

ION GEOPHYSICAL CORP
Form 10-K
February 24, 2012
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UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

Form 10-K

(Mark One)

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

For the Fiscal Year Ended December 31, 2011

or

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

Commission file number 1-12691

ION Geophysical Corporation

(Exact Name of Registrant as Specified in Its Charter)

Delaware

(State or Other Jurisdiction of Incorporation or Organization)

22-2286646

(I.R.S. Employer Identification No.)

2105 CityWest Blvd

Suite 400

Houston, Texas 77042-2839

(Address of Principal Executive Offices, Including Zip Code)

(281) 933-3339

(Registrant's Telephone Number, Including Area Code)

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, \$0.01 par value	New York Stock Exchange

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

None

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

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

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☐ No ☒

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

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

Large accelerated filer ☐ Accelerated filer ☐ Non-accelerated filer ☒ Smaller reporting company ☐

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

As of June 30, 2011 (the last business day of the registrant's second quarter of fiscal 2011), the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was \$1.4 billion based on the closing sale price on such date as reported on the New York Stock Exchange.

As of February 17, 2012, the number of shares of common stock, \$0.01 par value, outstanding was 155,585,036 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Document	Parts Into Which Incorporated
Portions of the Proxy Statement for the Annual Meeting of Stockholders to be held May 23, 2012	Part III

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PART I

Preliminary Note: This Annual Report on Form 10-K contains forward-looking statements as that term is defined in the Private Securities Litigation Reform Act of 1995. Forward-looking statements should be read in conjunction with the cautionary statements and other important factors included in this Form 10-K. See Item 1A. *Risk Factors* for a description of important factors which could cause actual results to differ materially from those contained in the forward-looking statements.

In this Form 10-K, ION Geophysical, ION, the company, we, our, ours and us refer to ION Geophysical Corporation and its consolidated subsidiaries, except where the context otherwise requires or as otherwise indicated. Certain trademarks, service marks and registered marks of ION referred to in this Form 10-K are defined in Item 1. *Business Intellectual Property*.

Item 1. *Business*

We are a technology-focused seismic solutions company that provides advanced acquisition equipment, software and planning and seismic processing services to the global energy industry. Our products, technologies, and services are used by oil and gas exploration and production (E&P) companies and seismic acquisition contractors to generate high-resolution images of the Earth's subsurface during exploration, exploitation, and production operations. Our products and services are intended to measure and interpret seismic data about rock and fluid properties within the Earth's subsurface to enable oil and gas companies to make improved drilling and production decisions. We also acquire and process seismic data from seismic surveys in regional data programs, which then become part of our seismic data library. The seismic surveys for our data library business are pre-funded, or underwritten, in part by our customers, and we contract with third party seismic data acquisition companies to acquire the data, all of which is intended to minimize our risk exposure. We serve customers in all major energy producing regions of the world from strategically located offices in 19 cities on five continents.

In March 2010, we formed a joint venture with BGP, Inc., China National Petroleum Corporation (BGP), a subsidiary of China National Petroleum Corporation (CNPC), and contributed most of our land seismic equipment businesses to INOVA Geophysical Equipment Limited (INOVA Geophysical), the joint venture entity. BGP is generally regarded as the world's largest land geophysical service contractor. It owns a 51% interest and we own a 49% interest in INOVA Geophysical.

Our products and services include the following:

Seismic data processing and reservoir imaging services,

Seismic data libraries,

Planning services for survey design and optimization,

Marine seismic data acquisition equipment,

Navigation, command & control, and data management software products, and

Land seismic data acquisition equipment (principally through our 49% ownership in INOVA Geophysical). Seismic imaging plays a fundamental role in hydrocarbon exploration and reservoir development by delineating structures, rock types, and fluid locations in the subsurface. Geoscientists interpret seismic data to identify new sources of hydrocarbons and pinpoint drilling locations for wells, which can be costly and involve high risk. As oil and gas reservoirs have become harder to find and more expensive to develop and exploit in recent years, the demand for advanced seismic imaging solutions has grown. In addition, seismic technologies are now being applied more broadly over the entire life cycle of a hydrocarbon reservoir to optimize production. For example, time-lapse seismic images (referred to as 4D or four-dimensional surveys), in which the fourth dimension is time, can be made of producing reservoirs to track the movement of injected or

produced fluids and/or to identify locations containing by-passed hydrocarbons.

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ION has been involved in the seismic technology industry for over 40 years, starting in the 1960s when we designed and manufactured seismic equipment under our previous company name, Input/Output, Inc. In recent years, we have transformed our business from being solely a manufacturer and seller of seismic equipment to being a provider of a full range of seismic imaging products, technologies, and services.

We operate our company through four business segments: Solutions, Systems, Software and INOVA Geophysical.

Solutions advanced seismic data processing services for marine and land environments, reservoir solutions, onboard processing and quality control, seismic data libraries, and services by our GeoVentures™ services group (formerly known as the Integrated Seismic Solutions services group).

Systems towed streamer and redeployable ocean bottom cable seismic data acquisition systems and shipboard recorders, streamer positioning and control systems and energy sources (such as air guns and air gun controllers) and analog geophone sensors.

Software software systems and related services for navigation and data management involving towed marine streamer and seabed operations.

INOVA Geophysical through our interest in INOVA Geophysical, cable-based, cableless and radio-controlled seismic data acquisition systems, digital sensors, vibroseis vehicles (i.e. vibrator trucks) and source controllers for detonator and energy sources business lines. Our executive headquarters are located at 2105 CityWest Boulevard, Suite 400, Houston, Texas 77042-2839. Our international sales headquarters are located at LOB 16, office 504, Jebel Ali Free Zone, P.O. Box 18627, Dubai, United Arab Emirates. Our telephone number is (281) 933-3339. Our home page on the internet is www.iongeo.com. We make our website content available for information purposes only. Our website should not be relied upon for investment purposes, and it is not incorporated by reference into this Form 10-K.

In portions of this Form 10-K, we incorporate by reference information from parts of other documents filed with the Securities and Exchange Commission (SEC). The SEC allows us to disclose important information by referring to it in this manner, and you should review this information. We make our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, annual reports to stockholders, and proxy statements for our stockholders' meetings, as well as any amendments to those reports, available free of charge through our website as soon as reasonably practicable after we electronically file those materials with, or furnish them to, the SEC.

You can learn more about us by reviewing our SEC filings on our website. Our SEC reports can be accessed through the Investor Relations section on our website. The SEC also maintains a website at www.sec.gov that contains reports, proxy statements, and other information regarding SEC registrants, including our company.

Seismic Industry Overview

Since the 1930s, oil and gas companies have sought to reduce exploration risk by using seismic data to create an image of the Earth's subsurface. Seismic data is recorded when listening devices placed on the Earth's surface or seabed floor, or carried within the streamer cable of a towed streamer vessel, measure how long it takes for sound vibrations to echo off rock layers underground. For seismic acquisition onshore, the acoustic energy producing the sound vibrations is generated by the detonation of small explosive charges or by large vibroseis (vibrator) vehicles. In marine acquisition, the energy is provided by a series of air guns that deliver highly compressed air into the water column.

The acoustic energy propagates through the subsurface as a spherical wave front, or seismic wave. Interfaces between different types of rocks will both reflect and transmit this wave front. Onshore, the reflected signals return to the surface where they are measured by sensitive receivers that may be either analog coil-spring geophones or digital accelerometers based on MEMS (micro-electro-mechanical systems) technology. Offshore, the reflected signals are recorded by either hydrophones towed in an array behind a streamer acquisition vessel or by multicomponent geophones or MEMS sensors that are placed directly on the seabed. Once the recorded seismic energy is processed using advanced algorithms and workflows, images of the subsurface can be created.

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to depict the structure, lithology (rock type), fracture patterns, and fluid content of subsurface horizons, highlighting the most promising places to drill for oil and natural gas. This processing also aids in engineering decisions, such as drilling and completion methods, as well as decisions affecting overall reservoir production.

Typically, an E&P company engages the services of a geophysical acquisition company to prepare site locations, coordinate logistics, and acquire seismic data in a selected area. The E&P company generally relies upon third parties, such as ION, to provide the contractor with equipment, navigation and data management software, and field support services necessary for data acquisition. After the data is collected, the same geophysical contractor, a third-party data processing company, the Company's data processing services or the E&P company itself will process the data using proprietary algorithms and workflows to create a series of seismic images. Geoscientists then interpret the data by reviewing the images and integrating the geophysical data with other geological and production information such as well logs or core information.

During the 1960s, digital seismic data acquisition systems (which converted the analog output from the geophones into digital data for recording) and computers for seismic data processing were introduced. Using the new systems and computers, the signals could be recorded on magnetic tape and sent to data processors where they could be adjusted and corrected for known distortions. The final processed data was displayed in a form known as "stacked" data. Computer filing, storage, database management, and algorithms used to process the raw data quickly grew more sophisticated, dramatically increasing the amount of subsurface seismic information.

Until the early 1980s, the primary commercial seismic imaging technology was two-dimensional, or 2-D, technology. 2-D seismic data is recorded using straight lines of receivers crossing the surface of the Earth. Once processed, 2-D seismic data allows geoscientists to see only a thin vertical slice of the Earth. A geoscientist using 2-D seismic technology must speculate on the characteristics of the Earth between the slices and attempt to visualize the true three-dimensional (3-D) structure of the subsurface.

The commercial development of 3-D imaging technology in the early 1980s was an important technological milestone for the seismic industry. Previously, the high cost of 3-D seismic data acquisition techniques and the lack of computing power necessary to process, display, and interpret 3-D data on a commercial basis had slowed its widespread adoption. Today's 3-D seismic techniques record the reflected energy across a series of closely-spaced seismic lines that collectively provide a more holistic, spatially-sampled depiction of geological horizons and, in some cases, rock and fluid properties, within the Earth.

3-D seismic data and the associated computer-based interpretation platforms are designed to allow geoscientists to generate more accurate subsurface maps than could be constructed on the basis of the more widely spaced 2-D seismic lines. In particular, 3-D seismic data provided more detailed information about and higher-quality images of subsurface structures, including the geometry of bedding layers, salt structures, and fault planes. The improved 3-D seismic images allowed the oil and gas industry to discover new reservoirs, reduce finding and development costs, and lower overall hydrocarbon exploration risk. Driven by faster computers and more sophisticated mathematical equations to process the data, the technology advanced quickly.

As commodity prices decreased in the late 1990's and the pace of innovation in 3-D seismic imaging technology slowed, E&P companies slowed the commissioning of new seismic surveys. Also, business practices employed by geophysical contractors impacted demand for seismic data. In an effort to sustain higher utilization of existing capital assets, geophysical contractors increasingly began to collect speculative seismic data for their own account in the hopes of selling it later to E&P companies. These generic, speculative, multi-client surveys were not tailored to meet the unique imaging objectives of individual clients and caused an oversupply of seismic data in many regions. Additionally, since contractors incurred most of the costs of this speculative seismic data at the time of acquisition, contractors lowered prices to recover as much of their fixed investment as possible, which drove operating margins down.

