ISCO INTERNATIONAL INC
Form 10-K/A
May 04, 2005
Table of Contents

SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

Form 10-K/A

Amendment No. 1

(Mark On)

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

For the fiscal year ended December 31, 2004

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.)

1001 Cambridge Drive

Elk Grove Village, Illinois 60007

(847) 391-9400

(Address and telephone number of principal executive offices)

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

Title of Class	Name of Exchange on Which Registered
Common Stock, Par Value $0.001 Per Share and associated Preferred Stock Purchase Rights	**American Stock Exchange**

Securities registered pursuant to Section 12(g) of the Act: None

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. ¨

Indicate by check mark whether the registrant is an accelerated filer (as defined in Rule 12b-2 of the Act). Yes ¨ No x

On June 30, 2004, 160,496,203 shares of the registrant s Common Stock, par value $0.001 per share (the Common Stock) were outstanding. The aggregate market value on June 30, 2004 of the registrant s Common Stock held by non-affiliates of the registrant was $33.7 million, based on the closing price per share of the registrant s common stock as quoted on the American Stock Exchange. This amount excludes more than 67 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 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

None.

Table of Contents

Explanatory Note

Amendment No. 1 to the Registrant s Annual Report on Form 10-K for the fiscal year ended December 31, 2004 (the Annual Report) filed with the Securities and Exchange Commission on March 31, 2005 is being filed to:

1. correct certain typographical errors in the Registrant s Balance Sheet on page 29 of the Annual Report, such corrections having no effect on total liabilities, equity, or assets in the Balance Sheet or elsewhere in the Annual Report;

2. make certain technical corrections to the description of the FASB s SFAS No. 123 (revised 2004) on pages 37-38 of the Annual Report; and

3. delete a reference to a management bonus pool authorized by the Registrant s Board of Directors in December 2002 described in Item 11 on page 54 of the Annual Report that was applicable solely to fiscal year 2003 and thus is no longer being implemented by the Registrant.

As a result of these amendments, the certifications pursuant to Sections 302 and 906 of the Sarbanes-Oxley Act of 2002, filed as exhibits to the original filing, have been re-executed and re-filed as of the date of this Form 10-K/A. In addition, the independent registered public accounting firm has provided an updated consent, also filed as an exhibit. All other items of the Annual Report, are refilled herein for the convenience of reference. No other items of the Annual Report are being amended and this Amendment No. 1 does not reflect any events occurring after the filing on March 31, 2005 of the original Annual Report, except for the amendments described above.

Table of Contents

TABLE OF CONTENTS

Table of Contents

PART I

Business

The Company develops and sells solutions designed to optimize the RF (Radio Frequency) link within wireless networks, particularly, but not exclusively, on the reverse link. RF link, or Radio link, is the signal between the mobile device (e.g., mobile phone) and the base station (Link). Reverse link is the signal from the mobile device to the base station. Forward link is the signal from the base station to the mobile device. The Company s array of solutions includes its ANF product line (adaptive notch filter, ANF) the RF² product family (radio link radio frequency fidelity, RF²), services and other solutions, all focused on optimizing RF handling.

The benefits of using the Company s solutions include: allowing carriers (channels) to carry traffic in certain circumstances where they otherwise could not, increased cell site capacity and utilization, reduced mobile transmit power and thus improved battery life, improved voice quality and substantial reduction in dropped calls and failed attempts, culminating in more satisfied customers and increased revenues for wireless operators. These benefits have been documented in field trials and commercial deployments with wireless operators involving existing wireless systems.

In addition, the Company believes that current and near-term upgrades of existing wireless networks to allow for data throughput (2.5G systems) and further, by the rollout of the next generation of wireless systems (3G or 3rd Generation), operators will need to manage the RF signal and eliminate interference more effectively in order to meet their performance objectives. The Company believes that with the increased data bit rates required of these systems and the increased usage of these systems with the adoption of wireless internet services, that interference levels will increase substantially while tolerance to interference will decrease substantially, thereby requiring an improved RF signal handling and filtering system in the cell site. Additionally, the difficulty in enabling multiple network standards will require enhancements to the operator s infrastructure. The Company believes that its products can be an effective element of solutions in these areas.

ANF Technology

One of the difficult tasks facing any wireless operator is the need to resolve interference that is from multiple sources, sporadic or quickly moving. Often, sources of interference prove difficult to locate due to their sporadic nature, and other times are beyond the operator s control (such as in the case of border sites). Regardless, in-band interference is a fast-growing problem, one that can substantially reduce the ability of the network to carry traffic.

