

Lightwave Logic, Inc.  
Form 10-K  
April 02, 2012

**UNITED STATES**  
**SECURITIES AND EXCHANGE COMMISSION**  
**Washington, D.C. 20549**

**FORM 10-K**

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

For the fiscal year ended December 31, 2011

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

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number: **0-52567**

**Lightwave Logic, Inc.**

(Exact name of registrant as specified in its charter)

**Nevada**  
(State or other jurisdiction of  
incorporation or organization)

**82-049-7368**  
(I.R.S. Employer  
Identification No.)

**111 Ruthar Drive,  
Newark, DE**  
(Address of principal executive offices)

**19711**  
(Zip Code)

(Registrant's Telephone Number, including Area Code): **302-356-2709**

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

Title of each class registered	Name of each exchange on which registered
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Securities registered pursuant to section 12(g) of the Act:

Common Stock, Par Value \$0.001

(Title of class)

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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 15(d) of the Act.

Yes

No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes

No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) 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 the 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 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

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Non-Accelerated filer

..

Smaller reporting company

x

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act of 1934).

Yes ..

No x

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant was \$32,013,928 as of June 30, 2011.

As of March 29, 2012, there were 47,562,340 shares outstanding of the registrant's common stock, \$.001 par value.

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### Forward-Looking Statements

This report on Form 10-K contains forward-looking statements. These statements relate to future events or future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our Company or its industry's actual 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 the forward-looking statements.

In some cases, you can identify forward-looking statements by terminology such as may, will, should, expects, anticipates, believes, estimates, predicts, potential, or the negative of these terms or other comparable terminology. These statements are only predictions. Actual events or results may differ materially. Although our Company believes that the expectations reflected in the forward-looking statements are reasonable, our Company cannot guarantee future results, levels of activity, performance or achievements. The forward-looking statements are based on our beliefs, assumptions and expectations of our future performance, taking into account information currently available to us. These beliefs, assumptions and expectations can change as a result of many possible events or factors, including those events and factors described by us in Item 1.A Risk Factors, not all of which are known to us.

Further, this report on Form 10-K contains forward looking statements that involve substantial risks and uncertainties. Such statements include, without limitation, all statements as to expectation or belief and statements as to our future results of operations, the progress of any research and product development, the need for, and timing of, additional capital and capital expenditures, partnering prospects, the protection of and the need for additional intellectual property rights, effects of regulations, the need for additional facilities and potential market opportunities. Our Company's actual results may vary materially from those contained in such forward-looking statements because of risks to which our Company is subject, such as lack of available funding, competition from third parties, intellectual property rights of third parties, regulatory constraints, litigation and other risks to which our Company is subject.

You should not place undue reliance on these forward-looking statements. Statements regarding the following subjects are forward-looking by their nature:

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Our business

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Our business strategy

.

Our future operating results

.

Our ability to obtain external financing

.

Our understanding of our competition

.

Industry and market trends

.

Future capital expenditures

.

The impact of technology on our products, operations and business

## PART I

### Item 1.

#### Business.

#### Our Business Development

PSI-TEC Corporation ( **PSI-TEC** ) was founded in 1991 and incorporated under the laws of the State of Delaware on September 12, 1995. PSI-TEC was founded in Upland, Pennsylvania by Dr. Frederick J. Goetz where he established a laboratory with a small amount of private funding. PSI-TEC subsequently moved its operations to laboratory space provided by the U.S. Army on the Aberdeen Proving Grounds in cooperation with a division of the Department of Defense for the advancement of ultra wide-bandwidth satellite telecommunications. Thereafter, PSI-TEC commenced operations of its own organic synthesis and thin-films laboratory in Wilmington, Delaware.

In order to become a non-reporting publicly-traded corporation, in July 2004 PSI-TEC reorganized with our Company whereby (i) our Company changed its name from Eastern Idaho Internet Services, Inc. to PSI-TEC Holdings, Inc.; (ii) our Company acquired all of the issued and outstanding shares of PSI-TEC stock; (iii) PSI-TEC became our Company's wholly-owned operating subsidiary; and (iv) our Company's then sole officer and director resigned, PSI-TEC's nominees were elected to our Company's board of directors and new management was appointed. For accounting purposes, this acquisition transaction was accounted for as a reverse-acquisition, whereby PSI-TEC was deemed to have purchased our Company. As a result, the historical financial statements of PSI-TEC became the historical financial statements of our Company.

Immediately prior to the time of the reorganization transaction, our Company was a non-reporting development stage company whose stock was traded on the OTC: Pink Sheets. We had no substantive business operations and we were seeking other business opportunities. Our Company was originally incorporated under the laws of the State of Nevada on June 24, 1997 as Eastern Idaho Internet Services, Inc. to operate as an Internet services marketing firm. It was unsuccessful in this venture, and in June 1998 it ceased its operations and sold all of its operating assets.

On October 20, 2006, in order to consolidate the operations of PSI-TEC Holdings, Inc. and PSI-TEC Corp. (PSI-TEC Holdings, Inc.'s wholly owned subsidiary), PSI-TEC Holdings, Inc. and PSI-TEC Corp. merged; and PSI-TEC Holdings, Inc., a Nevada corporation, became the surviving entity and subsequently changed its name to Third-Order Nanotechnologies, Inc. No change of control or domicile occurred as a result of the merger.

On March 10, 2008, Third-order Nanotechnologies, Inc. changed its name to Lightwave Logic, Inc. to better suit its strategic business plan and to facilitate stockholder recognition of the Company and its business.



Unless the context otherwise requires, all references to the **Company**, **we**, **our** or **us** and other similar terms mean Lightwave Logic, Inc., a Nevada corporation.

Our principal executive office is located at 111 Ruthar Drive, Newark, DE 19711, and our telephone number is (302)-356-2709. Our website address is [www.lightwavelogic.com](http://www.lightwavelogic.com). No information found on our website is part of this report. Also, this report includes the names of various government agencies and the trade names of other companies. Unless specifically stated otherwise, the use or display by us of such other parties' names and trade names in this report is not intended to and does not imply a relationship with, or endorsement or sponsorship of us by, any of these other parties.

## Overview

We are a development stage research and development company. Our primary area of expertise is the chemical synthesis of chromophore dyes used in the development of organic Application Specific Electro-Optic Polymers (ASEOP) and Organic Non-Linear All-Optical Polymers (NLAOP) that have high electro-optic and optical activity. Both types of materials are thermally and photo-chemically stable, which we believe could have utility across a broad range of applications in devices that address markets like, telecommunication, data communications, computing and photovoltaic cells. Secondly, the company is developing proprietary electro-optical and all-optical devices utilizing the advanced capabilities of our materials

Electro-optic devices convert data from electric signals into optical signals for use in communications systems and in optical interconnects for high-speed data transfer. We expect our patented and patent-pending technologies when completed and tested to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies.

Our electro-optic polymers (polymers) are property-engineered at the molecular level (nanotechnology level) to meet the exacting thermal, environment and performance specifications demanded by electro-optic devices. We believe that our patented and patent pending technologies will enable us to design electro-optic polymers that are free from the numerous diverse inherent flaws that plague competitive polymer technologies employed by other companies and research groups. We engineer our polymers with the intent to have temporal, thermal, chemical and photochemical stability within our patent pending molecular architectures.

Our non-linear all optical polymers have demonstrated resonantly enhanced Third-order properties approximately 2,630 times larger than fused silica, which means that they are highly photo-optically active in the absence of an RF layer. In this way they differ from our electro-optical polymers and are considered more advanced next-generation materials.

Our patented and patent pending molecular architectures are based on a well-understood chemical and quantum mechanical occurrence known as aromaticity. Aromaticity provides a high degree of molecular stability. Aromaticity is what will enable our core molecular structures to maintain stability under a broad range of polymerization conditions that otherwise appear to affect other current polymer molecular designs. Polymers, polymer-based devices and the processes used to create them are often patentable, which can provide the developers of such technology with a significant competitive advantage. We consider our proprietary intellectual property to be unique.

## Glossary of Select Technology Terms Used Herein

All-optical devices

All-optical devices convert data in the form of input light signals to a secondary light data stream. The future market of all-optic devices is expected to include all-optical transistors.

All-optical transistors

All-optical transistors are devices currently under development that use an input light signal to switch a secondary light signal. All-optical transistors are expected to enable the fabrication of an entirely new generation of high-speed computers that operate on light instead of electricity. We believe that this will significantly improve computation speeds.

Aromaticity

Aromaticity causes an extremely high degree of molecular stability. It is a molecular arrangement wherein atoms combine into a ring or rings and share their electrons among each other. Aromatic compounds are extremely stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack.

### CLD-1

An electro-optic material based upon unstable polyene molecular architectures. Unlike our own molecular designs, CLD-1 is not a CSC model molecule and exhibits thermal degradation at low temperatures (~250 C) making it less suitable for commercial and military applications.

### CSC (Cyclical Surface Conduction) theory

Most charge-transfer dyes (e.g. Disperse Red 1, CLD, FTC) are based upon a polyene architecture wherein the ground state and first excited state differ by the alteration of single and double bonds. CSC model molecules use nitrogenous heterocyclical structures.

### Electro-optic devices

Electro-optic devices convert data from electric signals into optical signals for use in communications systems and in optical interconnects for high-speed data transfer.

### Electro-optic materials

Electro-optic materials are materials that are engineered at the molecular level. Molecular level engineering is commonly referred to as nanotechnology.

### Electro-optic modulators

Electro-optic modulators are electro-optic devices that perform electric-to-optic conversions within the infrastructure of the Internet.

### Nanotechnology

Nanotechnology refers to the development of products and production processes at the molecular level, which is a scale smaller than 100 nanometers (a nanometer is one-billionth of a meter).

### Nitrogenous heterocyclical structure

A multi-atom molecular ring or combination of rings that contain nitrogen.

### Plastics/Polymers

Polymers, also known as plastics, are large carbon-based molecules that bond many small molecules together to form a long chain. Polymer materials can be engineered and optimized using nanotechnology to create a system in which unique surface, electrical, chemical and electro-optic characteristics can be controlled. Materials based on polymers are used in a multitude of industrial and consumer products, from automotive parts to home appliances and furniture, as well as scientific and medical equipment.

#### Polymerization

Polymerization is a molecular engineering process that provides the environmental and thermal stability necessary for functional electro-optical devices. Polymer materials can be engineered and optimized using nanotechnology to create a system in which unique surface, electrical, chemical and electro-optic characteristics can be controlled.

#### Thermal Gravimetric Analysis (TGA)

The basic principle in TGA is to measure the mass of a sample as a function of temperature. This, in principle, simple measurement is an important and powerful tool in solid-state chemistry and materials science. The method, for example, can be used to determine water of crystallization, follow degradation of materials, determine reaction kinetics, study oxidation and reduction, or to teach the principles of stoichiometry, formulae and analysis.

#### Zwitterionic-aromatic push-pull

Most charge-transfer dyes (e.g. Disperse Red 1, CLD, FTC) have an excited state (such as during photonic absorption) wherein a full charge is separated across the molecule. Such a molecule is said to be excited-state zwitterionic. Within such a molecular system the zwitterionic state is unstable and the molecule typically collapses rapidly into its lower dipole ground state. In our molecular designs, the excited state is further stabilized by the aromatization of the molecular core. In that aromaticity stabilizes

this excited state, it is said to "pull" the molecule into this higher energy state; on the other hand, the unstable zwitterionic state is said to "push" the molecule out of the excited state.

## **Our Business**

Lightwave Logic, Inc. is developing a new generation of advanced organic nonlinear materials to be used to make electro-optic polymers and non-linear all-optical polymers. These polymer-based materials when used in modulators can convert high-speed electronic signals into optical (light) signals for use in communications systems for high-speed data transfer. In the case of non-linear all-optical polymers, certain of our Company's materials can be used in devices that use light waves to switch other light waves.

Electro-optic material is the core active ingredient in high-speed fiber-optic telecommunication systems. Utilizing our proprietary technology, we are in the process of engineering advanced electro-optic polymers that we believe may lead to significant performance advancements, component size and cost reduction, ease of processing, and thermal and temporal stability. We believe that polymer materials engineered at the molecular level may have a significant role in the future development of commercially significant electro-optic related products.

Our organic materials work by affecting the optical properties of light in the presence of an electric field at extremely high frequencies (wide bandwidths), but possess inherent advantages to inorganic materials

Currently, the core electro-optic material contained in most modulators is a crystalline material, such as lithium niobate or gallium arsenide, which must be manufactured in strict dust-free conditions since even slight contamination can render them inoperable. As a result, these crystalline materials are expensive to produce. Current electro-optic crystals are limited to telecommunication speeds that are less than 40Gb/s (40 billion digital bits of data per second). Lithium niobate devices require large power levels (modulation voltages) to operate and are large in size -- typically measuring about four inches long. Considering that most integrated circuits are literally invisible to the naked eye, these devices are enormous. Additionally, it is important to note that these crystalline-based electro-optic modulators require expensive mechanical packaging ( housings) generally comprised of materials, such as gold-plated Kovar, in order to assure operational integrity over required time and operating temperature ranges.

Unlike crystals, electro-optic polymers appear to be capable of being tailored at the molecular level for optimal performance characteristics. Additionally, electro-optic polymers are less expensive to manufacture and demand significantly lower power requirements (modulation voltages). The electro-optic polymers have demonstrated the ability to perform many times faster (>100Gb/s) than existing crystalline technology.

We consider electro-optic polymers to be the most feasible technology for future high-speed (wide bandwidth) electronic-optical conversion. Due to the ease of processing afforded by electro-optic polymers, as well as their

capacity to foster component size reduction. We believe electro-optic polymers have the potential to replace existing high-speed fiber-optics components that are used today in many commercial and military applications.

We also believe that the extreme miniaturization provided by advanced electro-optic polymers may allow for the successful fabrication of chip-to-chip (backplane) optical interconnect devices for computers that create the high-speed data transmission necessary for extremely high-speed computations. Further, we believe that additional potential applications for electro-optic polymers may include phased array radar, cable television (CATV), electronic counter measure (ECM) systems, ultra-fast analog-to-digital conversion, land mine detection, radio frequency photonics, spatial light modulation and all-optical (light-switching-light) signal processing.

*Our Electro-Optic Technology*

For the past two decades, diverse corporate interests, including, to our knowledge, IBM, Lockheed Martin, DuPont, AT&T Bell Labs, Corning, Honeywell and 3M, as well as numerous universities and U.S. Government Agencies, have been attempting to produce high-performance, high-stability electro-optic polymers for high-speed (wide bandwidth) telecommunication applications. These efforts have largely been unsuccessful due, in our opinion, to the industry's singular adherence to an industry pervasive engineering model known as the Bond Length Alternation ("BLA") theory model. The BLA model, like all other current industry-standard molecular designs, consists of molecular designs containing long strings of atoms called polyene chains. Longer polyene chains provide higher electro-optic performance, but are also more susceptible to environmental threats, which result in unacceptably low-performing, thermally unstable electro-optic polymers.

As a result, high frequency modulators engineered with electro-optic polymers designed on the BLA model or any other polyene chain design models are unstable over typical operating temperature ranges, and often exhibit performance degradation within days, hours or even minutes. Similarly, lower frequency modulators exhibit comparable failings, but to a lesser extent. These flaws have prevented commercial quality polymer-based modulators operating at 10-40Gb/s from entering the commercial marketplace. The thermal stability of these devices does not generally meet the minimum Telcordia GR-468 operating temperature range (-40 degrees Celsius to +85 degrees Celsius) much less the more harsh MILSPEC 883D (military specification) range of -55 degrees Celsius to 150 degrees Celsius.

None of our molecular designs rely on the BLA polyene chain design model. Our proposed solution lies in a far less mainstream, yet firmly established, scientific phenomenon called aromaticity. Aromaticity causes a high degree of molecular stability. It is a molecular arrangement wherein atoms combine into multi-membered rings and share their electrons among each other. Aromatic compounds are stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack.

Our research and findings in this area resulted in our Company being the sole recipient of the 2006 Electro-Optic Materials Technology Innovation of the Year Award by Frost & Sullivan. Frost & Sullivan's Technology Innovation of the Year Award is bestowed upon candidates whose original research has resulted in innovations that have, or are expected to bring, significant contributions to multiple industries in terms of adoption, change, and competitive posture. This award recognizes the quality and depth of our Company's research and development program as well as the vision and risk-taking that enabled us to undertake such an endeavor. Our Company did not actively elicit consideration or apply to receive this award. Frost & Sullivan independently contacted our Company and conducted several interviews, which included chemical and technical experts in the field of electro-optics who were supplied with detailed public information regarding our Company's technological innovations.

*Our Intellectual Property*



Issued U.S. Patents:

- US 7 919 619 - Heterocyclical Chromophore Architectures (Granted April 5, 2011)
- US 7 894 695 - Tricyclic Spacer Systems for Nonlinear Optical Devices (Granted February 22, 2011)

We have twenty seven pending patent applications (including six patent families with applications in Australia, Canada, China, European Patent Office, Japan and the U.S. based on the PCT and U.S. applications below) in the field of nonlinear optic chromophore design as follows:

- 61/265012 - Stable Free Radical Chromophores, processes for preparing the same.
- PCT/US05/39212 - Tricyclic Spacer Systems for Nonlinear Optical Devices
- PCT/US05/39664 - Anti-Aromatic Chromophore Architectures

- PCT/US05/39213 - Heterocyclical Anti-Aromatic Chromophore Architectures
- PCT/US05/39010 - Heterocyclical Chromophore Architectures
- PCT/US06/11637 - Heterocyclical Chromophore Architectures with Novel Electronic Acceptor Systems.

#### Heterocyclical Anti-Aromatic Systems

Two of our provisional patents cover heterocyclical anti-aromatic electronic conductive pathways, which are the heart of our high-performance, high-stability molecular designs. The completely heterocyclical nature of our molecular designs "lock" conductive atomic orbitals into a planar (flat) configuration, which provides improved electronic conduction and a significantly lower reaction to environmental threats (e.g. thermal, chemical, photochemical, etc.) than the BLA design paradigm employed by other competitive electro-optic polymers.

The anti-aromatic nature of these structures dramatically improves the "zwitterionic-aromatic push-pull" of the systems, providing for low energy charge transfer. Low energy charge transfer is important for the production of extremely high electro-optic character.

Heterocyclical Steric Hindering System This patent describes a nitrogenous heterocyclical structure for the integration of steric hindering groups that are necessary for the nanoscale material integration. Due to the [pi]-orbital configuration of the nitrogen bridge, this structure has been demonstrated not to interfere with the conductive nature of the electronic conductive pathway and thus is non-disruptive to the electro-optic character of the core molecular construction. The quantum mechanical design of the system is designed to establish complete molecular planarity (flatness) for optimal performance.