However, beginning in 2004, commodity prices began increasing and E&P companies increased their capital spending programs, which drove higher demand for our products and services. The financial crisis that occurred in 2008 and the resulting economic downturn drove hydrocarbon prices down sharply, which had the effect of sharply reducing exploration activities in North America and in many parts of the world. Since then, crude oil prices have recovered, and were within a range of approximately \$80 to \$100 per barrel at the end of 2011; North American natural gas prices have remained depressed due in part to the excess supply of natural gas in the market.

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ION Geophysical's Business Strategy

Factors Affecting Long-Term Demand

We are now seeing increasing levels of capital spending related to E&P activity, and we believe that current conditions exist that favor increased seismic spending for the years ahead. These conditions include the following:

Global demand for crude oil remains high even though there is little spare production capacity at this time, particularly considering the geopolitical conditions in North Africa and the Middle East, which have had the effect of placing a risk premium on crude oil prices;

The decline in large oil reserves around the world has continued, and the pace of reinvestment into exploration and development will need to increase to offset future production declines;

Remaining oil reserves are proving harder to find, and the potential for large undiscovered or underdeveloped reservoirs in offshore locations should continue to drive demand by E&P companies and seismic contractors for improvements in marine equipment technology and offshore seismic data libraries;

Large E&P companies are focusing on hydrocarbon reservoirs that are located in complex shale geological formations and harder-to-access regions of the world, which should increase demand for newer and more efficient imaging processing and equipment technology solutions; and

While U.S. natural gas prices may remain at depressed levels, investment in shale liquid markets should remain relatively strong in North America and in other parts of the world. In addition, E&P companies will be under increasing pressure to find ways (including new technologies) to locate, find and produce shale oil and gas on a more cost-efficient basis.

The complex hydrocarbon reservoirs that have been developed in recent years generally have more subtle characteristics than the reservoirs that were discovered in prior decades. These unconventional reservoir types include tar sand deposits, shale gas or oil formations. As a result, the process of finding and developing these hydrocarbon deposits is proving to be more challenging, which in turn results in escalating costs and increasing demands for newer and more efficient imaging technologies. Also, producers are increasingly using seismic data to enhance production from known fields by repeating time-lapse seismic surveys over a defined area. We believe that this trend should benefit seismic companies such as ION by extending the utility of subsurface imaging beyond exploration and into production monitoring, which can continue for decades.

We believe that E&P companies will, in the future, increasingly use seismic technology providers who will collaborate with them to tailor seismic surveys that address specific geophysical problems and to apply advanced imaging technologies to take into account the geologic peculiarities of a specific area. In the future, we expect that E&P companies will rely less on undifferentiated, mass seismic studies created using analog sensors and traditional processing technologies that do not adequately identify geologic complexities.

Becoming a Broad-Based Seismic Provider

Two acquisitions in 2004—Concept Systems Holdings Limited (Concept Systems) and GX Technology Corporation (GXT)—were important in our evolution to becoming a broad-based seismic solutions company from primarily a seismic equipment provider. Concept Systems provided us our integrated planning, navigation, command & control, and data management software and solutions business for towed marine streamers and seabed operations. GXT provided us our advanced seismic data processing services and marine seismic data library business. Through these and other acquisitions, along with our research and development efforts, we have broadened our offering to span the entire seismic workflow, which includes survey planning, acquisition, processing and interpretation. Our offerings include seismic data acquisition hardware, command and control software, value-added services associated with seismic survey design, seismic data processing and interpretation, and seismic data libraries. We have remained an asset light seismic solutions company by not owning a fleet of boats or crews to acquire marine or land surveys.

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In March 2010, we completed the formation of INOVA Geophysical, our joint venture with BGP. The scope of the joint venture's business is to design, develop, engineer and manufacture land-based equipment used in seismic data acquisition for the petroleum industry, and to conduct related research and development, distribution, sales and marketing and field support operations.

A key part of the strategy behind the joint venture was to leverage our research and development experience and expertise with the operational experience and global expertise of BGP. The R&D centers for the joint venture have remained primarily in the U.S. and Canada, although we intend to evaluate lower-cost manufacturing opportunities in China and pursue these opportunities when appropriate. In addition, the joint venture partners intend that BGP's geophysical crews will field test the joint venture's new technology and related equipment for operational feedback and quality improvements. Finally, we expect, over time, that BGP will eventually purchase more of its land equipment from the joint venture and will purchase more ION products and services from our other business segments.

A key element of our business strategy has been to understand the challenges faced by E&P companies in survey planning, acquisition, processing and interpretation, and to strive to develop and offer technology and services that enable us to work with the E&P companies to solve their challenges. We have found that a collaborative relationship with E&P companies, with a goal of better understanding their imaging challenges and then working with them and our contractor customers to assure that the right technologies are properly applied, is the most effective method for meeting our customers' needs. This strategy of being a full solutions provider to solve the most difficult challenges for our customers is an important element of our long term business strategy, and we are implementing this approach globally through local personnel in our regional organizations who understand the unique challenges in their areas.

Current Strategy. While we anticipate continuing to grow and refine our seismic data equipment businesses in marine and land (through INOVA Geophysical), our emphasis on growth will continue to be in our Solutions segment's data processing and GeoVentures multi-client businesses. This focus is consistent with our asset-light strategy, whereby the majority of our investments will be devoted toward research and development and computing infrastructure for our data processing business, and in support of our GeoVentures multi-client projects. This focus better positions our company as a full-service technology company having increasing revenues coming from E&P company customers using our GXT data processing and GeoVentures services.

In this regard, we are currently concentrating on four key market sectors in our Solutions businesses:

Challenging environments, such as the Arctic frontier: we have performed many successful surveys in the Arctic, including programs in the Beaufort Sea, Greenland and most recently, a scientific study in the Russian high Arctic Sea area.

Complex and hard-to-image geologies, such as deepwater subsurface salt formations in the Gulf of Mexico and off of West Africa and Brazil: we believe that GXT's technologies are well-suited to meet depth imaging challenges.

Unconventional reservoirs, such as those in shale-producing areas: we have gained valuable experience in China, where our technology has been successful in imaging deep-fractured tight gas sands. In 2011, we devoted approximately one-third of our GeoVentures capital expenditures on North American shale oil and natural gas geologies; our shale libraries, called ResSCAN programs, feature unique measurement techniques, such as recording full-wave seismic data resulting in higher-definition images of the subsurface, and proprietary processing techniques. We expect that shale plays will grow in increasing importance around the world.

Basin exploration, which encompasses our GeoVentures business: we believe that our BasinSPAN programs can provide E&P companies with a better comprehensive understanding of the regional geologies in offshore frontier areas; this business, beginning in 2003, has grown to a substantial data library that covers many of the frontier basins in the world, including offshore East and West Africa and Brazil, as well as in the Arctic and the deepwater Gulf of Mexico.

E&P companies continue to be interested in technology to increase production and in improving their understanding of targeted reservoirs, in both the exploration and production phases. We believe that our

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technologies, such as DigiFIN[®], DigiSTREAMER[®], O[®] and INOVA Geophysical's FireFly[®], will continue to attract interest because they are designed to deliver improvements in both image quality and productivity. For more information regarding our products and services, see *Products and Services* below.

In summary, our business strategy is predicated on successfully executing six key imperatives:

Expanding our Solutions business in new regions with new customers and new land and marine service offerings, including proprietary services for E&P producers;

Globalizing our Solutions data processing business by opening advanced imaging centers in strategic locations, and expanding our presence in the land seismic processing segment, with emphasis on serving national oil companies;

Developing and introducing our next generation of marine towed streamer products, with a goal of developing markets beyond the new vessel market;

Developing a next generation of seabed seismic data imaging technology using our VectorSeis[®] Ocean (VSO) seismic data acquisition system platform and derivative products to obtain technical and market leadership in what we continue to believe is a very important and expanding market;

Managing our cost structure to reflect current market and economic conditions while keeping key strategic technology programs progressing; and

Through our investment in INOVA Geophysical, (i) increasing market share and profitability in land data acquisition systems, as well as other land equipment technologies; and (ii) leveraging INOVA Geophysical's land equipment business to design and deliver lower cost, more reliable land imaging systems to our worldwide customer base of land acquisition contractors, while at the same time, tapping into a broader set of global geophysical opportunities associated with the exploration, asset development, and production operations of BGP's parent, CNPC.

Products and Services

Solutions Services

Services for our Solutions segment include the following:

GeoVentures Formerly named Integrated Seismic Solutions (ISS) services, our GeoVentures services are designed to manage the entire seismic process, from survey planning and design to data acquisition and management, through pre-processing and final subsurface imaging. The GeoVentures group focuses on the technologically intensive components of the image development process, such as survey planning and design and data processing and interpretation, and outsources the logistics component to geophysical logistics contractors. ION offers its GeoVentures services to customers on both a proprietary and multi-client basis. On both bases, the customers pre-fund a majority of the data acquisition costs. With our proprietary service, the customer also pays for the imaging and processing, but has exclusive ownership of the data after it has been processed. For multi-client surveys, we assume some of the processing costs but retain ownership of the marketing rights to the data and images and receive on-going license revenue from subsequent data license sales.

Since 2002, GeoVentures has acquired and processed a growing seismic data library consisting of non-exclusive marine and ocean bottom data from around the world. The majority of the data libraries licensed by GeoVentures consist of ultra-deep 2-D seismic survey data that E&P companies use to better evaluate the evolution of petroleum systems at the basin level, including insights into the character of source rocks and sediments, migration pathways, and reservoir trapping mechanisms. In many cases, the availability of geoscience data extends beyond seismic information to include magnetic, gravity, well log, and electromagnetic information, which help to provide a more comprehensive picture of the

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subsurface. Particular attention is made to ensure the data obtained can integrate with legacy 2D and 3D datasets. Known as SPANS, these geophysical data libraries currently exist for major offshore basins worldwide, including:

the Gulf of Mexico,

the Caribbean,

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off the north, east and west coasts of South America,

off the east and west coasts of Africa,

off the east and west coasts of India,

the Arctic Ocean,

off Australia, and

off certain southeast Asian coasts.

During 2011, we announced expansions of our (i) East AfricaSPAN data library, acquiring approximately 8,700 kilometers of regional seismic data offshore Tanzania, Mozambique, and Comoros, and (ii) ArcticSPAN data library, acquiring an additional 5,200 kilometers of regional seismic data offshore Northeast Greenland.

In addition, we have designed reservoir imaging and characterization programs, or SCANS, to provide E&P companies with the ability to better understand conventional and unconventional reservoirs. Known as ResSCAN programs, these 3D seismic data programs are designed, acquired and depth-imaged using advanced geophysical technology. We have designed and acquired two SCAN programs: (i) MarcellusSCAN, for a portion of the Marcellus shale area in the Appalachian Basin, and (ii) NiobraraSCAN, for the Niobrara formation in northwestern Colorado.

Other seismic and non-seismic programs are planned or under development for other regions of the world.

Seismic Data Processing Services We believe that our GXT Imaging Solutions group is a leader in advanced land and marine seismic data processing services. E&P companies apply our solutions to produce high-quality subsurface images in marine, ocean bottom and land environments.

