ILLINOIS SUPERCONDUCTOR CORPORATION
Form 10-K405
April 01, 2002

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SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2001

OR

[ ] TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

COMMISSION FILE NUMBER 0-22302

ISCO INTERNATIONAL, INC.
(Exact name of registrant as specified in its charter)

DELAWARE	36-3688459
(State or other jurisdiction of incorporation)	(I.R.S. Employer Identification No.)

451 KINGSTON COURT
MT. PROSPECT, ILLINOIS 60056
(847) 391-9400
(Address and telephone number of principal executive offices)

Securities registered pursuant to Section 12(b) of the Act: NONE

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

Title of each class

Common Stock, par value $0.001 per share
Preferred Stock Purchase Rights

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

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

On February 22, 2002, 147,835,202 shares of the registrant s Common Stock were outstanding. The aggregate market value on February 22, 2002 of the registrant s Common Stock held by non-affiliates of the registrant was $42,600,000, based on the closing price per share of the registrant s common stock as quoted on the OTC bulletin board. This amount excludes more than 62 million shares of common stock held by

affiliates . Exclusion of shares held by any person should not be construed to indicate that such person possesses the power, direct or

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indirect, to direct or cause the direction of the management or policies of the registrant, or that such person is controlled by or under common control with, the registrant.

DOCUMENTS INCORPORATED BY REFERENCE

Certain portions of the registrant s definitive proxy statement for the annual meeting of stockholders to be held during May/June, 2002 are incorporated by reference in Part III of this Form 10-K (the 2001 Proxy Statement).

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A NOTE CONCERNING
FORWARD-LOOKING STATEMENTS

Because ISCO International, Inc. (ISCO or ISCO International) wants to provide investors with more meaningful and useful information, this Annual Report on Form 10-K (Form 10-K) contains, and incorporates by reference, certain forward-looking statements that reflect the Company s current expectations regarding the Company s future results of operations, performance and achievements. The Company has tried, wherever possible, to identify these forward-looking statements by using words such as anticipates, believes, estimates, expects, designs, p intends and similar expressions. These statements reflect the Company s current beliefs and are based on information currently available to the Company. Accordingly, these statements are subject to certain risks, uncertainties and contingencies, including the factors set forth under the caption Risk Factors, which could cause the Company s actual results, performance or achievements for 2002 and beyond to differ materially from those expressed in, or implied by, any of these statements. You should not place undue reliance on any forward-looking statements. Except as otherwise required by federal securities laws, the Company undertakes no obligation to release publicly the results of any revisions to any such forward-looking statements that may be made to reflect events or circumstances after the date of this Annual Report on Form 10-K or to reflect the occurrence of unanticipated events.

PART I

ITEM 1. BUSINESS

The Company develops and manufactures advanced front-end systems for wireless networks using patented and proprietary technologies including high temperature superconducting filters (HTS or CRFE) and adaptive notch filters (ANF) to eliminate out-of-band and in-band interference. Through the integration of the technologies from the ANF division of Lockheed Martin Canada, Spectral Solutions, Inc. and Illinois Superconductor Corporation, the Company believes it has assembled the most comprehensive interference management product and intellectual property portfolio in the industry.

The Company believes that the benefits of using the Company s products include: increased cell site capacity and utilization (as much as 70% or more), increased revenues per cell site (as much as 100% increase based on minutes of use), easier location of new cell sites due to tolerance of interference, improved voice quality and reduced dropped calls (up to 40%). These benefits have been documented in field trials and commercial deployments with wireless operators involving existing cellular and PCS systems.

In addition, the Company believes, that based on test results conducted by NTT DoCoMo (NTT), the next generation of wireless systems (3G or 3rd Generation) will need to manage and eliminate interference more effectively in order to meet performance objectives. The Company believes that with the increased data bit rates required of 3G systems and the increased usage of 3G systems due to the wireless internet , that interference levels will increase substantially, thereby requiring an improved filtering system in the base station.

HTS Technology

The Company s patented HTS technology includes the use of superconducting materials, radio frequency (RF) filter designs and cryogenic technologies that are needed to develop, manufacture and market high performance RF filter products. These products are designed to enhance the quality, capacity, coverage and flexibility of wireless telecommunications services.

RF filters refine the radio signals by passing radio waves through a series of resonators (poles), which allow certain frequencies to pass while rejecting other frequencies. Generally, the more poles in the RF filter, the more effective the RF filter. Each pole, however, has electrical resistance which causes the loss (insertion loss) of desired radio waves. Therefore, the more poles in a conventional RF filter, the greater the insertion loss.

Superconductive materials, when cooled below a critical temperature, are able to transmit an electric current with no loss or minimal loss of energy. The advantage of

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using superconductors in RF filters is that more poles can be added without significant increases in insertion loss, thereby creating a more effective RF filter.

HTS filters can be designed with a variety of structures and materials, each with different results. The Company is able to produce RF filters using the two main HTS filter designs, thin-film and thick-film design. The Company believes it is the only Company in the world that uses thick-film design and the Company believes it has an extensive patent position in the thick-film area that will protect its proprietary position.

One benefit of thick-film technology is that, according to published data of tests conducted by NTT DoCoMo, it produces an almost theoretically perfect RF filter for suppression of out-of-band interference (see diagram on page 18).

Another benefit of thick-film design is already incorporated in the Company s patented All-Temperature Performance (ATP) feature, which eliminates the need for certain redundant backup systems in a wireless base station. One of the hurdles of incorporating an HTS RF filter in a base station is that the HTS filter has an active feature, the cryo-cooler, which may be subject to failure or power loss. Non-HTS filters do not have an active component and therefore non-HTS filter performance is not hindered by a lack of power. The incorporation of the ATP function in an HTS RF filter eliminates the need for a backup system in case of power failure, because even without power, it has filtering capabilities at least equal to a non-HTS filter. Thin-film technology requires a back-up system and a by-pass system to continue to operate the filtering component of the base station, both of which adds cost and size to the overall product presentation.

The company also uses its patented thin-film superconducting technology for its patented T-series, or tower-mount RF filters. The Company believes that its tower-mount products will be a source of competitive advantage in the deployment of HTS filters worldwide. These products offer the Company additional tools with which to address the needs of its customers.

Finally, the Company believes that once the wireless operator accepts a cryo-cooler in a base station for HTS filter applications, the entire front-end of the base station will be open to improved performance through the use of HTS materials, known as the Cryogenic Front End (CRFE). The Company has studied all the components of the front end and believes that a hybrid of thin-film and thick-film technologies will greatly improve the performance of the Digital Wireless Communications System (see diagram on page 20).

ANF Technology

One of the difficult tasks facing any wireless operator trying to suppress interference is determining its source and location. In general, wireless operators do not care about the source (whether it is in-band or out-of-band interference), just that it interferes with the efficiency of the base station.

With the acquisition of the ANF (Adaptive Notch Filter) division of Lockheed Martin Canada Corporation during 2000, the Company owns proprietary technologies to produce filters that monitor RF spectrum and block spontaneous interference occurring within that spectrum. This allows the Company to offer what it believes to be the only product in the world that locates and suppresses in-band interference in a CDMA carrier within 20 milliseconds.

