses ultraviolet light to harden, or cure, the photoresist so that it is more effective in maintaining the desired pattern during the subsequent implant processes and etch steps (in which the top layer of the surface of the wafer not covered by photoresist is removed). After these steps, the photoresist is no longer necessary and must be removed. The primary means of removing photoresist and residue is a process called dry strip or ashing. Our dry strip machines, also called ashers, use microwave and rf energy to turn process gases into plasma, which then acts to clean the surface of the wafer by removing the photoresist and unwanted residue.

Stripping photoresist during the front-end-of-line transistor sequence is relatively simple and, therefore, the equipment required is characterized by high throughput and low cost. Our dry strip tools are capable of removing bulk photoresist from the wafer, as well as the residue left behind after bulk strip. In addition to its use prior to the front-end-of-line implant and etch processes, photoresist is also applied and removed during back-end-of-line processes. Stripping photoresist in the back-end-of-line interconnect sequence requires more complicated tools and cleaning chemistries due to the advanced materials being used at smaller geometries. One key process is the stripping of the photoresist lying on top of the low-k dielectric film used between copper lines. Since the low-k materials are easily damaged during the photoresist removal process, tools must be designed to minimize this damage. We believe that Axcelis offers the only no damage low-k dry strip solution and that the advantages of our technology will drive growth for Axcelis dry strip tools in this important application space. Our front-end photo resist removal

capabilities coupled with our technology for back-end photoresist removal provides a complete solution for our customers.

Our curing systems are used by integrated circuit manufacturers worldwide because of our proprietary ultraviolet light source. Through several joint development efforts with third parties our curing systems also have been used for several applications in the interconnect processes such as for hardening and drying low-k dielectric materials. We believe that as the adoption rate for low-k accelerates, this film curing application provides a growth opportunity for Axcelis.

Thermal Processing Systems

At a number of points during the manufacturing process, silicon wafers need to be heated rapidly, often to 900 degrees centigrade or higher, in order to complete chemical or electronic reactions. This heating process is referred to as rapid thermal processing, or RTP. This step is used in both the transistor formation and interconnect formation processes of semiconductor manufacturing.

Our thermal processing machine employs a patented design to process a single wafer in a hot wall vertical reactor. The reactor has three zones that are heated by resistive coils, as well as an actively cooled base, which create a uniform temperature gradient from top to bottom. Rapid heating and cooling of the wafer is achieved by simply adjusting the vertical position of the wafer within the reactor through the use of a lifter. The technology in our thermal processing system differs from most other thermal processing equipment, which regulates temperature through a lamp-based system.

Our Summit series of thermal processing systems has a flexible design, offering both single and dual chamber systems. Its engineering incorporates recent developments in furnace design, temperature measurement, emission correction techniques and wafer handling. The machine is suited particularly well for lower temperature processing where lamp-based systems may have difficulty controlling the temperature. One of the trends in this market segment is the migration to lower temperature nickel silicide formation for advanced devices at 90 nanometers and below. Most logic customers now are looking to migrate to nickel silicide processes from standard cobalt silicide processes over the next couple of years.

Aftermarket Support and Services

We offer our customers extensive aftermarket service and support throughout the lifecycle of the equipment we manufacture. We believe that more than 4,400 of our products, including products shipped by SEN, are in use in 50 countries worldwide. The service and support that we provide include spare parts, equipment upgrades, and maintenance services. We offer service out of 51 field offices in sixteen countries. Revenues generated through our service and support business represented about 38.2% of revenue in 2006 and 42.3% of revenue in 2005.

Our customer support network consists of over 600 staff, including sales and marketing personnel, field service engineers, and spare parts and applications engineers as well as employees located at our manufacturing facilities who work with our customers to provide customer training and documentation, product, process and applications support.

Most of our customers maintain spare parts inventories for our machines. In addition to our web-based spare parts management and replenishment tracking program, we offer a number of Business-to-Business options to support our customers' parts management requirements. AMI (Axcelis Managed Inventory) provides the customer with full spares support through which Axcelis takes responsibility for the complete supply chain. The expansion of these services provides ease of use alternatives that help us reduce order fulfillment costs and improve cycle time, resulting in an expanded customer base for this service offering.

Sales and Marketing

We primarily sell our equipment and services through our direct sales force. We have 16 sales offices in ten countries. Aftermarket service and support is also offered at all of these offices. In the United States, we conduct sales and marketing activities from seven locations. Outside of the United States, our sales offices are located in Taiwan, South Korea, China, Japan, Germany, Singapore, Netherlands, France and Italy. In addition, isolated sales are made in smaller markets through distributors and manufacturing representatives.

In Japan, we exclusively license specified ion implant products to our joint venture, SEN, which manufactures and sells its machines and services directly to semiconductor manufacturers (see SEN Corporation, an SHI and Axcelis Company below). We sell our curing systems, dry strip and thermal processing products in Japan through Toda Technologies Service Co., Ltd., an unaffiliated company, which provides sales and support services for these products in the Japanese market.

International revenues, including export sales from our U.S. manufacturing facilities to foreign customers, sales by foreign subsidiaries and branches, and royalties accounted for 67.1% of total revenue in 2006, 70.4% in 2005, and 77.0% in 2004. Substantially all of our sales are denominated in U.S. dollars. SEN's sales are denominated in Japanese yen. See Note 18 to our Consolidated Financial Statements contained in Item 15 of this Form 10-K for a breakdown of our revenues and long-lived assets in the United States, Europe and Asia.

Customers

In 2006, the top 20 semiconductor manufacturers accounted for approximately 79.0% of total semiconductor industry capital spending, up slightly from 77.4% in 2005. These manufacturers are from the four largest semiconductor manufacturing regions in the world: the United States, Asia Pacific (Taiwan, South Korea, Singapore, and China), Japan and Europe. The Company and SEN together serve all of the 20 largest semiconductor manufacturers. We believe that more than 4,400 of our products, including products shipped by SEN, are in use worldwide.

Revenues from our ten largest customers accounted for 54.9%, 60.2%, and 55.4% of revenue in 2006, 2005, and 2004, respectively. We expect that sales of our products to relatively few customers will continue to account for a high percentage of revenue for the foreseeable future. In 2006, no single customer accounted for greater than 10% of revenue or consolidated accounts receivable at December 31, 2006. However, in 2005, one customer, Samsung, accounted for 17.5% of revenue and 11.2% of consolidated accounts receivable at December 31, 2005. In 2004, one customer, ST Microelectronics, accounted for 14.9% of revenue.

SEN Corporation, an SHI and Axcelis Company

Since 1983, we have exclusively licensed our Japanese joint venture, SEN Corporation, an SHI and Axcelis Company (formerly known as Sumitomo Eaton Nova Corporation), to manufacture and sell specific ion implanter systems covered by our technology in Japan. As of year end 2006, SEN had 506 employees and 324 temporary staff based in Tokyo and Saijo, Japan. We own 50% of the equity of SEN and our senior managers serve as half of the members of SEN's Board of Directors. Sumitomo Heavy Industries, Ltd., a Japanese corporation, holds the other 50% of the equity of SEN.

We have granted to SEN an exclusive license to use our patented and unpatented technology to manufacture, use and sell specified ion implant products in Japan. SEN has granted us a royalty-free worldwide (except for Japan) license to use any technology SEN develops that is an improvement to our technology. Axcelis has not licensed SEN to sell the Optima MD, Optima HD and Optima HE, which are available in Japan directly from Axcelis. SEN pays royalties on its net sales of licensed ion implantation

products in accordance with the rates set forth in the license agreement between SEN and Axcelis. The royalty rates vary depending on the type of implanter sold. These royalty amounts were \$9.2 million, \$8.7 million and \$13.0 million in 2006, 2005 and 2004, respectively. The current license agreement between SEN and Axcelis will continue in effect until terminated. The license agreement may be terminated by Axcelis or by SEN, with the approval of the Axcelis representatives on the SEN Board, on twelve months notice. Axcelis does not expect to terminate the SEN license agreement.

We have in the past allowed, and may in the future allow, SEN to sell implanters outside of Japan. We have allowed these sales when we believe that a SEN product, rather than an Axcelis product, is more likely to be successful at a particular customer. When these sales are allowed, we receive commissions in addition to royalties from SEN on these extra-territorial sales and assume most of the post-installation warranty responsibility. The financial benefit to Axcelis from the sale of a SEN implanter is less than the financial benefit of a sale of an Axcelis implanter, so such extra-territorial sales may have an adverse effect on our revenues. For this reason, Axcelis has, on occasion, denied permission to SEN to sell products to particular customers outside of Japan. In several instances, SEN has engaged in selling activities outside of Japan that have not been authorized by Axcelis. To date, these unauthorized sales by SEN have not had a material negative impact on Axcelis results of operations. See Item 1A. Risk Factors Our inability to control our Japanese joint venture may adversely affect our results.

Until recently, Axcelis has requested, but has not received material cash dividends from SEN. In the past, SEN has paid token annual dividends of ¥10,000 per share, resulting in Axcelis receipt of approximately \$500,000 annually. After several years of negotiation, in 2006 Axcelis and Sumitomo Heavy Industries, Ltd., the other shareholder of SEN, agreed to instruct SEN to dividend 40% of SEN's net earnings for SEN's fiscal year ended March 31, 2006. On January 31, 2007, Axcelis received a payment of approximately \$5.7 million, representing its 50% share of the dividend. Axcelis and Sumitomo Heavy Industries have an understanding that dividends will be paid for SEN's fiscal years ending March 31, 2007 and March 31, 2008 at the level of 40% of SEN's net earnings. Thereafter, future dividends will be subject to mutual agreement between Axcelis and Sumitomo Heavy Industries.

Until October 1, 2005, we received royalties from SEN for SEN's use of the names Eaton and Nova. Axcelis does not receive royalties for the use of Axcelis in the joint venture's new name.

Research and Development

Our industry continues to experience rapid technological change, requiring us to frequently introduce new products and enhancements. Our ability to remain competitive in this market will depend in part upon our ability to develop new and enhanced systems and to introduce these systems at competitive prices on a timely and cost effective basis.

We devote a significant portion of our personnel and financial resources to research and development programs and seek to maintain close relationships with our customers to remain responsive to their product needs. We have also sought to reduce the development cycle for new products through a collaborative process whereby our engineering, manufacturing and marketing personnel work closely together with one another and with our customers at an earlier stage in the process. We also use 3D, computer-aided design, finite element analysis and other computer-based modeling methods to test new designs.

Our expenditures for research and development were \$72.4 million, \$70.9 million and \$63.2 million in 2006, 2005, and 2004, respectively, or 15.7%, 19.0% and 12.4% of revenues, respectively. We expect in future years that research and development expenditures will continue to represent a substantial investment.

Manufacturing

We manufacture ion implant, dry strip, curing, and thermal processing products at our 417,000 sq. ft. facility in Beverly, Massachusetts. In addition, SEN manufactures ion implant and flat panel products at its 300,000 square foot facility in Saijo, Japan. Our manufacturing facilities employ advanced manufacturing methods and technologies, including lean manufacturing, Six Sigma controls and processes, and web-enabled inventory purchase systems. We manufacture our products in clean room environments that are similar to the clean rooms used by semiconductor manufacturers for wafer fabrication.

Our Beverly facility is also the location of our Advanced Technology Center, which houses an advanced process development laboratory with 12,500 sq. ft of class 10/100/1000 clean room space for product demonstration and process development and a 34,000 sq. ft. customer training center. These demonstration facilities are used to facilitate sales and to allow customers to test their processing steps on our systems under conditions that substantially replicate the customer's production environment. These environmental conditions include power requirements, toxic gas usage, air handling requirements including humidity and temperature, equipment bay configuration, wafer characteristics and other factors. These procedures are intended to reduce installation and production qualification times and the amount of particulates and other contaminants in the assembled system, which in turn improves yield and reduces downtime for the customer.

Most ion implant systems are assembled in five separate modules. The modules are then tested individually using specially developed software and are shipped directly to the customer, bypassing the integration of the modules into a complete implanter. As a result, the implanter system is integrated for the first time on the customer's factory floor and tested for quality assurance. We refer to this process as ship from cell. Ship from cell manufacturing allows us to more quickly and efficiently ship and install ion implant systems than the traditional manufacturing method involving a full integration of the system in our factory. Ship from cell saves an average of 4 weeks in our manufacturing cycle time, thus improving product margins and lead-times for our customers. In 2006, 71% of our ion implantation tools were manufactured using the ship from cell technique, compared with 73% and 71% of our tools shipped from cell for the years ended December 31, 2005 and 2004, respectively. All of our 200mm and 300mm implanters are qualified for ship from cell manufacturing with the exception of the Optima product line, which we expect to be available for ship from cell in 2007. Ship from cell has become our standard method of implantation manufacturing.