With the acquisition of the ANF division of Lockheed Martin Canada Corporation during 2000 and subsequent development efforts, the Company owns proprietary technologies 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 dynamically.

The Company has announced the expansion of the ANF platform to support network-wide deployment in metropolitan service areas. The more flexible platform now has the capability to scan and protect any combination of 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. This web-based reporting feature provides customers a valuable tool for their use in managing their networks, and thus provides a strong competitive advantage to the ANF product line.

Based on customer feedback, the Company has further added to its ANF product line to include an ANF on Wheels . This is a rapidly deployable solution to combat immediate problems that also serves as a state-of-the-art reporting tool. Operators can utilize the reporting features of this product to gain critical information of interference events within their networks.

The Company plans to expand this product family beyond the traditional cellular bands (850 MHz), and into PCS (1900 MHz) and 3G bands. It also plans to significantly improve its platforms to allow for more ubiquitous deployments.

Table of Contents

RF² Technology

The Company launched its RF² product line during September 2003, and received commercial orders during the fourth quarter 2003. New products were added to this family during 2004, with purchase orders for those products received during 2004. The Company entered 2005 with more than $2 million in customer purchase orders for first quarter delivery related to data network requirements.

Designed for network-wide deployment, the RF² drastically reduces the noise figure in a base station, improving the ability of a base station to optimally process wireless signals. The impact of RF² is also felt on handsets in the form of reduced mobile transmit power and increased talk time while improving base station coverage. As a result, operators have fewer dropped calls, fewer connection failures, and most importantly, more satisfied customers. Higher-priced, more exotic solutions exist, such as HTS units (High Temperature Superconductor filters), yet the RF² has been shown to deliver performance generally comparable to HTS-based solutions.

The wireless telecommunications industry is undergoing significant transformation as it attempts to integrate existing technology with new equipment. Additionally, the Company believes that the recent increase in merger activity will force merged companies to integrate disparate technology platforms. The Company s products, particularly its RF² products, are modularly designed to assist in that requirement.

The Company also has the technology and experience in a number of HTS solutions that can be made available for the proper application, but has focused on the RF² as the value leader in the industry.

Professional Services

Over time, the Company has developed expertise in the area of radio link issues, including interference mitigation. This expertise is available to customers in the form of interference audits and analytical tools, thus allowing customers to focus their resources on running their networks instead of focusing on understanding interference problems.

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 as Illinois Superconductor Corporation in Illinois on October 18, 1989 and reincorporated in Delaware on September 24, 1993. The Company shifted its focus from that of a superconductive filter provider to a customer-driven interference management company during 2001, changing its name to ISCO International, Inc. More recently, the Company has broadened its view to the optimization of the radio link of wireless networks. The Company s facilities and principal executive offices are located at 1001 Cambridge Drive, Elk Grove Village, Illinois 60007 and its telephone number is (847) 391-9400. The Company maintains a website at *http://www.iscointl.com*. The information contained therein is not incorporated into this annual report.

BUSINESS STRATEGY

The Company s strategic goal is to become the leading supplier of RF management and radio link optimization solutions to wireless operators. ISCO is seeking to accomplish its goal by:

Marketing its products aggressively to leading wireless operators;

Providing customers comprehensive radio link management infrastructure-based solutions for wireless networks;

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

Outsourcing product manufacturing and reducing product cost.

Table of Contents

The Company is focusing its continuous efforts on winning the support of the world s leading wireless operators for its radio link optimization solutions. The Company believes that its ANF and RF² product families, as well as its professional service support and other products, make it a preeminent radio link management specialist in the market.

The Company currently outsources production for its products. Management believes that it can maintain or achieve targeted product gross margins and minimize capital needs while reducing product costs. Management further believes that offering the lowest product cost will further strengthen the Company s ability to achieve its strategic objectives.

LINK ISSUES, INCLUDING INTERFERENCE, AND WIRELESS SYSTEMS

Link issues are a growing problem limiting cell site coverage, capacity and range, as well as mobile transmit power and related battery-life issues. Link problems cause 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. Interference may begin within a particular frequency or migrate from another frequency. Increased usage of co-location (multiple providers using the same towers), increased sensitivity of non-voice applications, and the continued surge in wireless traffic result in increasing the impact of interference on wireless networks.