Recently, the Company announced the expansion of the ANF platform (A-series) to support network-wide deployment in metropolitan service areas. The expanded platform now has the capability to scan and clean multiple CDMA carriers in either A-band or B-band cellular networks, along with a web-based network management software package to allow operators to remotely monitor and manage large numbers of sites equipped with ANF technology.

HISTORY

The Company was founded in 1989 by ARCH Development Corporation, an affiliate of the University of Chicago, to commercialize superconductor technologies initially developed by Argonne National Laboratory. The Company was incorporated in Illinois on October 18, 1989 and reincorporated in Delaware on September 24, 1993. The Company s facilities and principal executive offices are located at 451 Kingston Court, Mt. Prospect, Illinois 60056 and its telephone number is (847) 391-9400.

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BUSINESS STRATEGY

The Company s strategic goal is to become the leading supplier of interference control solutions to wireless operators. ISCO is seeking to accomplish its goal by:

Marketing aggressively its products to leading wireless operators and original equipment manufacturers (OEM s);

Providing customers comprehensive interference-control solutions;

Continuing to build on its strong intellectual property position and assert its rights therein; and

Outsourcing product manufacturing and reducing product cost.

The Company is focusing its continuous efforts on winning the support of the world s leading wireless operators for its interference-control solutions. The Company has also conducted trials with NTT DoCoMo as well as several other leading Japanese and Korean operators, and is actively engaged in discussions with several OEMs.

The Company believes that its thin-film and thick-film HTS filters, ANF products and HTS front-end features (including all-temperature performance , tower mounted cryogenic RF receiver and cryogenic equalization technologies) make it the most comprehensive provider of wireless interference-solutions in the market, the only HTS provider to address both in-band and out-of-band interference, as well as the only supplier capable of addressing both the uplink and downlink interference problems. In addition, the Company recently started a business unit that will focus on providing services to operators who need expert advice on understanding and controlling interference in their networks.

The Company believes it has the most comprehensive intellectual property portfolio in CRFE technology and other areas of interference-management (132 patents issued or pending). The Company believes it has the seminal U.S. patent (issued July 17, 2001) that covers commercially viable configurations of CRFE applications for commercial wireless telecommunications. Accordingly, the Company filed a patent infringement lawsuit against two domestic competitors. The Company is expanding the scope of its patent program, focusing particularly on broad applications-controlling patents. Management believes that as interference-control technology becomes a vital component in wireless networks, the IP portfolio will become a powerful element of the Company s overall business strategy.

The Company currently outsources production for its ANF products and is working with other potential contract manufacturers to outsource production of the HTS units as well. Management believes that it can maintain or achieve healthy product gross margins, minimize capital needs while reducing product costs. Management believes that offering the lowest product cost will further strengthen the Company s ability to achieve its strategic objective.

RECENT DEVELOPMENTS/SUBSEQUENT EVENTS

Shareholder Rights Offering

On February 15, 2002, the previously announced Shareholder Rights Offering was completed, resulting in approximately 40 million shares sold to shareholders. The Company received nearly $20 million from this offering.

Issuance and Subsequent Repayment of Notes

On February 15, 2002, the Company used a portion (approximately $9.8 million) of the proceeds to repay all existing notes and accrued interest.

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RISK FACTORS

The following factors, in addition to other information contained herein, should be considered carefully in evaluating the Company and its business.

RISKS RELATED TO THE OPERATIONS AND FINANCING OF THE COMPANY

Limited Operating History; History of Losses; and Uncertainty of Financial Results

The Company was founded in October 1989 and through 1996 was engaged principally in research and development, product testing, manufacturing, marketing and sales activities. It has incurred net losses since inception. As of December 31, 2001, the accumulated deficit was approximately $129,862,000. The Company has only recently begun to generate revenues from the sale of the Company's RF filter products. Prior to the commencement of these sales, the majority of the Company's revenues were derived from R&D contracts, primarily from the U.S. government. Management does not expect revenues to increase dramatically until the Company ships a significantly larger amount of the Company's RF products. Accordingly, management expects that the Company may continue to experience net losses and cannot be certain if or when the Company will become profitable. Spectral Solutions, Inc., recently acquired, had similar operating history and financial uncertainty. In addition, the Company may incur non-cash compensation charges related to the Company's stock option re-pricing which may further decrease the Company's earnings in the future.

The Company has only a limited operating history upon which an evaluation of it and its prospects can be based. It must therefore be considered in light of the risks, expenses and difficulties frequently encountered by companies in their early stages of product commercialization.

Future Capital Needs

To date, the Company has financed its operations primarily through public and private equity and debt financings. The Company believes that it has sufficient funds to operate its business as identified herein without the need for substantial future capital sources other than those described herein through the end of fiscal year 2002. In addition, the Company has put in place mechanisms to raise additional capital when and if needed. The company intends to augment its existing capital position through the funding mechanisms identified and through other strategic sources of capital. Although the Company believes it has sufficient capital resources available to meet its obligations through the end of fiscal year 2002, there is no guarantee that the funding mechanisms identified will allow the company to access additional funds.

The actual amount of future funding requirements will depend on many factors, including: the amount and timing of future revenues, the level of product marketing and sales efforts to support the Company's commercialization plans, the magnitude of research and product development programs, the ability to improve or maintain product margins, the outcome of litigation against the Company, the cost of additional plant and equipment for manufacturing, if needed, and the costs involved in protecting patents or other intellectual property.

Limited Experience in Manufacturing, Sales and Marketing

For the Company to be financially successful, it must either manufacture its products in substantial quantities, at acceptable costs and on a timely basis or enter into an outsourcing arrangement with a qualified manufacturer that will allow it the same. In the event that it is unable to enter into a manufacturing arrangement on acceptable terms with a qualified manufacturer, the Company would have to produce the products in commercial quantities in its own facilities. Although to date the Company has produced limited quantities of its products for commercial installations and for use in development and customer field trial programs, production of large quantities of its products at competitive costs presents a number of technological and engineering challenges. The Company may be unable to manufacture such products in sufficient volume. The Company has limited experience in manufacturing, and substantial costs and expenses may be incurred in connection with attempts to manufacture larger quantities of the Company's products. The Company may be unable to make the transition to large-scale commercial production successfully.

The Company s sales and marketing experience to date is very limited. The Company may be required to further develop its marketing and sales force in order to effectively demonstrate the advantages of its products over more traditional products, as well as other competitors HTS products. The Company also may elect to enter into arrangements with third parties regarding the commercialization and marketing of its

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products. If the Company enters into such agreements or relationships, it will be substantially dependent upon the efforts of others in deriving commercial benefits from its products. The Company may be unable to establish adequate sales and distribution capabilities, it may be unable to enter into marketing arrangements or relationships with third parties on financially acceptable terms, and any such third party may not be successful in marketing the Company s products. There is no guarantee that its sales and marketing effort will be successful.