GXT offers processing and imaging services designed to help our E&P customers reduce exploration and production risk, appraise and develop reservoirs, and increase production. GXT develops a series of subsurface images by applying its processing technology to data owned or licensed by its customers and also provides its customers with support services (even onboard seismic vessels), such as data pre-conditioning for imaging and outsourced management, including quality control, of seismic data acquisition and image processing services.

GXT utilizes a globally distributed network of Linux-cluster processing centers throughout the world (including centers in North America, South America, Africa, Asia and Europe), scaled to local needs, which are combined with our major hub in Houston, to process seismic data by applying advanced proprietary algorithms and workflows that incorporate processing techniques such as illumination analysis, data conditioning and velocity modeling, and time and depth migration. These techniques help produce more detailed, higher-quality imaging of subsurface formations.

GXT pioneered pre-stack depth migration (PreSDM) technology, a processing technique involving the application of advanced, computer-intensive processing algorithms, which convert time-based seismic information to a geological depth basis. While pre-stack depth migration is not required for every imaging situation, it generally provides the most accurate subsurface images in areas of complex geology. Our Reverse Time Migration (RTM) technology was developed to improve imaging in areas where complex structural conditions or steeply dipping subsurface horizons have provided imaging challenges for oil and gas companies. Both PreSDM and RTM techniques have proved effective in their application to hard-to-image subsalt reservoirs in the Gulf of Mexico.

The Solutions segment has a broad portfolio of offerings throughout the entire seismic workflow. Our technologies are designed to allow us to clearly define a solution to ensure that our customers' goals are met, such as removing false reflections and identifying fractures in reservoirs.

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Our AXIS Geophysics group (AXIS), based in Denver, Colorado, focuses on advanced seismic data processing for stratigraphically complex onshore environments. Many hydrocarbon plays, including shale plays, are impacted by subsurface anisotropy which causes seismic velocities to vary according to source-receiver direction. AXIS has developed a proprietary data processing technique called AZIM that is designed to better account for the anisotropic effects of the Earth (i.e., the fact that the speed of the seismic waves does not just depend on the subsurface location but also on the direction that the seismic waves travel, or propagate), which tend to distort seismic images. AZIM is designed to correct for these anisotropic effects by producing higher resolution images in areas where the velocity of seismic waves varies with compass direction (or azimuth). The AZIM technique is used to analyze fracture patterns within reservoirs.

We believe that the application of ION's advanced processing technologies and imaging techniques can better identify complex hydrocarbon-bearing structures and deeper exploration prospects. We also believe that the combination of GXT's capabilities in advanced velocity model building and depth imaging, along with AXIS' capability in anisotropic imaging, provides an advanced toolkit for maximizing full-wave data measurements.

For information regarding our backlog of commitments for certain Solutions services as of December 31, 2011, see Item 7. *Management's Discussion and Analysis of Financial Condition and Results of Operations*, *Executive Summary*, *Economic Conditions*.

Systems Products

Our Systems segment products include the following:

Marine Acquisition Systems Our marine acquisition system consists of towed marine streamers and shipboard electronics that collect seismic data in water depths greater than 30 meters. Marine streamers, which contain hydrophones, electronic modules and cabling, may measure up to 12,000 meters in length and are towed (up to 20 at a time) behind a towed streamer seismic acquisition vessel. The hydrophones detect acoustical energy transmitted through water from the Earth's subsurface structures. Our DigiSTREAMER system, our next-generation towed streamer system, uses solid streamer and integrated continuous acquisition technology for towed streamer operations. We delivered a twelve-streamer DigiSTREAMER system to BGP in 2011.

E&P companies are showing increased interest in seabed seismic activities for mature fields in which the companies are seeking more detailed reservoir characteristics. During 2004, we introduced our VectorSeis Ocean (VSO) system, an advanced system for seismic data acquisition using redeployable ocean bottom cable. Since then, we have sold a total of five VSO ocean-bottom systems, all sold to Reservoir Exploration Technology, ASA (RXT), a Norwegian seismic contractor. We made no sales or deliveries of ocean-bottom VSO systems in 2010 or 2011. During 2010, we announced the launch of VSO II, which offered significant enhancements over the initial VSO system. We continue to actively develop our seabed technology.

Marine Positioning Systems Our DigiCOURSE® marine streamer positioning system includes streamer cable depth control devices, lateral control devices, compasses, acoustic positioning systems, and other auxiliary sensors. This equipment is designed to control the vertical and horizontal positioning of the streamer cables and provides acoustic, compass, and depth measurements to allow processors to tie navigation and location data to geophysical data to determine the location of potential hydrocarbon reserves. DigiFIN is an advanced lateral streamer control system that we commercialized in 2008. Between 2008 and 2011, we have sold and delivered 35 DigiFIN systems, and have completed multiple DigiFIN vessel expansions. DigiFIN is designed to maintain tighter, more uniform marine streamer separation along the entire length of the streamer cable, which allows for better sampling of seismic data and improved subsurface images. We believe that DigiFIN also enables faster line changes and minimizes the requirements for in-fill seismic work.

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Source and Source Control Systems We manufacture and sell air guns, which are the primary seismic energy source used in marine environments to initiate the acoustic energy transmitted through the Earth's subsurface. An air gun fires a high compression burst of air underwater to create an energy wave for seismic measurement. We offer a digital source control system (DigiSHOT®), which allows for reliable control of air gun arrays for 4-D exploration activities.

Geophones Geophones are analog sensor devices that measure acoustic energy reflected from rock layers in the Earth's subsurface using a mechanical, coil-spring element. We market a full suite of geophones and geophone test equipment that operate in most environments, including land, transition zone, and downhole. We believe our Sensor group is the leading designer and manufacturer of precision analog geophones used in seismic data acquisition. Our analog geophones are used in other industries as well.

Software Products and Services

Through this segment, we supply command-and-control software systems and services for towed marine streamer and seabed operations. Software developed by our subsidiary, Concept Systems, is installed on towed streamer marine vessels worldwide and is a component of many redeployable and permanent seabed monitoring systems. Products and services for our Software segment include the following:

Marine Imaging Orca is our next-generation software product for towed streamer navigation and integrated data management applications. We believe that Orca has made significant inroads into the towed streamer market with several major seismic contractors adopting the technology for their new, high-end seismic vessels. We currently estimate our market share to be in excess of 40%, having outfitted our 51st vessel in 2011. During 2011, we outfitted 7 streamer vessels with Orca software, a number of these installations were replacements of legacy Concept Systems products. Orca was initially targeted at larger scale vessels shooting highly complex surveys, but is now making inroads into smaller vessels working in less complex configurations. Orca includes modules designed to manage marine acquisition surveys integrating the navigation, source control, and streamer control functions. Orca manages complex marine surveys such as time-lapse 4-D surveys and WATS (Wide Azimuth Towed Streamer) surveys. WATS is an advanced acquisition technique for imaging complex structures (for example, subsalt formations) in the marine environment, generally implemented with multiple source vessels that shoot at some distance from the streamer recording vessel. Orca is designed to function with our DigiFIN product, which enables streamer lateral control, and DigiSTREAMER, our new marine streamer acquisition system. SPECTRA® is Concept Systems' legacy integrated navigation and survey control software system for towed streamer-based 2-D, 3-D, and 4-D seismic survey operations.

Seabed Imaging Concept Systems offers GATOR®, an integrated navigation and data management software system for multi-vessel ocean bottom cable and transition zone (such as marshlands) operations. The GATOR system is designed to provide real-time, multi-vessel positioning and data management solutions for ocean-bottom, shallow-water, and transition zone crews. During 2011, Concept released its GATOR II® software system, with enhanced functionality for seabed operations. The first sale of the new system was concluded in June 2011; it is now available for sale to all seabed clients. GATOR II command and control is designed to meet the unique challenges of distributed, multi-vessel seabed, transition zone, and electromagnetic data acquisition. The system is extremely flexible and scalable to configure and control single vessel operations to highly complex surveys spanning multiple vessels and acquisition systems.

Survey Design, Planning and Optimization Concept Systems offers consulting services for planning, designing and supervising complex surveys, including 4D and WATS survey operations. Concept Systems' acquisition expertise and in-field software platforms and development capability are designed to allow their clients, including oil companies and seismic acquisition contractors, to optimize these complex surveys, improving image quality and reducing costs. Our Orca and GATOR systems are designed to integrate with our post-survey tools for processing, analysis, and data quality control, including by our experts' use of our REFLEX® software for seismic coverage and attribute analysis, and our Optimiser™ technology planning tool.

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INOVA Geophysical Products

Products of INOVA Geophysical include the following:

Land Acquisition Systems INOVA now provides two offerings for cableless land acquisition, FireFly and Hawk . By removing the constraints of cables, geophysicists can custom-design surveys for multiple subsurface targets and increase receiver station density to more fully sample the subsurface. Cableless systems enable contractors to efficiently operate in challenging, culturally-intensive environments. Other benefits include a decrease in system weight and, we believe, superior operational efficiencies, reduction in operational troubleshooting time and better defined sampled seismic data.

FireFly is INOVA's radio-based cableless system. It allows for a central location to communicate with the field units via radio and receive information back from the field units. This communication link allows for management of the equipment on the ground by relaying commands that respond to operational variables. It also provides valuable quality control information from the field as to the status of the equipment and geophysical attributes. In 2011, INOVA Geophysical introduced its improved FireFly DR31 system, providing increased ruggedness and protection through an aluminum enclosure, reduced power consumption and support for 3-channel analog or VectorSeis digital sensors within the same field electronics.

In 2011, INOVA Geophysical released its Hawk SN11 autonomous node cableless system. Hawk is a lower-priced version of FireFly that provides a wireless platform without radio infrastructure. Given its simpler infrastructure, it consumes less power in turn increasing battery life. The straight forward infrastructure is ideal for swift operations or as a complement to cable-based or FireFly systems. Hawk allows for the use of analog geophones as well as VectorSeis digital sensors.

VectorSeis is INOVA's digital multicomponent sensor and it can be used with all of its recording systems. Since 1999, VectorSeis full-wave technology has been used to acquire seismic data all over the world.

INOVA Geophysical cable-based land acquisition systems, Scorpion® and ARIES®, consist of a central recording unit and multiple remote ground equipment modules that are connected by cable. The central recording unit is in a transportable enclosure that serves as the control center of each system and is typically mounted within a vehicle. The central recording unit receives digitized data, stores the data on storage media for subsequent processing and displays the data on optional monitoring devices. It also provides calibration, status and test functionality. The remote ground equipment consists of multiple remote modules and line taps positioned over the survey area. Seismic data is collected by analog geophones or VectorSeis® digital sensors.

INOVA Geophysical ARIES product line was originally acquired in connection with our acquisition of ARAM in September 2008. The product line consists of analog cable-based land acquisition systems and related peripherals and equipment. ARIES land system products include remote acquisition modules (RAMs), which acquire seismic data from the sensors and transmit the data digitally to the central processing equipment. Line tap units interconnect baseline cables from the recording equipment to multiple receiver lines and function to retransmit data from the RAMs to central recording equipment. ARIES products also include system batteries, central recording equipment, and baseline cables that connect the central recording equipment with the taps and receiver line cables.