Totally Integrated Material Engineering System This patent covers material integration structures under a design strategy known as Totally Integrated Material Engineering. These integration structures provide for the "wrapping" of the core molecule in sterically hindering groups that maximally protect the molecule from environmental threats and maximally protect it from microscopic aggregation (which is a major cause of performance degradation and optical loss) within a minimal molecular volume. These structures also provide for the integration of polymerizable groups for integration of materials into a highly stable cross-linked material matrix.

#### *Our Latest Tests and Results*

Prior to our recent experimental results, in 2004, quantum mechanical calculations were independently performed on our novel electro-optic polymer designs at government laboratories located at the Naval Air Warfare Center Weapons Division in China Lake, California. The results of these calculations suggest that our initial aromatic molecules perform two and a half (2.5) to three and three-tenths (3.3) times more efficiently than currently available telecom grade electro-optic polymers. Logical extensions of this novel molecular design paradigm further suggest even greater

performance improvements. Subsequently, top scientists and engineers at Wright-Patterson Air Force Base reviewed these calculations and concluded that our molecular designs show promise of a five to ten times improvement over existing commercial polymeric architectures. Our conclusion is that performance improvements of this magnitude indicate a significant breakthrough in the field of fiber-optic telecommunication.

In May and June of 2006, we initiated performance evaluations of one of our first extremely high-performance electro-optic materials. The initial tests were performed by electro-optic expert, Dr. C.C. Teng, co-inventor of the renowned Teng-Man test, the industry-wide standard method of evaluating the material performance of electro-optic polymers, and subsequently confirmed by the University of Arizona's College of Optical Sciences, one of the most respected and fastest growing optical sciences departments in the world. Under identical laboratory conditions at low molecular loadings, one of our recent molecular designs outperformed one of the industry's highest performance electro-optic systems by a factor as high as 650%.

We believe results of the Teng-Man test have established the validity of our novel, patent pending molecular design paradigm known as CSC (Cyclical Surface Conduction) theory. We believe the success of CSC theory has the potential to establish the fundamental blueprint of electro-optic material design for decades to come, and to have broad application in commercial and military telecommunication and advanced computational systems.

On September 25, 2006 we obtained independent laboratory results that confirmed the thermal stability of our Perkinamine™ electro-optic materials. Thermal stability as high as 350 degrees Celsius was confirmed, significantly exceeding many other commercially available high performance electro-optic materials, such as CLD-1 that exhibits thermal degradation in the range of 250 degrees Celsius to 275 degrees Celsius. This high temperature stability of our materials eliminates a major obstacle to vertical integration of electro-optic polymers into standard microelectronic manufacturing processes (e.g. wave/vapor-phase soldering) where thermal stability of at least 300 degrees Celsius is required. In independent laboratory tests, ten-percent material degradation, a common evaluation of overall thermal stability, did not occur until our Perkinamine™ materials base was exposed to temperatures as high as 350 degrees Celsius, as determined by Thermo-Gravimetric Analysis (TGA).

The test results supported our Company's progress to introduce our materials into commercial applications such as optical interconnections, high-speed telecom and datacom modulators, and military/aerospace components.

In July 2007, our Company developed an innovative process to integrate our unique architecture into our anticipated commercial devices, whereby dendritic spacer systems are attached to its core chromophore. In the event we are successful in developing a commercially viable product, we believe these dendrimers will reduce the cost of manufacturing materials and reduce the cost and complexity of tailoring the material to specific customer requirements.

In March 2008, we commenced production of our first prototype photonic chip, which we delivered to Photon-X, LLC to fabricate a prototype polymer optical modulator and measure its technical properties. As a result of delays caused by engineering setbacks related to our material production, the production of our first prototype photonic chip was temporarily halted, along with the completion of our proof of concept tests that were being administered by Dr. Robert Norwood at the University of Arizona Photonics Department. In order to address this issue, Dr. David Eaton's role and responsibilities with the Company were significantly expanded, and we added two veteran synthetic chemists to our science and technology team. We have since overcome a majority of these engineering setbacks and we are currently in the continual process of extensive testing for material performance, including, among other tests, the (r33) Teng-Man testing protocol. In June 2009 we released test results conducted by Dr. C.C. Teng that re-confirmed our previous test results, and we intend to deliver completed independent validated material performance test results, including the (r33) Teng-Man testing protocol, as they become ripe for release.

In August 2009, Photon-X, LLC commenced a compatible study, process sequences, and fabricated wafers/chips containing arrays of phase modulators. The first one hundred plus modulators were completed at the end of October 2009, and were successfully characterized for insertion loss, V<sub>pi</sub>, modulation dynamic range and initial frequency response in March 2010. The multi-step manufacturing process we utilized to fabricate our modulators involved exposing our proprietary Perkinamine™ materials to extreme conditions that are typically found in standard

commercial manufacturing settings. Our step-by-step analysis throughout the fabrication process demonstrated to us that our Perkinamine™ materials could successfully withstand each step of the fabrication process without damage. We anticipate completing the development and building of functional prototype 40 Gb/s and 100 Gb/s modulators during the second quarter of 2010. However, we may incur delays in this process due to slower than expected material production within our laboratories and/or delays caused by the production of the modulator and testing procedures.

In August 2009, we retained Perdix, Inc in Boulder, Colorado to help us identify and build prototype products for high growth potential target markets in fiber optic telecommunications systems.

During October 2009, we initiated the development and production of our prototype amplitude modulator, which can ultimately be assembled into 1- and 2- dimensional arrays that are useful for optical computing applications, such as encryption and pattern recognition. We expect our initial prototype amplitude modulator to be completed by the end of the second quarter 2010.

In November 2009 we introduced our new prototype phase modulator to the Gilder/Forbes Telecosm Conference in Tarrytown, New York and discussed how our material could be spun onto silicon chips prior to stacking and used for input, output, and interconnect due to the stability of our electro-optic polymer and our recent demonstration that our proprietary Perkinamine™ materials can survive all of the rigors of standard commercial manufacturing processes. Other applications discussed with the conference attendees included low cost modulators for fiber optic communications, multi-channel modulators for ultra dense wavelength division multiplex systems, and optical computing.

In December 2009 we filed our sixth patent application. The provisional application covers stable free radical chromophores for use in Non-linear optical applications. The new polymeric electro-optic material has enormous potential in spatial light modulation and all optical signal processing (light switching light).

In January 2010 we entered into an agreement with the University of Alabama at Tuscaloosa to conduct cooperative development, analytical testing, optimization, and scale-up of our proprietary materials platform, which should help shorten the time to market for our new Polymeric Electro-Optic materials.

In March 2010 we successfully concluded the electrical and optical performance testing stage of our prototype phase modulator and began Application Engineering of our technology in customer design environments and working directly with interested large system suppliers to attempt to engineer specific individual product materials and device designs for sale to or by these suppliers.

In October of 2010 we completed the concept stage of a novel design for an advanced optical computing application and moved forward into the design stage with Celestec, Inc. of Chantilly, Virginia. This project will incorporate one of our Company's advanced electro-optical polymer materials.

In October of 2010 we announced the results of testing performed by Lehigh University that demonstrated the Third-order non-linear properties of our proprietary molecules in the Perkinamine NR™ chromophore class. Lehigh University determined that the material was 100 times stronger than the highest off-resonance small molecule currently known. They also determined that it was 2,600 times more powerful than fused silica and demonstrated extremely fast (less than 1 picosecond) photo-induced non-linear response that would be capable of modulation at rates of 1 THz (terahertz).

In March 2011 we entered into a research and development agreement with the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) to develop Third-order non-linear devices. The combination of LaNMP's device capabilities together with our materials expertise should accelerate the development of all-optical devices.

In February and April 2011, the United States Patent Office granted our Company 2 patents: US Patent No. 7,919,619 for Heterocyclical Chromophore Architectures directed to our Perkinamine™ chromophores and US Patent No. 7,894,695 covering our Tricyclic Spacer System for Non-Linear Optical Devices. These composition of matter patents taken together protect the core of our electro-optical materials portfolio.

In March 2011 the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) fabricated our first-ever all optical waveguide using one of our Perkinamine NR™ chromophores. It is anticipated that LaNMP will use this device architecture to develop various all-optical devices including an all-optical transistor.

In March 2011 we announced a two-year research and development collaboration with the University of Alabama to explore the advanced energy capture properties of our Perkinamine™ class of chromophores. Our material absorbs light across a wide range of wavelengths from near infrared into the near ultraviolet. The University intends to explore how to efficiently capture a wide range of solar radiation with our material.

In December 2011, we announced the discovery of a new material named Perkinamine Indigo™. We believe this represents a major advancement in the field of organic nonlinear optical materials. These are early results and we have much to learn about how to harness full potential of Perkinamine Indigo™. The material demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt at 1550 nanometers with excellent thermal and photo stability. Independent research laboratories at Micron Inc., Photon-X and The University of Colorado confirmed these characteristics.

## **The Electro-Optic Device Market**

### *General*

Electro-optic devices such as fiber-optic modulators translate electric signals into optical signals. Such devices are used in communication systems to transfer data over fiber-optic networks. Optical data transfer is significantly faster and more efficient than transfer technologies using only electric signals, permitting more cost-effective use of bandwidth for broadband Internet and voice services.

Two distinct technologies currently exist for the fabrication of fiber-optic devices, such as fiber-optic modulators. The first, which is the more traditional technology, utilizes an electro-optically active inorganic core crystalline material (e.g. lithium niobate). The second, which is the focus of the Company's research, involves the exploitation of electro-optic polymers.

### *Traditional Technology - Inorganic Crystals*

Traditional technology translates electric signals into optical signals generally relying upon electro-optic materials, such as lithium niobate or gallium arsenide. Six of the largest inorganic fiber-optic component manufacturers hold approximately 85% of the electro-optic modulator component market. They are JDS Uniphase, Sumitomo, Avanex, Covega, Fujitsu, and Bookham. These companies are heavily invested in the production of crystalline-based electro-optic modulator technologies, as well as the development of novel manufacturing techniques and integrated laser/modulator designs. While each company possesses their own modulator design and processing patents, the underlying core constituents (lithium niobate, gallium arsenide, indium phosphide) occur in nature and as such cannot be patented.



*New Technology - Organic Polymers*

Our developing technology that translates electric signals into optical signals relies upon organic electro-optic materials, such as electro-optic polymers. Electro-optic polymers involve the material integration of specifically engineered organic (carbon-based) compounds. The molecular designs of these compounds are precise and do not occur naturally; thus they may be protected under patent law.

Polymer-based electro-optic modulators may provide considerable advantages over traditional inorganic fiber-optic technology in terms of:

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Cost

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Size and versatility

.

Modulating/switching speed

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Optical transmission properties

.

Lower operating voltages

.

Generate less heat

### *Competition*

We are aware of only one company, Gigoptix, Inc., that competes directly with us. They have designed and patented potentially commercially feasible electro-optic polymers and hold an exclusive license to all electro-optic polymeric technology developed within the University of Washington.

As a result, no significant commercial market developments have occurred with electro-optic polymer devices. This is because all previously known electro-optic polymer design strategies incorporate molecular structures that adversely react to the requisite polymerization processes that thermally-stabilize the material matrix. This inherent design flaw causes the polymer to melt at unreasonably low temperatures, which corrupts the polymer's electro-optic performance.

Our Company holds an extensive amount of internally developed intellectual property in the field of electro-optic molecular design that, as a whole, attempts to fundamentally solve these and other problems associated with these molecular structures. We believe our provisional patents describe broad, highly unique techniques for novel paradigms in molecular design.

Our innovative solution lies in a very well known scientific phenomenon called aromaticity, which causes a high degree of molecular stability. Aromaticity is a molecular arrangement wherein atoms combine into multi-membered rings and share their electrons among each other. Aromatic compounds are extremely stable because the electronic charge distributes evenly over a great area preventing hostile moieties, such as oxygen and free radicals, from finding an opening to attack. Until now, to our knowledge, no one has been able to propose molecular designs that could effectively exploit aromaticity in the design of a high-performance electro-optic polymer.

We believe now that we have fabricated electro-optic molecular architectures that do in fact exhibit extremely high thermal stability, our technologies may soon replace inorganic electro-optic materials in the marketplace due to their considerable advantages over traditional inorganic fiber-optic materials.

### **Our Target Markets**

Our proprietary electro-optic polymers are designed at the molecular level for potentially superior performance, stability and cost-efficiency and we believe may have the potential to replace more expensive, lower-performance materials used in fiber-optic ground, wireless and satellite communication networks. We believe our electro-optic polymers may have broad applications in civilian and military telecommunications and advanced computational systems. Potential future applications may include: (i) telecommunications; (ii) backplane optical interconnects; (iii) entertainment; (iv) medical applications; (v) satellite reconnaissance; (vi) navigation systems; (vii) radar applications; (viii) all-optical transistors and (ix) photovoltaic cells.

*Telecommunications/Data Communications*

Telecommunications is one of the primary initial target applications for electro-optic polymers.

Telecommunication companies are currently faced with the enormous challenge to keep up with the tremendous explosion in demand for bandwidth due to the popularity of Internet enabled devices accessing all forms of streaming media, along with voice messaging, text messaging and cloud based data access.

The challenge for these companies is converting digital information in the form of electric signals into optical information and back. Their networks rely upon optical modulators based around inorganic materials, such as lithium niobate, to accomplish this task. These existing legacy modulators have inherent limitations in terms of maximum data rates, error correction, and costs associated with their manufacture and other operating costs related to drive voltage and heat dissipation due to the complexities

of producing single crystalline ingots of sufficient diameter (3 to 5 inches). Also, strict environmental controls must be enforced during the growth of the core crystalline material.

Replacing these inorganic materials with organic polymer materials made with Perkinamine™ chromophores would offer significant improvements in data rates; reduce form factor; require less error correction along with a significant reduction in drive voltage leading to less heat dissipation and hence reduce the overall cost of operation with regard to site cooling. Polymers are not inherently costly to produce nor do they require such strict environmental conditions. Due to their material flexibility (e.g. ability to more easily mold into specific topologies) they are expected to enable smaller, cheaper, faster, less expensive, and more integrated network components. In many laboratory tests, electro-optic polymers have demonstrated substantial (3-10x) transmission data speed improvements over crystalline technologies (lithium niobate, gallium arsenide, indium phosphide).

### *Backplane Optical Interconnects*

Organic nonlinear polymer based devices offer advantages in Active Optical cables that are used in data communications in computer-to-computer or server-to-server applications. It is reported that backplane optical interconnects are envisioned by members within leading corporations (including IBM, Intel and Agilent Technologies) as the future of high-speed computation. These components can potentially replace copper circuitry with photons carrying digital information over fiber optic cable in CPU architecture to manage CPU-to-graphics, CPU to-memory and CPU-to-I/O device interactions that have previously operated over an internal electrical bus. On-Chip optical buses can increase performance and decrease cost. They could speed the transmission of information within an integrated circuit, among integrated circuit chips in a module, and across circuit boards at speeds unattainable with traditional metallic interconnections and bus structures. Additionally, our organic polymer material possesses the thermal stability necessary to survive Complementary Metal Oxide Semiconductor (CMOS) processing temperatures that gives it the ability to be spin-coated on silicon substrates requiring no additional production steps. In the future, all-optical (light-switching-light) signal processing could become possible using an advanced version of our chemistry.

### *Entertainment*

Entertainment applications, including CATV and Internet, are a highly important potential application subdivision of the telecommunication market. The ever-increasing number of entertainment services such as VOD (video on demand) and digital cable, as well as the future ability to download television and movies real-time from the Internet, drives the demand for ever-increasing bandwidth. Flexible displays utilizing organic light emitting diodes are inherently compatible with our polymer waveguides.

### *Medical Applications*

Medical Applications for electro-optic polymers have been proposed for many varied applications, including dentistry, oncology and protein identification. Although experimental, it is believed that the successful fabrication of high-stability electro-optic polymers could open up many future applications such as these. Other medical applications such as the higher-speed transmission of medical records, X-ray and MRI scans over the Internet would be improved by the broadening of Internet bandwidth.

*Satellite Reconnaissance*

Satellite reconnaissance applications include a specific target market within the Department of Defense, the 14-member Intelligence Community and their contractors. Electro-optic polymers have historically been seen as attractive for potential application in this market due to the constant need for the fastest bandwidth transmission to meet the needs of national security.

### *Navigation Systems*

Navigation systems for both advanced aerial and missile guidance require the use of electro-optic gyroscopes. These devices are currently fabricated out of lithium niobate or similar electro-optic materials; the application of electro-optic polymers would facilitate the development of more accurate and architecturally simple device designs.

### *Radar Applications*

Radar Applications, specifically phased array radar, has been traditionally understood as a potential application for successful electro-optic material designs, along with electronic counter measure systems (ECM) systems, ultra-fast analog-to-digital conversion, land mine detection, radio frequency photonics and spatial light modulation.

### *Optical Filters*

Optical filters are devices that utilize optical waveguides and various other structures like ring resonators that can be made with organic nonlinear materials that can filter out a specific wavelengths from one waveguide and redirect them to a different waveguide.

### *Optical Limiters*

Optical limiters can be in the form of coating that can react to extremes types of light as in a laser directed at a pilots eyes or intense light emanating from a nuclear weapon. Because of extremely fast reaction time of organic materials, the coating can offer various forms of protection by limiting or reducing the intensity of incoming waves.

### *Spatial Light Modulators*

Spatial Light Modulators (SLMs) are optical computing devices that can be used in various recognition applications by collecting and correlating optical input to stored images in a database using complex mathematical computations based around calculated light intensity at various point on an image. Proliferation of these devices has been hampered by existing Liquid Crystal display technology that is accurate, but too slow for widespread adoption. Organic nonlinear polymers offer potential performance increases that could be orders of magnitude greater than LCD technology.

*All-Optical Transistors*

All-optical transistors are expected to be included in the future market of all-optic devices. All-optical devices convert data in the form of input light signals to a secondary light data stream. Some experts anticipate that all-optical transistors will replace traditional transistors used today in microprocessors. All-optical transistors are expected to enable the fabrication of an entirely new high-speed generation of "polymer" computers that operate on light instead of electricity, which in turn should significantly improve computation speeds.

**Our Business Strategy**

Our economic model anticipates that our revenue stream will be derived from one or some combination of the following: (i) technology licensing for specific product application; (ii) joint venture relationships with significant industry leaders; or (iii) the production and direct sale of our own electro-optic device components. Our objective is to be a leading provider of proprietary technology and know-how in the electro-optic device market. In order to meet this objective, we intend, subject to successful testing of our technology and having available financial resources, to:

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Develop electro-optic product devices.

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Continue to develop proprietary intellectual property.

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Streamline our product development process.

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Develop a comprehensive marketing plan.