Each system module is packaged to maintain clean room standards during shipment. Installation is itself not a complex process and does not require specialized skills. A team of assemblers from the customer and Axcelis typically performs the installation. The process includes placing and leveling the equipment at its installation site, connecting it to sources of gas, water and electricity and recalibrating it to specifications that had previously been met during module testing.

We purchase materials, components and sub-assemblies, such as pumps, machine components, power supplies and other electrical components, from various suppliers. These items are either standard products or built to our specifications. Some of the components and sub-assemblies included in our products are obtained either from a sole source or a limited group of suppliers. Disruption to our source could affect our ability to deliver products to our customers. We have installed a web-based supply chain system in order to increase efficiency and cut costs associated with obtaining materials and components. This system electronically exchanges information with our vendors as to purchase orders, forecasts and automatic delivery updates.

We outsource many of our major sub-assemblies and components. We have several large outsourcing partners that provide this service for assemblies like the frames, power distribution systems, wafer handling systems and vacuum systems. Axcelis will continue to aggressively pursue outsourcing opportunities where the economics are justified, with a goal of enabling factory capacity, quality and margin improvement. We

outsource complex assemblies up to and including module build. Critical assemblies will continue to be manufactured in house due to the high level of expertise required. See Item 1a. Risk Factors Our dependence upon a limited number of suppliers for many components and sub-assemblies could result in increased cost or delays in the manufacture and sale of our products.

Competition

The semiconductor wafer fabrication equipment market is highly competitive and is characterized by a small number of medium to large size participants. We compete in four principal product markets in both the front-end and back-end of the semiconductor wafer fabrication process: ion implantation, dry strip, curing and thermal processing. We believe that preexisting relationships have a significant influence on a customer's choice of equipment supplier. Other significant competitive factors in the semiconductor equipment market include price, cost of ownership, equipment performance, customer support, breadth of product line, distribution and financial viability.

Ion Implantation. In ion implantation, our major competitors are Varian Semiconductor Equipment Associates, Inc. and Applied Materials, Inc. In the high-energy equipment segment, where we hold a leading share, we compete with Varian. In the high current segment we compete with both Applied Materials and Varian. In the medium current equipment segment, we compete with Nissin Electric Co., Ltd. and Varian. SEN faces the same competitors in the Japanese market.

On February 13, 2007 Applied Materials announced its intention to cease future development of beamline implant products. The impact this will have on future implant market opportunities is uncertain at this time.

Dry Strip and Curing Systems. Our principal competitors in the dry strip product market are Mattson Technology Inc. and Novellus Systems, Inc. Our principal competitors in curing are Applied Materials, Inc. and Novellus Systems, Inc.

Thermal Processing Systems. Our chief competitors in the thermal processing equipment market are Applied Materials, Inc. and Mattson Technology, Inc.

Intellectual Property

We rely on patent, copyright, trademark and trade secret protection, as well as contractual restrictions, in the United States and in other countries to protect our proprietary rights in our products and our business. As of January 1, 2007, we had 281 patents issued in the United States and 581 patents granted in other countries, as well as 805 patent applications (106 in the United States and 699 in other countries) on file with various patent agencies worldwide.

We intend to file additional patent applications and grow our intellectual property portfolio as appropriate. Although patents are important to our business, we do not believe that we are substantially dependent on any single patent or any group of patents.

We have trademarks, both registered and unregistered, that are maintained to provide customer recognition for our products in the marketplace.

From time to time, we enter into license agreements with third parties under which we obtain or grant rights to patented or proprietary technology. Except for our license agreement with SEN (described above under SEN Corporation, an SHI and Axcelis Company), we do not believe that any of our licenses are currently material to us.

There has been substantial litigation regarding patent and other intellectual property rights in semiconductor-related industries. We do not have any currently pending patent litigation.

We can give no assurance that we, our licensors, licensees, customers or suppliers will not be subject to claims of patent infringement or claims to invalidate our patents, or that any such claims will not be successful, requiring us to pay substantial damages or delete certain features from our products or both.

Backlog

As of December 31, 2006, our systems backlog (excluding deferred systems revenue) was \$91.7 million, as compared to \$47.3 million and \$78.0 million as of December 31, 2005 and 2004, respectively. Systems backlog including deferred systems revenue was \$124.8 million, \$88.3 million, and \$118.4 million as of December 31, 2006, 2005, and 2004, respectively. We believe it is meaningful to investors to include deferred systems revenue as part of our backlog. Deferred systems revenue represents revenue that will be recognized in future periods based on prior shipments. Our policy is to include in backlog only those system orders for which we have accepted purchase orders and typically are due to ship within 6 months. Backlog does not include orders received for our service business (spare parts, consumables and service contracts) due to the turn rate associated with that business. Generally, orders for service or parts revenue received during the quarter are performed or shipped within the same quarter. All orders are subject to cancellations or rescheduling by customers with limited or no penalties. Due to possible changes in system delivery schedules, cancellations of orders, and delays in systems shipments, our backlog at any particular date is not necessarily indicative of our actual sales for any succeeding period. In addition, our backlog at the beginning of a quarter typically does not include all orders required to achieve our sales objectives for that quarter and is not a reliable indicator of our future sales.

Employees

As of December 31, 2006, we had 1,632 employees and 123 temporary staff worldwide, of which 1,370 work in North America, 272 in Asia and 113 in Europe. We consider our relationship with our employees to be good. Our employees are not represented by a labor union and are not subject to a collective bargaining agreement. Some of our European locations have formed work councils, which have certain information and discussion rights under applicable law.

Environmental

We are subject to environmental laws and regulations in the countries in which we operate that regulate, among other things: air emissions; water discharges; and the generation, use, storage, transportation, handling and disposal of solid and hazardous wastes produced by our manufacturing, research and development and sales activities. As with other companies engaged in like businesses, the nature of our operations exposes us to the risk of environmental liabilities, claims, penalties and orders. We believe, however, that our operations are in substantial compliance with applicable environmental laws and regulations and that there are no pending environmental matters that would have a material impact on our business. We are ISO-14001 certified at our Beverly, MA facility.

Executive Officers

Mary G. Puma, 49, has been our President and Chief Executive Officer since January 2002 and Chairman since 2005. From May 2000 until January 2002, Ms. Puma was our President and Chief Operating Officer, prior to which she served as a Vice President of Axcelis from February 1999. In 1998, she became General Manager and Vice President of the Implant Systems Division of Eaton Corporation, a global diversified industrial manufacturer. In May 1996, she joined Eaton as General Manager of the Commercial Controls Division. Prior to joining Eaton, Ms. Puma spent 15 years in various marketing and general management positions for General Electric Company. Ms. Puma is a director of Nordson Corporation, North Shore Medical Center and Semiconductor Equipment and Materials International (SEMI).

Stephen G. Bassett, 59, has been our Chief Financial Officer since April 2004 and Executive Vice President, Finance since May 2005, prior to which he was Senior Vice President, Finance since 2004. Prior to that, Mr. Bassett had served as interim Chief Financial Officer for Axcelis beginning in June 2003. From 1999 to 2002, Mr. Bassett served as Chief Financial Officer of Ezenia! Inc., a provider of real-time voice, video and data collaboration solutions for corporate networks and the Internet. From 1996 to 1999, Mr. Bassett worked as an independent financial consultant. From 1981 until 1996, Mr. Bassett served as an audit partner at Ernst & Young LLP, where he managed auditing services for a variety of organizations, ranging from multinational Fortune 500 companies to emerging businesses.

Kevin J. Brewer, 48, is our Senior Vice President, Manufacturing Operations, a position he has held since May 2005, prior to which he had been Vice President of Manufacturing Operations since October 2002 and Director of Operations from 1999 to 2002. Prior to joining Axcelis in 1999, Mr. Brewer was Director of Operations, Business Jets at Raytheon Aircraft Company, a leading manufacturer of business and special mission aircraft owned by Raytheon Company, a manufacturer of defense, government and commercial electronics, as well as aircraft. Prior to that, Mr. Brewer held various management positions in operations and strategic planning in Raytheon Company's Electronic Systems and Missile Systems groups.

Lynnette C. Fallon, 47, has been our General Counsel and corporate Secretary since 2001 and Executive Vice President, Human Resources/Legal since May 2005. Prior to that, Ms. Fallon was Senior Vice President HR/Legal since 2002, and Senior Vice President since 2001. Before joining Axcelis, Ms. Fallon was a partner in the Boston law firm of Palmer & Dodge LLP since 1992, where she was head of the Business Law Department from 1997 to 2001.

Matthew P. Flynn, 50, is our Senior Vice President, Global Customer Operations, a position he has held since May 2005, prior to which he was Vice President Global Customer Operations since October 2002. Before then, Mr. Flynn was Director of Sales, Ion Implant and RTP systems. Prior to joining Axcelis in 1996, Mr. Flynn held executive and management roles at Cherry Semiconductor, an integrated circuit manufacturer, and at Teledyne Inc., in its microelectronics business.

Craig Halterman, 43, has been our Chief Information Officer since July 2000 and a Senior Vice President since May 2005, before which he was a Vice President since July 2000 and our Director of Information Technology since the beginning of 2000. Prior to joining us, Mr. Halterman was Information Technology Director at Honeywell/AlliedSignal in its defense and space systems business since 1997. Before that, Mr. Halterman held various information technology positions at The Dow Chemical Co., Thompson Consumer Electronics, General Electric Co. and RCA Consumer Electronics.

Marc S. Levine, 48, has been our Senior Vice President, Product Development since August 2005. From 1980 until he joined Axcelis, Mr. Levine held executive and management roles at Teradyne Inc., a manufacturer of semiconductor test and interconnection products, most recently as Vice President,

Worldwide Field Operations, and including Vice President, Enabling Technology Group and Vice President and Division Manager, ITD.

Mark J. Namaroff, 43, has been our Senior Vice President of Strategic Marketing since August 2006, prior to which he was Senior Vice President of Marketing since May 2005 and Vice President of Marketing since January 2005. Prior to that, Mr. Namaroff was Director of Product Marketing for Ion Implantation products since September 2004 and Director of Investor Relations and Corporate Development from May 2001. Before then, Mr. Namaroff held various marketing positions since 1996, when he joined Axcelis. Before joining Axcelis, Mr. Namaroff held marketing and engineering positions at Materials Research Corporation, a manufacturer of semiconductor processing equipment, from 1990-1996.

Donald W. Palette, 49, is our Senior Vice President, Finance and Controller. He has held the position of Controller since 1999, Treasurer since 2003 and Senior Vice President since May 2005. Prior to that, Mr. Palette was our Vice President since June 2003, prior to which he was Director of Finance since August 2000. Before joining Axcelis in 1999, Mr. Palette was Controller of Financial Reporting/Operations for Simplex, a leading manufacturer of fire protection and security systems. Prior to that, Mr. Palette was Director of Finance for Bell & Howell's Mail Processing Company, a leading manufacturer of high speed mail insertion and sorting equipment.

Item 1A. Risk Factors.

Some of the matters discussed in this filing contain forward-looking statements regarding future events that are subject to risks and uncertainties. From time to time, we may also make other forward-looking public statements, such as statements concerning our then expected future revenues or earnings or concerning the prospects for our markets or our product development, projected plans, performance, order procurement as well as other estimates relating to future operations. Forward-looking statements may be in reports filed under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), in registration statements filed under the Securities Act of 1933, as amended (the "Securities Act"), in press releases or informal statements made with the approval of an authorized executive officer. The words or phrases "will likely result," "are expected to," "will continue," "is anticipated," "estimate," "project," or similar expressions are intended to identify forward-looking statements within the meaning of Section 21E of the Exchange Act and Section 27A of the Securities Act, as enacted by the Private Securities Litigation Reform Act of 1995.

We wish to caution you not to place undue reliance on these forward-looking statements. These statements speak only as of the date on which they are made and represent management's expectations based on information available to them at that time. The factors listed below, as well as other factors that we may or may not have not currently identified, could affect our financial or other performance and could cause our actual results for future periods to differ materially from any opinions or statements expressed with respect to future periods or events in any current statement.

We will not undertake and specifically decline any obligation to publicly release revisions to these forward-looking statements to reflect either circumstances after the date of the statements or the occurrence of events that may cause us to re-evaluate our forward-looking statements.

Important factors that could cause our actual results to differ materially from those projected in forward-looking statements in this Form 10-K or that may otherwise be made by us or on our behalf include, but are not limited to: the cyclical nature of the semiconductor industry, our ability to keep pace with rapid technological changes in the semiconductor manufacturing processes, the highly competitive nature of the semiconductor equipment industry, quarterly fluctuations in operating results attributable to the timing and amount of orders for our products and services, dependence on SEN (our Japanese joint venture) for access to the Japanese semiconductor equipment market, and those risk factors contained in the section titled "Outlook" and below. If any of those risk factors actually occurs, our business, financial

condition and results of operations could be seriously harmed and the trading price of our common stock could decline.

If semiconductor manufacturers do not make sufficient capital expenditures, our sales and profitability will be harmed.