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, the ease of customer churn due to number portability, 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.

Using the Company s solutions to optimize the radio link and other RF aspects of the wireless network, including the mitigation of interference, the Company believes that operators can capture additional capacity and utilization, expand cell site range and coverage as well as reduce dropped calls to a fraction of what they were prior to the addition of the Company s equipment and to drastically improve overall call quality. Further, the addition of data has placed a tremendous strain on wireless networks, and the Company has encountered cases where its products enabled carriers (channels) to carry traffic where they could not do so without the Company s solutions. These issues, capacity and quality, have been presented as critical wireless operator issues in today s environment.

The Company estimates the economic payback to operators as a result of the use of the Company s solutions should occur in less than one year, depending on cell site traffic levels and dynamics. The Company believes that the short economic payback of its equipment compare favorably with other solutions and that the relatively low capital cost of the Company s products make its products the best value of all alternatives to system operators.

The higher data rates of 2.5G systems and 3G systems that are currently coming online (up to 10 to 100 times faster than current 2G networks), will require much cleaner signals to support data transfers and 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 the Company s solutions in a large number of their base stations.

The wireless telecommunications industry is undergoing significant transformation as it attempts to integrate existing technology with new equipment. Additionally, the recent increase in merger activity will force merged companies to integrate disparate technology platforms. The Company s products are designed to assist in that requirement.

Table of Contents

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 increased from 136 minutes in 1998 to 403 minutes in 2002. The same source indicates that total cell phones in use in the United States increased from 4 million in 1990 to 168 million during 2004. According to industry sources, the worldwide number of subscribers using mobile wireless networks is increased from 308 million in 1998 to 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 systems resulting in the need for enhanced infrastructure-based solutions to optimize the radio link in order to achieve data and error rates specified.

3. Interference and coverage issues are primary causes 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 and coverage management technologies as necessary to protect against their customer bases migrating to other carriers (churn), an especially sensitive topic since number portability (the ability to retain one s phone number when changing wireless operators historically a barrier to changing providers) went into effect.

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.

5. The wireless telecommunications industry is undergoing significant transformation as it attempts to integrate existing technology with new equipment. Additionally, the Company believes that the recent increase in merger activity will force merged companies to integrate disparate technology platforms. The Company s products are modularly designed to assist in that requirement.

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 processing voice signals. The guiding principle of 2G systems (including TDMA, GSM, and 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.

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 and cdma2000. These standards are broadly similar. They are based on wideband CDMA architecture, and will require the same general ultra-clean interference suppression solutions to achieve optimal performance. These new standards will allow for user data-rates of 500 kb/s and up to 2 MB/s *nearly two hundred times faster than previous 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.

The Company believes itself to be a highly competent in differentiated technologies in radio link management and optimization. The Company s goal is to position itself to lead the industry in radio link optimization applications within wireless systems.

Table of Contents

TECHNOLOGY OVERVIEW

A wireless base station is roughly divided into two halves: the digital portion and the so-called RF portion.

The core expertise of ISCO is the application of technology and experience to wireless RF 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 RF components. Further, undesired electromagnetic interference (inband and out of band) also leaks into the system due to imperfections in the characteristics of the RF devices.

The use of ISCO solutions for wireless RF systems is based on creating RF components which block or mitigate the impact of interference, optimize signal processing within the radio path while introducing very little signal loss or degradation, and help operators identify and resolve issues impacting performance.

RF² (Radio link Radio Frequency Fidelity)

The RF² product is a radio link low noise RF solution developed out of ISCO s years of experience with radio frequency and wireless base station performance needs. The RF² product is designed and priced for network wide deployment, improving base station coverage integrity and eliminating dead zones. The impact of RF² is also felt on the handset in the form of reduced mobile transmit power and increased talk time while improving base station coverage. As a result, operators have fewer dropped calls, fewer connection failures, and most importantly, more satisfied customers.

The wireless telecommunications industry is undergoing significant transformation as it attempts to integrate existing technology with new equipment. Additionally, the recent increase in merger activity will force merged companies to integrate disparate technology platforms. The Company s products are designed to assist in that requirement.

The RF² is easy to install, maintenance-free, and a fraction of the cost of more exotic solutions such as HTS. Additionally, it has been shown to deliver results generally comparable to HTS-based solutions without a cryogenic cooler or other moving parts that may degrade reliability. The Company believes that the ease of integration and value compete strongly with these and other solutions.