The latest version of ARIES – the ARIES II land recording system – features a 24-bit system architecture that is designed to dramatically improve channel capacity, ensure efficient equipment deployment, and maximize system performance. It is also enabled to work with analog geophones and VectorSeis digital sensors and provides continuous recording functionality for microseismic and high productivity vibroseis operations. Aries II supports high channel count, source-driven, high productivity vibroseis acquisition.

The Scorpion system is also capable of recording digital multicomponent seismic data, as well as analog data. Digital sensors can provide increased response linearity and bandwidth, which translate into higher resolution images of the subsurface. In addition, one digital sensor can replace a string of six or more analog geophones, providing users with equipment weight reduction and improved operating efficiencies.

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Source Products Vibrators are devices carried by large vehicles and, along with dynamite, are used as energy sources for land seismic acquisition. INOVA Geophysical markets and sells the AHV-IV, a line of articulated tire-based vibrator vehicles, and a tracked vibrator, the XVib®, for use in environmentally sensitive areas such as the Arctic tundra and desert environments. During 2011, INOVA launched the UniVib, a smaller vibrator with up to 26,000 lb peak force that allows easier mobility and offers options for vibroseis or accelerated impulse source generation.

INOVA Geophysical is also a provider of energy source control and positioning technologies. The Vib Pro control system provides vibrator vehicles with digital technology for energy control and global positioning system technology for navigation and positioning. The Shot Pro dynamite firing system, released in 2007, is the equivalent technology for seismic operations using dynamite energy sources.

Product Research and Development

Our research and development efforts have focused on improving both the quality of the subsurface image and the seismic data acquisition economics for our customers. Our ability to compete effectively in the manufacture and sale of seismic equipment and data acquisition systems, as well as related processing services, depends principally upon continued technological innovation. Development cycles of most products, from initial conception through commercial introduction, may extend over several years.

During 2011, our product development efforts continued across selective business lines aimed at the development of strategic key products and technologies. A large part of our research and development efforts in 2011 were focused on development of our Digi- line of marine streamers and our other marine technologies. Also, in our data processing business, we are investing in continued improvements in productivity and in enhancing our applications to handle increasingly complex data acquisition environments and difficult-to-image geology. We also expect to devote increasing research and development emphasis on shale play technologies and marine seabed platform technologies. For a summary of our research and development expenditures during the past five years, see Item 6. *Selected Financial Data* below.

Because many of these new products and services are under development, their commercial feasibility or degree of commercial acceptance is not yet established. No assurance can be given concerning the successful development of any new products or services, any enhancements to them, the specific timing of their release or their level of acceptance in the marketplace.

Markets and Customers

Based on historical revenues, we believe that we are a market leader in seismic data acquisition in the Arctic and in numerous product lines, including full-wave sensors based upon micro-electro magnetic systems (MEMS), navigation and data management software, marine positioning and streamer control systems, redeployable seabed recording systems and, through INOVA Geophysical, cableless land acquisition systems.

Our principal customers are oil companies, seismic contractors and E&P companies. We market and sell products and offer services directly to E&P companies, primarily imaging-related processing services from our GXT subsidiary and multi-client seismic data libraries from our GeoVentures group, as well as consulting services from Concept Systems and GXT. Seismic contractors purchase our data acquisition systems and related equipment and software to collect data in accordance with their E&P company customers' specifications or for their own seismic data libraries. During 2011, 2010 and 2009, no single customer accounted for 10% or more of our consolidated net revenues.

A significant part of our marketing effort is focused on areas outside of the United States. Foreign sales are subject to special risks inherent in doing business outside of the United States, including the risk of armed conflict, civil disturbances, currency fluctuations, embargo and governmental activities, customer credit risks, and risk of non-compliance with U.S. and foreign laws, including tariff regulations and import/export restrictions.

We sell our products and services through a direct sales force consisting of employees and international third-party sales representatives responsible for key geographic areas. During 2011, 2010 and 2009, sales to destinations outside of North America accounted for approximately 66%, 60% and 64% of our consolidated net revenues, respectively. Further, systems sold to domestic customers are frequently deployed internationally and, from time to time, certain foreign sales require export licenses.

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Traditionally, our business has been seasonal, with strongest demand in the fourth quarter of our fiscal year.

For information concerning the geographic breakdown of our net revenues, see Note 4 of *Notes to Consolidated Financial Statements*.

Manufacturing Outsourcing and Suppliers

Since 2003, we have increased the use of contract manufacturers in our Systems segment as an alternative to manufacturing our own products. We have outsourced the manufacturing of our towed marine streamers, our redeployable ocean bottom cables and various components of VectorSeis Ocean. We may experience supply interruptions, cost escalations, and competitive disadvantages if we do not monitor these relationships properly.

Competition

The GXT Imaging Solutions group within our Solutions segment competes with more than a dozen processing companies that are capable of providing pre-stack depth migration services to E&P companies. See *Products and Services Solutions Services*. While the barriers to entry into this market are relatively low, the barriers to competing at the higher end of the market, the advanced pre-stack depth migration market where our efforts are focused, are significantly higher. At the higher end of this market, Compagnie General de Geophysique Veritas (CGGVeritas) and WesternGeco L.L.C. (a wholly-owned subsidiary of Schlumberger Limited, a large integrated oilfield services company) are our Solutions segment's two primary competitors for advanced imaging services. Both of these companies are larger than ION in terms of revenues, number of processing locations, and sales, marketing and financial resources. In addition, both CGGVeritas and WesternGeco possess an advantage of being part of affiliated seismic contractor companies, providing them with access to customer relationships and seismic datasets that require processing. The GXT Imaging Solutions group also competes with companies that are capable of performing data processing services via internal resources.

The market for seismic products and services is highly competitive and is characterized by continual changes in technology. Our principal competitor for land and marine seismic equipment is Societe d'Etudes Recherches et Construction Electroniques (Sercel), an affiliate of the French seismic contractor, CGGVeritas. Sercel possesses the advantage of being able to sell its products and services to an affiliated seismic contractor that operates both land crews and seismic acquisition vessels, providing it with a greater ability to test new technology in the field and to capture a captive internal market for product sales. Sercel has also demonstrated that it is willing to offer extended financing sales terms to customers in situations where we declined to do so due to credit risk. We also compete with other seismic equipment companies on a product-by-product basis. Our ability to compete effectively in the manufacture and sale of seismic instruments and data acquisition systems depends principally upon continued technological innovation, as well as pricing, system reliability, reputation for quality, and ability to deliver on schedule.

Certain seismic contractors have designed, engineered, and manufactured seismic acquisition technology in-house (or through a controlled network of third-party vendors) in order to achieve differentiation versus their competition. For example, WesternGeco relies heavily on its in-house technology development for designing, engineering, and manufacturing its Q-Technology platform, which includes seismic acquisition and processing systems. Although this technology competes directly with ION's technology for marine streamer, seabed, and land acquisition, WesternGeco does not provide Q-Technology services to other seismic acquisition contractors. However, the risk exists that other seismic contractors may decide to conduct more of their own seismic technology development, which would put additional pressures on the demand for ION acquisition equipment products.

In addition, over the last several years, we have seen both new-build and consolidation activity within the marine towed streamer segment, which could impact our business results in the future. We expect the number of 2-D and 3-D marine streamer vessels, including those in operation, under construction, or announced additions to capacity, to increase by 25, to approximately 150 in 2016 compared to approximately 125 at December 31, 2011. We understand that 23 out of these estimated 25 vessels will be outfitted to perform 3-D seismic survey work. In addition, there has been an increase in acquisition activity within the sector, with the major vessel operators Schlumberger, CGGVeritas, and Petroleum Geo-Services ASA (PGS) all moving to acquire new market entrants in the last several years. Many of these incumbent operators develop their own marine streamer technologies, such that consolidation in the sector reduces the number of potential customers and vessel outfitting opportunities for us.

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Concept Systems provides advanced data integration software and services to seismic contractors acquiring data using either towed streamer vessels or ocean-bottom cable on the seabed. Vessels or ocean-bottom cable crews that do not use Concept Systems software either rely upon manual data integration, reconciliation, and quality control, or develop and maintain their own proprietary software packages. There is growing competition to Concept Systems' core command and control business from Sercel and other smaller companies. Concept Systems has signed long term (between two and five years) technology partnerships with many of its key clients and will continue to seek to develop key new technologies with these clients. An important competitive factor for companies in the same business as Concept Systems is the ability to provide advanced complex command and control software with a high level of reliability combined with expert systems and project support to ensure operations run cost-effectively.

Intellectual Property

We rely on a combination of patents, copyrights, trademark, trade secrets, confidentiality procedures, and contractual provisions to protect our proprietary technologies. Although our portfolio of patents is considered important to our operations, and particular patents may be material to specific business lines, no one patent is considered essential to our consolidated business operations.

Our patents, copyrights, and trademarks offer us only limited protection. Our competitors may attempt to copy aspects of our products despite our efforts to protect our proprietary rights, or may design around the proprietary features of our products. Policing unauthorized use of our proprietary rights is difficult, and we are unable to determine the extent to which such use occurs. Our difficulties are compounded in certain foreign countries where the laws do not offer as much protection for proprietary rights as the laws of the United States. From time to time, third parties inquire and claim that we have infringed upon their intellectual property rights and we make similar inquiries and claims to third parties. No material liabilities have resulted from these third party claims to date. For more information on current litigation related to the Company's intellectual property, see Item 3. *Legal Proceedings*.

The information contained in this Annual Report on Form 10-K contains references to trademarks, service marks and registered marks of ION and our subsidiaries, as indicated. Except where stated otherwise or unless the context otherwise requires, the terms VectorSeis, FireFly, ARIES, ARIES II, DigiSHOT, XVib, DigiCOURSE, GATOR, GATOR II, SPECTRA, Orca, Scorpion, and REFLEX refer to VECTORSEIS, FIREFLY®, ARIES®, ARIES II®, DIGISHOT®, XVIB®, DIGICOURSE®, GATOR®, GATOR II®, SPECTRA®, ORCA®, SCORPION®, and REFLEX® registered marks owned by ION or INOVA Geophysical, and the terms AZIM, BasinSPAN, DigiSTREAMER, AHV-IV, Vib Pro, Shot Pro, GeoVentures, Optimiser, ResSCAN, Hawk, UniVib and DigiFIN, refer to AZIM, BasinSPAN, DigiSTREAMER, AHV-IV, Shot Pro, GeoVentures, Optimiser, ResSCAN, Hawk, UniVib and DigiFIN trademarks and service marks owned by ION or INOVA Geophysical.

Regulatory Matters

Our operations are subject to various international conventions, laws and regulations in the countries in which we operate, including laws and regulations relating to the importation of and operation of seismic equipment, currency conversions and repatriation, oil and gas exploration and development, taxation of offshore earnings and earnings of expatriate personnel, environmental protection, the use of local employees and suppliers by foreign contractors and duties on the importation and exportation of equipment. Our operations are subject to government policies and product certification requirements worldwide. Governments in some foreign countries have become increasingly active in regulating the companies holding concessions, the exploration for oil and gas and other aspects of the oil and gas industries in their countries. In some areas of the world, this governmental activity has adversely affected the amount of exploration and development work done by major oil and gas companies and may continue to do so. Operations in less developed countries can be subject to legal systems that are not as mature or predictable as those in more developed countries, which can lead to greater uncertainty in legal matters and proceedings.