Almost all of our new orders will depend upon demand from semiconductor manufacturers who build or expand fabrication facilities. If the rate of construction or expansion of fabrication facilities declines, demand for our systems will decline, reducing our revenues. This would also hurt our profitability, because our fixed cost structure and our continued investments in engineering, research and development and marketing necessary to develop new products and to maintain extensive customer service and support capabilities limit our ability to reduce expenses in proportion to declining sales.

Our financial results may fluctuate significantly.

We derive most of our revenues from the sale of a relatively small number of expensive products to a small number of customers. The list prices on these products range from \$200,000 to over \$5.0 million. At our current sales level, each sale, or failure to make a sale, could have a material effect on us in a particular quarter. In a given quarter, a number of factors can adversely affect our revenues and results, including changes in our product mix, increased fixed expenses per unit due to reductions in the number of products manufactured, and higher fixed costs due to increased levels of research and development and expansion of our worldwide sales and marketing organization. Axcelis' financial results also fluctuate based on gross profit realized on sales. A variety of factors may cause gross profit as a percentage of revenue to vary, including the mix and average selling prices of products sold, costs to manufacture and customize systems and warranty costs. New product introductions may also affect our gross margins. Due to the foregoing factors, we believe that investors should not rely on period-to-period comparisons of our operating results as an indicator of our future performance.

Our financial results may fall short of anticipated levels; forecasting revenues and profitability is complex and may be inaccurate.

Management typically provides financial forecasts for the subsequent quarter in the earnings release for each quarter. These forecasts when made are based on assumptions believed to be reasonable when made of shipment timing and contract terms. However, in some cases, the final customer terms may not have been agreed and documented at the time the forecast is made, so the level of revenues recognizable in a particular quarter may vary from the forecast. Our lengthy sales cycle, coupled with customers' competing capital budget considerations, make the timing of customer orders uneven and difficult to predict. In addition, our backlog at the beginning of a quarter typically does not include all orders required to achieve our sales objectives for that quarter and is not a reliable indicator of our future sales. As a result, our revenues and operating results for a quarter depend on our shipping orders as scheduled during that quarter, receiving customer acceptance of shipped products during the quarter, and obtaining new orders for products to be shipped in that same quarter. Any delay in, or cancellation of, scheduled shipments and customer acceptances or in shipments from new orders could materially and adversely affect our financial results.

The SEC's Staff Accounting Bulletin 104, addressing revenue recognition, has added additional complexity in forecasting quarterly revenues and profitability. Orders for our products usually contain multiple delivery elements that result in revenue deferral under generally accepted accounting principles. Due to the foregoing factors, investors should understand that our actual financial results for a quarter may vary significantly from our forecasts of financial performance for that quarter. Failure to meet forecast financial performance may have an adverse effect on the price of our common stock.

The semiconductor industry is highly cyclical and we expect that demand for our products will regularly increase and decrease, making it difficult to manage the business and potentially causing harm to our sales and profitability.

The semiconductor business is highly cyclical, experiencing upturns when the demand for our products is high and downturns when our customers are not investing in new or expanded fabrication facilities. Our revenues can vary significantly from one point in the cycle to another, making it difficult to manage the business, both when revenues are increasing and when they are decreasing. In addition, a substantial portion of our operating expenses are fixed and do not fluctuate with changes in volume. Significant decreases in revenues can therefore have a disproportionate effect on profitability.

Oversupply in the semiconductor industry reduces demand for capital equipment, including our products.

From time to time, inventory buildups in the semiconductor industry, resulting in part from periodic downturns, produce an oversupply of semiconductors. This will cause semiconductor manufacturers to revise capital spending plans, resulting in reduced demand for capital equipment such as our products. If an oversupply is not reduced by increasing demand from the various electronics industries that use semiconductors, which we cannot accurately predict, our sales and profitability will be harmed.

If we fail to develop and introduce reliable new or enhanced products and services that meet the needs of semiconductor manufacturers, our results will suffer.

Rapid technological changes in semiconductor manufacturing processes require us to respond quickly to changing customer requirements. Our future success will depend in part upon our ability to develop, manufacture and successfully introduce new systems and product lines with improved capabilities and to continue to enhance existing products, including products that process 300 millimeter wafers using a single wafer platform. This will depend upon a variety of factors, including new product selection, timely and efficient completion of product design and development and of manufacturing and assembly processes, product performance in the field and effective sales and marketing. In particular:

- We must develop the technical specifications of competitive new systems, or enhancements to our existing systems, and manufacture and ship these systems or enhancements in volume in a timely manner.
- We will need to accurately predict the schedule on which our customers will be ready to transition to new products, in order to accurately forecast demand for new products while managing the transition from older products.
- We will need to effectively manage product reliability or quality problems that often exist with new systems, in order to avoid reduced orders, higher manufacturing costs, delays in acceptance and payment and additional service and warranty expenses.
- Our new products must be accepted in the marketplace.

Our failure to meet any of these requirements will have a material adverse effect on our operating results and profitability.

If we are unable to gain market share in the 300 millimeter single wafer high current ion implant market, in a timely way, our results will suffer.

Our future success will depend in large part upon our ability to successfully introduce and gain market share with our new single wafer ion implant system, the Optima HD. The Optima HD will serve the 300 millimeter high current (high dose) market segment of ion implant, which is a substantial portion of the total market opportunity available to Axcelis. Our success will depend upon a variety of factors, including

the existence of customer opportunities for the Optima HD to be selected, timely and efficient completion of product reliability and development and of manufacturing and assembly processes, product performance in the field and effective sales and marketing. In particular:

- The technical specifications of the Optima HD system must be competitive;
- The Optima HD must be manufactured and shipped in volume in a timely manner;
- We must effectively manage any product reliability or quality problems that often exist with new systems, in order to avoid reduced orders, higher manufacturing costs, delays in acceptance and payment and additional service and warranty expenses; and
- The Optima HD must be accepted in the marketplace.

Our failure to meet any of these requirements will have a material adverse effect on our operating results and profitability.

We are late to market with the Optima HD system, so we must compete against established competitive offerings for the high current 300 millimeter ion implant market. Some of our competitors have substantial financial, engineering, manufacturing, marketing and customer service and support resources. In addition, there are smaller, emerging semiconductor equipment companies that are offering or developing single wafer 300 millimeter high current implant systems. We expect our competitors to continue to improve the design and performance of their existing products and processes and to introduce new products and processes with improved price and performance characteristics.

If we fail to compete successfully in the highly competitive semiconductor equipment industry, our sales and profitability will decline.

The market for semiconductor manufacturing equipment is highly competitive and includes companies with substantially greater financial, engineering, manufacturing, marketing and customer service and support resources than we have that may be better positioned to compete successfully in the industry. In addition, there are smaller, emerging semiconductor equipment companies that provide innovative systems with technology that may have performance advantages over our systems. We expect our competitors to continue to improve the design and performance of their existing products and processes and to introduce new products and processes with improved price and performance characteristics. If we are unable to improve or introduce competing products when demanded by the markets, our business will be harmed. In addition, if competitors enter into strategic relationships with leading semiconductor manufacturers covering products similar to those sold or being developed by us, our ability to sell products to those manufacturers may be adversely affected. Finally, if we must lower prices to remain competitive without commensurate cost of goods savings, our gross margins and profitability will be adversely affected.

We have been dependent on sales to a limited number of large customers; the loss of any of these customers or any reduction in orders from them could materially affect our sales.

Historically, we have sold a significant portion of our products and services to a limited number of fabricators of semiconductor products. For example, in 2006, our top ten customers accounted for 54.9% of our net sales. None of our customers has entered into a long-term agreement requiring it to purchase our products. Although the composition of the group comprising our largest customers has varied from year to year, the loss of a significant customer or any reduction or delays in orders from any significant customer could adversely affect us. The ongoing consolidation of semiconductor manufacturers may also increase the harmful effect of losing one or more significant customers.

Our inability to control our Japanese joint venture may adversely affect our results.

We own 50% of the equity of a Japanese corporation called SEN Corporation, an SHI and Axcelis Company, to which we have granted an exclusive license to manufacture and sell certain multi-wafer and single wafer ion implanters in Japan. Sumitomo Heavy Industries, Ltd., a Japanese manufacturer of industrial machinery and ships, owns the remaining 50% of the equity. SEN's business is subject to the same risks as our business.

Neither Axcelis nor SHI has the right to buy out the other's interest in SEN and the SEN joint venture is perpetual (although SEN's license to use our technology could be terminated by Axcelis or SEN with the approval of Axcelis representatives on the SEN Board, on twelve months notice). Our joint venture agreement with SHI gives both owners veto rights, so that neither of us alone can effectively control SEN. As a result of this joint venture structure, we have less control over SEN management than over our own management. For example, SEN has, from time to time, engaged in unauthorized selling activities outside of Japan in contravention of the license agreement with Axcelis. In addition, given the equal balance of ownership, it is possible that the SEN Board may be unable to reach consensus from time to time, which could delay important decisions or create a deadlock, which could lead to the liquidation of SEN.

In addition, SEN and Axcelis are engaged in an arbitration initiated by Axcelis to establish a basis for setting the royalty for a single wafer, high current ion implant system known as the SHX. In response to Axcelis' arbitration claim, SEN has filed counter claims which Axcelis believes have no merit. In December 2006, SEN and Axcelis jointly appointed a sole arbitrator. The schedule for this arbitration is not yet fixed. We believe that this proceeding will lead to a mutually acceptable royalty-bearing license in favor of Axcelis at a rate similar to that paid by SEN under the existing license agreement. To date, the amount of royalty due to Axcelis for sales of the SHX, computed at such a rate, is not material and, given royalty rates on other SEN products, is not expected to have a material impact on Axcelis' results of operations in future periods.

Historically, Japan has represented approximately 20% of the annual worldwide market for ion implanters. Royalties and income from SEN have been a substantial contribution to our earnings, and a substantial decline in SEN's sales and net income, or a failure of SEN to pay royalties to Axcelis, could have a material adverse effect on our net income. See Item 1. Business - SEN Corporation, an SHI and Axcelis Company.

Axcelis is subject to the risks of operating internationally and we derive a substantial portion of our revenues from outside the United States, especially from Asia.

We are substantially dependent on sales of our products and services to customers outside the United States. International sales, including export sales from our U.S. manufacturing facilities to non-U.S. customers and sales by our non-U.S. subsidiaries and branches, accounted for 67.1% of total revenue in 2006, 70.4% in 2005, and 77.0% in 2004. System shipments to Asian customers represented 53% of total shipment dollars in 2006 in comparison to 68% of total shipment dollars in 2005. We anticipate that international sales will continue to account for a significant portion of our revenue. Because of our dependence upon international sales, our results and prospects may be adversely affected by a number of factors, including:

- unexpected changes in laws or regulations resulting in more burdensome governmental controls, tariffs, restrictions, embargoes or export license requirements;
- difficulties in obtaining required export licenses;
- volatility in currency exchange rates;
- political and economic instability, particularly in Asia;

- difficulties in accounts receivable collections;
- extended payment terms beyond those customarily offered in the United States;
- difficulties in managing distributors or representatives outside the United States;
- difficulties in staffing and managing foreign subsidiary and branch operations; and
- potentially adverse tax consequences.

We may not be able to maintain and expand our business if we are not able to hire, retain and integrate qualified personnel.

Our business depends on our ability to attract and retain qualified, experienced employees. There is substantial competition for experienced engineering, technical, financial, sales and marketing personnel in our industry. In particular, we must attract and retain highly skilled design and process engineers. Competition for such personnel is intense, particularly in the Boston metropolitan area, as well as in other locations around the world. If we are unable to retain our existing key personnel, or attract and retain additional qualified personnel, we may from time to time experience levels of staffing inadequate to develop, manufacture and market our products and perform services for our customers. As a result, our growth could be limited or we could fail to meet our delivery commitments or experience deterioration in service levels or decreased customer satisfaction, all of which could adversely affect our financial results.

Our dependence upon a limited number of suppliers for many components and sub-assemblies could result in increased costs or delays in the manufacture and sale of our products.

We rely to a substantial extent on outside vendors to manufacture many of the components and sub-assemblies of our products. We obtain many of these components and sub-assemblies from either a sole source or a limited group of suppliers. Accordingly, we may be unable to obtain an adequate supply of required components on a timely basis, on price and other terms acceptable to us, or at all.

In addition, we often quote prices to our customers and accept customer orders for our products before purchasing components and sub-assemblies from our suppliers. If our suppliers increase the cost of components or sub-assemblies, we may not have alternative sources of supply and may not be able to raise the price of our products to cover all or part of the increased cost of components.

The manufacture of some of these components and sub-assemblies is an extremely complex process and requires long lead times. As a result, we have in the past and may in the future experience delays or shortages. If we are unable to obtain adequate and timely deliveries of our required components or sub-assemblies, we may have to seek alternative sources of supply or manufacture these components internally. This could delay our ability to manufacture or to ship our systems on a timely basis, causing us to lose sales, incur additional costs, delay new product introductions and suffer harm to our reputation.