Management of Growth

Growth to date has caused, and will continue to cause, a significant strain on the Company's management, operational, financial and other resources. The ability to manage growth effectively may require the Company to implement and improve its operational, financial, manufacturing and management information systems and expand, train, manage and motivate employees. These demands may require the addition of new management personnel and the development of additional expertise by management. Any increase in resources devoted to product development and marketing and sales efforts could have an adverse effect on financial performance in future fiscal quarters. If the Company were to receive substantial orders, it may have to expand current facilities, which could cause an additional strain on the Company's management personnel and development resources. The failure of the management team to effectively manage growth could have a material adverse effect on the business, operating results and financial condition.

RISKS RELATED TO THE COMPANY'S COMMON STOCK AND CHARTER PROVISIONS

Delisting of Common Stock

The Company s common stock was de-listed from trading on the NASDAQ National Market in June 1999 due to its inability to meet the net tangible assets requirement for continued listing. The Company s common stock is now traded in the over-the-counter market and quoted on the over-the-counter bulletin board (OTCBB). While to date, the OTCBB market has not diminished the liquidity of the common stock, there is no guarantee that the OTCBB will provide the same liquidity for the trading of securities as the NASDAQ National Market in the future. Management intends to apply for relisting on the AMEX or NASDAQ National Market when reasonably confident that the application would be approved. However, there is no guarantee that this application for relisting will be approved.

Volatility of Common Stock Price

The market price of the Company s common stock, like that of many other high-technology companies, has fluctuated significantly and is likely to continue to fluctuate in the future. Since January 1, 1999 and through December 31, 2001, the closing price of its common stock has ranged from a low of $0.3438 per share to a high of $39.00 per share. Announcements by us or others regarding the receipt of customer orders, quarterly variations in operating results, acquisitions or divestitures, additional equity or debt financings, results of customer field trials, scientific discoveries, technological innovations, litigation, product developments, patent or proprietary rights, government regulation and general market conditions may have a significant impact on the market price of the common stock. In addition, fluctuations in the price of our common stock could affect the Company s ability to have its common stock accepted for listing on a securities market or exchange.

Risk of Dilution

As of December 31, 2001, the Company had (i) outstanding warrants to purchase 33,033 shares of common stock at a weighted average exercise price of $1.47 per share and (ii) outstanding options to purchase 9,639,313 shares of common stock at a weighted average exercise price of $1.64 per share (7,181,001 of which have not yet vested) issued to employees, directors and consultants pursuant to the 1993 Stock Option Plan as Amended, the merger agreement with Spectral Solutions, and individual agreements with management and directors. In order to attract and retain key personnel, the Company may issue additional securities, including stock options, in connection with the Company's employee benefit plans, or may lower the price of existing stock options.

On January 8, 2001, and subsequently amended through January, 2002, the Company filed a registration statement on Form S-3 for the sale of up to $20 million of shares of common stock in a rights offering to common shareholders as of a certain holding date

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which was subsequently determined to be January 7, 2002. Nearly 40 million shares were issued to shareholders under that rights offering, which completed February 15, 2002. On January 12, 2001, a registration statement was filed on Form S-3 for the sale of up to $50 million of shares of common stock in a universal shelf offering. During March, 2001, the Company entered into an agreement with Paul Revere Capital Partners, Ltd., whereby Paul Revere Capital commits to acquire up to $20 million of the Company s stock over the next 24 months upon demand by the Company, subject to the conditions contained in the agreement. Pursuant to this facility, the Company may, at its discretion, sell shares of its common stock to Paul Revere Capital Partners at a discount to the market price of 94% of the average weighted volume price over a 22 day period. Each draw down is limited to the lesser of $4 million or 20% of the trading volume over a specified period of time. The Company will also issue a warrant to Paul Revere Capital Partners to purchase a number of shares equal to 0.5% of the shares issued in each draw down. The Company has also agreed to pay its placement agent a fee equal to 4% of each draw down and issue a warrant to the placement agent to purchase a number of shares equal to 0.5% of the shares issued in each draw down. Subsequent to entering into this agreement, the SEC issued an interpretive release that requires the Company to amend the registration statement to include the purchase agreement prior to drawing down on this facility. Due to the depressed stock price and reduced trading volume, there is no assurance that this facility will be an effective source of capital. As of March 31, 2002, the Company had not amended the registration statement nor had it drawn down on this facility.

The exercise of options and warrants for common stock and the issuance of additional shares of common stock and/or rights to purchase common stock at prices below market value would be dilutive to existing stockholders and may have an adverse effect on the market value of the common stock.

Concentration of the Company s Stock Ownership

At the time of this filing, officers, directors and principal stockholders (holding greater than 5% of outstanding shares) together control approximately 74% of the outstanding voting power. Consequently, these stockholders, if they act together, would be able to exert significant influence over all matters requiring stockholder approval, including the election of directors and approval of significant corporate transactions. In addition, this concentration of ownership may delay or prevent a change of control of the company, even if a change may be in the best interests of the Company s stockholders. The interests of these stockholders may not always coincide with the interests of the company or the interests of other stockholders. Accordingly, these stockholders could cause the Company to enter into transactions or agreements that it would not otherwise consider.

Anti-Takeover Provisions

There exist certain arrangements which may be deemed to have a potential anti-takeover effect in that such provisions may delay, defer or prevent a change of control of the company. In February 1996, the Board of Directors adopted a stockholders rights plan. In addition, the Company s Certificate of Incorporation and By-Laws provide that (i) stockholder action may be taken only at stockholders meetings; (ii) the Board of Directors has authority to issue series of the Company s preferred stock with such voting rights and other powers as the Board of Directors may determine; (iii) prior specified notice must be given by a stockholder making nominations to the Board of Directors or raising business matters at stockholders meetings; and (iv) the Board of Directors is divided into three classes, each serving for staggered three-year terms. The effect of the rights plan and the anti-takeover provisions in charter documents may be to deter business combination transactions not approved by the Board of Directors, including acquisitions that may offer a premium over market price to some or all stockholders.

TECHNOLOGY AND MARKET RISKS

The Company is dependent on wireless telecommunications.

The principal target market for the Company s products is wireless telecommunications. The devotion of substantial resources to the wireless telecommunications market creates vulnerability to adverse changes in this market. Adverse developments in the wireless telecommunications market, which could come from a variety of sources, including future competition, new technologies or regulatory decisions, could affect the competitive position of wireless systems. Any adverse developments in the wireless telecommunications market during the foreseeable future may have a material adverse effect on the Company s business, operating results and financial condition.

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The Company is dependent on the enhancement of existing 2G and 2.5G networks and the build-out of 3G networks, and the capital spending patterns of wireless network operators.

Increased sales of products is dependent on a number of factors, one of which is the build-out of third generation, or 3G, enabled wireless communications networks as well as enhancements of existing infrastructure. Building wireless networks is capital intensive, as is the process of upgrading existing second generation, 2G, equipment. Further, the capital spending patterns of wireless network operators is beyond management s control and depends on a variety of factors, including access to financing, the status of federal, local and foreign government regulation and deregulation, changing standards for wireless technology, the overall demand for wireless services, competitive pressures and general economic conditions. The build-out of 2.5G and 3G enabled networks may take years to complete. The magnitude and timing of capital spending by these operators for constructing, rebuilding or upgrading their systems significantly impacts the demand for the Company s products. Any decrease or delay in capital spending patterns in the wireless communication industry, whether because of a general business slowdown or a reevaluation of the prospective demand for 2.5G and 3G services, would delay the build-out of these networks and may significantly harm business prospects.