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Changes in these conventions, regulations, policies or requirements could affect the demand for our products and services or result in the need to modify them, which may involve substantial costs or delays in sales and could have an adverse effect on our future operating results. Our export activities are subject to extensive and evolving trade regulations. Certain countries are subject to trade restrictions, embargoes, and sanctions imposed by the U.S. government. These restrictions and sanctions prohibit or limit us from participating in certain business activities in those countries.

Our operations are subject to numerous local, state, and federal laws and regulations in the United States and in foreign jurisdictions concerning the containment and disposal of hazardous materials, the remediation of contaminated properties, and the protection of the environment. While we have experienced an increase in general environmental regulation worldwide and laws and regulations protecting the environment have generally become more stringent, we do not believe compliance with these regulations will have a material adverse effect on our business or results of operations, and we do not currently foresee the need for significant expenditures to ensure our continued compliance with current environmental protection laws. Regulations in this area are subject to change, and there can be no assurance that future laws or regulations will not have a material adverse effect on us.

The Deepwater Horizon incident in the U.S. Gulf of Mexico in April 2010 resulted in a moratorium on certain offshore drilling activities by the Bureau of Ocean Energy Management, Regulation and Enforcement, or BOEMRE. This moratorium and other regulatory initiatives in response to this incident adversely affected decisions of E&P companies to explore and drill in the Gulf of Mexico, and negatively impacted our Solutions segment during the second half of 2010 and 2011. During this time period, we experienced a significant reduction in data processing revenues attributable to the Gulf of Mexico. The BOEMRE has issued and is expected to issue additional new safety and environmental guidelines or regulations for drilling in the Gulf of Mexico and other offshore regions, and may take other steps that could increase the costs of exploration and production, reduce the area of operations, and result in permitting delays. The Deepwater Horizon incident is likely to have a significant and lasting effect on the US offshore energy industry, and will likely result in a number of fundamental changes, including heightened regulatory scrutiny, more stringent operating and safety standards, changes in equipment requirements and the availability and cost of insurance, as well as increased politicization of the industry. These changes may result in increases in our and our customers' operating costs.

We do not engage in hydraulic fracturing services, a commonly used process in the completion of oil and natural gas wells, particularly in low permeability formations such as shales, that involves the injection of water, proppants, and chemicals under pressure into the target reservoir to stimulate hydrocarbon production. Our business, however, is highly dependent on the level of activity by our oil and gas exploration and production customers, and hydrocarbons cannot be economically produced from certain reservoirs without extensive fracturing. Due to public concerns about any environmental impact that hydraulic fracturing may have, including potential impairment of groundwater quality, legislative and regulatory efforts at the federal, state, and local levels have been initiated to impose more stringent permitting and compliance obligations on such operations. In the U.S. Congress, for example, there is a pending bill entitled the Fracturing Responsibility and Awareness of Chemicals Act, or the FRAC Act, that would amend the federal Safe Drinking Water Act, or the SDWA, to repeal an existing exemption from underground injection control permitting for hydraulic fracturing that does not utilize diesel fuels. In early 2010, the U.S. Environmental Protection Agency (the EPA) indicated that it intended to regulate hydraulic fracturing utilizing diesel fuels under the SDWA and require permitting for any well where such hydraulic fracturing was conducted. While industry groups have challenged the EPA's action as improper rulemaking, the Agency's position, if upheld, could result in additional permitting. The EPA also has commenced a study of the potential adverse effects that hydraulic fracturing may have on water quality and public health, indicated that it intends to develop standards for discharges of hydraulic fracturing wastewaters, proposed air standards for certain hydraulic fracturing operations, and initiated a process for collecting health information and other data about fracturing additives. Separately, the United States Department of the Interior has announced its intention to propose new rules regulating hydraulic fracturing activities on federal lands, including requirements for disclosure, well bore integrity, and handling of flowback water. A number of state and local governments, moreover, have adopted or are considering adopting additional requirements relating to hydraulic fracturing. Any legislative and regulatory initiatives imposing significant additional restrictions on, or otherwise limiting, the hydraulic fracturing process could make it more difficult or costly to complete natural gas and oil wells. In the event such requirements are enacted, demand for our shale data libraries and seismic acquisition services may be adversely affected.

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Our customers' operations are also significantly impacted in other respects by laws and regulations concerning the protection of the environment and endangered species. For instance, many of our marine contractors have been affected by regulations protecting marine mammals in the Gulf of Mexico. To the extent that our customers' operations are disrupted by future laws and regulations, our business and results of operations may be materially adversely affected.

Employees

As of December 31, 2011, we had 937 regular, full-time employees, 615 of whom were located in the U.S. From time to time and on an as-needed basis, we supplement our regular workforce with individuals that we hire temporarily or as independent contractors in order to meet certain internal manufacturing or other business needs. Our U.S. employees are not represented by any collective bargaining agreement, and we have never experienced a labor-related work stoppage. We believe that our employee relations are satisfactory.

Financial Information by Segment and Geographic Area

For a discussion of financial information by business segment and geographic area, see Note 4 of *Notes to Consolidated Financial Statements*.

Item 1A. Risk Factors

This report contains or incorporates by reference statements concerning our future results and performance and other matters that are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (*Securities Act*), and Section 21E of the Securities Exchange Act of 1934, as amended (*Exchange Act*). These statements involve known and unknown risks, uncertainties, and other factors that may cause our or our industry's results, levels of activity, performance, or achievements to be materially different from any future results, levels of activity, performance, or achievements expressed or implied by such forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as *may*, *will*, *would*, *should*, *intend*, *expect*, *plan*, *anticipate*, *believe*, *potential*, or *continue* or the negative of such terms or other comparable terminology. Examples of other forward-looking statements contained or incorporated by reference in this report include statements regarding:

the effects of current and future worldwide economic conditions and demand for oil and natural gas and seismic equipment and services;

the effects of current and future unrest in the Middle East, North Africa and other regions;

future benefits to be derived from our INOVA Geophysical joint venture;

future increases of capital expenditures for seismic activities;

the expected outcome of litigation and other claims against us;

the timing of anticipated sales and associated realized revenues;

future levels of spending by our customers;

the timing of future revenue realization of anticipated orders for seismic data processing work in our Solutions segment;

future oil and gas commodity prices;

the duration of the slowdown in exploration and development activities in the Gulf of Mexico resulting from the April 2010 Deepwater Horizon incident, which affects us and our customers;

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expected net revenues, income from operations and net income;

expected improved revenues from data processing services in our Solutions segment;

expected gross margins for our products and services;

future demand for seismic equipment and services;

future benefits to our customers to be derived from new products and services;

future benefits to be derived from our investments in technologies and acquired companies;

future growth rates for our products and services;

the degree and rate of future market acceptance of our new products and services;

our expectations regarding oil and gas exploration and production companies and contractor end-users purchasing our more technologically-advanced products and services;

anticipated timing and success of commercialization and capabilities of products and services under development and start-up costs associated with their development;

future cash needs and future availability of cash to fund our operations and pay our obligations;

potential future acquisitions;

future levels of capital expenditures;

our ability to maintain our costs at consistent percentages of our revenues in the future;

future seismic industry fundamentals;

future opportunities for new products and projected research and development expenses;

future success in integrating acquired businesses;

future compliance with our debt financial covenants;

expectations regarding realization of deferred tax assets; and

anticipated results regarding accounting estimates we make.

These forward-looking statements reflect our best judgment about future events and trends based on the information currently available to us. Our results of operations can be affected by inaccurate assumptions we make or by risks and uncertainties known or unknown to us. Therefore, we cannot guarantee the accuracy of the forward-looking statements. Actual events and results of operations may vary materially from our current expectations and assumptions. While we cannot identify all of the factors that may cause actual results to vary from our expectations, we believe the following factors should be considered carefully:

As a technology-focused company, we are continually exposed to risks related to complex, highly technical products and services.

We have made, and we will continue to make, strategic decisions from time to time as to the technologies in which we invest, and if we choose the wrong technology, our financial results could be adversely impacted. Our operating results are dependent upon our ability to improve and refine our seismic imaging services and to successfully develop, manufacture, and market our products and other services and products. New technologies generally require a substantial investment before any assurance is available as to their commercial viability. If we choose the wrong technology, or if our competitors develop or select a superior technology, we could lose our existing customers and be unable to attract new customers, which would harm our business and operations.

The markets for our services and products are characterized by changing technology and new product introductions. We must invest substantial capital to develop and maintain a leading edge in technology, with no assurance that we will receive an adequate rate of return on those investments. If we are unable to develop and produce successfully and timely new or enhanced products and services, we will be unable to compete in the future and our business, our results of operations and our financial condition will be materially and adversely affected. Our business could suffer from unexpected developments in technology, or from our failure to adapt to these changes. In addition, the preferences and requirements of customers can change rapidly.

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The businesses of our Solutions and Software segments, being more concentrated in software, processing services, and proprietary technologies, have also exposed us to various risks that these technologies typically encounter, including the following:

future competition from more established companies entering the market;

technology obsolescence;

dependence upon continued growth of the market for seismic data processing;

the rate of change in the markets for these segments' technology and services;

research and development efforts not proving sufficient to keep up with changing market demands;

dependence on third-party software for inclusion in these segments' products and services;

misappropriation of these segments' technology by other companies;

alleged or actual infringement of intellectual property rights that could result in substantial additional costs;

difficulties inherent in forecasting sales for newly developed technologies or advancements in technologies;

recruiting, training, and retaining technically skilled personnel that could increase the costs for these segments, or limit their growth; and

the ability to maintain traditional margins for certain of their technology or services.

Seismic data acquisition and data processing technologies historically have progressed rather rapidly, and we expect this progression to continue. In order to remain competitive, we must continue to invest additional capital to maintain, upgrade and expand our seismic data acquisition and processing capabilities. However, due to potential advances in technology and the related costs associated with such technological advances, we may not be able to fulfill this strategy, thus possibly affecting our ability to compete.

Our customers often require demanding specifications for performance and reliability of our products and services. Because many of our products are complex and often use unique advanced components, processes, technologies, and techniques, undetected errors and design and manufacturing flaws may occur. Even though we attempt to assure that our systems are always reliable in the field, the many technical variables related to their operations can cause a combination of factors that can, and have from time to time, caused performance and service issues with certain of our products. Product defects result in higher product service, warranty, and replacement costs and may affect our customer relationships and industry reputation, all of which may adversely impact our results of operations. Despite our testing and quality assurance programs, undetected errors may not be discovered until the product is purchased and used by a customer in a variety of field conditions. If our customers deploy our new products and they do not work correctly, our relationship with our customers may be materially and adversely affected.

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As a result of our systems' advanced and complex nature, we expect to experience occasional operational issues from time to time. Generally, until our products have been tested in the field under a wide variety of operational conditions, we cannot be certain that performance and service problems will not arise. In that case, market acceptance of our new products could be delayed and our results of operations and financial condition could be adversely affected.