Our international operations involve currency risk.

Substantially all of our sales are billed in U.S. dollars, thereby reducing the impact of fluctuations in foreign exchange rates on our results. Operating margins of certain foreign operations can fluctuate with changes in foreign exchange rates to the extent revenues are billed in U.S. dollars and operating expenses are incurred in the local functional currency. During the year ended December 31, 2006, approximately 67.1% of our revenues were derived from foreign operations with this inherent risk. In addition, at December 31, 2006, our operations outside of the United States accounted for approximately 29% of our total assets, the majority of which was denominated in currencies other than the U.S. dollar. Our investment in SEN and our royalty and equity income from SEN are subject to foreign currency exchange

risks. We use forward contracts to hedge the risk of currency fluctuation with respect to SEN royalties for which payment is received in Japanese yen.

We may be unable to obtain needed additional capital.

Our capital requirements may vary widely from quarter to quarter, depending on, among other things, capital expenditures, fluctuations in our operating results, financing activities, acquisitions and investments and inventory and receivables management. At December 31, 2006, we held outstanding convertible debt in the principal amount of approximately \$150 million, of which \$74.2 million was repaid in January 2007, and \$76.9 million becomes due in January 2009. We believe that our existing cash and cash equivalents and marketable securities will be sufficient to satisfy our anticipated cash requirements through the end of 2007. This, of course, depends on the accuracy of our assumptions about levels of sales and expenses, and a number of factors, including those described in these Risk Factors, could cause us to require additional capital from external sources. In addition, in the future, we may require or choose to obtain additional debt or equity financing in order to finance acquisitions or other investments in our business. Depending on market conditions, future debt or equity financings may not be possible on attractive terms or at all. In addition, future debt or equity financings could be dilutive to the existing holders of our common stock and convertible notes.

Our stock price could be volatile and you could lose the value of your investment.

Our stock price has been volatile and has fluctuated significantly to date. The trading price of our stock is likely to continue to be highly volatile and subject to wide fluctuations. Your investment in our stock could lose value. Some of the factors that could significantly affect the market price of our stock include:

- actual or anticipated variations in results;
- analyst reports or recommendations;
- changes in interest rates; and
- other events and factors, many of which are beyond our control.

The stock market in general and Nasdaq and technology companies in particular have experienced extreme price fluctuations.

Our proprietary technology may be vulnerable to efforts by competitors to challenge or design around, potentially reducing our market share.

We rely on a combination of patents, copyrights, trademark and trade secret laws, non-disclosure agreements and other intellectual property protection methods to protect our proprietary technology. Despite our efforts to protect our intellectual property, our competitors may be able to legitimately ascertain the non-patented proprietary technology embedded in our systems. If this occurs, we may not be able to prevent their use of this technology. Our means of protecting our proprietary rights may not be adequate and our patents may not be sufficiently broad to prevent others from using technology that is similar to or the same as our technology. In addition, patents issued to us have been, or might be challenged, and might be invalidated or circumvented and any rights granted under our patents may not provide adequate protection to us. Our competitors may independently develop similar technology, duplicate features of our products or design around patents that may be issued to us. As a result of these threats to our proprietary technology, we may have to resort to costly litigation to enforce or defend our intellectual property rights. Finally, all patents expire after a period of time (in the U.S., patents expire 20 years from the date of filing of the patent application). Our market share could be negatively impacted by the expiration of a patent which had created a barrier for our competitors.

Axcelis also has agreements with third parties for licensing of patented or proprietary technology with Axcelis as the licensor or the licensee. These agreements include royalty-bearing licenses and technology cross-licenses. Termination of license agreements could have an adverse impact on our financial performance or ability to ship products with existing configurations.

We or customers that we indemnify might face intellectual property infringement claims or patent disputes that may be costly to resolve and, if resolved against us, could be very costly to us and prevent us from making and selling our systems.

From time to time, claims and proceedings have been or may be asserted against us relative to patent validity or infringement matters. We typically agree to indemnify our customers from liability to third parties for intellectual property infringement arising from the use of our products in their intended manner. Therefore, we occasionally receive notification from customers who believe that we owe them indemnification or other obligations related to infringement claims made against the customers by third parties. Our involvement in any patent dispute or other intellectual property dispute or action to protect trade secrets, even if the claims are without merit, could be very expensive to defend and could divert the attention of our management. Adverse determinations in any litigation could subject us to significant liabilities to third parties, require us to seek costly licenses from third parties and prevent us from manufacturing and selling our systems. In addition, infringement indemnification clauses in system sale agreements may require us to take other actions or require us to provide certain remedies to customers who are exposed to indemnified liabilities. Any of these situations could have a material adverse effect on our business results.

If operations were disrupted at Axcelis primary manufacturing facility it would have a negative impact on our business.

We have one primary manufacturing facility, located in Massachusetts. Its operations could be subject to disruption for a variety of reasons, including, but not limited to natural disasters, work stoppages, operational facility constraints and terrorism. Such disruption could cause delays in shipments of products to our customers and could result in cancellation of orders or loss of customers, which could seriously harm our business.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We have a total of 56 properties, of which 18 are located in the United States and the remainder are located in Asia and Europe, including offices in Taiwan, Singapore, South Korea, China, Japan, Malaysia, Italy, Netherlands, Germany and France. Of these properties, one is owned and 55 are leased.

Our principal facilities are listed below:

| Facility Location | Principal Use | Square Footage (Owned/Leased) |
|------------------------|---|----------------------------------|
| Beverly, Massachusetts | Manufacturing, research and development, sales/marketing, customer support, advanced process development, product demonstration, customer-training center and corporate headquarters. | 417,000 (owned) |
| Rockville, Maryland | Research and development, marketing and customer support. | 89,000 (leased) |

Our Japanese joint venture manufactures ion implantation products in a 300,000 square foot owned facility located in Saijo, Japan.

During 2005, we consolidated the administrative offices, development, and customer support operations of our Cleaning and Curing product group, based in Rockville, Maryland, into our headquarters and manufacturing facility located in Beverly, Massachusetts. The consolidation was part of our ongoing initiative to reduce our fixed cost infrastructure and to enhance profitability and cash flow. We continue to occupy approximately 22,000 square feet of the Rockville, Maryland facility. At December 31, 2006, approximately 9,000 square feet of the Rockville, Maryland facility has been subleased and 58,000 square feet is unoccupied. This Rockville lease and sublease will expire in 2007.

We believe that there is no material long-term, excess capacity in our manufacturing facilities, although utilization is subject to change based on customer demand. We believe that our manufacturing facilities and equipment generally are well maintained, in good operating condition, suitable for our purposes, and adequate for our present operations. Our Beverly, Massachusetts and Rockville, Maryland facilities are ISO 9001 and ISO 14001 certified and all locations are ISO 9001 certified.

Item 3. Legal Proceedings.

We are not a party to any material legal proceedings.

Item 4. Submission of Matters to a Vote of Security Holders.

None.

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PART II**Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.**

Our common stock trades on the Nasdaq stock market under the symbol ACLS. The following table sets forth the high and low closing sale prices as reported on the Nasdaq stock market during each of the quarters for the two most recent years. As of March 13, 2007, we had approximately 6,455 stockholders of record. We have not paid any cash dividends in the past five years and do not anticipate paying cash dividends in the future.

| | Common Stock Price | |
|----------------|---------------------------|------------|
| | High | Low |
| <u>2005</u> | | |
| First quarter | \$ 9.35 | \$ 6.79 |
| Second quarter | 7.96 | 5.49 |
| Third quarter | 7.48 | 5.12 |
| Fourth quarter | 5.87 | 4.12 |
| <u>2006</u> | | |
| First quarter | \$ 8.00 | \$ 4.78 |
| Second quarter | 7.02 | 5.31 |
| Third quarter | 7.04 | 5.21 |
| Fourth quarter | 7.71 | 5.70 |

Item 6. Selected Financial Data.

The following selected consolidated statements of operations data for each of the three years ended December 31, 2006, 2005, and 2004 and the consolidated balance sheet data as of December 31, 2006 and 2005 have been derived from the audited consolidated financial statements contained in Item 15 of Part IV of this Form 10-K. The selected consolidated balance sheet data as of December 31, 2004 and 2003, and the statement of operations data for the years ended December 31, 2003 and 2002, has been derived from the audited financial statements contained in our Form 10-K filed on March 15, 2005. The consolidated balance sheet data as of December 31, 2002 has been derived from the audited financial statements contained in our Form 10-K filed on March 28, 2003.

The historical financial information set forth below may not be indicative of our future performance and should be read together with Management's Discussion and Analysis of Financial Condition and Results of Operations and our historical consolidated financial statements and notes to those statements included in Item 7 of Part II and Item 15 of Part IV, respectively of this Form 10-K.

| | Years ended December 31, | | | | |
|---|---|-------------|-------------|-------------|-------------|
| | 2006 | 2005 | 2004 | 2003 | 2002 |
| | (in thousands, except per share amounts) | | | | |
| Consolidated statements of operations data | | | | | |
| Revenue | \$ 461,717 | \$ 372,540 | \$ 507,976 | \$ 327,990 | \$ 318,084 |
| Gross profit | 191,514 | 154,431 | 211,528 | 110,368 | 112,344 |
| Equity income of SEN | 19,266 | 15,751 | 30,531 | 8,954 | 4,806 |
| Income (loss) before income taxes | 42,783 | (1,982) | 75,139 | (44,341) | (49,743) |
| Net income (loss) | 40,770 | (3,855) | 74,175 | (113,876) | (26,150) |
| Net income (loss) per share | | | | | |
| Basic | \$ 0.40 | \$ (0.04) | \$ 0.75 | \$ (1.16) | \$ (0.27) |
| Diluted | \$ 0.40 | \$ (0.04) | \$ 0.73 | \$ (1.16) | \$ (0.27) |
| Shares used in computing basic and diluted per share amounts | | | | | |
| Basic | 101,058 | 100,301 | 99,528 | 98,514 | 97,920 |
| Diluted | 101,361 | 100,301 | 101,205 | 98,514 | 97,920 |
| Consolidated balance sheet data | | | | | |
| Cash and cash equivalents | \$ 140,451 | \$ 71,417 | \$ 108,295 | \$ 65,749 | \$ 146,298 |
| Working capital | 284,910 | 301,143 | 298,184 | 231,537 | 293,340 |
| Total assets | 753,993 | 661,443 | 688,862 | 585,244 | 668,752 |
| Long-term liabilities | 86,290 | 141,176 | 137,994 | 134,023 | 135,063 |
| Stockholders' equity | 477,562 | 426,041 | 443,473 | 353,250 | 452,508 |

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

Certain statements in Management's Discussion and Analysis of Financial Condition and Results of Operations are forward-looking statements that involve risks and uncertainties. Words such as may, will, should, would, anticipates, expects, intends, plans, believes, seeks, estimates and similar expressions identify such forward-looking statements. The forward-looking statements contained herein are based on current expectations and entail various risks and uncertainties that could cause actual results to differ materially from those expressed in such forward-looking statements. Factors that might cause such a difference include, among other things, those set forth under Liquidity and Capital Resources and Risk Factors and those appearing elsewhere in this Form 10-K. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect management's analysis only as of the date hereof. We assume no obligation to update these forward-looking statements to reflect actual results or changes in factors or assumptions affecting forward-looking statements.

Overview

Axcelis Technologies, Inc. (Axcelis, we, us, or our), is a worldwide producer of ion implantation, dry strip, thermal processing and curing equipment used in the fabrication of semiconductors. In addition, we provide extensive aftermarket service and support, including spare parts, equipment upgrades, and maintenance services. We own 50% of the equity of a joint venture known as SEN Corporation, an SHI and Axcelis Company, or SEN with Sumitomo Heavy Industries, Ltd. in Japan. SEN licenses technology from us relating to the manufacture of specified ion implantation products and has exclusive rights to manufacture and sell these products in the territory of Japan. SEN is the leading producer of ion implantation equipment in Japan.

The semiconductor capital equipment industry has in the past been subject to significant cyclical swings in capital spending by semiconductor manufacturers. Capital spending is influenced by demand for semiconductors and the products using them, the utilization rate and capacity of existing semiconductor manufacturing facilities and changes in semiconductor technology, all of which are outside of our control. As a result, our revenues and gross margins, to the extent affected by increases or decreases in volume, could fluctuate from year to year and period to period. Our gross margins are also affected by the introduction of new products. We typically become more efficient in manufacturing products as they mature. For example, our gross margins in 2002, 2003 and 2004 were adversely affected in part as a result of the increased proportion of relatively new systems sold to process 300mm wafers. We expect gross margins to continue to be under substantial pressure in 2007 due to sales of our new single wafer implant products. Our expense base is largely fixed and does not vary significantly with changes in volume. Therefore, we could experience fluctuations in operating results and cash flows depending on our revenues as driven by the level of capital expenditures by semiconductor manufacturers.