·  
Maintain/develop strategic relationships with government agencies, private firms, and academic institutions.

·  
Attract seasoned executives and science and technology personnel to our Company.

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Expand into a state-of-the-art development, testing and manufacturing facility.

*Develop Electro-Optic Product Devices*

We intend to utilize our proprietary technology to create an initial portfolio of commercially feasible electro-optic polymer product devices and applications for various markets, including telecommunications and government. We expect our initial product device line to include high-speed 40Gb/s and 100Gb/s modulators and system applications.

*Continue to Develop Proprietary Intellectual Property*

We plan to advance our core competence in electro-optic polymer technology by continuing to develop proprietary materials, processes, designs and devices. We also plan to protect our technology by filing patent applications where appropriate, obtaining exclusive technology rights where available, and taking other appropriate steps to secure and protect our intellectual property.



*Streamline Our Product Development Process*

We intend to streamline our development process and to design, fabricate and test proprietary materials and potential electro-optic polymer devices in order to position our Company to take advantage of emerging market opportunities.

*Develop a Comprehensive Marketing Plan*

We are presently building a sales and marketing organization dedicated to developing customers and multiple distribution channels for our products. We plan to aggressively pursue sales of our potential products through the use of industry-specific sales organizations, such as electro-optic component representatives and distributors. In addition, we plan to target market leaders as initial customers and to leverage relationships with these market leaders to obtain future contracts and sales references.

In 2008 we retained TangibleFuture, Inc., a San Francisco based technology analysis and business development consulting company, to generate an independent assessment of our business opportunities in the fiber-optic telecommunications and optical computing sectors and develop strategies to penetrate those potential markets.

In 2011 we retained the services of EOvation Advisors LLC, a technology and business advisory firm founded by Dr. Frederick Leonberger, former chief technology officer at JDS Uniphase Corporation, a leading provider of communications test and measurement solutions, and optical products. Dr. Leonberger is presently assisting our Company with strategic planning and the design of optical modulators that we intend to develop.

*Maintain/Develop Strategic Relationships with Government Agencies, Private Firms, and Academic Institutions*

Almost since our inception, we have had beneficial strategic relationships with various government agencies that have provided us with funding and access to important technology. We intend to re-establish our relationship with DARPA, the Defense Advance Research Project Agency (the agency in the Intelligence Community credited with the origination of the Internet), by sharing the technical data and test results on our aromatic molecular materials. DARPA previously provided our Company with funding in order to advance of our technologies and to bring them to the public market, but due to a change in focus at DARPA our funding was not renewed.

As we advanced towards the commercialization phase of our strategic plan, we commenced discussions with several potential strategic alliance partners ranging from micro-electronic component firms to large-scale computer companies, as well as petrochemical companies having very large volume production capabilities. We believe strategic alliances and/or technology licensing will be a crucial step in commercializing our novel technologies and achieving competitive advantages. We entered into a strategic relationship with Photon-X, LLC, a technology solutions provider for polymer waveguides that works in conjunction with various government agencies.

We have also developed an excellent relationship with the University of Delaware, an institution well known for excellence in chemical engineering, which we intend to maintain and strengthen our relationships with The University of Alabama Department of Chemistry, The City University of New York (CUNY) Laboratory for Nano and Micro Photonics (LaNMP), Lehigh University Center for Optical Technologies, and The Guided Wave Optics Laboratory (GWOL) of the University of Colorado at Boulder (UCB).

*Attract seasoned executives and science and technology personnel to our Company*

In May 2007, we retained Dr. David F. Eaton as our Interim Chief Technology Officer and in January 2008, Dr. Eaton became our permanent Chief Technology Officer until his resignation as such in November 2011. Dr. Eaton now serves as our scientific advisor, a non-executive position. Previously, Dr. Eaton spent thirty years with DuPont where he worked in research & development, research & development management and business leadership positions. Dr. Eaton spearheaded DuPont's entry into polymer-based components for fiber optic telecommunication by founding DuPont Photonics Technology, a wholly owned subsidiary of DuPont.

In March 2008, we retained Terry Turpin as our Optical Computing expert. Mr. Turpin began his engineering career developing computing engines for the National Security Agency (NSA) where he served as Chief of the Advanced Processing Technologies Division, representing the NSA on the Tri-Service Optical Processing Committee organized by the Under Secretary of Defense for Research and Engineering.

In August 2008, we retained Mr. James S. Marcelli as our Chief Executive Officer. Mr. Marcelli has served as the president and/or chief executive officer of multiple start-up and growth companies in high tech development and manufacturing businesses with a core focus on business and market development and building strong management teams.

In November 2008, we retained Howard E. Simmons, III, PhD to our technology team. Dr. Simmons is a graduate of MIT and Harvard, who spent 25 years with DuPont engaged in research & development at the corporate and business unit level. Mr. Simmons has contributed to programs in organic light emitting diodes (OLEDs), printable electronics, graphic arts, optical recording materials and fundamental polymer research and holds 26 patents.

In February 2009, we retained Anthony J. Cocuzza, PhD to our technology team. Dr. Cocuzza worked for 30 years in medicinal chemistry and brings a highly developed set of synthetic and analytical

skills to our Company. A graduate of Princeton, Dr. Cocuzza spent 24 years with DuPont engaged in corporate research & development and with DuPont's joint venture with Merck.

In August 2011, we retained Charles Olson as our Vice President of Sales & Marketing. Mr. Olson has over 25 years of sales and marketing experience in the Microelectronics/ Semiconductor industries, of which 15+ years were based in Silicon Valley.

In November 2011 we retained Dr. Louis C. Glasgow as our Chief Technology Officer. For seven years Dr. Glasgow worked at Corning, Inc. as the Director of Organic Technology. Prior to that, Dr. Glasgow spent 28 years working at DuPont in various capacities, his last being Director of Innovation.

In December 2011, we retained Dr. Frederick Leonberger, PhD as our Senior Advisor. Dr. Leonberger is the former Chief Technology Officer of JDS Uniphase, Inc. We previously retained EOvation Advisors LLC, a technology and business advisory firm founded by Dr. Frederick Leonberger, as a consultant to the Company. Dr. Leonberger is presently assisting our Company with strategic planning and the design of optical modulators that we intend to develop.

*Expand Into A State-Of-The-Art Development, Testing and Manufacturing Facility*

We plan to expand into a state-of-the-art development, testing and manufacturing facility in order to advance our technology platforms, attract additional key industry talent, streamline our product development processes and minimize our time to market. We have already begun to integrate our operations with respect to streamlining our product development process and minimizing the time to market for our potential products through a multifaceted approach to material development. We are able to accomplish this because our technology provides us with the flexibility to create tailored material properties for a multitude of specific applications, and also to allow for the specific tailoring of materials for compatibility with silicon, glass, metals or many polymers.

In August 2006, we executed a co-location agreement with a New Jersey-based micro-optics company, InPlane Photonics that allowed our scientists to advance our organic material development. The agreement with InPlane was terminated in early 2007 in favor of a strategic alliance formed in December, 2006 with Photon-X, LLC, a Pennsylvania-based company that has significant experience in polymer waveguide production. Photon-X is working as a strategic ally with our Company to establish a pre-production line in order to test and integrate our organic materials into waveguide devices and system prototypes as a first step toward product commercialization. The agreement affords our Company access to a full suite of fabrication facilities capable of producing commercial quantities of precision micro-optic devices such as high-speed 40Gb/s telecom modulators, optical filters, and optical interconnects important to military and civilian global information movement and management markets.

**Our Research and Development Process**

Our research and development process consists of the following steps:

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We develop novel polymer materials utilizing our patent pending technology to meet certain performance specifications. We then develop methods to synthesize larger quantities of such material.

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We conduct a full battery of tests at the completion of the synthesis of each new polymer material to evaluate its characteristics. We also create development strategies to optimize materials to meet specifications for specific applications.

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We integrate data from the material characterization and test results to fabricate devices. We analyze device-testing results to refine and improve fabrication processes and methods. In addition, we investigate alternative material and design variations to possibly create more efficient fabrication processes.

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We create an initial device design using simulation software. Following device fabrication, we run a series of optical and electronic tests on the device.

### **Our Proprietary Products in Development**

As part of a two-pronged marketing strategy, our Company is developing several devices, which are in various stages of development and that utilize our organic nonlinear optical materials. They include:

#### *Telecommunications Modulator*

We have recently begun a second-generation design of a unique telecommunications modulator incorporating our newly developed material Perkinamine™ Indigo. We intend to have a working bench-top prototype sometime during 2012 for commercial marketing. We anticipate this modulator will be able to exceed the performance of existing legacy modulators by an order of magnitude, and will allow for improvements in the form of reduced power consumption and reduced device cost.

#### *Spatial Light Modulator*

We have recently begun the development of a Spatial Light Modulator with an outside manufacture utilizing certain of our Perkinamine™ chromophores. A spatial modulator is a form of optical computer that can perform various advanced tasks, such as object and facial recognition, by using advanced mathematical calculations known as Fourier Transforms. Our organic nonlinear optical materials can potentially produce update rates of more than a million times per second, which is a significant improvement in processing speed over existing Liquid Crystal Display technology that updates at only 30 times per second.

#### *Optical Filter*

We are in preliminary design and fabrication phases of development of an optical filter using our proprietary Perkinamine™ and Perkinamine NR™ materials within a SiNx photonics platform. Initial work has been done in collaboration with City University of New York, but limitations in their process capabilities have led us to seek alternate fabrication facilities, which are underway at this time.

#### *Optical Limiter*

An optical limiter is a device that protects an optical detector (or a human eye) from damage by attack from high power laser weapons. In order to provide protection for these systems, an optical attenuator device with an exceptionally fast reaction time is required. We are utilizing the third-order nonlinearities of our Perkinamine™ and Perkinamine NR™ materials to explore this utility as a potential product. We are in the very early stages of feasibility studies in collaboration with a potential customer and a government agency laboratory.

*All-Optical Switch*

An all-optical switch is one that enables signals in optical fibers or networks to be selectively switched from one fiber or circuit to another. Many device designs have been developed and commercialized in today's telecom networks to effect optical switching by using mechanical or electrical control elements to accomplish the switching event. Future networks will require all-optical switches that can be more rapidly activated with a low energy and short duration optical control pulse. We are in early development of an all-optical switch in collaboration with a potential customer.

*Multi-Channel Optical Modem*

We are in early feasibility study of a multi-wavelength optical modem that will enable an order of magnitude increase in Internet capacity over legacy fiber.

### **Our Current Strategic Partners**

#### *Photon-X, LCC*

Photon-X, LLC, is a technology solutions provider for polymer waveguides that works in conjunction with various government agencies. In connection therewith, we will provide Photon-X with our unique polymeric material to be tested and used on certain niche devices for anticipated military and commercial applications. If the tests are successful, our management believes that our alliance with Photon-X will serve to simultaneously lead its commercialization as well as publicly validate its scientific findings, creating a new standard in electro-optic polymers.

#### *The University of Alabama*

The University of Alabama Department of Chemistry specializes in novel approaches to solving complex chemical problems with a focus on new or unusual bonding arrangements. The research group couples extraordinary synthetic skills with novel structures using of a variety of physical techniques as well as theoretical/computational methods. The Department of Chemistry is well equipped for modern research.

#### *The City University of New York (CUNY)*

The City University of New York (CUNY) Laboratory for Nano and Micro Photonics (LaNMP) has developed technology to fabricate high index contrast slot waveguides using organic composites of inorganic nanoparticles. These devices take advantage of the high index contrast to concentrate optical power into the composite materials of the waveguide itself, thus enhancing the non-linear optical response. The group has exploited this effect to build optical devices with specific optical responses such as lasing, optical switching, optical amplification and others.

#### *Lehigh University*

Lehigh University Center for Optical Technologies is a multi-institutional initiative with a charter to advance research and applications of optical and optoelectronic technologies. Currently, the three primary research focus areas are optoelectronics, all-optical functionalities, and biophotonics involving applications of nonlinear optics for material characterization involving second and third order nonlinear optical effects.



*Perdix*

In August 2009, we retained Perdix, Inc. located in Boulder, Colorado to help us identify and build prototype products for high growth potential target markets in fiber optic telecommunications systems. Perdix, Inc. provides engineering, research, and development services for government and industry in the optics and optics related industries. In addition to optical design, science, and technology, its specific strength is materials science as applied toward novel optical device design and development. They have significant expertise in the liquid crystal, polymer, nanocomposite, and nonlinear optical materials field. During October 2009, we initiated the development and production of our prototype amplitude modulator, which can ultimately be assembled into 1- and 2- dimensional arrays that are useful for optical computing applications, such as encryption and pattern recognition.

*University of Colorado Boulder*

The Guided Wave Optics Laboratory (GWOL) of the University of Colorado at Boulder (UCB) is the research laboratory of Prof. Alan Mickelson. Active research areas at present include nonlinear optics in polymers, plasmonic meta-materials and silicon photonics. Facilities at GWOL include cleanroom for optical and electrical device fabrication, VIS/IR lasers and optical benches for testing, high speed

electronics for driving subsystems and micropositioning necessary for coupling to nanooptics as well as fiber optic systems. GWOL has been performing optical testing as a customer service for since its inception in 1984, especially services such as Teng Mann electro-optic coefficient determination.

### **Our Past Government Program Participation**

Our Company has been a participant in several vital government sponsored research and development programs with various government agencies that protect the interests of our country. The following is a list of some of the various divisions of government agencies that have provided us with advisory, financial and/or materials support in the pursuit of high-speed electro-optic materials. We are not partnered with, strategically related to, or financially supported by any governmental agency at this time.

#### *National Reconnaissance Office (NRO)*

During 1998 and 1999, we worked with the NRO to advance the development of extremely high performance electro-optic polymers pursuant to an unclassified Director's Innovative Initiative. The NRO is a member of the Department of Defense Agency and plays a primary role in achieving information superiority for the U.S. Government and Armed Forces. The NRO designs, builds, and operates reconnaissance satellites, assists in military operation preparedness, and monitors the environment. NRO products are paramount to national security and are provided to an expanding list of users including the Central Intelligence Agency and the Department of Defense.

#### *Army Research Laboratory (ARL)*

During 1998 through 2000, we were provided strong support for our electro-optic materials development by the Process and Properties Branch of the Army Research Laboratory on the Aberdeen Proving Grounds in Aberdeen, Maryland. This support was in cooperation with other government agencies and included the advisory support of the Army Missile Command at Redstone Arsenal. The Army Research Laboratory provided us with access to its highly advanced organic chemical development laboratories and state-of-the-art analytic equipment. PSI- TEC operated out of more than five laboratories at the Army Research Laboratory. During the nascent stages of our technological development, this support provided us with the strong foundations we needed to progress electro-optic technology into its second generation. The technically skilled members at Army Missile Command provided our engineers instruction on the latest advancements of the military's research and development in the area of polymeric materials and device fabrication. Much of our initial work at the Army Research Laboratory was based upon revolutionary advancements of our Chief Technical Officer's (Dr. Frederick J. Goetz) highly unique electro-optic polymeric design as exhibited in our U.S. Patent #6,041,157: "Environmentally sensitive compositions of matter based on 3H-fluoren-3-ylidenes and process for making same."

*Defense Advance Research Project Agency (DARPA)*

DARPA, the agency in the Intelligence Community credited with the origination of the Internet, provided our Company with funding for the advancement of our technologies and bridging these technologies to the public market. Under the auspices of DARPA initiatives, the MORPH (Molecular Photonics) and C2OI (Chip-to-Chip Optical Interconnects) programs, our advanced technologies were reviewed by the Naval Air Warfare Center Weapons Division (NAVAIR) and the Air Force Research Laboratory (AFRL). DARPA works to maintain the technological superiority of the U.S. military and to prevent technological surprise from harming our national security by sponsoring revolutionary, high-payoff research that bridges the gap between fundamental discoveries and their military use.

*Naval Air Warfare Center Weapons Division (NAVAIR)*

Under the auspices of the Defense Advance Research Projects Agency (DARPA), high-level scientists at the Naval Air Warfare Center Weapons Division in China Lake, California reviewed our

electro-optic molecular design paradigms in 2004. Computer calculations regarding the quantum mechanical performance of our electro-optic molecular designs were repeated and verified by NAVAIR staff. These calculations suggest an improvement in electro-optic performance over the current state-of-the-art.

Our unique, proprietary technology was demonstrated through detailed computer calculations to improve existing approaches in the production of ultra fast frequencies (wide bandwidths). Calculations performed at NAVAIR regarding our preliminary, first-stage next-generation molecular architectures indicate an improvement of hyperpolarizability (electro-optic character) of several times existing state-of-the-art molecular designs.

These computer calculations have been validated by independent tests performed on our recently developed electro-optic materials at the University of Arizona.

*Air Force Research laboratory (AFRL)*

In cooperation with the Defense Advance Research Projects Agency (DARPA), top-level and senior engineers and scientists at the Air Force Research Laboratory at Wright-Patterson Air Force Base in Dayton, Ohio reviewed our molecular design technologies. An Air Force Research Laboratory senior scientist and engineer, in connection with a National Science Foundation proposal and as a result of reviews conducted under the Defense Advance Research Projects Agency's C2OI (Chip-to-Chip Optical Interconnects) and MORPH (Molecular Photonics), concluded that, "[our] molecular designs show promise of a five to ten times improvement over existing commercial polymeric architectures." In review of detailed calculations performed on our future material designs, Air Force Research Laboratory personnel further note, "Computer simulations and modeling indicate that [our] approach to materials synthesis has the potential for realizing high nonlinearity (i.e., high electro-optic performance). This, in turn, could result in five to ten times lower drive voltages for devices." "Synthesis of [our] materials to verify the properties predicted by the computer models is essential for new NLO (electro-optic) polymer material development.... This is a very novel and promising approach that has the potential for high payoff."

These predictions were validated in 2006 by independent tests performed on our patented and patent-pending electro-optic materials at the University of Arizona, which performed approximately seven times better than other competitive technologies.

With regard to applications of our materials, an Air Force Research Laboratory senior scientist stated, "Highly active NLO (electro-optic) polymer materials are key for the realization of next generation electro-optic devices and render high application potential for high-speed fiber-optic telecommunication (i.e., Internet, HDTV), satellite reconnaissance (i.e., homeland security), and navigation and guidance systems."

## **Our Competition**

The markets we are targeting for our electro-optic polymer technology are intensely competitive. Among the largest fiber-optic component manufactures are Finisar, NeoPhotonics, OpLink, CyOptics, FiBest and Multiplex. Additional the five largest inorganic modulator component manufacturers hold approximately 85% of the electro-optic modulator component market. They are JDS Uniphase, Sumitomo, Oclaro, Fujitsu and ThorLabs. These companies are heavily invested in the production of crystalline-based electro-optic modulator technologies, as well as the development of novel manufacturing techniques and modulator designs.