RF² Competition

OEM competition includes solutions such as adding a carrier to the CDMA cell sites (to increase capacity), cell splitting, or even adding an entirely new base station so as to add capacity and coverage. After-market competition includes repeaters, TMA s, and HTS receiver front ends, as well as duplexers and other non-integrated solutions. As with the OEM-based solutions, these products may generally improve the coverage of the network, but don t offer the value of the Company s fully integrated link management solutions.

Adaptive Notch Filters

The Company offers ANF product solutions that continually scan a segment of RF spectrum for interference and block that interference within milliseconds per carrier (channel). 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 dynamic environment. The complementary nature of these products with the Company s RF² solutions offers complete radio link optimization solutions to its customers, rather than force customers to try to isolate the primary cause of problems prior to looking for an effective solution.

ISCO s ANF solutions substantially reduce or eliminate altogether the effects of such in-band interference. Each ANF unit continuously monitors up to all seven available CDMA carriers (or seven 1.25MHz channels) being

Table of Contents

utilized for service, identifying and eliminating narrow-band interferers within the channel whenever and wherever they occur. By dynamically notching out this in-band interference, the coverage integrity and supportable capacity of the cell site are maintained as designed during the network build out. As a direct consequence, the ANF product thereby recovers lost minutes of use, reduces the number of dropped calls and failed call attempts. An entire network of ANF hardware can be managed via the web-based management software that supports the hardware.

The current product is focused on CDMA networks. A product evolution path is planned to extend the range of applications to wide-band CDMA systems (W-CDMA). During 2004, the Company launched an outdoor application of this product. This has expanded the Company s addressable market, as certain base stations are located in outdoor configurations.

ISCO s ANF solution dynamically identifies and eliminates direct in-band interference in the radio link of a wide-band system such as CDMA. When such interference is present without being eliminated, the radio link of such a system will be significantly reduced, often to the point of not allowing any calls on the entire CDMA channel. The ANF unit continuously monitors the power spectral density across the CDMA carriers in use and identifies narrow-band interference in the band of interest. The severity of multiple in-band interferers is prioritized, and the ANF unit dynamically inserts a highly selective notch to eliminate multiple interferers with minimal impact on the desired broadband signal. A single ANF unit supports both the main and diversity paths of a single sector within the cell sites.

ISCO has also developed a network-wide, web-based network management tool (web monitor), allowing its customers to perform management functions for all ANF units throughout the system. This tool with a graphical user interface allows the service provider to control, configure, and monitor the ANF units remotely from the network management center. This includes:

- Remote configuration of parameters within all ANF units
- Remote monitoring of alarm status for all ANF units
- Observe interference and notch activity from all units
- View on-line event data and reports based on measured performance data

ISCO has industry leading expertise in the optimization of CDMA networks. To facilitate rapid penetration of ANF, ISCO is offering professional services to the service providers engineering team to identify and quantify interference, and, its effects on network performance. ISCO has already developed the following custom software and hardware tools to perform interference analysis and interference audit. iSMART (Interference from System Metric Analysis Rules Tool): This software tool enables a service provider to identify potential ANF candidate sectors/cell sites by analyzing the system performance metrics data generated in their CDMA network. Automated Test Equipment, ANF-on-wheels and ANF Web Monitor: This software/hardware combination allows the Company to perform interference audit at cell sites of service providers regardless of the frequency band of operation. This service helps quantify interference and identify new markets (frequency bands) with high interference.

ANF competition

ISCO holds proprietary technology on ANF but there are alternative solutions that can be categorized as either direct or indirect competition. Direct competition is defined as products that directly address the problem of the issue at hand, namely in-band interference. Indirect competition is categorized as other wireless communication products that do not directly solve the problem of in-band interference, but may be perceived as an alternate solution by service providers. Base-station manufacturers are referred to as the OEMs, whereas manufacturers of auxiliary equipment to augment the base station are referred to as After-Market Vendors.

Direct Competition *After-Market Vendors*

Fixed-frequency notch filters are the main form of direct competition. However, these will only work in a static interference environment, and hence do not satisfy the need of dynamic interference detection and elimination as observed in a vast majority of in-band interference scenarios. Smart antennas were also developed with the intent

Table of Contents

of in-band interference mitigation. However, the Company believes these solutions have limited applicability and effectiveness in eliminating in-band interference, particularly in a CDMA-based network, and are typically substantially more expensive (in addition to being less effective) than ISCO s ANF solution.