The sizable expense of building, upgrading or expanding a semiconductor fabrication facility is increasingly causing semiconductor companies to contract with foundries to manufacture their semiconductors. In addition, consolidation and partnering within the semiconductor manufacturing industry is increasing. We expect these trends to continue to reduce the number of our potential customers. This growing concentration of Axcelis' customers may increase competitive pricing as higher percentages of our total revenues are tied to the buying decisions of a particular customer or a small number of customers.

The years 2005 and 2006 were transition years in implant products and technology. While customers continue to buy multi-wafer tools, many customers have shifted primarily to single wafer tools for high current applications. Because we did not have a single wafer high current product we experienced a significant loss of market share in 2005. We introduced our single wafer Optima MD product in 2005 and our single wafer Optima HD product in 2006. Throughout 2005 and 2006, we began shipping these

products for medium and high current applications. Our single wafer tool for high energy applications is scheduled to be released in the second half of 2007. These new single wafer products are expected to enable us to regain market share in 2007 and future years.

Axcelis accesses the important Japanese market for certain ion implant systems through a joint venture (known as SEN) with Sumitomo Heavy Industries, Ltd. that we do not control. The joint venture agreement gives both owners veto rights, so that neither owner alone can effectively control SEN. SEN's business is subject to the same risks as our business. Royalties and equity income from SEN have made a substantial contribution to our earnings, and a substantial decline in SEN's sales and net income could have a material adverse effect on our operating results. As a result of this joint venture structure, we have less control over SEN management than over our own management and may not have timely knowledge of factors affecting SEN's business. In addition, given the equal ownership, it is possible that the SEN Board may be unable to reach consensus on important matters from time to time which could delay important decisions or create a deadlock, which could lead to the liquidation of SEN. See Item 1. Business SEN Corporation, an SHI and Axcelis Company.

In addition, SEN and Axcelis are engaged in an arbitration initiated by Axcelis to establish a basis for setting the royalty for a single wafer, high current ion implant system known as the SHX. See Item 1. Business SEN Corporation, an SHI and Axcelis Company. In response to Axcelis arbitration claim, SEN has filed counter claims which Axcelis believes have no merit. In December 2006, SEN and Axcelis jointly appointed a sole arbitrator. The schedule for this arbitration is not yet fixed. We believe that this proceeding will lead to a mutually acceptable royalty-bearing license in favor of Axcelis at a rate similar to that paid by SEN under the existing license agreement. To date, the amount of royalty due to Axcelis for sales of the SHX, computed at such a rate, is not material and, given royalty rates on other SEN products, is not expected to have a material impact on Axcelis' results of operations in future periods.

Operating results for the future years presented are not necessarily indicative of the results that may be expected for other interim periods or for the year as a whole.

Critical Accounting Estimates

Management's discussion and analysis of our financial condition and results of operations are based upon Axcelis' consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. On an on-going basis, we evaluate our estimates, including those related to revenue recognition, income taxes, accounts receivable, inventory and warranty obligations. Management's estimates are based on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe the following accounting policies are critical in the portrayal of our financial condition and results of operations and require management's most significant judgments and estimates in the preparation of our consolidated financial statements.

Revenue Recognition

Axcelis' revenue recognition policy involves significant judgment by management. As described in detail below, we consider a broad array of facts and circumstances in determining when to recognize revenue, including contractual obligations to the customer, the complexity of the customer's post delivery acceptance provisions, payment history, customer creditworthiness and the installation process. In the

future, if the post delivery acceptance provisions and installation process become more complex or result in a materially lower rate of acceptance, we may have to revise our revenue recognition policy, which could delay the timing of revenue recognition.

Axcelis' revenue transactions include sales of products under multiple element arrangements. Revenue under these arrangements is allocated to each element, except systems, based upon its estimated fair market value. The amount of revenue allocated to systems is calculated on a residual method. Under this method, the total value of the arrangement is allocated first to the undelivered elements, with the residual amount being allocated to systems revenue. The value of the undelivered elements includes (a) the greater of (i) the fair value of the installation or (ii) the portion of the sales price that will not be received until the installation is completed (the retention) plus (b) the fair value of all other undelivered elements. The amount allocated to installation is based upon the fair value of the service performed, including labor, which is based upon the estimated time to complete the installation at hourly rates, and material components. The fair value of all other undelivered elements is based upon the price charged when these elements are sold separately. System revenue is generally recognized upon shipment provided title and risk of loss has passed to the customer, evidence of an arrangement exists, prices are contractually fixed or determinable, collectibility is reasonably assured through historical collection results and regular credit evaluations, and there are no uncertainties regarding customer acceptance. Revenue from installation services is recognized at the time formal acceptance is received from the customer or, for certain customers, when both the formal acceptance and retention payment have been received. Revenue for other elements is recognized at the time products are shipped or the related services are performed.

Management continues to believe recognition of systems revenue at the time of shipment is appropriate because the customer's post delivery acceptance provisions and installation process have been established to be routine, commercially inconsequential and perfunctory. The majority of Axcelis' systems are designed and tailored to meet the customer's specifications, as outlined in the contract between the customer and Axcelis, which may be the Axcelis standard specification. To ensure that the customer's specifications are satisfied, many customers request that newer systems be tested at Axcelis' facilities prior to shipment, normally with the customer present, under conditions that substantially replicate the customer's production environment and the customer's criteria are confirmed to have been met. Customers of mature products generally do not require pre-shipment testing. We believe the risk of failure to complete a system installation is remote. Should an installation not be completed successfully, the contractual provisions do not provide for forfeiture, refund or other purchase price concession beyond those prescribed by the provisions of the Uniform Commercial Code applicable generally to such transactions.

In the small number of instances where Axcelis is unsure of meeting the customer's specifications or obtaining customer acceptance upon shipment of the system or for initial shipments of systems with new technologies, Axcelis will defer the recognition of systems revenue and related costs until written customer acceptance of the system is obtained. This deferral period is generally within twelve months of shipment.

Services revenue includes revenue from spare parts, equipment upgrades and maintenance services. Revenue related to maintenance and service contracts is recognized ratably over the duration of the contracts, or based on parts usage, where appropriate. Revenue related to time and material services is recognized when the services are performed. Revenue related to spare parts sales and equipment upgrades is recognized upon the later of shipment or when the title and risk of loss passes to the customer.

Goodwill and Other Intangible Assets

We account for acquisitions under the purchase method of accounting pursuant to Statement of Financial Accounting Standard (SFAS) No. 141, Business Combinations. Goodwill represents the excess of cost over net assets, including all identifiable intangible assets, of acquired businesses. Pursuant to SFAS

No. 142, Goodwill and Other Intangible Assets, goodwill is not amortized. Other intangible assets that are separable from goodwill and have determinable useful lives are valued separately and amortized over their useful lives. Such other identifiable intangible assets consist mainly of developed technology and are generally amortized over periods ranging from five to ten years.

We perform an annual impairment review of goodwill. Impairment reviews may be performed more frequently if there are other indicators of impairment. The annual impairment test consists of determining the fair market value of the business unit through a discounted cash flow analysis. Management's best judgments are employed in determining future market conditions that impact this discounted cash flow analysis. As a result of our annual review conducted as of December 31, 2006, we determined that there was no impairment of our goodwill. If we determine through the impairment review process that goodwill has been impaired, we would record the impairment charge in our statement of operations as a non-cash charge to earnings.

We assess the impairment of intangible assets, other than goodwill, whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors we consider important that could trigger an impairment review include the following:

- a significant underperformance relative to expected operating results;
- a significant change in the manner of our use of the acquired asset or the strategy for our overall business;
- a significant negative industry or economic trend; and
- a significant decrease in our market capitalization relative to net book value.

As part of this assessment, we review the expected future undiscounted cash flows to be generated by the assets. If we determine that the carrying value of intangibles may not be recoverable, we measure any impairment based on a projected discounted cash flow method using a discount rate determined by our management to be commensurate with the risk inherent in our current business model.

Accounts Receivable Allowance for Doubtful Accounts

Axcelis records an allowance for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. If the financial condition of Axcelis' customers were to deteriorate, resulting in an impairment of their ability to make payments, additional allowances may be necessary.

Inventory Allowance for Excess and Obsolescence

Axcelis records an allowance for estimated excess and obsolete inventory. The allowance is determined using management's assumptions of materials usage, based on estimates of forecasted and historical demand and market conditions. If actual market conditions become less favorable than those projected by management, additional inventory write-downs may be required.

Product Warranty

Axcelis offers a one to three year product warranty, the terms and conditions of which vary depending upon the product sold. For all systems sold, we accrue a liability for the estimated cost of standard warranty at the time of system shipment and defer the portion of systems revenue attributable to the fair value of non-standard warranty. Costs for non-standard warranty are expensed as incurred. Factors that affect our warranty liability include the number of installed units, historical and anticipated product failure rates, material usage and service labor costs. We periodically assess the adequacy of our recorded liability and adjust the amount as necessary.

Results of Operations

The following table sets forth our results of operations as a percentage of total revenues for the periods indicated:

| | Years Ended December 31, | | |
|-----------------------------------|--------------------------|---------|--------|
| | 2006 | 2005 | 2004 |
| Revenue | | | |
| Systems | 59.8 % | 55.3 % | 64.3 % |
| Services | 38.2 | 42.3 | 32.9 |
| Royalties, primarily from SEN | 2.0 | 2.4 | 2.8 |
| | 100.0 | 100.0 | 100.0 |
| Cost of revenue | 58.5 | 58.5 | 58.4 |
| Gross profit | 41.5 | 41.5 | 41.6 |
| Operating expenses | | | |
| Research and development | 15.7 | 19.0 | 12.4 |
| Sales and marketing | 9.9 | 12.0 | 9.4 |
| General and administrative | 10.1 | 12.2 | 9.1 |
| Amortization of intangible assets | 0.5 | 0.7 | 0.5 |
| Restructuring charges | 0.1 | 1.7 | 0.2 |
| | 36.3 | 45.7 | 31.6 |
| Income (loss) from operations | 5.2 | (4.3) | 10.1 |
| Other income (expense) | | | |
| Equity income of SEN | 4.2 | 4.2 | 6.0 |
| Interest income | 1.8 | 1.5 | 0.4 |
| Interest expense | (1.9) | (1.8) | (1.3) |
| Other net | (0.1) | (0.2) | (0.4) |
| | 4.0 | 3.7 | 4.7 |
| Income (loss) before income taxes | 9.2 | (0.5) | 14.8 |
| Income taxes | 0.4 | 0.5 | 0.2 |
| Net income (loss) | 8.8 % | (1.0)% | 14.6 % |

Year ended December 31, 2006 in comparison to the year ended December 31, 2005**Revenue**

Systems revenue was \$276.3 million, or 59.8% of revenue in 2006, compared with \$206.1 million, or 55.3% of revenue, in 2005. The increase in sales of systems compared with 2005 was primarily attributable to stronger market demand resulting from higher levels of chip production by our semiconductor manufacturing customers. While overall systems revenue increased in 2006, the shift by semiconductor manufacturers from our multi-wafer high current ion implant systems to single wafer high current ion implant systems had an adverse, though not quantifiable, impact on systems revenue. The high current

segment constitutes approximately fifty percent of the worldwide ion implant market. Our first shipment of our new single wafer high dose ion implant system occurred in 2006. We began shipping our new mid dose single wafer ion implant system in 2005, and recognized revenue on multiple shipments during the year.

Approximately 42.2% of systems revenue in 2006 was from sales of 200mm products and 57.8% was from sales of 300mm products, compared with 42.3% and 57.7% for sales of 200mm products and 300mm products in 2005, respectively. Market trends for the past several years highlight the growth in sales toward 300mm products and the decrease in expansion of facilities using 200mm products.

Revenue from sales of ion implantation products and services accounted for \$342.9 million or 74.3% of total revenue in 2006, compared with \$297.3 million, or 79.8%, of total revenue in 2005. Ion implantation continues to be our largest product category.

As described above in Revenue Recognition, a portion of our systems revenue is deferred until installation and other services related to future deliverables are performed. The total amount of deferred revenue at December 31, 2006 and 2005 was \$33.9 million and \$41.3 million, respectively.

Services revenue, which includes spare parts, equipment upgrades, and maintenance services, was \$176.2 million, or 38.2% of revenue for 2006, compared with \$157.6 million, or 42.3% of revenue for 2005. Services revenue fluctuates with capacity utilization by our customers, and the increase in services revenue for 2006 is attributable to a continually expanding installed base of our products and increasing utilization by semiconductor manufacturers.

Royalty revenue was \$9.2 million, or 2.0% of revenue for 2006, compared with \$8.8 million, or 2.4% of revenue for 2005. Royalties are primarily earned under the terms of our license agreement with SEN. Revenue changes are mainly attributed to fluctuations in SEN sales volume based on demand for equipment by Japanese semiconductor manufacturers and the timing of shipments in Japan.