We are aware of only one company, Gigoptix, Inc., that competes directly with us. They have designed and patented potentially commercially feasible electro-optic polymers and hold an exclusive license to all electro-optic polymeric technology developed within the University of Washington.

As a result, no significant commercial market developments have occurred with electro-optic polymer devices. This is because all previously known electro-optic polymer design strategies incorporate molecular structures that adversely react to the requisite polymerization processes that thermally-stabilize the material matrix. This inherent design flaw causes the polymer to melt at unreasonably low temperatures, which corrupts the polymer's electro-optic performance.

As one of only two companies known to us that are actively pursuing the development of high-performance electro-optic materials for application and development in the high-speed telecommunication markets, we believe that upon the commercialization of our technology, that we will be poised to obtain a significant portion of the component manufacturing market. Electro-optic polymers demonstrate several advantages over other technologies, such as crystalline-based technologies, due to their reduced manufacturing and processing costs, higher performance and lower power requirements. Our electro-optic polymers are CSC model molecules that have demonstrated significant stability advantages over our sole known competitor's materials. In the expectation of becoming the sole producer of high-performance, high-stability electro-optic materials, we hope to capture all or some of this potential electro-optic component market.

We believe the principal competitive factors in our target markets are:

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The ability to develop and commercialize highly stable polymer-based products, including obtaining appropriate patent and proprietary rights protection.

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Lower cost, high production yield for these products.

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The ability to enable integration and implement advanced technologies.

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Strong sales and marketing channels for access to products.

We believe that our current business planning will position our Company to compete adequately with respect to these factors. Our future success is difficult to predict because we are an early stage company with all of our potential products still in development.

Many of our existing and potential competitors have substantially greater research and product development capabilities and financial, scientific, marketing and human resources than we do. As a result, these competitors may:

·  
Succeed in developing products that are equal to or superior to our potential products or that achieve greater market acceptance than our potential products.

·  
Devote greater resources to developing, marketing or selling their products.

·  
Respond quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies or potential products obsolete.

·  
Introduce products that make the continued development of our potential products uneconomical.

·  
Obtain patents that block or otherwise inhibit our ability to develop and commercialize our potential products.

·  
Withstand price competition more successfully than we can.

·  
Establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

·  
Take advantage of acquisition or other opportunities more readily than we can.

### **Our Laboratory Facilities**

Our Company operates an organic synthesis and thin-films laboratory in Wilmington, Delaware. These facilities include equipment such as NMR, IR, UV/VIS and HPLC analytical systems, profilometry evaluation and electro-optic (r33) materials characterization necessary to produce next generation fiber-optic organic materials. We also utilize an electro-optic test facility in conjunction with local universities





to perform critical evaluation tests (eg. R33) on our polymer material films and future electro-optic devices, such as our waveguides, modulators, and all-optical transistors.

## **Item 1A.**

### **Risk Factors.**

Investing in our common stock is risky. In addition to the other information contained in this annual report, you should consider carefully the following risk factors in evaluating our business and us. If any of the possible negative events described in the following risk factors were to occur, our business, financial condition or results of operations likely would suffer. In that event, the trading price of our common stock could decline, and you could lose all or a part of your investment.

*We have incurred substantial operating losses since our inception and will continue to incur substantial operating losses for the foreseeable future.*

Since our inception, we have been engaged primarily in the research and development of our electro-optic polymer materials technologies and potential products. As a result of these activities, we incurred significant losses and experienced negative cash flow since our inception. We incurred a net loss of \$3,482,622 for the year ended December 31, 2011 and \$3,713,232 for the year ended December 31, 2010. We anticipate that we will continue to incur operating losses through at least 2012.

We may not be able to generate significant revenue either through development contracts from the U.S. government or government subcontractors or through customer contracts for our potential products or technologies. We expect to continue to make significant operating and capital expenditures for research and development and to improve and expand production, sales, marketing and administrative systems and processes. As a result, we will need to generate significant additional revenue to achieve profitability. We cannot assure you that we will ever achieve profitability.

*We are subject to the risks frequently experienced by early stage companies.*

The likelihood of our success must be considered in light of the risks frequently encountered by early stage companies, especially those formed to develop and market new technologies. These risks include our potential inability to:

·  
Establish product sales and marketing capabilities;

·  
Establish and maintain markets for our potential products;

·  
Identify, attract, retain and motivate qualified personnel;

·  
Continue to develop and upgrade our technologies to keep pace with changes in technology and the growth of markets using polymer based materials;

·  
Develop expanded product production facilities and outside contractor relationships;

·  
Maintain our reputation and build trust with customers;

·  
Scale up from small pilot or prototype quantities to large quantities of product on a consistent basis; and

·  
Fund the capital expenditures required to develop volume production due to the limits of our available financial resources.

*We are entering new markets, and if we fail to accurately predict growth in these new markets, we may suffer substantial losses.*

We are devoting significant resources to engineer next-generation electro-optic plastics for future applications to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. We expect to continue to develop products for these markets and to seek to identify new markets. These markets change rapidly and we cannot assure you that they will grow or that we will be able to accurately forecast market demand, or lack thereof, in time to respond



appropriately. Our investment of resources to develop products for these markets may either be insufficient to meet actual demand or result in expenses that are excessive in light of actual sales volumes. Failure to predict growth and demand accurately in new markets may cause us to suffer substantial losses. In addition, as we enter new markets, there is a significant risk that:

.

The market may not accept the price and/or performance of our products;

.

There may be issued patents we are not aware of that could block our entry into the market or could result in excessive litigation; and

.

The time required for us to achieve market acceptance of our products may exceed our capital resources that would require additional investment.

*The failure to establish and maintain collaborative relationships may have a materially adverse affect on our business.*

We plan to sell many of our products directly to commercial customers or through potential industry partners. For example, we expect to sell our electro-optic plastic products to electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. Our ability to generate revenues depends significantly on the extent to which potential customers and other potential industry partners develop, promote and sell systems that incorporate our products, which, of course, we cannot control. Any failure by potential customers and other potential industry partners to successfully develop and market systems that incorporate our products could adversely affect our sales. The extent to which potential customers and other industry partners develop, promote and sell systems incorporating our products is based on a number of factors that are largely beyond our ability to control.

*Our future growth will suffer if we do not achieve sufficient market acceptance of our electro-optic plastic products.*

We are developing our electro-optic polymer products to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. All of our potential products are still in the development stage, and we do not know when a market for these products will develop, if at all. Our success depends, in part, upon our ability to gain market acceptance of our products. To be accepted, our products must meet the technical and performance requirements of our potential customers. OEMs, suppliers or government agencies may not accept polymer-based products. In addition, even if we achieve some degree of market acceptance for our potential products

in one industry, we may not achieve market acceptance in other industries for which we are developing products.

Achieving market acceptance for our products will require marketing efforts and the expenditure of financial and other resources to create product awareness and demand by customers. We may be unable to offer products that compete effectively due to our limited resources and operating history. Also, certain large corporations may be predisposed against doing business with a company of our limited size and operating history. Failure to achieve broad acceptance of our products by customers and to compete effectively would harm our operating results.

*Successful commercialization of our current and future products will require us to maintain a high level of technical expertise.*

Technology in our target markets is undergoing rapid change. To succeed in our target markets, we will have to establish and maintain a leadership position in the technology supporting those markets. Accordingly, our success will depend on our ability to:

.  
Accurately predict the needs of our target customers and develop, in a timely manner, the technology required to support those needs;

Provide products that are not only technologically sophisticated but are also available at a price acceptable to customers and competitive with comparable products;

Establish and effectively defend our intellectual property; and

Enter into relationships with other companies that have developed complementary technology into which our products may be integrated.

We cannot assure you that we will be able to achieve any of these objectives.

*Two of our significant target markets are the telecommunications and networking markets, which continue to be subject to overcapacity and slow growth or decline.*

Two of our significant target markets are the telecommunications and networking markets, and developments that adversely affect the telecommunications or networking markets, including delays in traffic growth and changes in U.S. government regulation, could slow down, or even halt our efforts to enter into these markets. Reduced spending and technology investment by telecommunications companies may make it more difficult for our products to gain market acceptance. Such companies may be less willing to purchase new technology such as ours or invest in new technology development when they have reduced capital expenditure budgets.

*Many of our products will have long sales cycles, which may cause us to expend resources without an acceptable financial return and which makes it difficult to plan our expenses and forecast our revenues.*

Many of our products will have long sales cycles that involve numerous steps, including initial customer contacts, specification writing, engineering design, prototype fabrication, pilot testing, device certification, regulatory approvals (if needed), sales and marketing and commercial manufacture. During this time, we may expend substantial financial resources and management time and effort without any assurance that product sales will result. The anticipated long sales cycle for some of our products makes it difficult to predict the quarter in which sales may occur. Delays in sales may cause us to expend resources without an acceptable financial return and make it difficult to plan expenses and forecast revenues.

*We will require additional capital to continue to fund our operations.*

Our business does not presently generate the cash needed to finance our current and anticipated operations. Based on our current operating plan and budgeted cash requirements, we believe that we have sufficient funds to finance our operations through September 2013; however, we will need to obtain additional future financing after that time to finance our operations until such time that we can conduct profitable revenue-generating activities. We expect that we will need to seek additional funding through public or private financings, including equity financings, and through other arrangements, including collaborative arrangements. Poor financial results, unanticipated expenses or unanticipated opportunities could require additional financing sooner than we expect. Other than the Lincoln Park Capital Fund, LLC ( Lincoln Park ) financing transaction (described in the paragraph below), we have no plans or arrangements with respect to the possible acquisition of additional financing, and such financing may be unavailable when we need it or may not be available on acceptable terms.

In May 2011, we entered into a purchase agreement (the Purchase Agreement ) with Lincoln Park, under which we may direct Lincoln Park to purchase up to \$20,000,000 worth of shares of our registered common stock over a 30-month period. If we make sales of our common stock under the Purchase Agreement, we would be able to fund our operations for a longer period of time. However, the extent to which we will rely on the Purchase Agreement with Lincoln Park as a source of funding will depend on a number of factors, including the prevailing market price of our common stock and volume of trading and the extent to which we are able to secure working capital from other sources. Specifically, Lincoln Park does not have the obligation to purchase any shares of our common stock on any business day that the price of our common stock is less than \$1.00 per share.

We registered for resale by Lincoln Park 10,000,000 shares of our common stock in June 2011. In the event we elect to issue more than 10,000,000 shares, we would be required to file a new registration statement and have it declared effective by the SEC. If obtaining sufficient funding from Lincoln Park does not occur or is prohibitively dilutive, we will need to secure another source of funding in order to satisfy our working capital needs. Should the financing we require to sustain our working capital needs be unavailable or prohibitively expensive when we require it, the consequences could be a material adverse effect on our business, operating results, financial condition and prospects.

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement and involves risks and uncertainties, and actual results could vary as a result of a number of factors, including the factors discussed elsewhere in this annual report. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect.

Additional financing may not be available to us, due to, among other things, our Company not having a sufficient credit history, income stream, profit level, asset base eligible to be collateralized, or market for its securities. If we raise additional funds by issuing equity or convertible debt securities, the percentage ownership of our existing shareholders may be reduced, and these securities may have rights superior to those of our common stock. If adequate funds are not available to satisfy our long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations.

*We may not be able to access the full amounts available under the Purchase Agreement, which could prevent us from accessing the capital we need to continue our operations that could have an adverse affect on our business.*

Under the Purchase Agreement, we may direct Lincoln Park to purchase up to \$20,000,000 worth of shares of our common stock over a 30-month period. On any trading day selected by us, we may sell to Lincoln Park up to \$200,000 of common stock by delivering a purchase notice to Lincoln Park. The Purchase Price of such shares is equal to the lesser of: (i) the lowest sale price of our common stock on the purchase date; or (ii) the arithmetic average of the three lowest closing sale prices for our common stock during the twelve consecutive trading days ending on the trading day immediately preceding the purchase date. Lincoln Park does not have the right or the obligation to purchase any shares of our common stock on any business day that the market price of our common stock is less than \$1.00. To the extent that the market price of our common stock is below \$1.00 per share on a trading day, we would not receive any proceeds under the Purchase Agreement for that day.

If the market price of our common stock is not below \$9.50 per share, our sales will be limited to up to \$1,000,000 of our common stock on each purchase date. If the market price of our common stock is not below \$4.50 per share, our sales will be limited to up to \$500,000 of our common stock on each purchase date. If the market price of our common stock is not below \$3.50 per share, our sales will be limited to up to \$400,000 of our common stock on each purchase date. If the market price of our common stock is not below \$2.50 per share, our sales will be limited to up to \$300,000 of our common stock on each purchase date.



Depending on the prevailing market price of our common stock, we may not be able to sell shares to Lincoln Park for the maximum \$20,000,000 over the term of the agreement. In addition, we are only registering 10,000,000 shares of our common stock under this prospectus. Assuming a purchase price of \$1.25 per share, the closing sale price of our common stock on May 19, 2011, and the issuance to Lincoln Park of 10,000,000 shares, which would be comprised of 9,851,412 shares purchased at \$1.25 per share and 148,588 shares issued as additional pro rata commitment shares for no additional consideration, the proceeds to us would only be \$12,500,000. In the event we elect to issue more than 10,000,000 shares, we would be required to file a new registration statement and have it declared effective by the SEC.

*The sale of shares of our common stock to Lincoln Park under the Purchase Agreement may cause substantial dilution to our existing stockholders and could cause the price of our common stock to decline.*

Under the Purchase Agreement, we may sell to Lincoln Park, from time to time and under certain circumstances, up to \$20,000,000 of our common stock upon the SEC declaring effective the resale registration statement, which occurred during June 2011. Over approximately 30 months from that time, generally, we have the right, but no obligation, to direct Lincoln Park to periodically purchase up to \$20,000,000 of our common stock in specific amounts under certain conditions, which periodic purchase amounts can be increased under specified circumstances.

We also agreed to issue to Lincoln Park up to an aggregate of 452,489 shares of common stock as a fee for Lincoln Park's commitment to purchase our shares. Of these commitment shares, we issued 150,830 shares upon entering into the agreement with Lincoln Park. The remaining 301,659 commitment shares are issuable to Lincoln Park on a pro rata basis as purchases are made under the Purchase Agreement.

Depending upon market liquidity at the time, sales of shares of our common stock to Lincoln Park may cause the trading price of our common stock to decline. Lincoln Park may ultimately purchase all, some or none of the \$20,000,000 of common stock, and after it has acquired shares, Lincoln Park may sell all, some or none of those shares. Therefore, sales to Lincoln Park by us could result in substantial dilution to the interests of other holders of our common stock. The sale of a substantial number of shares of our common stock to Lincoln Park, or the anticipation of such sales, could make it more difficult for us to sell equity or equity-related securities in the future at a time and at a price that we might otherwise wish to effect sales. However, we have the right to control the timing and amount of any sales of our shares to Lincoln Park, and the Purchase Agreement may be terminated by us at any time at our discretion without any cost to us.

*The exercise of options and warrants and other issuances of shares of common stock or securities convertible into common stock will dilute your interest.*

As of December 31, 2011, we have outstanding options and warrants to purchase an aggregate of 7,948,500 shares of our common stock at exercise prices ranging from \$0.25 per share to \$1.75 per share with a weighted average exercise price of \$1.01 per share. The exercise of options and warrants at prices below the market price of our common stock could adversely affect the price of shares of our common stock. Additional dilution may result from the issuance of shares of our capital stock in connection with any collaboration (although none are contemplated at this time) or in connection with other financing efforts, including pursuant to the Purchase Agreement with Lincoln Park.

Any issuance of our common stock that is not made solely to then-existing stockholders proportionate to their interests, such as in the case of a stock dividend or stock split, will result in dilution to each stockholder by reducing his, her or its percentage ownership of the total outstanding shares. Moreover, if we issue options or warrants to purchase our common stock in the future and those options or warrants are exercised or we issue restricted stock, stockholders may experience further dilution. Holders of shares of our common stock have no preemptive rights that

entitle them to purchase their pro rata share of any offering of shares of any class or series.

*We may incur debt in the future that might be secured with our intellectual property as collateral, which could subject our Company to the risk of loss of all of our intellectual property.*

If we incur debt in the future, we may be required to secure the debt with our intellectual property, including all of our patents and patents pending. In the event we default on the debt, we could incur the loss of all of our intellectual property, which would materially and adversely affect our Company and cause you to lose your entire investment in our Company.

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*Our quarter-to-quarter performance may vary substantially, and this variance, as well as general market conditions, may cause our stock price to fluctuate greatly and even potentially expose us to litigation.*

We have generated no sales to date and we cannot accurately estimate future quarterly revenue and operating expenses based on historical performance. Our quarterly operating results may vary significantly based on many factors, including:

.

Fluctuating demand for our potential products and technologies;

.

Announcements or implementation by our competitors of technological innovations or new products;

.

Amount and timing of our costs related to our marketing efforts or other initiatives;

.

The status of particular development programs and the timing of performance under specific development agreements;

.

Timing and amounts relating to the expansion of our operations;

.

Product shortages requiring suppliers to allocate minimum quantities;

.

Announcements or implementation by our competitors of technological innovations or new products;

.

The status of particular development programs and the timing of performance under specific development agreements;

.

Our ability to enter into, renegotiate or renew key agreements;

.

Timing and amounts relating to the expansion of our operations;

.

Costs related to possible future acquisitions of technologies or businesses; or

.

Economic conditions specific to our industry, as well as general economic conditions.

Our current and future expense estimates are based, in large part, on estimates of future revenue, which is difficult to predict. We expect to continue to make significant operating and capital expenditures in the area of research and development and to invest in and expand production, sales, marketing and administrative systems and processes. We may be unable to, or may elect not to, adjust spending quickly enough to offset any unexpected revenue shortfall. If our increased expenses are not accompanied by increased revenue in the same quarter, our quarterly operating results would be harmed.

*Our failure to compete successfully could harm our business.*

The markets that we are targeting for our electro-optic polymer technology are intensely competitive. Most of our present and potential competitors have or may have substantially greater research and product development capabilities, financial, scientific, marketing, manufacturing and human resources, name recognition and experience than we have. As a result, these competitors may:

.

Succeed in developing products that are equal to or superior to our potential products or that will achieve greater market acceptance than our potential products;

.

Devote greater resources to developing, marketing or selling their products;

.

Respond more quickly to new or emerging technologies or scientific advances and changes in customer requirements, which could render our technologies or potential products obsolete;

.

Introduce products that make the continued development of our potential products uneconomical;

.

Obtain patents that block or otherwise inhibit our ability to develop and commercialize our potential products;

.

Withstand price competition more successfully than we can;

.

Establish cooperative relationships among themselves or with third parties that enhance their ability to address the needs of our prospective customers.