The Company s success depends on the market s acceptance of its interference-management telecommunications products.

The Company s RF filter products, which are based on its high-temperature superconductor, or HTS, technology, and its adaptive notch filtering, or ANF, technology, have not been sold in very large quantities and a sufficient market may not develop for these products. Customers establish demanding specifications for performance and reliability, and although the Company believes it has met or exceeded these specifications to date, there is no guarantee that the wireless service providers will elect to use its HTS or ANF solutions to solve their interference problems. Although the Company has received several orders from domestic wireless operators for the Company s products over the past year, there is no assurance that it will continue to receive orders from these customers.

Rapid technological change and future competitive technologies could negatively affect operations.

The field of superconductivity is characterized by rapidly advancing technology. The Company s success will depend in large part upon its ability to keep pace with advancing superconducting technology, high performance RF filter design and efficient, low cost cryogenic technologies. Rapid changes have occurred, and are likely to continue to occur, in the development of superconducting materials and processes. Development efforts may be rendered obsolete by the adoption of alternative solutions to current wireless operator problems or by technological advances made by others such as smart antennas. In addition, other materials or processes, including other superconducting materials or fabrication processes, may prove more advantageous for the commercialization of high performance wireless products than the materials and processes selected by the Company.

BUSINESS RISKS

Dependence on a Limited Number of Customers

Sales to three customers accounted for over 72% and 80% of the Company s total revenues for 2001 and 2000, respectively. In addition, a significant amount of the Company s technical and managerial resources have been focused on working with the limited number of 3G license holders in Japan and Korea, as well as, established Original Equipment Manufacturers (OEMs) who may provide telecommunications equipment to these 3G wireless operators in these markets.

Management expects that if ISCO s RF filter products achieve market acceptance, a limited number of wireless service providers and OEMs will account for a substantial portion of revenue during any period. Sales of many of the Company s RF filter products depend in significant part upon the decision of prospective customers and current customers to adopt and expand their use of these products. Wireless service providers, wireless equipment OEMs and the Company s other customers are significantly larger than, and are able to exert a high degree of influence over the Company. Customers orders are affected by a variety of factors such as new product introductions, regulatory approvals, end user

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demand for wireless services, customer budgeting cycles, inventory levels, customer integration requirements, competitive conditions and general economic conditions. The failure to attract new customers would have a material adverse effect on the business, operating results and financial condition.

Lengthy Sales Cycles

Prior to selling products to customers, the Company may be required to undergo lengthy approval and purchase processes. Technical and business evaluation by potential customers can take up to a year or more for products based on new technologies such as HTS. The length of the approval process is affected by a number of factors, including, among others, the complexity of the product involved, priorities of the customers, budgets and regulatory issues affecting customers. The Company may not obtain the necessary approvals or ensuing sales of such products may not occur. The length of customers approval process or delays could make the Company s quarterly revenues and earnings inconsistent and difficult to trend.

Dependence on Limited Sources of Supply

Certain parts and components used in the Company s RF filter products, including substrates and cryogenic coolers, are only available from a limited number of sources. The Company s reliance on these limited source suppliers exposes it to certain risks and uncertainties, including the possibility of a shortage or discontinuation of certain key components and reduced control over delivery schedules, manufacturing capabilities, quality and costs. Any reduced availability of such parts or components when required could materially impair the ability to manufacture and deliver products on a timely basis and result in the cancellation of orders, which could have a material adverse effect on the business, operating results and financial condition.

In addition, the purchase of certain key components involves long lead times and, in the event of unanticipated increases in demand for the Company s products, the Company may be unable to manufacture products in quantities sufficient to meet customers demand in any particular period. The Company has no guaranteed supply arrangements with its limited source suppliers, does not maintain an extensive inventory of parts or components, and customarily purchases parts and components pursuant to purchase orders placed from time to time in the ordinary course of business.

To satisfy customer requirements, the Company may be required to stock certain long lead time parts in anticipation of future orders. The failure of such orders to materialize as forecasted could limit resources available for other important purposes or accelerate the requirement for additional funds. In addition, such excess inventory could become obsolete, which would adversely affect financial performance. Business disruption, production shortfalls or financial difficulties of a limited source supplier could materially and adversely affect the Company by increasing product costs or reducing or eliminating the availability of such parts or components. In such events, the inability to develop alternative sources of supply quickly and on a cost-effective basis could materially impair the ability to manufacture and deliver products on a timely basis and could have a material adverse effect on the business, operating results and financial condition.

Dependence on Key Personnel

The Company s success will depend in large part upon its ability to attract and retain highly qualified management, engineering, manufacturing, marketing, sales and R&D personnel. Due to the specialized nature of the Company s business, it may be difficult to locate and hire qualified personnel. The loss of services of one of the Company s executive officers or other key personnel, or the failure to attract and retain other executive officers or key personnel, could have a material adverse effect on the Company s business, operating results and financial condition.

Failure of products to perform properly might result in significant warranty expenses.

Although management believes the Company s products have not experienced any significant reliability problems to date, these products may develop reliability problems in the future. In general, products carry a warranty of one or two years, except in the case of superconducting materials which carry a five year warranty, limited to replacement of the product or refund of the cost of the product. In addition, the Company offers its customers extended warranties. Repeated or widespread quality problems could result in significant warranty expenses and/or the loss of customer

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confidence. The occurrence of such quality problems could have a material adverse effect on the business, operating results and financial condition.

Intense competition, and increasing consolidation in our industry, could create stronger competitors and harm the business.

The wireless telecommunications equipment market is very competitive. Many of these companies have substantially greater financial resources, larger research and development staffs and greater manufacturing and marketing capabilities than the Company. Its products compete directly with products which embody existing and future competing commercial technologies. Other emerging wireless technologies, including smart antennas , may also provide protection from RF interference and offer enhanced range to wireless communication service providers, potentially at lower prices and/or superior performance, and may therefore compete with the Company s products. High performance HTS RF filters may not become a preferred technology to address the needs of wireless communication service providers. Failure of its products to improve performance sufficiently, reliably, or at an acceptable price or to achieve commercial acceptance or otherwise compete with conventional and new technologies, will have a material adverse effect on the the business, operating results and financial condition.

Although the market for superconductive electronics currently is small, management believes it will become intensely competitive, especially if products with significant market potential are successfully developed. In addition, if the superconducting industry develops, additional competitors with significantly greater resources are likely to enter the field. In order to compete successfully, the Company must continue to develop and maintain technologically advanced products, reduce production costs, attract and retain highly qualified personnel, obtain additional patent or other protection for its technology and products and manufacture and market its products, either alone or with third parties. We may be unable to achieve these objectives. Failure to achieve these objectives would have a material adverse effect on the business, operating results and financial condition.