We are subject to intense competition, which could limit our ability to maintain or increase our market share or to maintain our prices at profitable levels.

Many of our sales are obtained through a competitive bidding process, which is standard for our industry. Competitive factors in recent years have included price, technological expertise, and a reputation for quality, safety and dependability. While no single company competes with us in all of our segments, we are subject to intense competition in each of our segments. New entrants in many of the markets in which certain of our products and services are currently strong should be expected. See Item 1. *Business Competition*. We compete with companies that are larger than we are in terms of revenues, number of processing locations and sales and marketing resources. A few of our competitors have a competitive advantage in being part of an affiliated seismic contractor company. In addition, we compete with major service providers and government-sponsored enterprises and affiliates. Some of our competitors conduct seismic data acquisition operations as part of their regular business, which we do not, and have greater financial and other resources than we do. These and other competitors may be better positioned to withstand and adjust more quickly to volatile market conditions, such as fluctuations in oil and natural gas prices, as well as changes in government regulations. In addition, any excess supply of products and services in the seismic services market could apply downward pressure on prices for our products and services. The negative effects of the competitive environment in which we operate could have a material adverse effect on our results of operations.

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We may be unable to obtain broad intellectual property protection for our current and future products and we may become involved in intellectual property disputes.

We rely on a combination of patent, copyright, and trademark laws, trade secrets, confidentiality procedures, and contractual provisions to protect our proprietary technologies. We believe that the technological and creative skill of our employees, new product developments, frequent product enhancements, name recognition, and reliable product maintenance are the foundations of our competitive advantage. Although we have a considerable portfolio of patents, copyrights, and trademarks, these property rights offer us only limited protection. Our competitors may attempt to copy aspects of our products despite our efforts to protect our proprietary rights, or may design around the proprietary features of our products. Policing unauthorized use of our proprietary rights is difficult, and we are unable to determine the extent to which such use occurs. Our difficulties are compounded in certain foreign countries where the laws do not offer as much protection for proprietary rights as the laws of the United States.

Third parties inquire and claim from time to time that we have infringed upon their intellectual property rights. Many of our competitors own their own extensive global portfolio of patents, copyrights, trademarks, trade secrets, and other intellectual property to protect their proprietary technologies. We believe that we have in place appropriate procedures and safeguards to help ensure that we do not violate a third party's intellectual property rights. However, no set of procedures and safeguards is infallible. We may unknowingly and inadvertently take action that is inconsistent with a third party's intellectual property rights, despite our efforts to do otherwise. Any such claims from third parties, with or without merit, could be time consuming, result in costly litigation, result in injunctions, require product modifications, cause product shipment delays or require us to enter into royalty or licensing arrangements. Such claims could have a material adverse effect on our results of operations and financial condition.

Much of our litigation in recent years have involved disputes over our and others' rights to technology. See Item 3. *Legal Proceedings*.

Our INOVA Geophysical joint venture with BGP involves numerous risks.

Our INOVA Geophysical joint venture with BGP is focused on designing, engineering, manufacturing, research and development, sales and marketing and field support of land-based equipment used in seismic data acquisition for the oil and gas industry. Excluded from the scope of the joint venture's business are the analog sensor businesses of our company and BGP and the businesses of certain companies in which BGP or we are currently a minority owner. In addition to these excluded businesses, all of our other businesses—including our Systems and Software segments and our Solutions division, which includes our Imaging Solutions, GeoVentures and BasinSPAN and seismic data library businesses remain owned and operated by us and do not comprise a part of the joint venture.

The INOVA Geophysical joint venture involves the integration of multiple product lines and business models contributed by us and BGP that previously have operated independently. This has been and will continue to be a complex and time-consuming process.

There can be no assurance that we will achieve the expected benefits of the joint venture. The INOVA Geophysical joint venture (and any future joint ventures or acquisitions that we may complete), may result in unexpected costs, expenses, and liabilities, which may have a material adverse effect on our business, financial condition or results of operations. INOVA Geophysical may encounter difficulties in developing and expanding its business. We may experience difficulties in funding any future capital contributions to the joint venture, exercising influence over the management and activities of the joint venture, quality control over joint venture products and services and potential conflicts of interest with the joint venture and our joint venture partner. Any inability to meet our obligations as a joint venture partner under the joint venture agreement could result in our being subject to penalties and reduced percentage interests in the joint venture for our company. Also, we could be disadvantaged in the event of disputes and controversies with our joint venture partner, since our joint venture partner is a relatively significant customer of our products and services and future products and services of the joint venture as well as a shareholder of 15.3% of our common stock.

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The joint venture is also subject to, and exposes us to, various additional risks that could adversely affect our results of operations. These risks include the following:

increased costs associated with the integration and operation of the new business and the management of geographically dispersed operations;

risks associated with the assimilation of new technologies (including incorporating BGP's land seismic equipment with our existing land seismic imaging product lines that were contributed to the joint venture), operations, sites, and personnel. In 2010 and 2011, INOVA Geophysical has had significant write-downs of inventory from the time of the joint venture formation;

difficulties in retaining and integrating key technical, sales and marketing personnel and the possible loss of such employees and costs associated with their loss;

difficulties associated with preserving relationships with our customers, partners and vendors;

risks that any technology developed by the joint venture may not perform as well as we had anticipated;

the diversion of management's attention and other resources from other business operations and related concerns;

the potential inability to replicate operating efficiencies in the joint venture's operations;

potential impairments of goodwill and intangible assets;

the requirement to maintain uniform standards, controls and procedures;

the impairment of relationships with employees and customers as a result of the integration of management personnel from different companies;

the divergence of our interests from BGP's interests in the future, disagreements with BGP on ongoing manufacturing, research and development and operational activities, or the amount, timing or nature of further investments in the joint venture;

the terms of our joint venture arrangements may turn out to be unfavorable to us;

we currently own 49% of the total equity interests in INOVA Geophysical, so there are certain decisions affecting the business of the joint venture that we cannot control or influence;

we may not be able to realize the operating efficiencies, cost savings or other benefits that we expect from the joint venture;

the joint venture's cash flows may be inadequate to fund its capital requirements, thereby requiring additional contributions to the capital of the joint venture by us and by BGP;

joint venture profits and cash flows may prove inadequate to fund cash dividends from the joint venture to the joint venture partners; and

the joint venture may experience difficulties and delays in production of the joint venture's products.

If the INOVA Geophysical joint venture is not successful, our business, results of operations and financial condition will likely be adversely affected.

In addition, the terms of the joint venture's governing instruments and the agreements regarding BGP's investment in our company contain a number of restrictive provisions affecting ION. For example, an investors' rights agreement grants pre-emptive rights to BGP with respect to certain future issuances of our stock. These restrictions may adversely affect our ability to quickly raise funds through a future issuance of our securities, and could have the effect of discouraging, delaying or preventing a merger or acquisition of our company that our stockholders may otherwise consider to be favorable.

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Continued depressed general economic conditions, credit market uncertainties and lower natural gas prices could have an adverse effect on customer demand for certain of our products and services, which in turn would adversely affect our results of operations, our cash flows, our financial condition and our stock price.

The global recession resulting from the 2008 financial crisis contributed to weakened demand and lower prices for natural gas on a worldwide basis, which reduced the levels of exploration for natural gas. Historically, demand for our products and services has been sensitive to the level of exploration spending by E&P companies and geophysical contractors. The demand for our products and services will be reduced if exploration expenditures remain low. During periods of reduced levels of exploration for oil and natural gas, there have been oversupplies of seismic data and downward pricing pressures on our seismic products and services, which in turn, have limited our ability to meet sales objectives and maintain profit margins for our products and services. In the past, these then-prevailing industry conditions have had the effect of reducing our revenues and operating margins. The markets for oil and gas historically have been volatile and may continue to be so in the future.

Turmoil or uncertainty in the credit markets and its potential impact on the liquidity of major financial institutions may have an adverse effect on our ability to fund our business strategy through borrowings under either existing or new debt facilities in the public or private markets and on terms we believe to be reasonable. Likewise, there can be no assurance that our customers will be able to borrow money on a timely basis or on reasonable terms, which could have a negative impact on their demand for our products and impair their ability to pay us for our products and services on a timely basis, or at all. Our sales are affected by interest rate fluctuations and the availability of liquidity, and we would be adversely affected by increases in interest rates or liquidity constraints. Rising interest rates may also make certain alternative products and services provided by our competitors more attractive to customers, which could lead to a decline in demand for our products and services. This could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We derive a substantial amount of our revenues from foreign operations and sales, which pose additional risks.

Sales to customers outside of North America accounted for approximately 66% of our consolidated net revenues for 2011, and we believe that export sales will remain a significant percentage of our revenue. U.S. export restrictions affect the types and specifications of products we can export. Additionally, to complete certain sales, U.S. laws may require us to obtain export licenses, and we cannot assure you that we will not experience difficulty in obtaining these licenses.

Like many energy services companies, we have operations in and sales into certain international areas, including parts of the Middle East, West Africa, Latin America, Asia Pacific and the Commonwealth of Independent States, that are subject to risks of war, political disruption (such as the political turmoil during 2011 in Tunisia, Egypt and Libya), civil disturbance, political corruption, possible economic and legal sanctions (such as possible restrictions against countries that the U.S. government may deem to sponsor terrorism) and changes in global trade policies. Our sales or operations may become restricted or prohibited in any country in which the foregoing risks occur. In particular, the occurrence of any of these risks could result in the following events, which in turn, could materially and adversely impact our results of operations:

disruption of oil and natural gas E&P activities;

restriction on the movement and exchange of funds;

inhibition of our ability to collect receivables;

enactment of additional or stricter U.S. government or international sanctions;

limitation of our access to markets for periods of time;

expropriation and nationalization of assets of our company or those of our customers;

political and economic instability, which may include armed conflict and civil disturbance;

currency fluctuations, devaluations, and conversion restrictions;

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confiscatory taxation or other adverse tax policies; and

governmental actions that may result in the deprivation of our contractual rights.

Our international operations and sales increase our exposure to other countries' restrictive tariff regulations, other import/export restrictions and customer credit risk.

In addition, we are subject to taxation in many jurisdictions and the final determination of our tax liabilities involves the interpretation of the statutes and requirements of taxing authorities worldwide. Our tax returns are subject to routine examination by taxing authorities, and these examinations may result in assessments of additional taxes, penalties and/or interest.

The drilling moratorium in the U.S. Gulf of Mexico and the other regulatory initiatives undertaken in response to the Deepwater Horizon disaster and resulting oil spill in the U.S. Gulf of Mexico, has adversely affected, and could adversely affect in the future, our customers and our business.