Gross Profit

Gross profit was 41.5% of revenue in 2006 compared with 41.5% of revenue in 2005. The gross profit performance compared to 2005 was the result of favorable systems volume, mix and deferrals (approximately 1.9 percentage points), favorable operating overheads (approximately 1.7 percentage points), offset by proportionately lower 100% margin SEN royalties (approximately 0.4 percentage points), proportionately lower parts and service volume (approximately 2.5 percentage points), and lower margins associated with new products (approximately 0.7 percentage points).

Research and Development

Research and development expense was \$72.4 million in 2006, an increase of \$1.5 million, or 2.1%, as compared with \$70.9 million in 2005. The increase was driven primarily by expenses associated with an increase of project-driven headcount (\$3.7 million), variable compensation payouts (\$2.2 million) and stock option expense (\$0.8 million). These cost increases were partially offset by lower costs associated with project material (\$2.2 million), development asset amortization and depreciation (\$1.8 million) and in-process research and development expense in 2005 related to the Diamond Semiconductor Group acquisition (\$1.5 million). Increases in overall research and development expenses in 2006 compared with 2005 are attributable principally to development efforts related to our single wafer Optima platform.

Research and development expense involved the following activities in 2006; 63% for new product development, 25% for improvement of existing products, and 12% for product testing.

Sales and Marketing

Sales and marketing expense was \$45.5 million in 2006, an increase of \$0.7 million, or 1.6%, as compared with \$44.8 million in 2005. This increase was driven primarily by higher commission (\$1.6 million) and variable compensation (\$0.9 million) expenses. These cost increases were partially offset by lower payroll (\$1.1 million) and amortization/depreciation (\$.8 million) expenses.

General and Administrative

General and administrative expense was \$46.6 million in 2006, an increase of \$1.0 million, or 2.2%, as compared with \$45.6 million in 2005. This increase was driven primarily by higher costs associated with variable compensation (\$3.6 million) and stock compensation (\$1.9 million) offset by reduced costs associated with the consolidation of our Rockville, Maryland operations into our headquarters and manufacturing facility located in Beverly, Massachusetts (\$2.3 million) and lower lease, travel, utilities, sales tax and insurance expense (\$1.6 million).

Stock-based Compensation Expense

During the first quarter of fiscal 2006, we adopted the Financial Accounting Standards Board's Statement of Financial Accounting Standards No. 123 (revised 2004), *Share-Based Payment*, or SFAS 123R, using the modified prospective application method. The effect of adopting SFAS 123R was to reduce net income for the year ended December 31, 2006 by \$3.3 million (\$0.03 on basic and diluted earnings per share).

Total stock-based compensation expense related to stock options, restricted stock, restricted stock units and the Employee Stock Purchase Plan for the year ended December 31, 2006 was \$5.5 million. Stock-based compensation expense recognized for restricted stock and restricted stock units for the year ended December 31, 2005 was \$1.1 million.

See Note 15 to our Consolidated Financial Statements contained in Item 15 of this Annual Report on Form 10-K for further information regarding our adoption of SFAS 123R.

Restructuring

For the year ended December 31, 2006, the Company recorded restructuring charges of \$0.7 million primarily related to a reevaluation of the assumptions used in determining the fair value of certain lease obligations related to facilities abandoned in a previous restructuring. The revised assumptions, including lower estimates of expected sub-rental income over the remainder of the lease terms and expected lease termination costs associated with exiting a portion of the facilities, are based on management's evaluation of the commercial rental market. The above mentioned charges are net of a credit of \$0.3 million to previously recognized restructuring charges relating primarily to the adjustment for severance and other one-time termination benefits associated with reduction in force actions and the consolidation of the Company's Rockville, Maryland operations into its headquarters and manufacturing facility located in Beverly, Massachusetts. In addition to the amounts reported as restructuring charges, \$0.3 million of relocation and other incremental expenses related to the consolidation of the Rockville, Maryland operations are included in general and administrative expense for the year ended December 31, 2006.

In total, the Company incurred approximately \$13.4 million in restructuring and general and administrative expenses related to these actions, all of which has been recognized in the statement of income since the fourth quarter of 2004. Of the total cost related to these actions, approximately \$12.4 million is expected to result in cash expenditures, of which \$11.3 million has been paid through December 31, 2006. Leases are expected to be paid over the remaining lease periods extending to 2007.

The impact of these cost reductions on our liquidity has not been significant, as management estimates these actions have yielded equivalent cash savings.

Changes in the Company's restructuring liability are as follows:

| | Severance (in thousands) | Retention | Leases | Total |
|--------------------------------|-----------------------------|-----------|----------|----------|
| Balance at December 31, 2005 | \$ 636 | \$ 120 | \$ 1,264 | \$ 2,020 |
| Restructuring expense (credit) | (287) | (51) | 1,020 | 682 |
| Cash payments | (349) | (69) | (1,160) | (1,578) |
| Balance at December 31, 2006 | \$ | \$ | \$ 1,124 | \$ 1,124 |

Other Income (Expense)

Equity income attributable to SEN was \$19.3 million in 2006 compared to \$15.8 million in 2005. Fluctuations in equity contributions from SEN reflect changes in its sales volume and net income resulting from demand changes in the Japanese semiconductor market, and the timing of shipments in Japan.

Interest income of \$8.4 million primarily relates to interest earned on cash, cash equivalents and short-term investments. Interest income increased by \$2.9 million from 2005 due primarily to higher interest rates earned on invested balances and an increase in average cash balances compared to 2005, most of which came from the issuance of an additional \$24.2 million of convertible senior subordinated notes on May 2, 2006.

Interest expense of \$9.1 million in 2006 and \$6.6 million in 2005 primarily relates to our long-term debt issued in January 2002. The increase of \$2.5 million relates primarily to our issuance of an additional \$24.2 million of convertible senior subordinated notes on May 2, 2006 which contain an effective yield to maturity of approximately 8%.

Income Taxes

Income tax expense for 2006 was \$2.0 million. Income tax expense relates principally to operating results of foreign entities in jurisdictions, principally in Asia, where we earn taxable income. We have significant net operating losses in the United States and certain foreign tax jurisdictions, principally Europe, and, as a result, do not pay significant income taxes in those jurisdictions nor have the ability to obtain tax benefit for such losses. Accordingly, our effective income tax rate is not meaningful.

Year ended December 31, 2005 in comparison to the year ended December 31, 2004

Revenue

Systems revenue was \$206.1 million, or 55.3% of revenue in 2005, compared with \$326.5 million, or 64.3% of revenue, in 2004. The decrease in sales of systems compared with 2004 was primarily attributable to weaker market demand resulting from lower levels of chip production by our semiconductor manufacturing customers. Also, while the effect is not yet quantifiable, systems revenue also declined because semiconductor manufacturers shifted away from our multi-wafer high current ion implant systems to single wafer high current ion implant systems.

Approximately 42.3% of systems revenue in 2005 was from sales of 200mm products and 57.7% were from sales of 300mm products, compared with 61.6% and 38.4% for sales of 200mm products and 300mm products in 2004, respectively.

Services revenue, which includes spare parts, equipment upgrades, and maintenance services, was \$157.6 million, or 42.3% of revenue for 2005, compared with \$167.0 million, or 32.9% of revenue for 2004.

Services revenue fluctuates with capacity utilization by our customers, and the decline in services revenue for 2005 is attributable to declining utilization by semiconductor manufacturers.

As described above in Revenue Recognition, a portion of our systems revenue is deferred until installation and other services related to future deliverables are performed. The total amount of deferred revenue at December 31, 2005 and 2004 was \$41.3 million and \$41.7 million, respectively.

Royalty revenue was \$8.8 million, or 2.4% of revenue for 2005, compared with \$14.4 million, or 2.8% of revenue for 2004. Royalties are primarily earned under the terms of our license agreement with SEN. Revenue changes are mainly attributed to fluctuations in SEN sales volume based on demand for equipment by Japanese semiconductor manufacturers and the timing of shipments in Japan.

Revenue from sales of ion implantation products and services accounted for \$297.3 million, or 79.8% of total revenue in 2005, compared with \$412.3 million, or 81.2%, of total revenue in 2004.

Gross Profit

Gross profit was 41.5% of revenue in 2005 compared with 41.6% of revenue in 2004. The gross profit decrease of .1 percentage points was the result of unfavorable systems cost and product mix (approximately 2.5 percentage points), unfavorable systems volume (approximately 1.6 percentage points) and 100% margin SEN royalties (approximately .5 percentage points), offset by an increased percentage of parts and service volume and margins (approximately 4.3 percentage points), and lower warranty costs (approximately .3 percentage points).

Research and Development

Research and development expense was \$70.9 million in 2005, an increase of \$7.7 million, or 12.2%, as compared with \$63.2 million in 2004. The increase was driven primarily by expenses associated with the timing of project material usage, supplies and contract labor (\$9.4 million) and increased amortization related to manufactured products used in research and development (\$1.4 million). These cost increases were partially offset by lower costs associated with variable compensation (\$2.2 million) and lower payroll and payroll related expenses (\$0.8 million). Increases in overall research and development expenses in 2005 compared with 2004 are attributable to development efforts related to our single wafer Optima platform. Research and development expense was attributable to the following activities in 2005; 60% for new product development, 22% for improvement of existing products, and 18% for product testing.

Sales and Marketing

Sales and marketing expense was \$44.8 million in 2005, a decrease of \$2.8 million, or 5.9%, as compared with \$47.6 million in 2004. This decrease was driven primarily by lower payroll and payroll related expenses associated with reduction in force actions (\$2.0 million) and lower commission expense (\$0.9 million).

General and Administrative

General and administrative expense was \$45.6 million in 2005, a decrease of \$0.5 million, or 1.1%, as compared with \$46.1 million in 2004. This decrease was driven primarily by lower costs associated with variable compensation (\$3.3 million), reduced salary expense (\$0.6 million) and reduced supplies costs (\$0.8 million) offset by costs associated with the consolidation of our Rockville, Maryland operations into our headquarters and manufacturing facility located in Beverly, Massachusetts (\$4.4 million).

Restructuring

Restructuring expense of \$6.5 million in 2005 consists primarily of severance and other one-time termination benefits related to reduction in force actions and the consolidation of our Rockville, Maryland operations into our headquarters and manufacturing facility located in Beverly, Massachusetts. We expect to incur \$12.4 million in restructuring and general and administrative expenses related to these actions. \$12.4 million had been recognized as expense since the fourth quarter of 2004. Of the total cost related to these actions, \$9.6 million in cash expenditures had been paid through December 31, 2005.

Changes in our restructuring liability are as follows:

| | Severance (in thousands) | Retention | Leases | Leasehold Improvements | Total |
|------------------------------|-----------------------------|-----------|----------|---------------------------|----------|
| Balance at December 31, 2004 | \$ 724 | \$ 44 | \$ | \$ | \$ 768 |
| Restructuring expense | 3,263 | 585 | 1,924 | 725 | 6,497 |
| Cash payments | (3,351) | (509) | (660) | | (4,520) |
| Non-cash impairment | | | | (725) | (725) |
| Balance at December 31, 2005 | \$ 636 | \$ 120 | \$ 1,264 | \$ | \$ 2,020 |

Other Income (Expense)

Equity income attributable to SEN was \$15.8 million in 2005 compared to \$30.5 million in 2004. Fluctuations in equity contributions from SEN reflect changes in its sales volume and net income resulting from demand changes in the Japanese semiconductor market, and the timing of shipments in Japan.

Interest income of \$5.5 million primarily relates to interest earned on cash, cash equivalents and short-term investments. Interest income increased by \$3.5 million from 2004 due primarily to higher interest rates earned on invested balances.

Interest expense of \$6.6 million in 2005 and \$6.7 million in 2004 primarily relates to our long-term debt issued in January 2002.

Income Taxes

Income tax expense for 2005 was \$1.9 million. Income tax expense relates principally to operating results of foreign entities in jurisdictions, principally in Asia, where we earn taxable income. We have significant net operating losses in the United States and certain foreign tax jurisdictions, principally Europe, and, as a result, do not pay significant income taxes in those jurisdictions nor have the ability to obtain tax benefit for such losses. Accordingly, our effective income tax rate is not meaningful.

Liquidity and Capital Resources

Cash, cash equivalents, and marketable securities at December 31, 2006 were \$203.7 million, compared to \$165.2 million at December 31, 2005. The \$38.5 million increase in cash and cash equivalents and short-term investments is mainly attributable to \$19.0 million in cash generated by operations, \$24.2 million from issuance of convertible debt and \$3.5 million in proceeds from the exercise of stock options and stock purchases under the Employee Stock Purchase Plan, partially offset by \$6.9 million in capital expenditures and a \$0.9 million increase of restricted cash balances.