If the worldwide economic slowdown continues, significant commercialization may be delayed.

Industry analysts predict that the softness within the telecommunications industry will continue through 2002. If the world-wide economic slowdown continues, the telecommunications industry will most likely continue to be adversely affected, which may cause the Company s product commercialization to be delayed.

LEGAL RISKS

Intellectual Property and Patents

The Company s success will depend in part on its ability to obtain patent protection for its products and processes, to preserve trade secrets and to operate without infringing upon the patent or other proprietary rights of others and without breaching or otherwise losing rights in the technology licenses upon which any of our products are based. As of December 31, 2001, the Company had been issued 39 U.S. and 11 foreign patents, had filed and were actively pursuing applications for 26 other U.S. and 56 other patents, and was the licensee of 7 U.S. patents and patent applications held by others. The Company acquired additional patent rights in connection with the purchase of the Adaptive Notch Filtering business unit of Lockheed Martin Canada. One of the patents is jointly owned with Lucent Technologies, Inc. The Company believes that, since the discovery of HTS materials in 1986, a large number of patent applications have been filed worldwide, and many patents have been granted in the U.S. relating to HTS materials. The claims in those patents often appear to overlap and there have been interference proceedings pending in the United States Patent and Trademark Office (not currently involving our company) regarding rights to inventions claimed in some of the HTS materials patent applications. The Company also believes there are a large number of patents and patent applications covering RF filter products and other products and technologies that it is pursuing. Accordingly, the patent positions of companies using HTS materials technologies and RF technologies, including the company, are uncertain and involve complex legal and factual questions. The patent applications filed by the Company or by its licensors may not result in issued patents or the scope and breadth of any claims allowed in any patents issued to the Company or its licensors may not exclude competitors or provide competitive advantages. In addition, patents issued to the Company, its subsidiaries or licensors may not be held valid if

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subsequently challenged or others may claim rights in the patents and other proprietary technologies owned or licensed by the Company. Others may have developed or may in the future develop similar products or technologies without violating any of the Company s proprietary rights. Furthermore, the loss of any license to technology that the Company now has or might acquire in the future may have a material adverse effect on the business, operating results and financial condition.

Some of the patents and patent applications owned or licensed by us are subject to non-exclusive, royalty-free licenses held by various U.S. governmental units. These licenses permit these U.S. government units to select vendors other than us to produce products for the U.S. Government, which would otherwise infringe the Company s patent rights that are subject to the royalty-free licenses. In addition, the U.S. Government has the right to require us to grant licenses (including exclusive licenses) under such patents and patent applications or other inventions to third parties in certain instances.

Older patent applications in the U.S. are currently maintained in secrecy until patents are issued. In foreign countries and for newer U.S. patent applications, this secrecy is maintained for a period of time after filing. Accordingly, publication of discoveries in the scientific literature or of patents themselves or laying open of patent applications in foreign countries or for newer U.S. patent applications tends to lag behind actual discoveries and filing of related patent applications. Due to this factor and the large number of patents and patent applications related to HTS materials, RF technologies and other products and technologies that we are pursuing, comprehensive patent searches and analyses associated with HTS materials, RF technologies and other products and technologies that the Company is pursuing are often impractical or not cost-effective. As a result, patent and literature searches cannot fully evaluate the patentability of the claims in its patent applications or whether materials or processes used by the Company for its planned products infringe or will infringe upon existing technologies described in U.S. patents or may infringe upon claims in patent applications made available in the future. Because of the volume of patents issued and patent applications filed relating to HTS materials, RF technologies and other products and technologies that it is pursuing, the Company believes there is a significant risk that current and potential competitors and other third-parties have filed or will file patent applications for, or have obtained or will obtain, patents or other proprietary rights relating to materials, products or processes used or proposed to be used by the Company. In any such case, to avoid infringement, it would have to either license such technologies or design around any such patents. The Company may be unable to obtain licenses to such technologies or, if obtainable, such licenses may not be available on terms acceptable to us or we may be unable to successfully design around these third-party patents.

Participation in litigation or patent office proceedings in the U.S. or other countries, which could result in substantial cost to and diversion of effort by the Company, may be necessary to enforce patents issued or licensed to it, to defend itself against infringement claims made by others or to determine the ownership, scope or validity of the proprietary rights of the Company and others. The parties to such litigation may be larger, better capitalized than the Company and better able to support the cost of litigation. An adverse outcome in any such proceedings could subject the Company to significant liabilities to third parties, require it to seek licenses from third parties and/or require it to cease using certain technologies, any of which could have a material adverse effect on the business, operating results and financial condition.

The Company believes that a number of patent applications, including applications filed by International Business Machines Corporation, Lucent Technologies, Inc., and other potential competitors of the company are pending that may cover the useful compositions and uses of certain HTS materials including yttrium barium copper oxide (YBCO), the principal HTS material used by the Company in its present and currently proposed products. Therefore, there is a substantial risk that one or more third parties may be granted patents covering YBCO and other HTS materials and their uses, in which case the Company could not use these materials without an appropriate license. As with other patents, there is no assurance that the Company would be able to obtain licenses to any such patents for YBCO or other HTS materials, processes for manufacturing those materials, or their uses or that such licenses would be available on commercially reasonable terms. Any of these problems would have a material adverse effect on the business, operating results and financial condition.

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Litigation

The Company has been subject to a number of lawsuits and currently has ongoing legal proceedings involving various claims. Ongoing cases exist with respect to a former employee (Laves) and patent infringement litigation and related counterclaims with two competitors. If the Company is not successful in defending itself against these claims, there may be a material and adverse effect on our business, operating results and financial condition.

Government Regulations

Although the Company believes that its wireless telecommunications products themselves would not be subject to licensing by, or approval requirements of, the FCC, the operation of base stations is subject to FCC licensing and the radio equipment into which the Company s products would be incorporated is subject to FCC approval. Base stations and the equipment marketed for use therein must meet specified technical standards. The ability to sell the Company s wireless telecommunications products is dependent on the ability of wireless base station equipment manufacturers and wireless base station operators to obtain and retain the necessary FCC approvals and licenses. In order for them to be acceptable to base station equipment manufacturers and to base station operators, the characteristics, quality and reliability of our base station products must enable them to meet FCC technical standards. The Company may be subject to similar regulations of the Canadian federal and provincial governments. Any failure to meet such standards or delays by base station equipment manufacturers and wireless base station operators in obtaining the necessary approvals or licenses could have a material adverse effect on the business, operating results and financial condition. In addition, HTS RF filters are on the U.S. Department of Commerce s export regulation list. Therefore, exportation of such RF filters to certain countries may be restricted or subject to export licenses.

The Company is subject to governmental labor, safety and discrimination laws and regulations with substantial penalties for violations. In addition, employees and others may bring suit against it for perceived violations of such laws and regulations. Defense against such complaints could result in significant legal costs for us. Although the Company endeavors to comply with all applicable laws and regulations, it may be the subject of complaints in the future, which could have a material adverse effect on the business, operating results and financial condition.