The failure to compete successfully against these existing or future competitors could harm our business.

*We may be unable to obtain effective intellectual property protection for our potential products and technology.*

Our intellectual property, or any intellectual property that we have or may acquire, license or develop in the future, may not provide meaningful competitive advantages. Our patents and patent applications, including those we license, may be challenged by competitors, and the rights granted under such patents or patent applications may not provide meaningful proprietary protection. For example, numerous patents held by third parties relate to polymer materials and electro-optic devices. These patents could be used as a basis to challenge the validity or limit the scope of our patents or patent applications. A successful challenge to the validity or limitation of the scope of our patents or patent applications could limit our ability to commercialize our polymer materials technology and, consequently, reduce our revenues.

Moreover, competitors may infringe our patents or those that we license, or successfully avoid these patents through design innovation. To combat infringement or unauthorized use, we may need to resort to litigation, which can be expensive and time-consuming and may not succeed in protecting our proprietary rights. In addition, in an infringement proceeding a court may decide that our patents or other intellectual property rights are not valid or are unenforceable, or may refuse to stop the other party from using the intellectual property at issue on the ground that it is non-infringing. Policing unauthorized use of our intellectual property is difficult and expensive, and we may not be able to, or have the resources to, prevent misappropriation of our proprietary rights, particularly in countries where the laws may not protect these rights as fully as the laws of the United States.

We also rely on the law of trade secrets to protect unpatented technology and know-how. We try to protect this technology and know-how by limiting access to those employees, contractors and strategic partners with a need to know this information and by entering into confidentiality agreements with these parties. Any of these parties could breach the agreements and disclose our trade secrets or confidential information to our competitors, or these competitors might learn of the information in other ways. Disclosure of any trade secret not protected by a patent could materially harm our business.

*We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from commercializing our potential products.*

Third parties may claim that our potential products or related technologies infringe their patents. Any patent infringement claims brought against us may cause us to incur significant expenses, divert the attention of our management and key personnel from other business concerns and, if successfully asserted against us, require us to pay substantial damages. In addition, as a result of a patent infringement suit, we may be forced to stop or delay developing, manufacturing or selling potential products that are claimed to infringe a patent covering a third party's intellectual property unless that party grants us rights to use its intellectual property. We may be unable to obtain these rights on terms acceptable to us, if at all. Even if we are able to obtain rights to a third party's patented intellectual property, these rights may be non-exclusive, and therefore our competitors may obtain access to the same intellectual property. Ultimately, we may be unable to commercialize our potential products or may have to cease some of our

business operations as a result of patent infringement claims, which could severely harm our business.

If our potential products infringe the intellectual property rights of others, we may be required to indemnify customers for any damages they suffer. Third parties may assert infringement claims against our current or potential customers. These claims may require us to initiate or defend protracted and costly litigation on behalf of customers, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of these customers or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products.



*Our technology may be subject to government rights and retained research institution rights.*

We may have obligations to government agencies or universities in connection with the technology that we have developed, including the right to require that a compulsory license be granted to one or more third parties selected by certain government agencies. In addition, academic research partners often retain certain rights, including the right to use the technology for noncommercial academic and research use, to publish general scientific findings from research related to the technology, and to make customary scientific and scholarly disclosures of information relating to the technology. It is difficult to monitor whether our partners will limit their use of the technology to these uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

*The loss of certain of our key personnel, or any inability to attract and retain additional personnel, could impair our ability to attain our business objectives.*

Our future success depends to a significant extent on the continued service of our key management personnel, particularly James S. Marcelli, our Chief Executive Officer and Dr. Louis C. Glasgow our Chief Technology Officer. Accordingly, the loss of the services of either of these persons would adversely affect our business and our ability to timely commercialize our products, and impede the attainment of our business objectives.

Our future success will also depend on our ability to attract, retain and motivate highly skilled personnel to assist us with product development and commercialization. Competition for highly educated qualified personnel in the polymer industry is intense. If we fail to hire and retain a sufficient number of qualified management, engineering, sales and technical personnel, we will not be able to attain our business objectives.

*If we fail to develop and maintain the quality of our manufacturing processes, our operating results would be harmed.*

The manufacture of our potential products is a multi-stage process that requires the use of high-quality materials and advanced manufacturing technologies. Also, polymer-related device development and manufacturing must occur in a highly controlled, clean environment to minimize particles and other yield and quality-limiting contaminants. In spite of stringent quality controls, weaknesses in process control or minute impurities in materials may cause a substantial percentage of a product in a lot to be defective. If we are not able to develop and continue to improve on our manufacturing processes or to maintain stringent quality controls, or if contamination problems arise, our operating results would be harmed.

*If we decide to make commercial quantities of products at our facilities, we will be required to make significant capital expenditures to increase capacity.*

We lack the internal ability to manufacture products at a level beyond the stage of early commercial introduction. To the extent we do not have an outside vendor to manufacture our products, we will have to increase our internal production capacity and we will be required to expand our existing facilities or to lease new facilities or to acquire entities with additional production capacities. These activities would require us to make significant capital investments and may require us to seek additional equity or debt financing. We cannot assure you that such financing would be available to us when needed on acceptable terms, or at all. Further, we cannot assure you that any increased demand for our potential products would continue for a sufficient period of time to recoup our capital investments associated with increasing our internal production capacity.

In addition, we do not have experience manufacturing our potential products in large quantities. In the event of significant demand for our potential products, large-scale production might prove more difficult or costly than we anticipate and lead to quality control issues and production delays.

*We may not be able to manufacture products at competitive prices.*

To date, we have produced limited quantities of products for research, development, demonstration and prototype purposes. The cost per unit for these products currently exceeds the price at which we could expect to profitably sell them. If we cannot substantially lower our cost of production as we move into sales of products in commercial quantities, our financial results will be harmed.

*We conduct significantly all of our research and development activities at a single facility, and circumstances beyond our control may result in considerable interruptions.*

We conduct significantly all of our research and development activities at a single facility. A disaster such as a fire, flood or severe storm at or near this facility could prevent us from further developing our technologies or manufacturing our potential products, which would harm our business.

*We are subject to regulatory compliance related to our operations.*

We are subject to various U.S. governmental regulations related to occupational safety and health, labor and business practices. Failure to comply with current or future regulations could result in the imposition of substantial fines, suspension of production, alterations of our production processes, cessation of operations, or other actions, which could harm our business.

*We may be unable to export our potential products or technology to other countries, convey information about our technology to citizens of other countries or sell certain products commercially, if the products or technology are subject to United States export or other regulations.*

We are developing certain polymer-based products that we believe the United States government and other governments may be interested in using for military and information gathering or antiterrorism activities. United States government export regulations may restrict us from selling or exporting these potential products into other countries, exporting our technology to those countries, conveying information about our technology to citizens of other countries or selling these potential products to commercial customers. We may be unable to obtain export licenses for products or technology if necessary. We currently cannot assess whether national security concerns would

affect our potential products and, if so, what procedures and policies we would have to adopt to comply with applicable existing or future regulations.

*We may incur liability arising from the use of hazardous materials.*

Our business and our facilities are subject to a number of federal, state and local laws and regulations relating to the generation, handling, treatment, storage and disposal of certain toxic or hazardous materials and waste products that we use or generate in our operations. Many of these environmental laws and regulations subject current or previous owners or occupiers of land to liability for the costs of investigation, removal or remediation of hazardous materials. In addition, these laws and regulations typically impose liability regardless of whether the owner or occupier knew of, or was responsible for, the presence of any hazardous materials and regardless of whether the actions that led to the presence were taken in compliance with the law. In our business, we use hazardous materials that are stored on site. We use various chemicals in our manufacturing process that may be toxic and covered by various environmental controls. An unaffiliated waste hauler transports the waste created by use of these materials off-site. Many environmental laws and regulations require generators of waste to take remedial actions at an off-site disposal location even if the disposal was conducted lawfully. The requirements of these laws and regulations are complex, change frequently and could become more stringent in the future. Failure to comply with current or future environmental laws and regulations could result in the imposition

of substantial fines, suspension of production, alteration of our production processes, cessation of operations or other actions, which could severely harm our business.

*Our plan to develop relationships with strategic partners may not be successful.*

Part of our business strategy is to maintain and develop strategic relationships with government agencies, private firms, and academic institutions to conduct research and development of technologies and products. For these efforts to be successful, we must identify partners whose competencies complement ours. We must also successfully enter into agreements with them on terms attractive to us, and integrate and coordinate their resources and capabilities with our own. We may be unsuccessful in entering into agreements with acceptable partners or negotiating favorable terms in these agreements. Also, we may be unsuccessful in integrating the resources or capabilities of these partners. In addition, our strategic partners may prove difficult to work with or less skilled than we originally expected. If we are unsuccessful in our collaborative efforts, our ability to develop and market products could be severely limited.

*Shares Eligible for Future Sale May Adversely Affect the Market.*

From time to time, certain of the Company's shareholders may be eligible to sell all or some of their shares of common stock by means of ordinary brokerage transactions in the open market pursuant to Rule 144, promulgated under the Securities Act, subject to certain limitations. In general, a non-affiliate stockholder who has satisfied a six-month holding period may, under certain circumstances, sell its shares, without limitation. Any substantial sale of the Company's common stock pursuant to Rule 144 or pursuant to any resale prospectus may have a material adverse effect on the market price of our common stock.

*There Is A Limited Market For Our Common Stock Which May Make It More Difficult For You To Sell Your Stock.*

Our Company's common stock is quoted on the OTC Bulletin Board under the symbol "LWLG.OB." The trading market for our common stock is limited, accordingly, there can be no assurance as to the liquidity of any markets that may develop for our common stock, your ability to sell our common stock, or the prices at which you may be able to sell our common stock.

*We are subject to the penny stock rules and brokers cannot generally solicit the purchase of our common stock, which adversely affects its liquidity and market price.*

The SEC has adopted regulations that generally define penny stock to be an equity security that has a market price of less than \$5.00 per share, subject to specific exemptions. The market price of our common stock on the OTC Bulletin Board has been substantially less than \$5.00 per share and therefore we are currently considered a penny stock according to SEC rules. This designation requires any broker-dealer selling these securities to disclose certain information concerning the transaction, obtain a written agreement from the purchaser and determine that the purchaser is reasonably suitable to purchase the securities. These rules limit the ability of broker-dealers to solicit purchases of our common stock and therefore reduce the liquidity of the public market for our shares.

*Our Company's Stock Price May Be Volatile.*

The market price of our Company's common stock is likely to be highly volatile and could fluctuate widely in price in response to various factors, many of which are beyond our control, including:

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Technological innovations or new products and services by our Company or our competitors;

.

Additions or departures of key personnel;

.

Sales of our Company's common stock;

·  
Our Company's ability to integrate operations, technology, products and services;

·  
Our Company's ability to execute our business plan;

·  
Operating results below expectations;

·  
Loss of any strategic relationship;

·  
Industry developments;

·  
Economic and other external factors; and

·  
Period-to-period fluctuations in our Company's financial results.

Because we have a limited operating history, you may consider any one of these factors to be material. Our stock price may fluctuate widely as a result of any of the above listed factors.

In addition, the securities markets have from time to time experienced significant price and volume fluctuations that are unrelated to the operating performance of particular companies. These market fluctuations may also materially and adversely affect the market price of our Company's common stock.

**Item 1B.**

**Unresolved Staff Comments.**

Not Applicable

**Item 2.**

**Properties.**

Our executive and business office headquarters are located at 111 Ruthar Drive, Newark, Delaware 19711. We coordinate our operations and market our services from this space. Our annual rent for this space is \$8,700.

We also lease approximately 1,400 square feet of laboratory space at 41A Germay Drive, Wilmington, Delaware 19804-1100. We operate an organic synthesis and thin-films laboratory from this facility, which has equipment including NMR, IR, UV/VIS and HPLC analytical systems. Our annual rent for the space is \$9,910.

**Item 3.**

**Legal Proceedings.**

We are not aware of any litigation or threatened litigation of a material nature.

**Item 4.**

**Mine Safety Disclosures.**

Not Applicable.





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

Our common stock is currently traded under the symbol LWLG on the over-the-counter bulletin board ("**OTCBB**").

The following table set forth below lists the range of high and low bids for our common stock for each fiscal quarter for the last two fiscal years. The prices in the table reflect inter-dealer prices, without retail markup, markdown or commission and may not represent actual transactions.

		Bid	High Ask	Bid	Low Ask
2010	1 <sup>st</sup> Quarter	\$	\$	\$	\$
		2.30	2.37	1.30	1.35
	2 <sup>nd</sup> Quarter	\$	\$	\$	\$
		1.90	2.20	1.28	1.35
	3 <sup>rd</sup> Quarter	\$	\$	\$	\$
		1.65	1.80	0.80	0.90
	4 <sup>th</sup> Quarter	\$	\$	\$	\$
		1.77	1.90	0.87	1.14
2011	1 <sup>st</sup> Quarter	\$	\$	\$	\$
		1.56	1.58	1.10	1.25
	2 <sup>nd</sup> Quarter	\$	\$	\$	\$
		1.20	1.40	0(1)	0(1)
	3 <sup>rd</sup> Quarter	\$	\$	\$	\$
		---(2)	---(2)	---(2)	---(2)
	4 <sup>th</sup> Quarter	\$	\$	\$	\$

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1.

Reflects that at least two market makers posted two-sided quotes for our common stock and all of the quotes were priced at zero.

2.

Reflects that no priced bids or asks were calculated because there was not a minimum of 2 two-sided quotes for our common stock.

### **Holders**

As of the date of this annual report, we have a total of 47,426,873 shares of common stock outstanding, held by approximately 2,930 individual shareholders. We do not have any shares of preferred stock outstanding.

### **Dividends**

No cash dividends have been declared or paid on our common stock to date. No restrictions limit our ability to pay dividends on our common stock. The payment of cash dividends in the future, if any, will be contingent upon our Company's revenues and earnings, if any, capital requirements and general financial condition. The payment of any dividends is within the discretion of our board of directors. Our board of director's present intention is to retain all earnings, if any, for use in our business operations and, accordingly, the board of directors does not anticipate paying any cash dividends in the foreseeable future.

**Securities Authorized for Issuance under Equity Compensation Plans**

Equity Compensation Plans as of December 31, 2011.

**Equity Compensation Plan Information**

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))
	(a)	(b)	(c)
Equity compensation plans approved by security holders (1)	4,647,000	\$1.16	957,450
Equity compensation plans not approved by security holders (2)	2,876,500	\$0.69	0
<b>Total</b>	<b>7,523,500</b>	<b>\$0.98</b>	<b>957,450</b>

1.

Reflects our 2007 Employee Stock Plan for the benefit of our directors, officers, employees and consultants. We have reserved 6,500,000 shares of common stock for such persons pursuant to that plan.

2.

Comprised of common stock purchase warrants we issued for services.

**Penny Stock Regulations and Restrictions on Marketability**

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a market price of less than \$5.00, other than securities registered on certain national securities exchanges or quoted on the NASDAQ system, provided that current price and volume information with respect to transactions in such securities is provided by the exchange or system. The penny stock rules require a broker-dealer, prior to a transaction in a penny stock, to deliver a standardized risk disclosure document prepared by the SEC, that: (a) contains a description of the nature and level of risk in the market for penny stocks in both public offerings and secondary trading; (b) contains a description of the broker's or dealer's duties to the customer and of the rights and remedies available to the customer with respect to a violation of such duties or other requirements of the securities laws; (c) contains a brief, clear, narrative description of a dealer market, including bid and ask prices for penny stocks and the significance of the spread between the bid and ask price; (d) contains a

toll-free telephone number for inquiries on disciplinary actions; (e) defines significant terms in the disclosure document or in the conduct of trading in penny stocks; and (f) contains such other information and is in such form, including language, type size and format, as the SEC shall require by rule or regulation.

The broker-dealer also must provide, prior to effecting any transaction in a penny stock, the customer with (a) bid and offer quotations for the penny stock; (b) the compensation of the broker-dealer and its salesperson in the transaction; (c) the number of shares to which such bid and ask prices apply, or other comparable information relating to the depth and liquidity of the market for such stock; and (d) a monthly account statement showing the market value of each penny stock held in the customer's account.

In addition, the penny stock rules require that prior to a transaction in a penny stock not otherwise exempt from those rules, the broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive the purchaser's written acknowledgment of the receipt of a risk disclosure statement, a written agreement as to transactions involving penny stocks, and a signed and dated copy of a written suitability statement.

These disclosure requirements may have the effect of reducing the trading activity for our common stock. Therefore, stockholders may have difficulty selling our securities.

**Recent Sales of Unregistered Securities**

During the period covered by this report, our Company has sold the following securities without registering the securities under the Securities Act:

***Securities issued for cash***

Date	Security
June 2011	Common stock 185,185 shares of common stock for aggregate proceeds of \$200,000 pursuant to a purchase agreement and registration rights agreement.
3 <sup>rd</sup> /4 <sup>th</sup> FQ 2011	Common stock/Warrants - 1,000,000 shares of common stock and warrants to purchase 1,000,000 shares of common stock for aggregate proceeds of \$1,000,000 pursuant to a private offering.

***Securities issued for services***

Date	Security
January 2011	Warrant - 10,000 shares of common stock at \$1.25 per share for services.
January 2011	Warrant - 25,000 shares of common stock at \$1.25 per share for services.
March 2011	Common stock 10,000 shares of common stock for \$14,500 in services.
April 2011	Warrant - 150,000 shares of common stock at \$1.18 per share for services.
May/June 2011	Common stock 153,847 shares of common stock for commitment fee to institutional investor.
June 2011	Common stock - 10,000 shares of common stock for \$10,400 in services.
September 2011	Common stock - 10,000 shares of common stock for \$14,500 in services.
October 2011	Common stock 2,018 shares of common stock for \$2,163 in services.

***Securities issued pursuant to our Employee Stock Plan***

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Date	Security
May 2011	Stock options - 200,000 shares of common stock at \$1.12 per share.
August 2011	Stock options - 150,000 shares of common stock at \$1.01 per share.
November 2011	Stock options - 150,000 shares of common stock at \$0.63 per share.
December 2011	Stock options 250,000 shares of common stock at \$1.01 per share.
December 2011	Stock options - 150,000 shares of common stock at \$1.30 per share.

No underwriters were utilized and no commissions or fees were paid with respect to any of the above transactions. These persons were the only offerees in connection with these transactions. We relied on Section 4(2) and Rule 506 of Regulation D of the Securities Act since the transaction does not involve any public offering.

**Item 6.**

**Selected Financial Data.**

Not Applicable.

**Item 7.**

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

The following management's discussion and analysis of financial condition and results of operations provides information that management believes is relevant to an assessment and understanding of our plans and financial condition. The following selected financial information is derived from our historical financial statements and should be read in conjunction with such financial statements and notes thereto set forth elsewhere herein and the "Forward-Looking Statements" explanation included herein.