Capital expenditures were \$6.9 million and \$7.8 million for the years ended December 31, 2006 and 2005, respectively. The decrease was primarily due to the completion of the consolidation of our Rockville, Maryland operations into our headquarters and manufacturing facility in Beverly, Massachusetts during 2005. We have no significant capital projects planned for 2007 and total capital expenditures for 2007 are

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projected to be less than \$10.0 million. Future capital expenditures beyond 2007 will depend on a number of factors, including the timing and rate of expansion of our business.

We have no off-balance sheet arrangements other than foreign exchange contracts used to hedge amounts receivable from SEN (\$1.1 million at December 31, 2006).

We have net operating loss and tax credit carryforwards the tax effect of which aggregate \$75.8 million at December 31, 2006. These carryforwards, which expire principally between 2018 and 2025, are available to reduce future income tax liabilities in the United States and certain foreign jurisdictions.

We had a \$50.0 million revolving credit facility that expired in October 2006. We are currently evaluating the need for a new credit facility and anticipate entering into a similar arrangement in 2007.

As discussed in Note 13 to the consolidated financial statements, on May 2, 2006, we entered into an exchange and purchase agreement pursuant to which the holder of an aggregate of approximately \$50.8 million of our existing 4.25% Convertible Subordinated Notes due January 15, 2007 (the Old Notes), agreed to exchange its Old Notes for \$50.8 million in aggregate principal amount of our newly issued 4.25% Convertible Senior Subordinated Notes due January 15, 2009 (the New Notes), plus accrued and unpaid interest on the Old Notes through but excluding May 2, 2006, the closing date of the exchange. At maturity, the Company is required to repay the outstanding principal of the New Notes, plus a maturity premium of 11.125% of such principal, resulting in an effective annual yield to maturity of approximately 8.0%. In addition, we issued an additional \$24.2 million of New Notes, resulting in an aggregate of \$75 million of New Notes outstanding. We repaid the remaining \$74.2 million of outstanding Old Notes in January 2007. We believe that our existing cash balances and expected positive cash flows for 2007 and 2008 will allow us to repay the New Notes when they mature without causing a liquidity issue.

We have outstanding standby letters of credit, bank guarantees and surety bonds in the amount of \$17.3 million to support certain operating lease obligations, workers' compensation insurance, and certain value added tax claims in Europe. In addition, at December 31, 2006, \$12.2 million of cash was pledged as collateral for certain outstanding standby letters of credit and bank guarantees and is reflected as restricted cash on the consolidated balance sheet.

The following represents our contractual obligations and commercial commitments as of December 31, 2006 (in thousands):

| Contractual Obligations | Total | Payments Due by Period | | | |
|-------------------------------------|------------|------------------------|-----------|-----------|------------|
| | | 2007 | 2008-2009 | 2010-2011 | Thereafter |
| Long-term debt (including interest) | \$ 167,107 | \$ 78,982 | \$ 88,125 | \$ | \$ |
| Purchase order commitments | 50,518 | 50,518 | | | |
| Operating leases | 8,721 | 5,311 | 3,267 | 143 | |
| | \$ 226,346 | \$ 134,811 | \$ 91,392 | \$ 143 | \$ |

| Other Commercial Commitments | Total | Amount of Commitment Expiration by Period | | | |
|------------------------------|-----------|---|-----------|-----------|------------|
| | | 2007 | 2008-2009 | 2010-2011 | Thereafter |
| Standby letters of credit | \$ 9,352 | \$ 9,352 | \$ | \$ | \$ |
| Guarantees | 7,971 | 2,703 | 5,268 | | |
| | \$ 17,323 | \$ 12,055 | \$ 5,268 | \$ | \$ |

Axcelis' liquidity is affected by many factors. Some of these factors are based on normal operations of the business and others relate to the uncertainties of global economies and the semiconductor equipment industry. Although our cash requirements fluctuate based on the timing and extent of these factors, we

believe that our existing cash, cash equivalents, and marketable securities will be sufficient to satisfy our anticipated cash requirements for at least the next twelve months.

Recent Accounting Pronouncements

SFAS 158

In September 2006, the Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standard (SFAS) No. 158, *Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans - An Amendment of FASB Statements No. 87, 88, 106, and 132R* (SFAS 158). SFAS 158 requires companies to recognize the funded status of pension and other postretirement benefit plans on sponsoring employers' balance sheets and to recognize changes in the funded status in the year the changes occur. It also requires the measurement date of plan assets and obligations to occur at the end of the employers' fiscal year. SFAS 158 is effective for the Company at the end of fiscal 2006, except for the change in measurement date, which is effective for the Company in fiscal 2007. The adoption of SFAS 158 did not impact the Company's financial condition, results of operations or liquidity and is not expected to have a material impact in future periods.

FIN 48

In June 2006, the FASB issued FASB Interpretation No. 48, *Accounting for Uncertainty in Income Taxes - an interpretation of FASB Statement No. 109* (FIN 48). FIN 48 clarifies the accounting for uncertainty in income taxes recognized in an enterprise's financial statements in accordance with SFAS 109, *Accounting for Income Taxes*. FIN 48 prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. FIN 48 also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods, disclosure, and transition. FIN 48 is effective for fiscal years beginning after December 15, 2006. The adoption of FIN 48 is not expected to have a material impact on the Company's financial condition, results of operations or liquidity.

SFAS 151

In November 2004, the FASB issued SFAS No. 151, *Inventory Costs, an amendment of Accounting Research Bulletin (ARB) No. 43, Chapter 4* (SFAS 151). SFAS 151 amends the guidance in ARB No. 43, Chapter 4, *Inventory Pricing*, to clarify that abnormal amounts of idle facility expense, freight, handling costs, and wasted material (spoilage) should be recognized as current-period charges. In addition, SFAS 151 requires that allocation of fixed production overhead to the costs of conversion be based on the normal capacity of the production facilities. The provisions of SFAS 151 are effective for fiscal years beginning after June 15, 2005. The adoption of SFAS 151 in the first quarter of fiscal 2006 did not impact the Company's financial condition, results of operations or liquidity.

SFAS 154

In May 2005, the FASB issued SFAS No. 154, *Accounting Changes and Error Corrections* (SFAS 154) which supersedes APB Opinion No. 20, *Accounting Changes* and SFAS No. 3, *Reporting Accounting Changes in Interim Financial Statements*. SFAS 154 provides guidance on the accounting for and reporting of accounting changes and error corrections. It establishes, unless impracticable, retrospective application as the required method for reporting a change in accounting principle in the absence of explicit transition requirements specific to the newly adopted accounting principle. The correction of an error in previously issued financial statements is not an accounting change. However, the reporting of an error correction involves adjustments to previously issued financial statements similar to those generally applicable to reporting an accounting change retroactively. Therefore, the reporting of a correction of an

error by restating previously issued financial statements is also addressed by this statement. SFAS 154 is effective for accounting changes and corrections of errors made in fiscal years beginning after December 15, 2005. The adoption of SFAS 154 in fiscal 2006 did not impact the Company's financial condition, results of operations or liquidity.

SFAS No. 157

In September 2006, the FASB issued SFAS No. 157, *Fair Value Measurements*, which defines fair value, establishes a framework for measuring fair value, and expands disclosures about fair value measurements. Where applicable, this Statement simplifies and codifies related guidance within generally accepted accounting principles (GAAP). This statement is effective for financial statements issued for fiscal years beginning after November 15, 2007, and interim periods within those fiscal years. The Company is currently analyzing the expected impact from adopting this statement on its financial statements, but currently does not believe its adoption will have a significant impact on the financial position or results of operations of the Company.

Outlook

Our performance is directly related to semiconductor manufacturers' levels of capital expenditures to open new fabrication facilities and expand existing ones, as well as operational improvements we have implemented over the past several years. The level of capital expenditures by these manufacturers depends upon the current and anticipated market demand for semiconductors and the products utilizing them, the available manufacturing capacity in manufacturers' fabrication facilities, and the ability of manufacturers to increase productivity in existing facilities without incurring additional capital expenditures.

On January 31, 2007, we announced that net revenues (excluding SEN) for the first quarter of 2007 are forecast in the range of \$90 million to \$100 million. Gross margins are projected in the 42% to 43% range. We expect results of operations to be in the range of \$0.02 to \$0.06 per share.

In addition, we provided a summary of expectations for the 2007 total year. Revenues are anticipated to increase 15% to 20% over 2006 levels with revenues from sales of our single wafer Optima products to contribute the majority of the increase. Gross margins are expected to remain in the low 40% range.

It is difficult to predict our customers' capital spending plans since they can change very quickly. At our current sales level, each sale, or failure to make a sale, could have a material effect on our results of operations in a particular quarter.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk.

Interest Rate Sensitivity

Axcelis' exposure to market risk for changes in interest rates relates primarily to our investment portfolio, which consists entirely of cash-equivalents and short-term investments at December 31, 2006. The primary objective of our investment activities is to preserve principal while maximizing yields without significantly increasing risk. This is accomplished by investing in marketable high investment grade securities and limiting exposure to any one issue or issuer. We do not use derivative financial instruments in managing our investment portfolio and, due to the nature of our investments, we do not expect our operating results or cash flows to be affected to any significant degree by any change in market interest rates.

Foreign Currency Exchange Risk

Substantially all of our sales are billed in U.S. dollars, thereby reducing the impact of fluctuations in foreign exchange rates on our results. Operating margins of certain foreign operations can fluctuate with

changes in foreign exchange rates to the extent revenues are billed in U.S. dollars and operating expenses are incurred in the local functional currency. During the years ended December 31, 2006 and 2005, approximately 9% and 11% of our revenues, respectively, were derived from foreign operations with this inherent risk. In addition, at both December 31, 2006 and 2005, our operations outside of the United States accounted for approximately 29.2% of our total assets, the majority of which was denominated in currencies other than the U.S. dollar.

Our investment in SEN and our royalty and equity income from SEN are subject to foreign currency exchange risks. For royalties to be received in cash and certain other accounts receivable from SEN (\$1.1 million at December 31, 2006) we hedge our exposure to currency fluctuation through the use of forward contracts. The effect of a 10% depreciation of the Japanese Yen compared to the U.S. dollar would result in a write-down in our investment in SEN and a corresponding decrease in accumulated other comprehensive income (included in stockholders equity) of \$11.4 million at December 31, 2006.

Item 8. Financial Statements and Supplementary Data.

Response to this Item is submitted as a separate section of this report immediately following Item 15.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures.

Our management, with the participation of our principal executive officer and principal financial officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act)) as of the end of the period covered by this annual report (the Evaluation Date). Based on this evaluation, our principal executive officer and principal financial officer concluded that, as of the Evaluation Date, these disclosure controls and procedures are effective.

Internal Control Over Financial Reporting

Management's Annual Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) under the Exchange Act. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. A control system, no matter how well designed and operated, can provide only reasonable assurance with respect to financial statement preparation and presentation. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting as of December 31, 2006. In making this assessment, management used the criteria set forth in the Committee of Sponsoring Organizations of the Treadway Commission (COSO) Internal Control-Integrated Framework.

Based on this assessment, management has concluded that, as of December 31, 2006, our internal control over financial reporting is effective based on those criteria.

Ernst & Young LLP, an independent registered public accounting firm that audited our financial statements for the year ended December 31, 2006 included in this annual report, has issued an attestation report on management's assessment of our internal control over financial reporting. This report is provided as follows:

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders of Axcelis Technologies, Inc.

We have audited management's assessment, included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting, that Axcelis Technologies, Inc. (the Company) maintained effective internal control over financial reporting as of December 31, 2006, based on criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (the COSO criteria). Axcelis Technologies Inc.'s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting. Our responsibility is to express an opinion on management's assessment and an opinion on the effectiveness of the company's internal control over financial reporting based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, evaluating management's assessment, testing and evaluating the design and operating effectiveness of internal control, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the Company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, management's assessment that Axcelis Technologies, Inc. maintained effective internal control over financial reporting as of December 31, 2006, is fairly stated, in all material respects, based on the COSO criteria. Also, in our opinion, Axcelis Technologies, Inc. maintained, in all material respects, effective internal control over financial reporting as of December 31, 2006, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of Axcelis Technologies as of December 31, 2006 and 2005, and the related consolidated statements of operations, stockholders equity, and cash flows for each of the three years in the period ended December 31, 2006 of Axcelis Technologies, Inc. and our report dated March 13, 2007 expressed an unqualified opinion thereon.

Boston, Massachusetts
March 13, 2007

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) under the Exchange Act) identified in connection with the evaluation of our internal control that occurred during our fourth quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

A portion of the information required by Item 10 of Form 10-K is incorporated by reference from the information responsive thereto contained in the sections in Axcelis Proxy Statement for the Annual Meeting of Stockholders to be held May 9, 2007 (the Proxy Statement) captioned:

- Proposal 1: Election of Directors,
- Corporate Governance, and
- Other Matters Section 16(a) Beneficial Ownership Reporting Compliance.

The remainder of such information is set forth under the heading Executive Officers at the end of Item 1 in Part I of this report.

Item 11. Executive Compensation.