Environmental Liability

Certain hazardous materials are used in research, development and manufacturing operations. As a result, the Company is subject to stringent federal, state and local regulations governing the storage, use and disposal of such materials. It is possible that current or future laws and regulations could require it to make substantial expenditures for preventive or remedial action, reduction of chemical exposure, or waste treatment or disposal. The Company believes it is in material compliance with all environmental regulations and to date has not had to incur significant expenditures for preventive or remedial action with respect to the use of hazardous materials. However, its operations, business or assets could be materially and adversely affected by the interpretation and enforcement of current or future environmental laws and regulations. In addition, although the Company believes that its safety procedures for handling and disposing of such materials comply with the standards prescribed by state and federal regulations, there is the risk of accidental contamination or injury from these materials. In the event of an accident, the Company could be held liable for any damages that result. Furthermore, the use and disposal of hazardous materials involves the risk that we could incur substantial expenditures for such preventive or remedial actions. The liability in the event of an accident or the costs of such actions could exceed available resources or otherwise have a material adverse effect on the business, results of operations and financial condition. The Company carries property and workman s compensation insurances in full force and effect through nationally known carriers which include pollution cleanup or removal and medical claims for industrial incidents.

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RISKS RELATED TO ACQUISITIONS AND BUSINESS EXPANSION

Risks of Future Acquisitions

In the future, the Company may pursue acquisitions to obtain products, services and technologies that it believes will complement or enhance its current product or services offerings. At present, no agreements or other arrangements exist with respect to any such acquisition. An acquisition may not produce the revenue, earnings or business synergies as anticipated and may attach significant unforeseen liabilities, and an acquired product, service or technology might not perform as expected. If an acquisition is pursued, the Company s management could spend a significant amount of time and effort in identifying and completing the acquisition and may be distracted from the operations of the business. In addition, management would probably have to devote a significant amount of resources toward integrating the acquired business with the existing business, and that integration may not be successful.

International Operations

The Company is in discussions with several companies in non-U.S. markets to form manufacturing, product development joint ventures and other marketing, distribution or consulting arrangements.

The Company believes that non-U.S. markets could provide a substantial source of revenue in the future. However, there are certain risks applicable to doing business in foreign markets that are not applicable to companies doing business solely in the U.S. For example, the Company may be subject to risks related to fluctuations in the exchange rate between the U.S. dollar and foreign currencies in countries in which it does business. In addition, it may be subject to the additional laws and regulations of these foreign jurisdictions, some of which might be substantially more restrictive than similar U.S. ones. Foreign jurisdictions may also provide less patent protection than is available in the U.S., and the Company may be less able to protect its intellectual property from misappropriation and infringement in these foreign markets.

INTERFERENCE AND WIRELESS SYSTEMS

Interference is the dominant physical problem limiting cell site coverage, capacity and range. It is the root cause of dropped calls, poor call quality, and other service problems that lead to subscriber dissatisfaction and turnover (churn). Interference enters a carrier s operating frequencies from such sources as: home electronic devices such as portable phones, two-way radios used by commercial enterprises and governmental agencies, air-to-ground radio, police, fire and emergency services radio, military radio, wireless data networking systems, television and radio broadcasts, radar and other cellular networks. Interference is also created by electrical sources used to power cellular base station equipment.

The Company believes the proliferation of wireless devices and high data rate services will exacerbate the amount of interference bombarding carriers operating frequencies. Conventional cellular base station equipment does not effectively cope with interference issues.

In the face of expanding subscriber bases, increased minutes of cell phone use, demand for high data rate services, high customer churn rates, restricted capital budgets and intense competition, the provisioning and optimization of wireless system infrastructure is a major challenge for operators. As a result of these industry conditions, wireless equipment manufacturers, including independent wireless technology companies and large original equipment manufacturers (OEM s) are working intensely to develop technologies that provide operators the tools necessary to monetize the growing demand for wireless services. As the table below illustrates, operators employ several techniques to increase cell site capacity and coverage, extend range and eliminate interference.

Using HTS Filters to mitigate out-of-band interference, Management believes that operators can capture up to 70% or more of additional capacity and utilization, expand cell site range and coverage as well as significantly reduce dropped calls and improve call quality. Management believes that the adoption of Adaptive Notch Filtering technology to mitigate in-band interference can provide operators with capacity enhancements of up to 50% while further reducing dropped calls and improving call

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quality. A trial of ISCO s products in major operator s 2G base stations surrounding a major airport demonstrated an average of 8-10% increase in minutes of use that is four to five times the baseline growth rate during the week following installation of ISCO equipment. Dropped and lost calls were reduced by 5-12%. At the physical level, mobile (cell phone) transmit power was reduced up to 4dB (about 65%).

The Company estimated the economic payback to the operator as a result of the use of the Company s filters to be between 2 and 8 months depending on cell site traffic levels. The operator purchased all of the equipment fitted to its base stations for the trial and placed a follow-on order in November, 2001 for filters to cover an additional 93 sectors within its network. The Compmany believes that the short economic payback of its equipment as opposed to other interference control solutions as well as the relatively low capital cost of the Company s products make it s products the best value of all alternatives to system operators.

The higher data rates of 2.5G systems (that are expected to begin to come online in 2002) and 3G systems (up to 10 to 100 times faster than current 2G networks), will require much cleaner signals to support IP protocols (error rates typically 1,000 to 10,000 times better than current 2G specifications). As a result, management believes that system operators will eventually utilize HTS and ANF filter technologies in a large percentage of their base stations. Industry observers believe that the OEM s will begin to offer their customers interference control sub-systems (sourced from HTS equipment manufacturers such as ISCO) integrated with their advanced 2.5G and 3G base stations.

Target Market

The Company believes demand for its products will be primarily driven by the following factors:

1. Existing 2G networks are straining under heavy traffic. According to the Cellular Telecommunications & Internet Association, minutes per user per month have increased from 136 minutes in 1998 to 255 minutes in 2000. According to industry sources, the worldwide number of subscribers using mobile wireless networks is expected to increase from 308 million in 1998 to almost 1 billion in 2004, representing an annual compound growth rate of 21%. Regardless of the timing of the introduction of high data rate 2.5G and 3G systems, these trends will drive demand for infrastructure enhancements.

2. As wireless operators install their data-oriented 2.5G overlay networks on top of their existing 2G network, the Company believes data-networks will further strain system capacity resulting in the need for interference-control in order to achieve data and error rates specified.

3. Interference is a primary cause of poor call quality, dropped and lost calls. The Company believes that as a result of increasing use of devices such as cellular phones, wireless data networking equipment, wireless consumer appliances and radar, wireless network operators are coming to view interference management technologies as necessary to protect against their customer bases migrating to other carriers (churn).

4. The Company believes that 3G wireless networks will require smaller operating cells and more base stations than existing cellular networks in order to cover the same geographic area. This is based on the requirement for high data rate transmission capability and cleaner error code criterion for 3G networks as well as the fact that transmissions at higher frequencies utilized by 3G networks (expected to operate in the 2100 MHz range) have shorter transmission waves as compared to lower frequency transmissions. Shorter transmission waves tend to limit the distance transmissions can travel without significant degradation.