**Overview**

Lightwave Logic, Inc. (then known as Eastern Idaho Internet Service, Inc.) was organized under the laws of the State of Nevada in 1997, where we engaged in the business of marketing Internet services until June 30, 1998 when our operations were discontinued. We were then inactive until we acquired PSI-TEC Corporation as our wholly owned subsidiary on July 14, 2004, at which time our name was changed to PSI-TEC Holdings, Inc. On October 20, 2006, we completed a parent-sub subsidiary merger with PSI-TEC Corporation whereby we were the surviving corporation of the merger, and our name was changed to Third-Order Nanotechnologies, Inc. On March 10, 2008, we changed our name to Lightwave Logic, Inc. to better suit our strategic business plan and to facilitate shareholder recognition of our Company and our business.

We are a development stage research and development company. We have developed and are continuing to develop Application Specific Electro-Optic Polymers (ASEOP) and Non-Linear All-Optical Polymers (NLAOP), which have high electro-optic and optical activity. Both types of materials are thermally and photo-chemically stable, which we believe could have utility across a broad range of applications in devices. We engineer our proprietary electro-optic polymers at the molecular level for superior performance, stability, cost-efficiency and ease of processing. We expect our NLAOP polymers to broadly replace more expensive, lower-performance materials that are currently used in, telecommunication, data communications, computing, photovoltaic cells, wireless and satellite communication



networks.

In order to transmit digital information at extremely high-speeds (wide bandwidth) over the Internet, it is necessary to convert the electrical signals produced by a computer into optical signals for transmission over long-distance fiber-optic cable. The actual conversion of electricity to an optical signal may be performed by a molecularly engineered material known as an electro-optic polymer.

We are currently developing electro-optic polymers that promise performance many times faster than any technology currently available and that have unprecedented thermal stability. High-performance electro-optic materials produced by our Company have demonstrated stability as high as 350 degrees Celsius. Stability above 250 degrees Celsius is necessary for vertical integration into many semi-conductor production lines. In December 2011 one of our non-linear optical polymers demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt with excellent thermal and photo stability. Independent research laboratories at Photon-X and The University of Colorado confirmed these characteristics.

Our non-linear all optical polymers have demonstrated resonantly enhanced Third-order properties about 2,630 times larger than fused silica, which means that they are very photo-optically active in the absence of an RF layer. In this way they differ from our electro-optical polymers and are considered more advanced next-generation materials.

Our revenue model relies substantially on the assumption that we will be able to successfully develop electro-optic products for applications within the industries described below. When appropriate, we intend to create specific materials for each of these applications and use our proprietary knowledge base to continue to enhance its discoveries.

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Satellite Reconnaissance

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Navigational Systems

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Radar Applications

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Telecommunications

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Optical Interconnects

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Optical Computing

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Entertainment

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Medical Applications

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Solar Panels (Photovoltaic cells)

To be successful, we must, among other things:

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Develop and maintain collaborative relationships with strategic partners;

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Continue to expand our research and development efforts for our products;

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Develop and continue to improve on our manufacturing processes and maintain stringent quality controls;

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Produce commercial quantities of our products at commercially acceptable prices;

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Rapidly respond to technological advancements;

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Attract, retain and motivate qualified personnel; and

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Obtain and retain effective intellectual property protection for our products and technology.

We believe that Moore's Law (a principle which states the number of transistors on a silicon chip doubles approximately every eighteen months) will create markets for our high-performance electro-optic material products.

## **Plan of Operation**

Since our inception, we have been engaged primarily in the research and development of our polymer materials technologies and potential products. We are devoting significant resources to engineer next-generation electro-optic polymers for future applications to be utilized by electro-optic device manufacturers, such as telecommunications component and systems manufacturers, networking and switching suppliers, semiconductor companies, aerospace companies and government agencies. We expect to continue to develop products that we intend to introduce to these rapidly changing markets and to seek to identify new markets. We expect to continue to make significant operating and capital expenditures for research and development activities.

As we move from a development stage company to a product vendor, we expect that our financial condition and results of operations will undergo substantial change. In particular, we expect to record both revenue and expense from product sales, to incur increased costs for sales and marketing and to increase general and administrative expense. Accordingly, the financial condition and results of operations reflected in our historical financial statements are not expected to be indicative of our future financial condition and results of operations.

On August 8, 2006, we contracted with Triple Play Communications Corporation, a design and market consulting company, to deliver a comprehensive market opportunity assessment report for high-speed 40G (commercial) & 100G+ (military/aerospace) modulators and system applications.

In August, 2006, we entered into a co-location agreement with InPlane Photonics, a New Jersey-based micro-optics company that allowed our scientists to establish a pre-production line in order to test and integrate our organic materials into waveguide devices and system prototypes as a first step toward product commercialization. This agreement was terminated at the end of January 2007 so that we could focus on pursuing a strategic relationship with Photon-X LLC, a Pennsylvania-based firm with extensive experience in polymer waveguide processing. We entered into a non-binding memorandum of understanding with Photon-X, LLC in December 2006 to work towards creating a fee for services agreement with Photon-X, LLC to design, develop, produce and market electro-optic components based upon our polymer technology, which we ultimately finalized in March 2007. This agreement with Photon-X, LLC enables our Company access to a full suite of fabrication facilities capable of producing commercial quantities of precision micro-optic devices such as high-speed (40GHz) telecom modulators, optical filters, and optical interconnects important to military and civilian global information movement and management markets.

On September 25, 2006, we obtained independent laboratory results that confirmed the thermal stability of our Perkinamine™ electro-optic materials. Thermal stability as high as 350 degrees Celsius was confirmed, significantly exceeding many other commercially available high performance electro-optic materials, such as CLD-1 that exhibits thermal degradation in the range of 250 degrees Celsius to 275 degrees Celsius. This high temperature stability of our materials eliminates a major obstacle to vertical integration of electro-optic polymers into standard microelectronic manufacturing processes (e.g. wave/vapor-phase soldering) where thermal stability of at least 300 degrees Celsius is required. In independent laboratory tests, ten-percent material degradation, a common evaluation of overall thermal stability, did not occur until our Perkinamine™ materials base was exposed to temperatures as high as 350 degrees Celsius, as determined by Thermo-Gravimetric Analysis (TGA). The test results supported our Company's progress to introduce our materials into commercial applications such as optical interconnections, high-speed telecom and datacom modulators, and military/aerospace components.

In July 2007, our Company developed an innovative process to integrate our unique architecture into our anticipated commercial devices, whereby dendritic spacer systems are attached to its core chromophore. In the event we are successful in developing a commercially viable product, we believe these dendrimers will reduce the cost of manufacturing materials and reduce the cost and complexity of tailoring the material to specific customer requirements.

In January 2008, we retained TangibleFuture, Inc., a San Francisco based technology analysis and business development consulting company, to generate an independent assessment of our business opportunities in the fiber-optic telecommunications and optical computing sectors and develop strategies to penetrate those potential markets.

In March 2008, we commenced production of our first prototype photonic chip, which we delivered to Photon-X, LLC to fabricate a prototype polymer optical modulator and measure its technical properties. As a result of delays caused by engineering setbacks related to our material production, the production of our first prototype photonic chip was temporarily halted, along with the completion of our proof of concept tests that were being administered by Dr. Robert Norwood at the University of Arizona Photonics Department. In order to address this issue, our Chief Technology Officer Dr. David F. Eaton's role and responsibilities with the Company were significantly expanded, and we added two veteran synthetic chemists to our science and technology team. We have since overcome a majority of these engineering setbacks and we are currently in the continual process of extensive testing for material performance, including, among other tests, the (r33) Teng-Man testing protocol.

In June 2009, we released test results conducted by Dr. C.C. Teng that re-confirmed our previous test results, and we intend to deliver completed independent validated material performance test results, including the (r33) Teng-Man testing protocol, as they become ripe for release.

In August 2009, Photon-X, LLC commenced a compatible study, process sequences and fabricated wafers/chips containing arrays of phase modulators. The first one hundred plus modulators were completed at the end of October

2009, and were successfully characterized for insertion loss, V<sub>pi</sub>, modulation dynamic range and initial frequency response in March 2010. The multi-step manufacturing

process we utilized to fabricate our modulators involved exposing our proprietary Perkinamine™ materials to extreme conditions that are typically found in standard commercial manufacturing settings. Our step-by-step analysis throughout the fabrication process demonstrated to us that our Perkinamine™ materials can successfully withstand each step of the fabrication process without damage. We anticipated completing the development and building of functional prototype 40 Gb/s and 100 Gb/s modulators during the second quarter of 2010. However, we have incurred delays with our modulator project due to our focus on current application driven projects and evaluations that we believe will more quickly generate revenue for our Company. The completion of these two modulator designs will most likely occur during the second half of 2011 upon completion of an anticipated updated optical device design. However, we may incur delays in this process due to slower than expected material production within our laboratories and/or delays caused by the production of the modulator and testing procedures.

In August 2009, we retained Perdux, Inc. to help us identify and build prototype products for high growth potential target markets in fiber optic telecommunications systems. During October 2009, we initiated the development and production of our prototype amplitude modulator, which can ultimately be assembled into 1- and 2- dimensional arrays that are useful for optical computing applications, such as encryption and pattern recognition. We expected our initial prototype amplitude modulator to be completed by the end of the second quarter 2010. Our Company continues to work with strategic partners in this development effort and we anticipate prototypes in second half of 2011. However, we may incur delays in this process due to slower than expected material production within our laboratories and/or delays caused by the production of the modulator and testing procedures.

In November 2009, we introduced our new prototype phase modulator to the Gilder/Forbes Telecosm Conference in Tarrytown, New York and discussed how Lightwave's material could be spun onto silicon chips prior to stacking and used for input, output, and interconnect due to the stability of Lightwave's electro-optic polymer and Lightwave's recent demonstration that its proprietary Perkinamine™ materials can survive all of the rigors of standard commercial manufacturing processes. Other applications discussed with the conference attendees included low cost modulators for fiber optic communications, multi-channel modulators for ultra dense wavelength division multiplex systems, and optical computing.

In December 2009, we filed our sixth patent application. The provisional application covers stable free radical chromophores for use in Non-Linear optical applications. The new polymeric electro-optic material has enormous potential in spatial light modulation and all optical signal processing (light switching light).

In January 2010, we entered into an agreement with the University of Alabama at Tuscaloosa to conduct cooperative development, analytical testing, optimization, and scale-up of our proprietary materials platform, which should help shorten the time to market for our new Polymeric Electro-Optic materials.

In March 2010, we successfully concluded the electrical and optical performance testing stage of our proof of principle prototype phase modulator and began Application Engineering of our technology in customer design environments and working directly with interested large system suppliers to attempt to engineer specific individual product materials and device designs for sale to or by these suppliers.

In October of 2010, we completed the concept stage of a novel design for an advanced optical computing application and moved forward into the design stage with Celestech, Inc. of Chantilly, Virginia. This project will incorporate one of our Company's advanced electro-optical polymer materials.

In October of 2010, we announced the results of testing performed by Lehigh University that demonstrated the Third-order non-linear properties of our proprietary molecules in the Perkinamine NR™ chromophore class. Lehigh University determined that the material was 100 times stronger than the highest off-resonance small molecule currently known. They also determined that it was 2,600 times more powerful than fused silica and demonstrated extremely fast (less than 1 picosecond) photo-induced non-linear response that would be capable of modulation at rates of 1 THz (terahertz).





In February and April 2011, respectively, the United States Patent Office granted our Company two patents: US Patent No. 7,894,695 covering our Tricyclic Spacer System for Non-Linear Optical Devices and US Patent No. 7,919,619 for Heterocyclical Chromophore Architectures directed to our Perkinamine™ chromophores. These composition of matter patents taken together protect the core of our electro-optical materials portfolio.

In March 2011, we entered into a research and development agreement with the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) to develop Third-order non-linear devices. We believe that the combination of LaNMP's device capabilities together with our materials expertise should accelerate the development of all-optical devices.

In March 2011, the United States Patent Office granted our Company 2 patents: US Patent No. 7,919,619 for Heterocyclical Chromophore Architectures directed to our Perkinamine™ chromophores and US Patent No. 7,894,695 covering our Tricyclic Spacer System for Non-Linear Optical Devices. These composition of matter patents taken together protect the core of our electro-optical materials portfolio.

In March 2011, the City University of New York's Laboratory for Nano Micro Photonics (LaNMP) fabricated our first-ever all optical waveguide using one of our Perkinamine NR™ chromophores. It is anticipated that LaNMP will use this device architecture to develop various all-optical devices including an all-optical transistor.

In March 2011, we announced a two-year research and development collaboration with the University of Alabama to explore the advanced energy capture properties of our Perkinamine™ class of chromophores. Our material absorbs light across a wide range of wavelengths from near infra-red into the near ultraviolet. The University intends to explore how to efficiently capture a wide range of solar radiation with our material.

In December 2011, we announced the discovery of a new material named Perkinamine Indigo™. We believe this represents a major advancement in the field of organic nonlinear optical materials. These are early results and we have much to learn about how to harness full potential of Perkinamine Indigo™. The material demonstrated an unusually high electro-optical effect of greater than 250 picometers per volt at 1550 nanometers with excellent thermal and photo stability. Independent research laboratories at Micron Inc., Photon-X and The University of Colorado confirmed these characteristics.

We ultimately intend to use our next-generation electro-optic polymers for future applications vital to the following industries. We expect to create specific materials for each of these applications as appropriate:

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Satellite Reconnaissance

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Navigational Systems

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Radar Applications

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Telecommunications

.

Optical Interconnects

.

Optical Computing

.

Entertainment

.

Medical Applications

.

Solar Panels (Photovoltaic cells)

In an effort to maximize our future revenue stream from our electro-optic polymer products, we are currently evaluating each of or some combination of the following approaches:

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Licensing our technology for individual specific applications;

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Entering into collaborative or joint venture agreements with one or a number of partners; or

Selling our products directly to commercial customers.

Additionally, we must create an infrastructure, including operational and financial systems, and related internal controls, and recruit qualified personnel. Failure to do so could adversely affect our ability to support our operations.

We have incurred substantial net losses since inception. We have satisfied our capital requirements since inception primarily through the issuance and sale of our common stock. During 2004 we raised approximately \$529,000 from the issuance of convertible promissory notes, of which \$30,000 was converted into common stock of the company during 2004 and the remaining \$499,000 converted in 2005. Also, during 2005, we raised an aggregate of \$1,000,000 from the private sale of our common stock. During 2006, we raised approximately \$425,000 from the private sale of our common stock, of which \$200,000 was rescinded during 2007. During 2007, we raised approximately \$2,301,524 from the private sale of our common stock. During 2008, we raised approximately \$414,000 from the private sale of our common stock and \$375,270 from the exercise of outstanding warrants. Through June 30, 2009, we raised approximately \$855,000 from the sale of our private stock. We have also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our company, including professional services. During October 2009 we obtained proceeds of \$455,000 from the exercise of outstanding warrants.

During 2010, we raised \$1,500,000 from the private sale of our common stock and \$539,000 from the exercise of outstanding options and warrants. We also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our company. During 2011, we raised \$1,000,000 from the private sale of our common stock and warrants to purchase our common stock. We also issued shares of our common stock and warrants to purchase shares of our common stock in exchange for services rendered to our company. Additionally, in May 2011, we signed an agreement with an institutional investor to sell up to \$20 million of common stock. Under the agreement subject to certain conditions and at our sole discretion, the institutional investor has committed to invest up to \$20 million in our common stock over a 30-month period. We filed a registration statement with the U.S. Securities and Exchange Commission covering the resale of the shares that may be issued to the institutional investor. The institutional investor is obligated to make purchases as we direct in accordance with the agreement, which may be terminated by us at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon the market prices of our common stock immediately preceding the sales to the institutional investor. On June 23, 2011, the institutional investor purchased 185,185 shares of common stock for proceeds of \$200,000. During January through March, 2012, the institutional investor purchased 1,870,588 shares of common stock for proceeds of \$2,999,998.

## **Award**

On September 26, 2006, we were awarded the 2006 Electro-Optic Materials Technology Innovation of the Year Award by Frost & Sullivan. Frost & Sullivan's Technology Innovation of the Year Award is bestowed upon candidates whose original research has resulted in innovations that have, or are expected to bring, significant

contributions to multiple industries in terms of adoption, change, and competitive posture. This award recognizes the quality and depth of our Company's research and development program as well as the vision and risk-taking that enabled us to undertake such an endeavor.

## Results of Operations

### Comparison of fiscal 2011 to fiscal 2010

#### Revenues

As a development stage research and development company, we had no revenues during the year ended December 31, 2011. There was \$3,200 in engineering revenues during the year ended December 31, 2010. The Company is at various stages with potential customers and expects additional revenues once customers release purchase orders against outstanding proposals or once customers complete product evaluations and product development.

#### Operating Expenses

Our operating expenses were \$3,316,343 and \$3,716,071 for the years ended December 31, 2011 and 2010, respectively, for a decrease of \$399,728. The decrease is due primarily to decrease in non cash general and administrative amortization of warrants based on vesting terms as part of the employment agreement entered into in January 2010 with the Company's new Chair, non cash research and development amortization of options and investor relation expenses offset by increases in fees incurred for the registration of common stock for resale to an institutional investor, expenses for the 2011 submission of the Company's 10-Q in eXtensible Business Reporting Language (XBRL,) laboratory electro-optic device prototype design, development and testing expense and wages and salaries.

Included in our operating expenses for the year ended December 31, 2011 was \$1,682,557 for research and development expenses compared to \$1,709,171 for the year ended December 31, 2010, for a decrease of \$26,614.

This is primarily due to decreases in non cash stock compensation and stock option amortization offset by increases in laboratory electro-optic device prototype design, development and testing expense, salaries and wages, the allocation of health insurance and travel and lodging expenses and expenditures for the removal of material past its useful life.

Research and development expenses currently consist primarily of compensation for employees engaged in internal research, product and application development activities; laboratory operations, outsourced prototype electro-optic device design, development and processing work; customer testing; material testing; fees; costs; and related operating expenses.

We expect to continue to incur substantial research and development expense to develop and commercialize our electro-optic material platform. These expenses will increase as a result of accelerated development effort to support

commercialization of our non-linear optical polymer materials technology; subcontracting work to build prototypes; expanding and equipping in-house laboratories; hiring additional technical and support personnel; engaging a senior technical advisor; pursuing other potential business opportunities and collaborations; customer testing and evaluation; and incurring related operating expenses.

Non cash stock compensation and stock option amortization decreased \$295,209 from \$936,912 for the year ended December 31, 2010 to \$641,703 for the year ended December 31, 2011.