Direct Competition OEMs

Digital-signal-processing based solutions may be under development by the various OEMs. Even if the manufacturers do develop such a solution for in-band interference, the Company believes that they would have limited dynamic range and hence would only be able to mitigate low-power interference.

Indirect Competition OEMs

Indirect competition does not directly address the problem of in-band interference, but could be viewed as a method for circumventing the problem without addressing the issues at hand. Some of these are based solely on OEM-based hardware, such as adding a carrier to the CDMA cell sites (to increase capacity), cell splitting, or even adding an entirely new base station so as to add capacity and higher signal-to-noise in a particularly problematic location. However, the Company believes these solutions to be very costly, and, while providing more absolute network capacity, do not guarantee increased performance due to the limiting effects of in-band interference.

Indirect Competition After-Market Vendors

Other forms of indirect competition include repeaters, TMA s, and HTS receiver front ends. As with the OEM-based solutions, the Company does not believe these to directly address the problem of in-band interference, but may generally improve the coverage of the network.

Product Benefits

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

Enable Launch of Data Networks. Beginning in 2005, The Company s solutions are being utilized with data network deployments. These launches require upgrades and changes to existing infrastructure. The Company s products have proven effective in helping customers in this area. It is expected that data networks will be widely deployed, in the United States and elsewhere, during 2005 and beyond.

Technology Integration due to Expansion or Consolidation. The wireless telecommunications industry is undergoing significant transformation as it attempts to integrate existing technology with new equipment. Additionally, the Company believes that the recent increase in merger activity will force merged companies to integrate disparate technology platforms. The Company s products are modularly designed to

assist in that requirement.

Greater Network Capacity and Utilization. The Company s solutions can increase capacity and utilization by up to 70% or more. In some cases, capacity increases because channels which were previously unusable due to interference are 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 systems can extend the radio link range of a wireless system by up to 30% or more. 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 products can allow wireless telecommunications service providers to co-locate base stations near other RF transmitters. The Company s products allow the cell site radio to better tolerate RF interference while reducing out-of band signals that could interfere with other nearby wireless telecommunication operators.

Table of Contents

Improved Call Quality Fewer Dropped Calls and Failed Connection Attempts. The Company s products improve call quality by reducing dropped and blocked calls. During commercial installations, the Company s RF products have demonstrated drastic reduction in dropped calls, by as much as 50% or more. The Company s products similarly reduce the number of ineffective connection attempts and dead zones within networks.

Reduced Mobile Transmit Power. By improving the radio link, reducing the system s noise floor and mitigating the destructive impact of interference, the Company s solutions greatly reduce required mobile transmit power. This improves battery life, among other benefits.

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 mid-size and smaller U.S. wireless operators.

Recently, the Company has started targeting certain international customers, 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.

Manufacturing

The Company emphasizes the outsourcing of its manufacturing processes in order to provide predictable product yields and easy expansion to meet increased customer demand. Toward that end, the Company currently produces all of its ANF and RF² products through third party manufacturers. The Company believes there are multiple sources available for manufacturing and foresees no problem continuing to apply its outsourcing strategy. The Company s internal manufacturing capability can be found in Elk Grove Village, IL.

Research and Development

The Company s R&D efforts have been focused on developing and improving RF products for wireless telecommunications systems. As a result of such efforts, product performance has been improved, product size has been reduced, production costs have been lowered, product functionality has been increased, and product packaging has been streamlined. While the Company expects to continue to invest in R&D to further improve and adapt its products to meet and exceed market expectations, and will continue to develop new technology-based solutions, this is expected to require significantly less capital than in the past (prior to 2002) as the combination of application development and technology development is expected to be more efficient than the initial development of products and technologies. The Company also intends to develop related products that are synergistic with its core offerings and which utilize the Company s core technical competencies in the radio link management arena.

The Company s total R&D expenses during 2002, 2003 and 2004 were approximately $2,737,000, $988,000, and $1,119,000, 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.

Table of Contents

HTS Technology

The Company spent many years developing HTS applications, resulting in a number of products, processes and materials related to HTS. This experience has helped the Company offer its current set of state of the art solid-state solutions, and the underlying technology is being utilized in the marketplace today and may be more fully utilized in the future.