The information required by Item 11 of Form 10-K is incorporated by reference from the information responsive thereto contained in the sections in the Proxy Statement captioned:

- Executive Compensation, and
- Other Matters Compensation Committee Interlocks and Insider Participation.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

A portion of the information required by Item 12 of Form 10-K is incorporated by reference from the information responsive thereto contained in the sections in the Proxy Statement captioned:

- Share Ownership of 5% Stockholders, and
- Share Ownership of Directors and Executive Officers.

The remainder of such information is set forth below:

Equity Plan Reserves Disclosure

We maintain two equity compensation plans, the 2000 Stock Plan and the Employee Stock Purchase Plan. The number of shares issuable upon exercise of outstanding options granted to employees and non-employee directors, as well as the number of shares remaining available for future issuance, under our equity compensation plans as of December 31, 2006 are summarized in the following table:

| Plan category | (A) Number of shares to be issued upon exercise of outstanding options | (B) Weighted-average exercise price of outstanding options | (C) Number of shares remaining available for future issuance under equity compensation plans (excluding shares reflected in column (A))(1) |
|--|--|---|---|
| Equity compensation plans approved by stockholders | 12,804,554 | \$ 5.98 | 21,547,105 |
| Equity compensation plans not approved by stockholders | | | |
| Total | 12,804,554 | | 21,547,105 |

(1) Represents the total shares available for issuance under our 2000 Stock Plan and our Employee Stock Purchase Plan, as of December 31, 2006, as follows:

(A) 17,440,944 shares were available for future issuance under the 2000 Stock Plan. Such amount represents the total number of shares reserved for issuance under the 2000 Stock Plan (33,173,367), less 207,643 outstanding shares issued under the plan as restricted stock, 1,760,894 shares issuable upon vesting of outstanding restricted stock units, 959,332 shares issued upon option exercises, and the outstanding options shown in column (A), all as of December 31, 2006. This plan is generally used for grants to employees and directors and was approved by our stockholders at our 2002 annual meeting.

(B) 4,106,161 shares were available under our Employee Stock Purchase Plan, which represents the total number of shares reserved for issuance under the plan (7,500,000) less 3,393,839 shares issued through December 31, 2006. The Employee Stock Purchase Plan was approved by Eaton Corporation, as our sole stockholder prior to our initial public offering, in compliance with Internal Revenue Code Section 423.

Item 13. Certain Relationships and Related Transactions and Director Independence.

The information required by Item 13 of Form 10-K is incorporated by reference from the information responsive thereto contained in the sections in the Proxy Statement captioned:

- Executive Compensation,
- Corporate Governance Board of Directors Independence and Meetings, and
- Corporate Governance Certain Relationships and Related Transactions.

Item 14. Principal Accounting Fees and Services

The information required by Item 14 of Form 10-K is incorporated by reference from the information responsive thereto contained in the section captioned Proposal 2: Ratification of the Appointment of our Independent Registered Public Accounting Firm in the Proxy Statement.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Report:

1) Financial Statements:

| | |
|--|-----|
| <u>Report of Independent Registered Public Accounting Firm</u> | F-1 |
| <u>Consolidated Statements of Operations For the years ended December 31, 2006, 2005 and 2004</u> | F-2 |
| <u>Consolidated Balance Sheets December 31, 2006 and 2005</u> | F-3 |
| <u>Consolidated Statements of Stockholders Equity For the years ended December 31, 2006, 2005 and 2004</u> | F-4 |
| <u>Consolidated Statements of Cash Flows For the years ended December 31, 2006, 2005 and 2004</u> | F-5 |
| <u>Notes to Consolidated Financial Statements</u> | F-6 |

2) Financial Statement Schedules:

Schedule II Valuation and Qualifying Accounts for the years ended December 31, 2006, 2005 and 2004

All other schedules for which provision is made in the applicable regulation of the Securities and Exchange Commission are not required under the related instructions or are inapplicable, and therefore have been omitted.

(b) Exhibits

The exhibits filed as part of this Form 10-K are listed on the Exhibit Index immediately preceding such Exhibits, which Exhibit Index is incorporated herein by reference.

(c) Financial Statement Schedules

The response to this portion of Item 15 is submitted as a separate section of this report.

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders of Axcelis Technologies, Inc.

We have audited the accompanying consolidated balance sheets of Axcelis Technologies, Inc. (the Company) as of December 31, 2006 and 2005, and the related consolidated statements of operations, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2006. Our audits also included the financial statement schedule listed in the index at Item 15(a). These financial statements and schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and schedule based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Axcelis Technologies, Inc. at December 31, 2006 and 2005, and the consolidated results of its operations and its cash flows for each of the three years in the period ended December 31, 2006, in conformity with U.S. generally accepted accounting principles. Also, in our opinion, the related financial statement schedule, when considered in relation to the basic financial statements taken as a whole, presents fairly in all material respects the information set forth therein.

As discussed in Note 2 to the consolidated financial statements, effective January 1, 2006, the Company adopted Statement of Financial Accounting Standards No. 123R *Share-Based Payment*.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the effectiveness of Axcelis Technologies, Inc.'s internal control over financial reporting as of December 31, 2006, based on criteria established in Internal Control - Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 13, 2007 expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

Boston, Massachusetts
March 13, 2007

F-1

Axcelis Technologies, Inc.
Consolidated Statements of Operations
(In thousands, except per share amounts)

| | Year Ended December 31, | | |
|--|-------------------------|-------------|------------|
| | 2006 | 2005 | 2004 |
| Revenue | | | |
| Systems | \$ 276,311 | \$ 206,087 | \$ 326,521 |
| Services | 176,199 | 157,644 | 167,027 |
| Royalties, primarily from SEN | 9,207 | 8,809 | 14,428 |
| | 461,717 | 372,540 | 507,976 |
| Cost of revenue | 270,203 | 218,109 | 296,448 |
| Gross profit | 191,514 | 154,431 | 211,528 |
| Operating expenses | | | |
| Research and development | 72,384 | 70,908 | 63,209 |
| Sales and marketing | 45,536 | 44,826 | 47,593 |
| General and administrative | 46,620 | 45,631 | 46,149 |
| Amortization of intangible assets | 2,551 | 2,448 | 2,448 |
| Restructuring charges | 682 | 6,497 | 994 |
| | 167,773 | 170,310 | 160,393 |
| Income (loss) from operations | 23,741 | (15,879) | 51,135 |
| Other income (expense) | | | |
| Equity income of SEN | 19,266 | 15,751 | 30,531 |
| Interest income | 8,383 | 5,459 | 2,032 |
| Interest expense | (9,085) | (6,634) | (6,673) |
| Other net | 478 | (679) | (1,886) |
| | 19,042 | 13,897 | 24,004 |
| Income (loss) before income taxes | 42,783 | (1,982) | 75,139 |
| Income taxes | 2,013 | 1,873 | 964 |
| Net income (loss) | \$ 40,770 | \$ (3,855) | \$ 74,175 |
| Net income (loss) per share | | | |
| Basic | \$ 0.40 | \$ (0.04) | \$ 0.75 |
| Diluted | \$ 0.40 | \$ (0.04) | \$ 0.73 |
| Shares used in computing basic and diluted net income (loss) per share | | | |
| Basic | 101,058 | 100,301 | 99,528 |
| Diluted | 101,361 | 100,301 | 101,205 |

See accompanying Notes to Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Balance Sheets
(In thousands, except per share amounts)

| | December 31, | |
|--|--------------|------------|
| | 2006 | 2005 |
| ASSETS | | |
| Current assets | | |
| Cash and cash equivalents | \$ 140,451 | \$ 71,417 |
| Marketable securities | 63,200 | 93,797 |
| Restricted cash | 11,019 | 8,037 |
| Accounts receivable, net | 73,635 | 79,379 |
| Inventories, net | 160,107 | 109,972 |
| Prepaid expenses and other current assets | 26,639 | 32,767 |
| Total current assets | 475,051 | 395,369 |
| Property, plant and equipment, net | 66,678 | 71,443 |
| Investment in SEN | 126,688 | 108,815 |
| Goodwill | 46,773 | 46,773 |
| Intangible assets | 13,549 | 16,100 |
| Restricted cash, long-term portion | 1,137 | 3,195 |
| Other assets | 24,117 | 19,748 |
| | \$ 753,993 | \$ 661,443 |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities | | |
| Accounts payable | \$ 37,312 | \$ 25,556 |
| Accrued compensation | 26,996 | 18,437 |
| Warranty | 5,229 | 5,739 |
| Income taxes | 3,906 | 3,021 |
| Deferred revenue | 28,811 | 30,140 |
| Current portion, long term debt | 74,217 | |
| Other current liabilities | 13,670 | 11,333 |
| Total current liabilities | 190,141 | 94,226 |
| Long-term debt | 76,887 | 125,000 |
| Long-term deferred revenue | 5,054 | 11,177 |
| Other long-term liabilities | 4,349 | 4,999 |
| Commitments and contingencies | | |
| Stockholders' equity | | |
| Preferred stock, \$0.001 par value, 30,000 shares authorized; none issued or outstanding | | |
| Common stock, \$0.001 par value, 300,000 shares authorized; 101,418 shares issued and 101,298 shares outstanding at December 31, 2006; 100,637 shares issued and 100,517 shares outstanding at December 31, 2005 | 101 | 101 |
| Additional paid-in capital | 469,967 | 466,454 |
| Deferred compensation | | (5,385) |
| Treasury stock, 120 shares at December 31, 2006 and 2005 | (1,218) | (1,218) |
| Retained earnings (deficit) | 9,583 | (31,187) |
| Accumulated other comprehensive loss | (871) | (2,724) |
| | 477,562 | 426,041 |
| | \$ 753,993 | \$ 661,443 |

See accompanying Notes to Consolidated Financial Statements

Axcelis Technologies, Inc.
Consolidated Statements of Stockholders Equity
(In thousands)

| | Common Stock | | Additional Paid-in Capital | Deferred Compensation | Treasury Stock | Retained Earnings (Deficit) | Accumulated Other Comprehensive Income (Loss) | Total |
|--|--------------|--------|----------------------------------|--------------------------|-------------------|-----------------------------------|--|------------|
| | Shares | Amount | | | | | | |
| Balance at December 31, 2003 | 99,114 | \$ 99 | \$ 451,389 | \$ (811) | \$ (1,218) | \$ (101,507) | \$ 5,298 | \$ 353,250 |
| Comprehensive loss | | | | | | | | |
| Net income | | | | | | 74,175 | | 74,175 |
| Foreign currency translation adjustments | | | | | | | 9,870 | 9,870 |
| Unrealized loss on marketable securities | | | | | | | (14) | (14) |
| Total comprehensive income | | | | | | | | 84,031 |
| Exercise of stock options | 245 | | 1,743 | | | | | 1,743 |
| Issuance of shares under Employee Stock Purchase Plan | 774 | 1 | 4,338 | | | | | 4,339 |
| Forfeiture of restricted common shares | (23) | | (135) | 135 | | | | |
| Stock-based compensation expense | | | | 110 | | | | 110 |
| Balance at December 31, 2004 | 100,110 | 100 | 457,335 | (566) | (1,218) | (27,332) | 15,154 | 443,473 |
| Comprehensive loss | | | | | | | | |
| Net loss | | | | | | (3,855) | | (3,855) |
| Foreign currency translation adjustments | | | | | | | (17,851) | (17,851) |
| Unrealized loss on marketable securities | | | | | | | (27) | (27) |
| Total comprehensive loss | | | | | | | | (21,733) |
| Exercise of stock options | 190 | | 1,141 | | | | | 1,141 |
| Issuance of shares under Employee Stock Purchase Plan | 327 | 1 | 2,019 | | | | | 2,020 |
| Forfeiture of restricted common shares | (34) | | (201) | 201 | | | | |
| Issuance of restricted common shares | 44 | | 300 | (300) | | | | |
| Issuance of restricted stock units | | | 5,860 | (5,860) | | | | |
| Stock-based compensation expense | | | | 1,140 | | | | 1,140 |
| Balance at December 31, 2005 | 100,637 | 101 | 466,454 | (5,385) | (1,218) | (31,187) | (2,724) | 426,041 |
| Comprehensive income | | | | | | | | |
| Net income | | | | | | 40,770 | | 40,770 |
| Foreign currency translation adjustments | | | | | | | 1,816 | 1,816 |
| Unrealized gain on marketable securities | | | | | | | 37 | 37 |
| Total comprehensive income | | | | | | | | 42,623 |
| Reclassification of deferred compensation upon adoption of SFAS No. 123R | | | (5,385) | 5,385 | | | | |
| Exercise of stock options | 265 | | 1,586 | | | | | 1,586 |
| Issuance of shares under Employee Stock Purchase Plan | 470 | | 2,266 | | | | | 2,266 |
| Forfeiture of restricted common shares | (4) | | (18) | | | | | (18) |
| Issuance of restricted common shares | 50 | | | | | | | |
| Stock-based compensation expense | | | 5,064 | | | | | |