Laboratory electro-optic and optical device prototype, development and testing expense increased \$94,846 from \$189,148 for the year ended December 31, 2010 to \$283,994 for the year ended December 31, 2011.

Wages and salaries increased \$47,008 from \$440,196 for the year ended December 31, 2010 to \$487,204 for the year ended December 31, 2011 primarily due to additional employees hired during 2010 and 2011 including a full time Chief Technology Officer.

Due to a change in the allocation between general and administrative and research and development expenses, health insurance, travel and lodging expenses allocated to research and development increased for the year ended December 31, 2011 as compared to the year ended December 31, 2010. Health insurance expenditures for research and development employees increased \$23,678 from \$26,558 for the year ended December 31, 2010 to \$50,236 for the year ended December 31, 2011. Travel and lodging expenses increased \$52,970 from \$1,034 for the year ended December 31, 2010 to \$54,004 for the year ended December 30, 2011. Travel and lodging expenses also increased as the result of additional travel in research and development activities.

Expenses for the disposal of materials past its useful life in research and development operations increased \$20,798 from \$2,092 for the year ended December 31, 2010 to \$22,890 for the year ended December 31, 2011.

General and administrative expense consists primarily of compensation and support costs for management staff, and for other general and administrative costs, including executive, sales and marketing, investor relations, accounting and finance, legal, consulting and other operating expenses.

General and administrative expenses decreased \$373,114 to \$1,633,786 for the year ended December 31, 2011 compared to \$2,006,900 for the year ended December 31, 2010. The decrease is due primarily to decrease in non cash amortization of warrants based on vesting terms as part of the employment agreement entered into in January 2010 with the Company's new Chair and investor relations expense offset by increases in fees for the registration of common stock for resale to an institutional investor, expenses for the 2011 submission of the Company's 10-Q in eXtensible Business Reporting Language (XBRL), wages and salaries and insurance.

Legal fees increased \$37,363 to \$113,107 and for the year ended December 31, 2011 compared to \$75,744 for the year ended December 31, 2010. The increase relates to the legal fees incurred during the year ended December 31, 2011 for the filing of a registration statement for the resale of common stock to an institutional investor.

Investor relations expenses decreased by \$38,396 from \$151,725 for the year ended December 30, 2010 to \$113,329 for the year ended December 31, 2011. During 2011, the Company employed an investor relations specialist in an effort to control costs and to expand its exposure to a broader base of investors.

Remaining general and administrative wages and salaries increased \$71,193 from \$97,193 for the year ended December 31, 2010 to \$168,386 for the year ended December 31, 2011 primarily due to the employment of a Vice President of Sales and Marketing during 2011.

Total expenses for accounting and administrative services decreased by \$54,639 for the year ended December 31, 2011 compared to the year ended December 31, 2010. Non-cash amortization of warrants for accounting and administrative services decreased \$103,639 from \$213,459 for the year ended December 31, 2010 to \$109,820 for the

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year ended December 31, 2011. Accounting fees increased \$49,000 from \$42,000 for the year ended December 31, 2010 compared to \$91,000 for the year ended December 31, 2011. The additional accounting fees incurred during the year ended December 31, 2011 included fees of \$13,000 for services relating to the registration statement for the resale of common stock to an institutional investor and the 2011 submission of the Company's 10-Q in eXtensible Business Reporting Language (XBRL) as required by the U.S. Securities and Exchange Commission (SEC).

SEC filing fees increased by \$7,652 from \$5,250 for the year ended December 31, 2010 to \$12,902 for the year ended December 31, 2011 for services relating to the 2011 submission of the Company's 10-Q in eXtensible Business Reporting Language (XBRL).



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Other professional fees increased by \$18,822 from \$1,941 for the year ended December 31, 2010 to \$20,763 for the year ended December 31, 2011 for fees associated with the resale of common stock to an institutional investor.

Health insurance premiums and directors and officers insurance increased \$56,156 from \$65,050 for the year ended December 31, 2010 to \$121,206 for the year ended December 31, 2011 primarily due to health insurance coverage for additional employees hired and an increase in directors and officers insurance coverage during 2011 offset by a change in the allocation between general and administrative and research and development expenses.

Non-cash stock compensation decreased by \$573,378 to \$749,925 for the year ended December 31, 2011 compared to \$1,323,303 for the year ended December 31, 2010. The stock compensation for the year ended December 31, 2011 included the aforementioned non-cash amortization of warrants for accounting and administrative expenses. This total decrease in stock compensation is primarily due to the non-cash amortization of warrants as part of the employment agreement entered into with the Company's new Chair during 2010.

Annual Shareholder meeting expenses decreased by \$16,049 to \$23,809 for the year ended December 31, 2011 compared to \$39,858 for the year ended December 31, 2010.

We expect general and administrative expense to increase in future periods as we increase the level of corporate and administrative activity, including increases associated with our operation as a public company; and increase expenditures related to the future business development and sales of our products.

### Other Income (Expense)

Other income (expense) was (\$166,279) for the year ended December 31, 2011, relating primarily to the commitment fee associated with the resale of shares to an institutional investor during the year ending December 31, 2011. Other income (expense) was (\$361) for the year ended December 31, 2010.

### Net Loss

Net loss was \$3,482,622 and \$3,713,232 for the years ended December 31, 2011 and 2010, respectively, for a decrease of \$230,610, primarily resulting from the decreases in non cash general and administrative amortization of warrants based on vesting terms as part of the employment agreement entered into in January 2010 with the Company's new Chair, non cash research and development amortization of options and investor relations expenses offset by increase in fees for the registration of common stock for resale to an institutional investor and commitment fees for the resale of common stock, expenses for the 2011 submission of the Company's 10-Q in eXtensible Business

Reporting Language (XBRL), laboratory electro-optic and optical device prototype designs, development and testing expense and wages and salaries.

### **Significant Accounting Policies**

Our Company's accounting policies are more fully described in Note 1 of Notes to Financial Statements. As disclosed in Note 1 of Notes to Financial Statements, the preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying disclosures. Although these estimates are based on our management's best knowledge of current events and actions our Company may undertake in the future, actual results could differ from the estimates.

## **Stock Based Compensation**

The Company uses the Black-Scholes option pricing model to calculate the grant-date fair value of an award, with the following assumptions for 2011 and 2010: no dividend yield in both years, expected volatility, based on the Company's historical volatility, between 115% and 125% in 2011 and between 123% and 134% in 2010, risk-free interest rate between 0.82% and 2.15% in 2011 and between 1.64% and 2.55% in 2010 and expected option life of three to five years in 2011 and 2010.

As of December 31, 2011, there was \$844,322 of unrecognized compensation expense related to non-vested market-based share awards that is expected to be recognized through December 2014.

## **Liquidity and Capital Resources**

During the year ended December 31, 2011, net cash used in operating activities was \$1,682,371 and net cash used in investing activities was \$111,672, which was due primarily to the Company's research and development activities and general and administrative expenditures. Net cash provided by financing activities for the year ended December 31, 2011 was \$1,200,000. At December 31, 2011, our cash and cash equivalents totaled \$359,824, our assets totaled \$921,435, our liabilities totaled \$238,426, and we had stockholders' equity of \$683,009.

During the year ended December 31, 2010, net cash used in operating activities was \$1,436,681 and net cash used in investing activities was \$108,441, which was due primarily to the Company's research and development activities and general and administrative expenditures. Net cash provided by financing activities for the year ended December 31, 2010 was \$2,039,000. At December 31, 2010, our cash and cash equivalents totaled \$953,867, our assets totaled \$1,471,633, our liabilities totaled \$116,012, and we had stockholders' equity of \$1,355,621.

## **Sources and Uses of Cash**

Our future expenditures and capital requirements will depend on numerous factors, including: the progress of our research and development efforts; the rate at which we can, directly or through arrangements with original equipment manufacturers, introduce and sell products incorporating our polymer materials technology; the costs of filing, prosecuting, defending and enforcing any patent claims and other intellectual property rights; market acceptance of our products and competing technological developments; and our ability to establish cooperative development, joint venture and licensing arrangements. We expect that we will incur in excess of \$2,000,000 of expenditures over the next 12 months. Our cash requirements are expected to increase at a rate consistent with the Company's path to revenue growth as we expand our activities and operations with the objective of commercializing our electro-optic polymer technology during 2012.

Our business does not presently generate the cash needed to finance our current and anticipated operations. We believe we have raised sufficient capital to finance our operations through September 2013, however, we will need to obtain additional future financing after that time to finance our operations until such time that we can conduct profitable revenue-generating activities.

Such future sources of financing may include cash from equity offerings, exercise of stock options, warrants and proceeds from debt instruments; but we cannot assure you that such equity or borrowings will be available or, if available, will be at rates or prices acceptable to us.

In May 2011 we signed our stock purchase agreement with Lincoln Park whereby subject to certain conditions and at our sole discretion, Lincoln Park has committed to purchase up to \$20 million of our common stock over a 30-month period. We registered for resale by Lincoln Park 10,000,000 shares of our common stock in June 2011. Lincoln Park is obligated to make purchases as the Company directs in accordance with the purchase agreement, which may be terminated by the Company at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon the

market prices of our Company's common stock immediately preceding the sales to Lincoln Park. We expect this financing to provide our Company with sufficient funds to maintain its operations for the foreseeable future. With the additional capital, we expect to achieve a level of revenues attractive enough to fulfill our development activities and adequate enough to support our business model for the foreseeable future. We cannot assure you that we will meet the conditions of the stock purchase agreement with Lincoln Park in order to obligate Lincoln Park to purchase our shares of common stock. In the event we fail to do so, and other adequate funds are not available to satisfy either short-term or long-term capital requirements, or if planned revenues are not generated, we may be required to substantially limit our operations. This limitation of operations may include reductions in capital expenditures and reductions in staff and discretionary costs.

There are no trading volume requirements or restrictions under the Purchase Agreement, and we will control the timing and amount of any sales of our common stock to Lincoln Park. Lincoln Park has no right to require any sales by us, but is obligated to make purchases from us as we direct in accordance with the Purchase Agreement. We can also accelerate the amount of common stock to be purchased under certain circumstances. There are no limitations on use of proceeds, financial or business covenants, restrictions on future funding, rights of first refusal, participation rights, penalties or liquidated damages in the Purchase Agreement. We may terminate the Purchase Agreement at any time, at our discretion, without any penalty or cost to us. Lincoln Park may not assign or transfer its rights and obligations under the Purchase Agreement.

We expect that our cash used in operations will increase during 2012 and beyond as a result of the following planned activities:

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The addition of management, sales, marketing, technical and other staff to our workforce;

.

Increased spending for the expansion of our research and development efforts, including purchases of additional laboratory and production equipment;

.

Increased spending in marketing as our products are introduced into the marketplace;

.

Developing and maintaining collaborative relationships with strategic partners;

.

Developing and improving our manufacturing processes and quality controls; and

.

Increases in our general and administrative activities related to our operations as a reporting public company and related corporate compliance requirements.

### **Analysis of Cash Flows**

For the year ended December 31, 2011

Net cash used in operating activities was \$1,682,371 for the year ended December 31, 2011, consisting of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure, offset by \$519,441 in warrants issued for services, \$882,640 in options issued for services, \$207,929 in common stock issued for services, \$35,394 in depreciation and patent amortization expenses, \$32,433 in prepaid expenses and other current assets and \$122,414 in accounts payable and accrued expenses.

Net cash used by investing activities was \$111,672 for the year ended December 31, 2011, consisting of \$93,778 for intangibles (patents) and \$17,894 in asset additions for the lab and research and development activities.

Net cash provided by financing activities was \$1,200,000 for the year ended December 31, 2011 and consisted of \$200,000 proceeds from sale of common stock to an institutional investor proceeds and \$1,000,000 from the issuance of common stock under private placement.

For the year ended December 31, 2010

Net cash used in operating activities was \$1,436,681 for the year ended December 31, 2010, consisting of payments for research and development, legal, professional and consulting expenses, rent and other expenditures necessary to develop our business infrastructure, offset by \$1,007,689 in warrants issued for services, \$1,252,526 in options issued for services, \$22,650 in common stock issued for services, \$37,500 in amortization of prepaid expenses, \$30,166 in depreciation expense, (\$58,316) in prepaid expenses and (\$15,664) in accounts payable and accrued expenses.

Net cash used by investing activities was \$108,441 for the year ended December 31, 2010, consisting of the purchase of intangibles (patents) for \$84,794 and \$23,647 in asset additions for the lab facility.

Net cash provided by financing activities was \$2,039,000 for the year ended December 31, 2010 and consisted of \$1,500,000 from the issuance of common stock under private placement and \$539,000 proceeds from the exercise of warrants.

**Item 7A.**

**Quantitative and Qualitative Disclosures About Market Risk**

Not Applicable

**Item 8.**

**Financial Statements and Supplementary Data**

Our Financial Statements of are attached as Appendix A (following Exhibits) and included as part of this Form 10-K Report. A list of our Financial Statements is provided in response to Item 15 of this Form 10-K Report.

**Item 9.**

**Changes In And Disagreements With Accountants On Accounting and Financial Disclosure**

Not Applicable.

**Item 9A.**

**Controls and Procedures.**

*Evaluation of Disclosure Controls and Procedures*

As of the end of the period covered by this report, our Company evaluated the effectiveness and design and operation of its disclosure controls and procedures. Our Company's disclosure controls and procedures are the controls and other procedures that we designed to ensure that our Company records, processes, summarizes, and reports in a timely manner the information that it must disclose in reports that our Company files with or submits to the Securities and Exchange Commission. Our principal executive officer and principal financial officer reviewed and participated in this evaluation. Based on this evaluation, our Company made the determination that its disclosure controls and procedures were effective.

*Management's Report on Internal Control Over Financial Reporting*

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of management, including our principal executive officer and



principal financial officer, we conducted an evaluation of the effectiveness of our internal controls over financial reporting based on the framework in Internal Control -Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on this evaluation, management has concluded that our internal control over financial reporting was effective as of December 31, 2011.

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

Our management, including our principal executive officer and principal financial officer, does not expect that our disclosure controls or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Internal control over financial reporting is a process that involves human diligence and compliance and is subject to lapses in judgment and breakdowns resulting from human failures. In addition, the design of any system of controls is based in part on certain assumptions about the likelihood of future events, and controls may become inadequate if conditions change. There can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

This annual report does not include an attestation report of the Company's independent registered public accounting firm regarding internal control over financial reporting. Management's report was not subject to attestation by the Company's registered public accounting firm pursuant to rules of the Securities and Exchange Commission that permit the Company to provide only management's attestation in this annual report.

#### *Changes in Company Internal Controls*

No change in our Company's internal control over financial reporting occurred during our fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

#### **Item 9B.**

#### **Other Information**

Not Applicable.



**PART III****Item 10.****Directors and Executive Officers and Corporate Governance****Identity of directors, executive officers and significant employees**

<b><u>Name</u></b>	<b><u>Age</u></b>	<b><u>Position</u></b>	<b><u>Term/Period Served</u></b>
James S. Marcelli	64	Director, Chief Executive Officer, President	1 yr./Since 2008
Louis C. Glasgow	68	Chief Technology Officer	Since November 2011
Andrew J. Ashton	35	Director, Senior Vice President & Co-Founder, Treasurer, Secretary	1 yr./Since 2004
Terry Turpin	69	Optical Computing Guru(1)	Since March 2008
Thomas E. Zelibor	56	Non-Executive Chair of the Board of Directors	1 yr./Since 2008
Ross Fasick	78	Director	1 yr./Since 2008
William C. Pickett, III	68	Director	1 yr./Since 2008
Joseph A. Miller	70	Director	1 yr./Since 2011

(1)

Optical Computing Guru is not an executive officer position, but our Company anticipates that Mr. Turpin's expertise in optical computing and his respect in the optical computing community will significantly contribute to the development of our Company.

**Business experience of directors, executive officers, and significant employees**

*Mr. James S. Marcelli.* Mr. Marcelli has served as an officer and director of our Company since August 2008. Mr. Marcelli is in charge of the day-to-day operations of our Company and its movement to a fully functioning commercial corporation. Since 2000, Mr. Marcelli has served as the president and chief executive officer of Marcelli Associates, a consulting company that offers senior management consulting, mentoring, and business development services to start-up and growth companies. Business segments Mr. Marcelli has worked with included an Internet networking gaming center, high speed custom gaming computers, high tech manufacturing businesses and business service companies.

*Dr. Louis C. Glasgow* has served as an officer of our Company since November 2011. From November 2003 to June 2010, Dr. Glasgow worked at Corning, Inc. as the Director of Organic Technology. From June 1973 to December 2001, Dr. Glasgow worked at DuPont in various capacities, his last being Director of Innovation. Dr. Glasgow holds a B.S. degree in chemistry from the University of Illinois, a M.S. degree and Ph.D. in physical chemistry from the University of Wisconsin and a Post Doctoral degree in photochemistry from the Max Planck Institute.

*Mr. Andrew J. Ashton.* Mr. Ashton has served as an officer and director of our Company since July 2004. Since that time his assistance in the creation of the synthetic chemistry of our novel molecular architecture has been fundamental to our Company's success. His current duties include the development of chemical synthesis, providing extensive analytical support and assisting with our Company's management goals. Mr. Ashton is a skilled computer scientist and organic chemist who began his career in 1998 at the Army Research Laboratory on the Aberdeen Proving Grounds where he helped to design and implement computer interfaces for fiberglass composite analysis.

*Mr. Terry Turpin.* Mr. Turpin has served as our Optical Computing expert since March 2008. Since October 2006, Mr. Turpin has been a member of the UMBC College of Natural Science and Mathematics Advisory Board. Until January 2007, when Northrop Grumman Space & Mission Systems Corp. acquired Essex Corporation, Mr. Turpin was a director of Essex Corporation. Mr. Turpin remained Senior Vice President and Chief Scientist for Essex Corporation after its acquisition until April 2007. Mr. Turpin was appointed as a director of Essex Corporation in January 1997 and became its Senior Vice President and Chief Scientist in 1996. He joined Essex Corporation through a merger with SEDC where he was Vice President and Chief Scientist from September 1984 through June 1989. From December 1983 to September 1984 he was an independent consultant. From 1963 through December 1983, the

National Securities Agency (NSA) employed Mr. Turpin. He was Chief of the Advanced Processing Technologies Division for ten years. He holds patents for optical computers and adaptive optical components. Mr. Turpin represented NSA on the Tri-Service Optical Processing Committee organized by the Under Secretary of Defense for Research and Engineering. He received a Bachelor of Science degree in Electrical Engineering from the University of Akron in 1966 and a Master of Science degree in Electrical Engineering from Catholic University in Washington, D.C. in 1970.