There are two ways of designing an HTS component thin-film and thick-film techniques. The Company has technologies in both aspects that may have application to specific, but currently limited markets. The Company is prepared to address those segments should the opportunity present itself, but currently has chosen to focus on higher value-added, solid state solutions appropriate for the wireless telecommunications application.

Patents

The Company has internally applied for patents and acquired patents, through assignment of a license from the Canadian government, in connection with the purchase of the Adaptive Notch Filtering business unit of Lockheed Martin Canada. One of the Company s patents is jointly owned with Lucent Technologies, Inc. Furthermore, the Company expects to pursue foreign patent rights on certain of its inventions and technologies critical to its products. Please refer to Note 2 of our Financial Statements for a discussion of patent useful lives and amortization.

Government Regulations

Although the Company believes that its wireless telecommunications products themselves are not licensed or governed by approval requirements of the Federal Communications Commission (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 Company s ability to sell its RF products is dependent on the ability of wireless base station equipment manufacturers and of wireless base station operators to obtain and retain the necessary FCC approvals and licenses. In order to be acceptable to base station equipment manufacturers and to base station operators, the characteristics, quality, and reliability of the Company s base station products must enable them to meet FCC technical standards.

The Company may use certain hazardous materials in its research, development and any manufacturing operations. As a result, the Company may be 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 the Company 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 the Company has not had to incur significant expenditures for preventive or remedial action with respect to the use of hazardous materials.

Employees

As of January 15, 2005, the Company had a total of 23 employees, 6 of whom hold advanced degrees. Of the employees, 2 are engaged in manufacturing and production, 8 are engaged in research, development and engineering, and 7 are engaged in marketing and sales, and 6 are engaged in finance and administration. Additionally, a former employee provides consulting services within the marketing/sales function. The Company also periodically employs other consultants and independent contractors on as as-needed basis. None of the Company s employees are covered by a collective bargaining agreement. The Company believes its relationship with its employees is good.

FORWARD- LOOKING STATEMENTS

Because ISCO International, Inc. (ISCO or ISCO International or Company) 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 its future results of operations, performance and achievements. The Company has tried, wherever

Table of Contents

possible, to identify these forward-looking statements by using words such as anticipates, believes, estimates, expects, designs, plans, in 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 2005 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 prospectus or to reflect the occurrence of unanticipated events.

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

History of Losses Raises Doubts About Ability to Continue as a Going Concern

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, 2004, the accumulated deficit was approximately $157 million. The Company has only recently begun to generate revenues from the sale of its ANF and RF² products. Accordingly, although management has announced the expectation of improvement during 2005, it is nonetheless possible that the Company may continue to experience net losses and cannot be certain if or when the Company will become profitable.

These conditions raise substantial doubt about the Company s ability to continue as a going concern. The accompanying consolidated financial statements have been prepared assuming the Company will continue as a going concern and do not include any adjustments relating to the recoverability of reported assets or liabilities should the Company be unable to continue as a going concern.

Future Capital Needs

To date, the Company has financed its operations primarily through public and private equity and debt financings, and most recently through financings with affiliates of its two largest shareholders. The Company believes that it has sufficient funds to operate its business as identified herein into the third quarter 2005, and very possibly longer, subject to working capital or other needs. The Company intends to look into augmenting its existing capital position by continuing to evaluate potential short-term and long-term sources of capital whether from debt, equity, hybrid, or other methods.

The Company s continued existence is therefore dependent upon its continued ability to raise funds through the issuance of its securities or borrowings, and its ability to acquire assets or satisfy liabilities by the issuance of stock. Management s plans in this regard are to obtain other debt and equity financing until such time as the Company s profitable operation and positive cash flow are achieved and maintained.

Although management believes, based on the fact that it has raised funds through sales of common stock and from borrowings over the past several years, that it will be able to secure suitable additional financing for the Company s operations, there can be no guarantee that such financing will continue to be available on reasonable terms, or at all. As a result, there is no assurance that the Company will be able to continue as a going concern.

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, and the costs involved in protecting patents or other intellectual property.

Table of Contents

Limited Experience in Manufacturing, Sales and Marketing and Dependence on Third Party Manufacturers

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. Currently, the Company s manufacturing requirements are met by third party contract manufacturers. The efficient operation of the Company s business will depend, in part, on its ability to have these and other companies manufacture its products in a timely manner, cost effectively and in sufficient volumes while maintaining the required quality. Any manufacturing disruption could impair the Company s ability to fulfill orders and could cause us to lose customers.