The 3G Opportunity: A True Wireless Internet

Existing wireless networks are based on technical architectures that were standardized in the late 1980s and early 1990s, and are highly optimized for voice signals. The guiding principle of 2G systems (including TDMA, GSM, CDMA) is signal compression to achieve spectrum efficiency. The basic user data-rate in these networks is typically around 10 kb/s, which is adequate for telephony voice traffic.

These networks are not capable of supporting true Internet applications. Recent experience with the i-Mode service introduced in 1999 by NTT DoCoMo in Japan has demonstrated a strong demand for wireless Internet type service, while also exposing the

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difficulties of delivering this service over existing 2G networks. The i-Mode service was launched in 1999 in Japan, and rapidly became the most successful new service introduction in the history of the wireless industry, adding six million customers in only six months. The service itself comprises an Internet-type connectivity for email, messaging, file transfer, as well as voice telephony, and by early 2000, more than 80% of the new subscribers being added in NTT s wireless network were i-Mode subscribers. However, beginning in February 2000, the network began to experience severe technical difficulties stemming from overloading of the basic 2G transmission facilities. By July 2000, it had become necessary to suspend the promotion of the service to new customers. While clearly demonstrating a strong demand for wireless Internet service, the i-Mode experiment clearly showed that a new network architecture will be needed to deliver this service effectively.

3G standards are being developed to meet the needs for a true wireless Internet service. [There are several competing versions of the 3G standard, including W-CDMA which is favored by most of the Europeans and by NTT DoCoMo, and cdma2000, promoted by Qualcomm and supported by many existing IS-95 (2G CDMA) operators. Both standards are broadly similar. They are based on wideband CDMA architecture, and will require the same general ultra-clean interference suppression solutions.] These new standards will allow for user data-rates of up to 2 MB/s *nearly two hundred times faster than 2G networks*. Moreover, 3G networks will have to support traffic patterns characteristic of Internet connectivity (always on service that may generate several hours of connect time per user per day) rather than today s short voice telephony patterns.

One system element that is especially affected by 3G performance objectives is the receiver front-end, especially the filters and low-noise amplifiers that acquire the desired signal and block interference from other sources. Existing 1G and 2G networks are designed around the less-than-perfect performance characteristics of conventional front-end systems based on metallic or ceramic (dielectric) filter technology. These systems allow for a great deal of interference to penetrate the desired signal. There is evidence that even in existing networks (2G CDMA) there are large losses in system capacity up to 50% or more of nominal capacity lost, according to recent tests with major CDMA carriers due solely to the imperfections in receiver front-end filtering based on conventional technology. With 3G, extensive testing by NTT DoCoMo and others indicates that conventional front-end technology will not deliver adequate performance. HTS-based receiver front-ends provide an almost theoretically perfect control over out-of-band interference. Recent publications and announcements by NTT scientists indicate that HTS is increasingly viewed as a basic requirement for 3G networks.

High-temperature superconducting materials are used to design RF subsystems such as receiver front-end filters which eliminate interference that can reduce the quality and capacity of wireless systems. Superconductor-based filters far outperform the best conventional front-end filters, as shown in Figure 1, which is adapted from [NTT DoCoMo] sponsored published test results in Japan:

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HTS Competition

All other HTS companies are limited to thin-film HTS. These include two small publicly-held U.S. based thin-film companies (Conductus, Inc. and Superconductor Technologies, Inc.) which have sold systems in the U.S. for receive filter applications. DuPont, a holder of a number of patents in the HTS materials area, has also been promoting its near antennae filter at the recent CTIA show in Orlando. This product is a thin-film, tower mounted unit which was developed by Dupont s Superconductivity Group. The company believes that DuPont has been promoting its product in Japan and the US but, to date, has not sold any commercial products. A number of other companies in Japan and Europe have engaged in development towards thin-film HTS, but to our knowledge have not delivered commercial HTS systems. In Japan, Cryodevices Ltd. is a joint venture between two Japanese companies, which has been working on thin-film technology for several years. In Europe, Cryoelectrica is a university-affiliated entity that has also been pursuing thin-film designs. To our knowledge, neither has delivered a commercial system.

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The following chart summarizes the relative publicly announced technology and product position of the current HTS competitors to the Company:

	Thin-film	Thick-film	Hybrid HTS	Transmit Products	Tower-Mount	ATP	Equali-zation
ISCO	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
CDTS	YES	NO	NO	NO	YES	NO	NO
SCON	YES	NO	NO	NO	YES	NO	NO

The Company believes it has the broadest HTS technology base of any company in the world. The Company s goal is to position itself to lead the industry in HTS wireless applications as HTS solutions move toward the mainstream with 2G and 3G applications. In addition, the Company has been granted by the US Patent Office what it believes is the seminal patent in the HTS wireless systems area. The patent was issued on July 17, 2001 and ISCO immediately filed a patent infringement suit against both Conductus and Superconducting Technologies, Inc. The patent is discussed in greater detail in other areas of this report. [The tower-mount unit is also the subject of a patent granted to ISCO by the USPO in 2000 and is subject to the patent infringement lawsuit as amended on March 26, 2002.]

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TECHNOLOGY OVERVIEW

A wireless base station is divided (roughly) into two halves: the digital portion, and the so-called front-end.

The core expertise of ISCO is the application of HTS to wireless front-end systems. The components in the receiver front-end are designed to acquire the desired information-bearing signal and pass it through to the digital portion of the system, where it is processed digitally and the user information is extracted. Typically, much of the signal is lost as it passes through the front-end components. As well, undesired electromagnetic interference also leaks into the system due to imperfections in the filtering characteristics of the front-end devices. 1G and 2G systems are designed around these losses and interference levels, and the information carrying capacity of these systems are inherently limited.

Superconductivity is a property of certain materials, at certain temperatures, in which electrical resistance is reduced essentially to zero. High-temperature superconductivity (HTS) refers to materials, which exhibit this property at relatively higher temperatures, which are suitable for practical industry applications. [These materials were first discovered in the 1980s. There are two main materials used today: Yttrium Barium Cupric Oxide (YBCO) and Thallium Barium Calcium Cupric Oxide (TBCCO). These materials exhibit superconductivity at temperatures up to 80-100° K, which is suitable for industrial applications.]

The use of HTS for wireless front-end systems is based on the following general concept: by coating the surfaces of filter elements and other elements of the front-end, it is possible to create front-end components which introduce very little signal loss or degradation (no electrical resistance). In turn, this allows for much more powerful filter architectures to be employed practically which results in much better performance. For example, the complexity of a filter is related to the number of serial stages or poles in the filter design. With conventional technology, it is impractical to construct a filter of more than around 8-10 poles (and most are less complex). With HTS, ISCO has delivered systems using 32 poles, with nearly perfect out-of-band filter performance. Finally, the fact that these systems are cooled cryogenically reduces the thermal noise component.

Thin-film & Thick-film HTS

There are two ways of designing an HTS component. So-called *thin-film* techniques use vacuum deposition processes to carefully lay down extremely thin layers of HTS material upon an appropriate substrate. The result is a wafer which can be etched to

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create components such as a filter, in a process similar to semi-conductor chip fabrication. The advantages of thin-film techniques are a somewhat smaller size of the filter component, and the potential for integration with other components in an Integrated Circuit or chip-type architecture.