In April 2010, the Deepwater Horizon drilling rig in the U.S. Gulf of Mexico sank following a catastrophic explosion and fire, which resulted in the release of millions of gallons of hydrocarbons. In response to this incident, the Minerals Management Service (now known as the BOEMRE) of the U.S. Department of the Interior issued a notice on May 30, 2010 implementing a six-month moratorium on certain drilling activities in the U.S. Gulf of Mexico. The moratorium was lifted in October 2010, but the BOEMRE has issued and is expected to issue new safety and environmental guidelines or regulations for drilling in the Gulf of Mexico and in other U.S. offshore locations. In addition, as a result of these changes, the permitting process for exploration and development activities in the U.S. Gulf of Mexico slowed considerably, resulting in very limited levels of activity there. These new safety and environmental regulations will expose our customers, and could expose us, to significant additional costs and liabilities. In addition, these and any such similar future laws and regulations could result in increased compliance costs or additional operating restrictions that may adversely affect the financial health of our customers or decrease the demand for our products and services. While certain new drilling plans and drilling permits were approved during 2011, we cannot predict when the pace at which operators in the U.S. Gulf of Mexico will be able to satisfy these requirements and return to previous levels of active drilling. Further, we cannot predict what the continuing effects from the U.S. government regulations on offshore deepwater drilling projects may have on offshore oil and gas exploration and development activity, or what actions may be taken by our customers or other industry participants in response to these regulations. Changes in laws or regulations regarding offshore oil and gas exploration and development activities and decisions by customers and other industry participants could reduce demand for our products and services, which would have a negative impact on our operations.

A prolonged suspension of drilling activity in the Gulf of Mexico, new regulations and increased liability for companies operating in this sector would adversely affect many of our customers who operate in the Gulf. This could, in turn, adversely affect our business, results of operations and financial condition, particularly regarding sales of our marine seismic equipment and our Solutions segment's survey and processing activities. Our Solutions segment was negatively impacted during 2010 and into 2011 by its experiencing a reduction in data processing business from the Gulf of Mexico and new venture and multi-client seismic data library sales from our GulfSPAN seismic dataset. The uncertainties that have resulted from the incident's aftermath adversely affect us, our customers and other providers of equipment and services to E&P companies, due to the lack of visibility as to which companies will continue to be active in U.S. Gulf of Mexico deepwater exploration and development. As a result, we cannot currently predict the extent to which these events may adversely affect our future business, the extent and length of time that any such adverse impact will be felt.

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Our business depends on the level of exploration and production activities by the oil and natural gas industry. If oil and natural gas prices or the level of capital expenditures by E&P companies were to decline, demand for our products and services would decline and our results of operations would be adversely affected.

Demand for our products and services depends upon the level of spending by E&P companies and seismic contractors for exploration and development activities, and those activities depend in large part on oil and gas prices. Spending by our customers on products and services that we provide is highly discretionary in nature, and subject to rapid and material change. Any significant decline in oil and gas related spending on behalf of our customers could cause alterations in our capital spending plans, project modifications, delays or cancellations, general business disruptions or delays in payment, or non-payment of amounts that are owed to us and could have a material adverse effect on our financial condition and results of operations and on our ability to continue to satisfy all of the covenants in our loan agreements. Additionally, increases in oil and gas prices may not increase demand for our products and services or otherwise have a positive effect on our financial condition or results of operations. E&P companies' willingness to explore, develop and produce depends largely upon prevailing industry conditions that are influenced by numerous factors over which our management has no control, such as:

the supply of and demand for oil and gas;

the level of prices, and expectations about future prices, of oil and gas;

the cost of exploring for, developing, producing and delivering oil and gas;

the expected rates of decline for current production;

the discovery rates of new oil and gas reserves;

weather conditions, including hurricanes, that can affect oil and gas operations over a wide area, as well as less severe inclement weather that can preclude or delay seismic data acquisition;

domestic and worldwide economic conditions;

political instability in oil and gas producing countries;

technical advances affecting energy consumption;

government policies regarding the exploration, production and development of oil and gas reserves;

the ability of oil and gas producers to raise equity capital and debt financing; and

merger and divestiture activity among oil and gas companies and seismic contractors.

Although we believe that the long-term trend is favorable, the level of oil and gas exploration and production activity has been volatile in recent years. Previously forecasted trends in oil and gas exploration and development activities may not continue and demand for our products and

services may not reflect the level of activity in the industry. Any prolonged substantial reduction in oil and gas prices would likely affect oil and gas production levels and therefore adversely affect demand for the products and services we provide.

If we do not effectively manage our transition into new products and services, our revenues may suffer.

Products and services for the seismic industry are characterized by rapid technological advances in hardware performance, software functionality and features, frequent introduction of new products and services, and improvement in price characteristics relative to product and service performance. Among the risks associated with the introduction of new products and services are delays in development or manufacturing, variations in costs, delays in customer purchases or reductions in price of existing products in anticipation of new introductions, write-offs or write-downs of the carrying costs of inventory and raw materials associated with prior generation products, difficulty in predicting customer demand for new product and service offerings and effectively managing inventory levels so that they are in line with anticipated demand, risks associated with customer qualification, evaluation of new products, and the risk that new products may have quality or other defects or may not be supported adequately by application software. The introduction of new products and services by our competitors also may result in delays in customer purchases and difficulty in predicting customer demand. If we do not make an effective transition from existing products and services to future offerings, our revenues and margins may decline.

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Furthermore, sales of our new products and services may replace sales, or result in discounting of some of our current product or service offerings, offsetting the benefit of a successful introduction. In addition, it may be difficult to ensure performance of new products and services in accordance with our revenue, margin, and cost estimations and to achieve operational efficiencies embedded in our estimates. Given the competitive nature of the seismic industry, if any of these risks materializes, future demand for our products and services, and our future results of operations, may suffer.

We invest significant sums of money in acquiring and processing seismic data for our Solutions multi-client data library.

We invest significant amounts in acquiring and processing new seismic data to add to our Solutions multi-client data library. A majority of these investments are funded by our customers, while the remainder is recovered through future data licensing fees. In 2011, we invested \$143.8 million in our multi-client data library. Our customers generally commit to licensing the data prior to our initiating a new data library acquisition program. However, the aggregate amounts of future licensing fees for this data are uncertain and depend on a variety of factors, including the market prices of oil and gas, customer demand for seismic data in the library, and the availability of similar data from competitors.

By making these investments in acquiring and processing new seismic data for our Solutions multi-client library, we are exposed to the following risks:

We may not fully recover our costs of acquiring and processing seismic data through future sales. The ultimate amounts involved in these data sales are uncertain and depend on a variety of factors, many of which are beyond our control.

The timing of these sales is unpredictable and can vary greatly from period to period. The costs of each survey are capitalized and then amortized as a percentage of sales and/or over the expected useful life of the data. This amortization will affect our earnings and, when combined with the sporadic nature of sales, will result in increased earnings volatility.

Regulatory changes that affect companies ability to drill, either generally or in a specific location where we have acquired seismic data, could materially adversely affect the value of the seismic data contained in our library. Technology changes could also make existing data sets obsolete. Additionally, each of our individual surveys has a limited book life based on its location and oil and gas companies interest in prospecting for reserves in such location, so a particular survey may be subject to a significant decline in value beyond our initial estimates.

The value of our multi-client data could be significantly adversely affected if any material adverse change occurs in the general prospects for oil and gas exploration, development and production activities.

The cost estimates upon which we base our pre-commitments of funding could be wrong. The result could be losses that have a material adverse effect on our financial condition and results of operations. These pre-commitments of funding are subject to the creditworthiness of our clients. In the event that a client refuses or is unable to pay its commitment, we could incur a substantial loss on that project.

As part of our asset-light strategy, we routinely charter vessels from third-party vendors to acquire seismic data for our multi-client business. As a result, our cost to acquire our multi-client data could significantly increase if vessel charter prices rise materially. Any reduction in the market value of such data will require us to write down its recorded value, which could have a significant material adverse effect on our results of operations.

Our operating results may fluctuate from period to period, and we are subject to seasonality factors.

Our operating results are subject to fluctuations from period to period as a result of new product or service introductions, the timing of significant expenses in connection with customer orders, unrealized sales, levels of research and development activities in different periods, the

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product mix sold, and the seasonality of our business. Because many of our products feature a high sales price and are technologically complex, we generally have experienced long sales cycles for these products and historically incur significant expense at the beginning of these cycles for component parts and other inventory necessary to manufacture a product in anticipation of a future sale, which may not ultimately occur. In addition, the revenues from our sales can vary widely from period

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to period due to changes in customer requirements and demand. These factors can create fluctuations in our net revenues and results of operations from period to period. Variability in our overall gross margins for any period, which depend on the percentages of higher-margin and lower-margin products and services sold in that period, compounds these uncertainties. As a result, if net revenues or gross margins fall below expectations, our results of operations and financial condition will likely be adversely affected. Additionally, our business can be seasonal in nature, with strongest demand typically in the fourth calendar quarter of each year. Customer budgeting cycles at times result in higher spending activity levels by our customers at different points of the year.

Due to the relatively high sales price of many of our products and seismic data libraries, our quarterly operating results have historically fluctuated from period to period due to the timing of orders and shipments and the mix of products and services sold. This uneven pattern makes financial predictions for any given period difficult, increases the risk of unanticipated variations in our quarterly results and financial condition, and places challenges on our inventory management. Delays caused by factors beyond our control, such as the granting of permits for seismic surveys by third parties, the effect from disasters such as the Deepwater Horizon incident in the Gulf of Mexico and the availability and equipping of marine vessels, can affect our Solutions segment's revenues from its processing and GeoVentures services from period to period. Also, delays in ordering products or in shipping or delivering products in a given period could significantly affect our results of operations for that period. Fluctuations in our quarterly operating results may cause greater volatility in the market price of our common stock.

The loss of any significant customer could materially and adversely affect our results of operations and financial condition.

We have traditionally relied on a relatively small number of significant customers. Consequently, our business is exposed to the risks related to customer concentration. No single customer represented 10% or more of our consolidated net revenues for 2011, 2010 and 2009; however, our top five customers in total represented approximately 30%, 28% and 29%, respectively, of our consolidated net revenues during those years. The loss of any of our significant customers or deterioration in our relations with any of them could materially and adversely affect our results of operations and financial condition.

During the last ten years, our traditional seismic contractor customers have been rapidly consolidating, thereby consolidating the demand for our products and services. The loss of any of our significant customers to further consolidation could materially and adversely affect our results of operations and financial condition.

Our stock price has been volatile from time to time, declining precipitously from time to time during the period from 2008 through 2011, and it could decline again.

The securities markets in general and our common stock in particular have experienced significant price and volume volatility in recent years. The market price and trading volume of our common stock may continue to experience significant fluctuations due not only to general stock market conditions but also to a change in sentiment in the market regarding our operations or business prospects or those of companies in our industry. In addition to the other risk factors discussed in this section, the price and volume volatility of our common stock may be affected by:

operating results that vary from the expectations of securities analysts and investors;

factors influencing the levels of global oil and natural gas exploration and exploitation activities, such as depressed prices for natural gas in North America or disasters such as the Deepwater Horizon incident in the Gulf of Mexico in 2010;

the operating and securities price performance of companies that investors or analysts consider comparable to us;

announcements of strategic developments, acquisitions and other material events by us or our competitors; and

changes in global financial markets and global economies and general market conditions, such as interest rates, commodity and equity prices and the value of financial assets.