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 other products. The Company also may elect to enter into arrangements with third parties regarding the commercialization and marketing of its 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 may 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 Company s business, operating results and financial condition.

RISKS RELATED TO THE COMPANY S COMMON STOCK AND CHARTER PROVISIONS

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, 2004, the closing price of its common stock has ranged from a low of $0.10 per share to a high of $39.00 per share, but its common stock has not traded above $1.07 per share during 2004. 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 the Company s common stock could affect the Company s ability to maintain the listing of its common stock on the American Stock Exchange.

Table of Contents

Risk of Dilution

As of December 31, 2004, the Company had outstanding options to purchase 9.1 million shares of common stock at a weighted average exercise price of $0.40 per share (2.7 million of which have not yet vested) issued to employees, directors and consultants pursuant to the 2003 Equity Incentive Plan and its predecessor 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 or outside the Company s employee benefit plans, or may lower the price of existing stock options.

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 40% 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 s 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) 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 and (ii) prior specified notice must be given by a stockholder making nominations to the Board of Directors or raising business matters at stockholders meetings. 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 Company s Board of Directors, including acquisitions that may offer a premium over market price to some or all stockholders. The Company s Board of Directors has expressed the intent to allow this plan to expire by its terms during February 2006.

The Board of Directors also recommended to the shareholders that staggered director terms be eliminated, such that all directors are to be elected annually. The Company s shareholders approved this amendment to the Company s Certificate of Incorporation during the annual meeting of shareholders held during December 2004.

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 may have a material adverse effect on the Company s business, operating results and financial condition.

Table of Contents

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 products.

The Company s RF products, including its ANF and RF² products, 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 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 these solutions to solve their wireless network problems. Although the Company has received several orders from wireless operators for the Company s products over the past year, including a record backlog entering 2005, 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 telecommunications is characterized by rapidly advancing technology. The Company s success will depend in large part upon its ability to keep pace with advancing its high performance RF technology and efficient, readily available low cost materials technologies. Rapid changes have occurred, and are likely to continue to occur, in the development of wireless telecommunications. Development efforts may be rendered obsolete by the adoption of alternative solutions to current wireless operator problems or by technological advances made by others.

BUSINESS RISKS

Dependence on a Limited Number of Customers

Sales to three of the Company s customers accounted for 94% and 98% of the Company s total revenues for 2004 and 2003, respectively. During 2004 the top three customers were Verizon Wireless, U.S. Cellular Corporation, and Pelephone Communications Ltd., respectively. In addition, a significant amount of the Company s technical and managerial resources have been focused on working with these and a limited number of other operators and OEMs.

The Company expects that if its 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 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 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 Company s business, operating results and financial condition.

Table of Contents

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. 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 products 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 its products, the Company may be unable to manufacture products in quantities sufficient to meet customers demand in any particular period. The Company has few 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 actual or anticipated purchase orders placed from time to time in the ordinary course of business.

Related to this topic, the Company produces substantially all of its products through third-party contract manufacturers. Like raw materials, the elimination of any of these entities or delays in the fulfillment process, for whatever reason, may impact the Company s ability to fulfill customer orders on a timely basis and may have a material adverse effect on the Company s business, operating results, or financial condition.

To satisfy customer requirements, the Company may be required to stock certain long lead-time parts and/or finished product in anticipation of future orders, or otherwise commit funds toward future purchase. 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 Company s 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.

In general, the Company s products carry a warranty of one or two years, 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 confidence. The occurrence of such quality problems could have a material adverse effect on the Company s business, operating results and financial condition.

Table of Contents

Intense competition, and increasing consolidation in the Company s 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, 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 RF solutions 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 existing and new technologies, would have a material adverse effect on the Company s business, operating results and financial condition.

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 the Company s products are based. The Company has internally applied for patents and acquired 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 there are a large number of patents and patent applications covering RF products and other products and technologies that it is pursuing. Accordingly, the patent positions of companies using RF technologies, including the Company, are uncertain and involve complex legal and factual questions. The patent applications filed by the Company or others may not result in issued patents or the scope and breadth of any claims allowed in any patents issued to the Company or others may not exclude competitors or provide competitive advantages. In addition, patents issued to the Company, its subsidiaries or others may not be held valid if 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 might acquire in the future may have a material adverse effect on the Company s business, operating results and financial condition.

Some of the patents and patent applications owned 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