Thick-film techniques use a series of processes more similar to the ceramic firing of a coating to create a somewhat thicker HTS layer on the substrate, and are typically employed to coat three-dimensional resonator elements and other larger structures. The manufacturing process is generally much simpler and less expensive (no clean room required as for thin-film). The advantages of thick-film HTS are much higher filter performance (i.e., better selectivity and ultimate rejection; much better intermodulation characteristics; larger numbers of poles can be employed.) as well as the ability to support high-power applications for transmit filters and other transmitter components.

ISCO is the only company in the world with both thin-film and thick-film HTS technology. Because of this, ISCO can design products using the best available HTS technology for a given application, and is the only company with the ability to combine thin-film and thick-film solutions in the same front-end platform.

Front-end Architectures (G-series and T-series filters)

ISCO has extensive experience in designing and producing a wide range of RF front-end systems using HTS. We believe that our experience base is greater than any other company in the world in the application of HTS to wireless systems. Key platform technologies (all patented by ISCO) include:

Tower-mounted cryogenic RF receiver front-end (plus LNA) the only patented HTS system designed for tower-top installations

All-temperature Performance (ATP) RF filter technology, capable of operating at either cryogenic or ambient temperatures (eliminating system failure point and need for conventional back-up system required by competing thin-film vendors); ATP encompasses unique HTS materials as well as frequency-compensation filter architectures

Cryogenic equalization technologies to control group delay in high-performance 3G systems. Group delay is the tendency of the digital signal to spread out in time, so that information-bearing digital pulses tend to smear together and cause inter-symbol interference (ISI). ISI is combated by equalization techniques, which can be implemented either in the front-end or in the digital domain. Digital equalization is a significant signal processing overhead that can eventually impose limits on system throughput; hence, it is desirable to accomplish as much of the equalization of the signal as possible in the analog front-end. ISCO is the only HTS company that has implemented equalization in HTS front-end systems.

Transmit filter designs capable of handling up to 100 watts of power.

Adaptive Notch Filters (A-series filters)

The Company also offers adaptive notch filter products that continually scan a segment of RF spectrum for interference and block that interference within 20 milliseconds. The blocking feature is in place as long as needed for noise suppression. These products are especially useful in dealing with sporadic in-band interference as they adapt the Company s interference-management technology to the fluid environment. The complementary nature of these products with the Company s HTS solutions for adjacent-band interference allows the Company to offer complete interference-management solutions to its customers, rather than force customers to try to isolate the primary cause of their interference problems prior to looking for an effective solution.

Product Benefits

The Company s products are designed to address the high performance RF front-end needs of domestic and international commercial wireless telecommunication systems by providing the following advantages:

Greater Network Capacity and Utilization. The Company s interference management solutions can increase capacity and utilization by up to 70%. In some cases, capacity increases because channels which were previously unusable due to interference are

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recovered. In other cases, system utilization increases because of lower levels of blocked or dropped calls, and increases in the ability of the system to permit weak signals to be processed with acceptable call quality. In CDMA systems, increased capacity frequently results from lowering the system s noise floor.

Improved Base Station Range. The Company s RF front-end systems can extend the uplink range of a wireless system by up to 30%. Greater range can reduce a service operator s capital expenditure per customer in lower density areas by filling in coverage gaps in existing systems or by reducing the number of required cell sites for new system deployments.

Improved Flexibility in Locating Base Stations. The Company s RF front-end products can allow wireless telecommunications service providers to co-locate base stations near other RF transmitters. The Company s products allow the base station radio to better tolerate RF interference while reducing out-of band signals that could interfere with other nearby wireless telecommunication operators.

Improved Call Quality. The Company s products improve call quality by reducing dropped and blocked calls. During commercial installations, the Company s RF filter products have demonstrated up to a 40% reduction in dropped calls. The Company s products also improve audio fidelity by reducing noise and interference.

Improved Digital System Capacity. Tests conducted by wireless operators show that on a single base station test, capacity of the base station increases by as much as 30%. The Company believes that with a system wide deployment of its products, the capacity of the system may increase by more than 70%.

COMPANY HIGHLIGHTS

Sales and Marketing

Until recently, the Company had historically focused its sales and marketing effort on U.S. wireless service providers for retrofit applications. To date, the Company has sold its products to many of the largest cellular operators in the United States as well as to numerous mid-size and smaller U.S. wireless operators.

Recently, the Company has also focused on international customers and OEM s, marketing both its existing products and presenting the benefits of its interference-management technology in the design and early stages of new systems for 2.5G and 3G Systems. The first of these systems is expected to be deployed during 2001 in Japan, with deployment in Korea, Europe, and the United States expected thereafter. Toward that end, the Company opened a sales office in Japan during 2000. The Company also sold its existing products in Chile, Spain, Japan and Canada during 2001 and looks to continue to market its products internationally during 2002 and beyond.

Manufacturing

The Company s manufacturing processes provide predictable product yields and can be easily expanded to meet increased customer demand. However, it is possible that substantial growth in demand could overwhelm existing capacity to supply products. To deal with this possibility, the Company is in the process of qualifying third party manufacturers of the RF filter products. The Company also has an agreement in place with a contract manufacturer that outsources production of its Adaptive Notch Filters (ANF units) at a facility in Toronto, Canada.

The Company s manufacturing operation can be found in Mount Prospect, IL.

Research and Development

The Company s R&D efforts have been focused on developing and improving RF filter products for wireless telecommunications systems. As a result of such efforts, filter performance has been improved, product size has been reduced, production costs have been lowered, product reliability has been increased, and product packaging has been streamlined. The Company expects to continue to invest in R&D to further improve and adapt its filter products to meet and exceed market expectations. The Company also intends to develop related products that are synergistic with its core filter offerings and which utilize the Company s core technical competencies in RF filter design, superconducting materials, and cryogenic cooling systems.

The Company s total R&D expenses during 1999, 2000 and 2001 were

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approximately $1,757,000, $3,188,000, and $7,132,000, respectively.

Intellectual Property and Patents

The Company regards certain elements of its product design, fabrication technology and manufacturing process as proprietary and protects its rights in them through a combination of patents, trade secrets and non-disclosure agreements. The Company also has obtained exclusive and non-exclusive licenses for technology developed with or by its research partners, Argonne National Laboratory (Argonne) and Northwestern University, and expects to continue to obtain licenses from such research partners and others. The Company believes that its success will depend in part upon the protection of its proprietary information, its patents and licenses of key technologies from third parties, and its ability to operate without infringing on the proprietary rights of others.

As of December 31, 2001, the Company had been issued 39 U.S. and 11 foreign patents, had filed and was actively pursuing applications for 26 other U.S. and 56 other patents, and was the licensee of 7 U.S. patents and patent applications held by others. The Company acquired additional patents, through assignment of a license from the Canadian government, in connection with the purchase of the Adaptive Notch Filtering business uni