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To the extent that the price of our common stock remains at lower levels or it declines further, our ability to raise funds through the issuance of equity or otherwise use our common stock as consideration will be reduced. In addition, further increases in our leverage may make it more difficult for us to access additional capital. These factors may limit our ability to implement our operating and growth plans.

If we, our option holders or stockholders holding registration rights sell additional shares of our common stock in the future, the market price of our common stock could decline. Additionally, our outstanding shares of Series D Preferred Stock are convertible into shares of our common stock. The conversion of the Series D Preferred Stock and exercise of our stock options could result in substantial dilution to our existing stockholders. Sales in the open market of the shares of common stock acquired upon such conversion or exercises may have the effect of reducing the then current market price for our common stock.

The market price of our common stock could decline as a result of sales of a large number of shares of our common stock in the market in the future, or the perception that such sales could occur. These sales, or the possibility that these sales may occur, could make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate. As of February 17, 2012, we had 155,585,036 shares of common stock issued and outstanding. Substantially all of these shares are available for sale in the public market, subject in some cases to volume and other limitations or delivery of a prospectus. At February 17, 2012, we had outstanding stock options to purchase up to 6,761,575 shares of our common stock at a weighted average exercise price of \$7.42 per share. We also had, as of that date, 1,151,713 shares of common stock reserved for issuance under outstanding restricted stock and restricted stock unit awards.

During 2009 we issued in a privately-negotiated transaction 18.5 million shares of our common stock to certain institutional investors. In March 2010 we issued 23.8 million shares to BGP in a privately-negotiated transaction in connection with the formation of our INOVA Geophysical joint venture. These shares may be resold into the public markets in sale transactions pursuant to currently-effective registration statements filed with the SEC. Sales in the public market of a large number of shares of common stock could apply downward pressure on the prevailing market price of our common stock. The market price of our common stock could decline as a result of such sales in the public markets in the future, or the perception that such sales could occur. These sales, or the possibility that these sales may occur, could make it more difficult for us to sell equity securities in the future at a time and at a price that we deem appropriate.

As of February 17, 2012, Fletcher International, Ltd., the holder of our Series D Preferred Stock, held 22,000 shares of our Series D-1 Cumulative Convertible Preferred Stock and 5,000 shares of our Series D-2 Cumulative Convertible Preferred Stock. Under the terms of the agreement with Fletcher by which it purchased the Series D Preferred Stock, Fletcher has the ability to sell, under currently effective registration statements, the shares of our common stock acquired by it upon conversion of its remaining shares of Series D Preferred Stock. The shares of our Series D Preferred Stock held by Fletcher as of February 17, 2012 are convertible into 6,065,075 shares of our common stock. The conversion of our outstanding shares of Series D Preferred Stock into shares of our common stock will dilute the ownership interests of existing stockholders. Sales in the public market of shares of common stock issued upon conversion would likely apply downward pressure on prevailing market prices of our common stock.

The conversion price of our outstanding Series D Preferred Stock is also subject to certain customary anti-dilution adjustments. For additional information regarding the terms of our Series D Preferred Stock, see Note 14 *Cumulative Convertible Preferred Stock* of *Notes to Consolidated Financial Statements* contained elsewhere in this Form 10-K. We currently have ongoing litigation with Fletcher in Delaware regarding issues involving our Series D Preferred Stock. For more information regarding our litigation with Fletcher, see Item 3. *Legal Proceedings*.

Shares of our common stock are also subject to certain demand and piggyback registration rights held by Laitram, L.L.C. We also may enter into additional registration rights agreements in the future in connection with any subsequent acquisitions or securities transactions we may undertake. Any sales of our common stock under these registration rights arrangements with Laitram or other stockholders could be negatively perceived in the trading markets and negatively affect the price of our common stock. Sales of a substantial number of our shares of common stock in the public market under these arrangements, or the expectation of such sales, could cause the market price of our common stock to decline.

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Goodwill and intangible assets that we have recorded in connection with our acquisitions are subject to impairment evaluations and, as a result, we could be required to write-off additional goodwill and intangible assets, which may adversely affect our financial condition and results of operations.

In accordance with Accounting Standard Codification (ASC) Topic 350, *Goodwill and Other Intangible Assets* (ASC 350), we are required to compare the fair value of our goodwill and intangible assets (when certain impairment indicators under ASC 350 are present) to their carrying amount. If the fair value of such goodwill or intangible assets is less than its carrying value, an impairment loss is recorded to the extent that the fair value of these assets within the reporting units is less than their carrying value. In 2008, we recorded an impairment charge of \$252.2 million related to our goodwill and intangible assets and in 2009 we recorded an impairment charge of \$38.0 million related to our intangible assets. Any further reduction in or impairment of the value of our goodwill or other intangible assets will result in additional charges against our earnings, which could have a material adverse effect on our reported results of operations and financial position in future periods. At December 31, 2011, our goodwill and other intangible asset balances were \$54.0 million and \$17.7 million, respectively.

Due to the international scope of our business activities, our results of operations may be significantly affected by currency fluctuations.

We derive a significant portion of our consolidated net revenues from international sales, subjecting us to risks relating to fluctuations in currency exchange rates. Currency variations can adversely affect margins on sales of our products in countries outside of the United States and margins on sales of products that include components obtained from suppliers located outside of the United States. Through our subsidiaries, we operate in a wide variety of jurisdictions, including the United Kingdom, China, Canada, the Netherlands, Brazil, Russia, the United Arab Emirates, Egypt and other countries. Certain of these countries have experienced geopolitical instability, economic problems and other uncertainties from time to time. To the extent that world events or economic conditions negatively affect our future sales to customers in these and other regions of the world, or the collectability of receivables, our future results of operations, liquidity and financial condition may be adversely affected. We currently require customers in certain higher risk countries to provide their own financing. We do not currently extend long-term credit through notes to companies in countries where we perceive excessive credit risk.

A majority of our foreign net working capital is within the United Kingdom. Our subsidiaries in the U.K. and in other countries receive their income and pay their expenses primarily in their local currencies. To the extent that transactions of these subsidiaries are settled in their local currencies, a devaluation of those currencies versus the U.S. dollar could reduce the contribution from these subsidiaries to our consolidated results of operations as reported in U.S. dollars. For financial reporting purposes, such depreciation will negatively affect our reported results of operations since earnings denominated in foreign currencies would be converted to U.S. dollars at a decreased value. In addition, since we participate in competitive bids for sales of certain of our products and services that are denominated in U.S. dollars, a depreciation of the U.S. dollar against other currencies could harm our competitive position relative to other companies. While we have employed economic cash flow and fair value hedges to minimize the risks associated with these exchange rate fluctuations, the hedging activities may be ineffective or may not offset more than a portion of the adverse financial impact resulting from currency variations. Accordingly, we cannot assure you that fluctuations in the values of the currencies of countries in which we operate will not materially adversely affect our future results of operations.

We rely on highly skilled personnel in our businesses, and if we are unable to retain or motivate key personnel or hire qualified personnel, we may not be able to grow effectively.

Our performance is largely dependent on the talents and efforts of highly skilled individuals. Our future success depends on our continuing ability to identify, hire, develop, motivate, and retain skilled personnel for all areas of our organization. We require highly skilled personnel to operate and provide technical services and support for our businesses. Competition for qualified personnel required for our data processing operations and our other segments' businesses has intensified in recent years. Our growth has presented challenges to us to recruit, train, and retain our employees while managing the impact of potential wage inflation and the lack of

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available qualified labor in some markets where we operate. A well-trained, motivated and adequately-staffed work force has a positive impact on our ability to attract and retain business. Our continued ability to compete effectively depends on our ability to attract new employees and to retain and motivate our existing employees.

Certain of our facilities could be damaged by hurricanes and other natural disasters, which could have an adverse effect on our results of operations and financial condition.

Certain of our facilities are located in regions of the United States that are susceptible to damage from hurricanes and other weather events, and, during 2005, were impacted by hurricanes or other weather events. Our Systems segment leases 93,000-square feet of facilities located in Harahan, Louisiana, in the greater New Orleans metropolitan area. In late August 2005, we suspended operations at these facilities and evacuated and locked down the facilities in preparation for Hurricane Katrina. These facilities did not experience flooding or significant damage during or after the hurricane. However, because of employee evacuations, power failures and lack of related support services, utilities and infrastructure in the New Orleans area, we were unable to resume full operations at the facilities until late September 2005. In September 2008, we lost power and related services for several days at our offices located in the Houston metropolitan area, which includes a substantial portion of our data processing infrastructure, and in Harahan, Louisiana as a result of Hurricane Ike and Hurricane Gustav.

Future hurricanes or similar natural disasters that impact our facilities may negatively affect our financial position and operating results for those periods. These negative effects may include reduced production, product sales and data processing revenues; costs associated with resuming production; reduced orders for our products and services from customers that were similarly affected by these events; lost market share; late deliveries; additional costs to purchase materials and supplies from outside suppliers; uninsured property losses; inadequate business interruption insurance and an inability to retain necessary staff. To the extent that climate change increases the severity of hurricanes and other weather events, as some have suggested, it could worsen the severity of these negative effects on our financial position and operating results.

Our operations, and the operations of our customers, are subject to numerous government regulations, which could adversely limit our operating flexibility.

Our operations are subject to laws, regulations, government policies, and product certification requirements worldwide. Changes in such laws, regulations, policies or requirements could affect the demand for our products or result in the need to modify products, which may involve substantial costs or delays in sales and could have an adverse effect on our future operating results. Our export activities are also subject to extensive and evolving trade regulations. Certain countries are subject to restrictions, sanctions, and embargoes imposed by the United States government. These restrictions, sanctions, and embargoes also prohibit or limit us from participating in certain business activities in those countries. Our operations are subject to numerous local, state, and federal laws and regulations in the United States and in foreign jurisdictions concerning the containment and disposal of hazardous materials, the remediation of contaminated properties, and the protection of the environment. These laws have been changed frequently in the past, and there can be no assurance that future changes will not have a material adverse effect on us. In addition, our customers' operations are also significantly impacted by laws and regulations concerning the protection of the environment and endangered species. Consequently, changes in governmental regulations applicable to our customers may reduce demand for our products and services. To the extent that our customers' operations are disrupted by future laws and regulations, our business and results of operations may be materially and adversely affected.

Climate change regulations or legislation could result in increased operating costs and reduced demand for the oil and gas our clients intend to produce.

More stringent regulations and laws relating to climate change and greenhouse gases (GHGs) may be adopted in the future and could reduce the demand for our products and services. In December 2009, the U.S. Environmental Protection Agency (the EPA) officially concluded that atmospheric concentrations of carbon dioxide, methane and certain other GHGs present an endangerment to public health and welfare because such gases are, according to the EPA, contributing to warming of the earth's atmosphere and other climatic changes. Consistent with its findings, the EPA has proposed or adopted various regulations under the Clean Air Act to

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address GHGs. Among other things, the EPA is limiting emissions of greenhouse gases from new cars and light duty trucks beginning with the 2012 model year. In addition, the EPA has adopted requirements for certain industrial plants and other stationary sources that emit large quantities of GHGs to obtain construction and operating permits.

The EPA also has published final