*Thomas E. Zelibor, Rear Admiral, USN (Ret).* RADM Zelibor has served as Non-Executive Chair of the Board of Directors of our Company since October 2011, and has served as a director of our Company since July 2008. RADM Zelibor has over twenty years of strategic planning and senior leadership experience. Currently, RADM Zelibor serves as the Chief Executive Officer and President of Flatirons Solutions Corp. a professional services firm that provides consulting, systems integration, systems & software engineering, and program management expertise to corporate and government clients. Previously, from July 2006 RADM Zelibor, served as the Dean of the College of Operational and Strategic Leadership at the United States Naval War College where he was responsible for the adoption of a corporate approach to leadership development. Prior to that time,, RADM Zelibor served in a number of positions, including as Director of Global Operations, United States Strategic Command; Director, Space, Information Warfare, Command and Control on the Navy staff; Department of the Navy, Deputy Chief Information Officer (CIO), Navy; Commander, Carrier Group Three and Commander, Naval Space Command.

*Dr. Ross Fasick.* Dr. Ross Fasick has served as a director of our Company since July 2008. Dr. Fasick has a broad spectrum of global business and chemistry experience that spans over thirty years. Dr. Fasick spent the early years of his career with DuPont as a research chemist primarily working with polymers and dyes. During his thirty year tenure at DuPont, Dr. Fasick held diverse positions ranging from manufacturing and business development to making divestitures and acquisitions. He served as both President of DuPont's Brazil division and Director of worldwide paint operations. He completed his DuPont career as Senior VP of Polymers and Automotive, a division that generates multi-billion dollar annual revenues. Since his retirement, Dr. Fasick has remained an active board and committee member for private college and pre-college level institutions. Dr Fasick earned his PhD in organic chemistry at the University of Delaware.

*Mr. William C. Pickett, III.* Mr. Pickett has served as a director of our Company since January 2008. Mr. Pickett enjoyed a 32 year career with E.I. DuPont de Nemours & Co., where he worked in numerous financial leadership positions, including serving from February 2002 to April 2004 as Chief Financial Officer of Invista, DuPont's \$7 billion man-made fibers company, which was ultimately sold to Koch Industries, Inc. Following retirement from DuPont Mr. Pickett has served as a member of the Board of Directors, Executive Committee, Treasurer and Chair of the Finance Committee of the Ronald McDonald House of Delaware; and since December 2004, Mr. Pickett has been serving as Chair of Audit Committee and Chief Compliance Officer of the Operation Warm charity. Mr. Pickett received his MBA from Harvard Business School and a BA from Trinity College.

*Dr. Joseph A. Miller.* Dr. Miller has served as a director of our Company since May 10, 2011. Dr. Miller currently serves as Executive Vice President and Chief Technology Officer of Corning Incorporated, having joined Corning Incorporated in 2001 as Senior Vice President and Chief Technology Officer. Dr. Miller was elected to his current position in 2002. Prior to joining Corning Incorporated, Dr. Miller was with E.I. DuPont de Nemours, Inc., where he served as Chief Technology Officer and Senior Vice President for Research and Development since 1994. Dr. Miller

began his career with DuPont in 1966. Dr. Miller is a director of Greatbatch, Inc. and Dow Corning Corporation and holds a doctorate degree in Chemistry from Penn State University.

Each Director of the Company holds such position until the next annual meeting of shareholders and until his successor is duly elected and qualified. The officers hold office until the first meeting of the board of directors following the annual meeting of shareholders and until their successors are chosen and qualified, subject to early removal by the board of directors.

### **Section 16(a) Beneficial Ownership Reporting Compliance**

Section 16(a) of the Securities Exchange Act of 1934 requires that our executive officers and directors, and persons who own more than ten percent of a registered class of our equity securities, file reports of ownership and changes in ownership with the SEC. Executive officers, directors and greater-than-ten percent stockholders are required by SEC regulations to furnish us with all Section 16(a) forms they file. To the best of our knowledge, based solely upon a review of Forms 3 and 4 and amendments thereto furnished to our Company during its most recent fiscal year and Forms 5 and amendments thereto furnished to our Company with respect to its most recent fiscal year, and any written representation referred to in paragraph (b)(1) of Item 405 of Regulation S-K, all of our executive officers, directors and greater-than-ten percent stockholders complied with all Section 16(a) filing requirements other than Mr. Thomas Zelibor who did not timely file a Form 4 to report one transaction.

### **Code of Ethics**

The Company has not yet adopted a code of ethics for its principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions or any other position due to its development stage, the small number of executive officers involved with the Company, and the fact that the Company operates with few employees. Our board of directors will continue to evaluate, from time to time, whether a code of ethics should be developed and adopted.

### **Audit Committee**

The Company does not have a separately designated standing audit committee in place; the Company's entire board of directors served, and currently serves, in that capacity. This is due to the Company's development stage, lack of business operations, the small number of executive officers involved with the Company, and the fact that the Company operates with few employees. Our board of directors will continue to evaluate, from time to time, whether a separately designated standing audit committee should be put in place. Mr. William C. Pickett, III serves as our audit committee financial expert as that term is defined by the rules promulgated by the Securities and Exchange Commission.

### **Nominating Committee**

Our Board of Directors does not have a nominating committee. This is due to our development stage and lack of business operations. Instead of having such a committee, our Board of Directors historically has searched for and evaluated qualified individuals to become nominees for membership on our Board of Directors. The directors recommend candidates for nomination for election or reelection for each annual meeting of shareholders and, as necessary, to fill vacancies and newly created directorships.

**Item 11.**

**Executive Compensation.**

The table below summarizes all compensation awarded to, earned by, or paid to our named executive officers for the fiscal years ended December 31, 2011 and 2010.



**Summary Compensation Table**

<u>Name and Principal Position</u>	<u>Year</u>	<u>Salary</u>	<u>Bonus</u>	<u>Stock Awards</u>	<u>Option Awards</u>	<u>All Other Compensation</u>	<u>Total</u>
		(\$)	(\$)	(\$)	(\$)	(\$)	(\$)
(a)	(b)	(c)	(d)	(e)	(f)	(i)	(j)
James S. Marcelli	2011	200,000	0	0	364,122	0	564,122
CEO, President	2010	184,833	0	0	541,667	1,200	727,700
Director(1)							
David F. Eaton,	2011	56,000	0	0	76,248	0	132,248
Chief Technology Officer (2)	2010	57,000	0	0	181,457	0	238,457

(1)

Pursuant to an employment agreement, effective August 1, 2010, Mr. Marcelli receives a salary of \$16,667 per month and an option to purchase up to 100,000 shares of common stock at an exercise price of \$1.50 per share. The options vest quarterly over two years in equal installments of 12,500 shares per quarter beginning August 1, 2010. Pursuant to a previous employment agreement, Mr. Marcelli received a salary of \$14,500 per month, a \$600 per month offsite car allowance which ended February 28, 2010, 200,000 shares of restricted stock in 2008 with immediate vesting, and an option to purchase up to 1,050,000 shares of common stock at an exercise price of \$1.75 per share. The options vest quarterly over three years in equal installments of 87,500 shares per quarter beginning November 1, 2008. Additionally, in the event Mr. Marcelli's employment terminates upon his death and the key man life insurance is in place for Mr. Marcelli, our Company will continue to pay the base cash compensation described in Mr. Marcelli's employment agreement to his estate through the remainder of term of his employment agreement, or 90 days, whichever is longer. The values described in column (f) reflect vested Options. The compensation includes the amount for services rendered to the Company in his capacity as both an officer and a director.

(2)

On November 1, 2011 Dr. Eaton tendered his resignation as our Chief Technology Officer. Dr. Eaton has agreed to remain with our company and serve as our scientific advisor, a non-executive position. Pursuant to an employment agreement, as amended, Dr. Eaton received \$500 per day. The values described in column (f) and (i) reflect vested options and warrants. On December 13, 2010, Dr. Eaton was awarded an option to purchase up to 150,000 shares of common stock at an exercise price of \$1.00 per share. The options vested as follows: 75,000 shares vested immediately and the remaining shares vested 6 months from the date of grant.

At no time during the last fiscal year was any outstanding option otherwise modified or re-priced, and there was no tandem feature, reload feature, or tax-reimbursement feature associated with any of the stock options we granted to our executive officers or otherwise; except that our Company modified the option awards provided to its officers and directors pursuant to our 2007 Employee Stock Plan so that in the event of a change in control of our Company, such person's options will become fully vested and/or exercisable, as the case may be, immediately prior to such change in control, and shall remain exercisable as set forth in their stock option agreement.

We grant stock awards and stock options to our executive officers based on their level of experience and contributions to our Company. The aggregate fair value of awards and options are computed in accordance with FASB ASC 718 and are reported in the Summary Compensation Table above in the columns (e) and (f).

At no time during the last fiscal year was any outstanding option otherwise modified or re-priced, and there was no tandem feature, reload feature, or tax-reimbursement feature associated with any of the stock options we granted to our executive officers or otherwise.

The table below summarizes all of the outstanding equity awards for our named executive officers as of December 31, 2011, our latest fiscal year end.

**Outstanding Equity Awards At Fiscal Year-End**

Name	Option Awards				Stock Awards				
	Number of Securities Underlying Unexercised Options (#)	Equity Incentive Plan Awards: Number of Securities Underlying Unexercised	Equity Incentive Plan Awards: Number of Securities Underlying Unexercised	Option Exercise Price	Option Expiration Date	Number Of Shares Or Units Of Stock That Have Not Vested	Market Value Of Shares Or Units Of Stock That Have Not Vested	Number Of Shares, Units Or Rights That Have Not Vested	Equity Incentive Plan Awards: Market Payout Value Of Unearned Shares, Units Or Rights That Have Not Vested
	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
James S. Marcelli	100,000	--	--	1.50	7/31/15	--	--	--	--
CEO, President	1,050,000	--	--	1.75	7/31/13	--	--	--	--
Director(1) David F. Eaton,	150,000	--	--	1.00	12/12/15	--	--	--	--
(2) Chief Technology Officer	501,000	--	--	0.72	11/17/12	--	--	--	--

(1)

On August 1, 2008 Mr. Marcelli received an option to purchase up to 1,050,000 shares of company common stock. The options vest quarterly over three years in equal installments of 87,500 shares per quarter beginning November 1, 2008. On August 1, 2010, Mr. Marcelli received an option to purchase up to 100,000 shares of company common stock. The options vest quarterly over two years in equal installments of 12,500 shares per quarter beginning August 1, 2010.

(2)

On November 17, 2007 Dr. Eaton was awarded an option to purchase up to 501,000 shares of common stock at an exercise price of \$.72 per share. On December 13, 2010, Dr. Eaton was awarded an option to purchase up to 150,000

shares of common stock at an exercise price of \$1.00 per share which vest as follows: 75,000 shares vest immediately and 75,000 shares vest six months from December 13, 2010. On November 1, 2011 Dr. Eaton tendered his resignation as our Chief Technology Officer. Dr. Eaton has agreed to remain with our company and serve as our scientific advisor, a non-executive position.

**Compensation of Directors**

Set forth below is a summary of the compensation of our directors during our December 31, 2011 fiscal year.

Name	Fees Earned or Paid in Cash (\$)	Stock Awards (\$)	Option Awards (\$)(7)	Non-Equity Incentive Plan Compensation (\$)	Non-Qualified Deferred Compensation Earnings (\$)	All Other Compensation (\$)(8)	Total (\$)
James S. Marcelli (1)	--	--	--	--	--	--	--
Andrew J. Ashton (1)	--	--	--	--	--	--	--
Ross Fasick (2)	--	--	78,292	--	--	--	78,292
William C. Pickett, III (3)	--	--	57,038	--	--	--	57,038
Philips W. Smith (4)	--	--	--	--	--	306,765	306,765
Thomas E. Zelibor (5)	--	2,163	128,169	--	--	--	130,332
Joseph A. Miller (6)	--	--	79,702	--	--	--	79,702

(1)

Serves as an executive officer and a director but receives no additional compensation for serving as a director.

(2)

On July 21, 2008, Mr. Fasick received an option to purchase up to 100,000 shares of company stock at an exercise price of \$1.75 that vest pursuant to the following schedule: 25,000 shares vested immediately; and the remaining options vest in 3 equal annual installments of 25,000 options per year commencing on July 21, 2009. On August 29, 2008, Mr. Fasick received an option to purchase up to 150,000 shares of company stock at an exercise price of \$1.42 that vest pursuant to the following schedule: 37,500 shares vest immediately and 37,500 shares vest at the end of every 12 month period commencing August 29, 2008. On December 13, 2010, Mr. Fasick received an option to purchase up to 100,000 shares of company stock at an exercise price of \$1.00 that vest pursuant to the following schedule: 25,000 shares vest immediately and 25,000 shares vest at the end of every 12 month period commencing November 4, 2010.

(3)

On January 8, 2008, Mr. Pickett received an option to purchase up to 100,000 shares of company stock at an exercise price of \$.72 that vest pursuant to the following schedule: 25,000 shares vested immediately; and the remaining options vest in 3 equal annual installments of 25,000 options per year commencing on January 8, 2009. On August 29, 2008, Mr. Pickett received an option to purchase up to 250,000 shares of company stock at an exercise price of \$1.42

that vest pursuant to the following schedule: 137,500 shares vest immediately and 37,500 shares vest at the end of every 12 month period commencing August 29, 2008. Mr. Pickett was awarded 250,000 options instead of 150,000 options on August 29, 2008 in recognition of the additional assistance he provided to the Company during his initial tenure as a director. On December 13, 2010, Mr. Pickett received an option to purchase up to 100,000 shares of company stock at an exercise price of \$1.00 that vest pursuant to the following schedule: 25,000 shares vest immediately and 25,000 shares vest at the end of every 12 month period commencing November 4, 2010.

(4)

On January 13, 2010, Mr. Smith received a warrant to purchase up to 650,000 shares of company stock at an exercise price of \$1.51 that vest pursuant to the following schedule: 162,500 warrants vested immediately; and the remaining warrants vest in 3 equal annual installments of 162,500 warrants per year commencing on January 13, 2011. The 162,500 warrants scheduled to vest on January 13, 2012 vested on

December 31, 2011. The warrant to purchase 650,000 shares of common stock, of which 487,500 shares were vested, forfeited.

(5)

On July 11, 2008, Mr. Zelibor received an option to purchase up to 100,000 shares of company stock at an exercise price of \$1.75 that vest pursuant to the following schedule: 25,000 shares vested immediately; and the remaining options vest in 3 equal annual installments of 25,000 options per year commencing on July 11, 2009. On August 29, 2008, Mr. Zelibor received an option to purchase up to 150,000 shares of company stock at an exercise price of \$1.42 that vest pursuant to the following schedule: 37,500 shares vested immediately and 37,500 shares vest at the end of every 12 month period commencing August 29, 2008. On December 13, 2010, Mr. Zelibor received an option to purchase up to 100,000 shares of company stock at an exercise price of \$1.00 that vest pursuant to the following schedule: 25,000 shares vest immediately and 25,000 shares vest at the end of every 12 month period commencing November 4, 2010. On December 19, 2011, Mr. Zelibor received an option to purchase up to 250,000 shares of company stock at an exercise price of \$1.01 that vest pursuant to the following schedule: 62,500 shares vest immediately and 62,500 shares vest at the end of every 12 month period commencing December 19, 2012. On October 13, 2011 Mr. Zelibor received 2,018 shares of common stock.

(6)

On May 10, 2011, Mr. Miller received an option to purchase up to 200,000 shares of company stock at an exercise price of \$1.12 that vest pursuant to the following schedule: 50,000 shares vested immediately; and the remaining options vest in 3 equal annual installments of 50,000 options per year commencing on May 10, 2012.

(7)

The values described in this column reflect vested Options.

(8)

The values described in this column reflect vested Warrants.

### **Compensation Committee**

Our Board of Directors currently has no standing compensation committee or committee performing similar functions. This is due to the Company's development stage, lack of business operations, the small number of executive officers involved with the Company, and the fact that the Company operates with few employees. The Company's entire Board of Directors currently participates in the consideration of executive officer and director compensation. Our Board of Directors will continue to evaluate, from time to time, whether it should appoint standing compensation committee.

### **Compensation Policies And Practices As They Relate To Our Risk Management**

No risks arise from our Company's compensation policies and practices for our employees that are reasonably likely to have a material adverse effect on our Company.

**Item 12.**

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

The following table sets forth, as of March 29, 2012, the names, addresses, amount and nature of beneficial ownership and percent of such ownership of each person or group known to our Company to be the beneficial owner of more than five percent (5%) of our common stock:



**Security Ownership of Certain Beneficial Owners**

Name and Address <u>of Beneficial Owner</u> (1)	Amount and Nature <u>Of Beneficial Ownership</u> (3)	<u>% of Class Owned</u> (5)
Frederick J. Goetz, Jr. (2)	3,221,667	6.77%
Frederick J. Goetz (2)	6,480,926(4)	13.62%
Mary Goetz (2)	6,480,926(4)	13.62%
Andrew J. Ashton	2,981,667	6.26%

(1)

In care of our Company at 111 Ruthar Drive, Newark, Delaware 19711.

(2)

Frederick J. Goetz and Mary Goetz are Husband and wife, and Frederick J. Goetz, Jr. is their son.

(3)

To our best knowledge, as of the date hereof, such holders had the sole voting and investment power with respect to the voting securities beneficially owned by them, unless otherwise indicated herein. Includes the person's right to obtain additional shares of common stock within 60 days from the date hereof.

(4)

Consists of (i) 3,365,000 shares of common stock owned by Frederick J. Goetz; and (ii) 3,115,926 shares of common stock owned by Mary Goetz. Each of Frederick J. Goetz and Mary Goetz disclaim any beneficial ownership of their spouse's shares of common stock.

(5)

Based on 47,562,340 shares of common stock outstanding on March 29, 2012. Does not include shares underlying: (i) options to purchase shares of our common stock under our 2007 Plan, or (ii) outstanding warrants to purchase shares of our common stock.

The following table sets forth, as of March 29, 2012, the names, addresses, amount and nature of beneficial ownership and percent of such ownership of our common stock of each of our officers and directors, and officers and directors as a group:

**Security Ownership of Management**

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Name and Address of Beneficial Owner (1)	Amount and Nature of Beneficial Ownership (2)	% of Class Owned (3)(4)
James S. Marcelli Director, Chief Executive Officer, President	1,390,000(5)	2.92%
Andrew J. Ashton Director, Executive Vice President, Treasurer, Secretary	2,981,667	6.26%
Ross Fasick Director	579,000(6)	1.21%
William C. Pickett, III Director	421,000(7)	*
Thomas E. Zelibor Non-Executive Chair of the Board of Directors	405,924(8)	*
Louis Glasgow Chief Technology officer	25,000(9)	*
Joseph A. Miller Director	100,000(10)	*
Directors and Officers as a Group (8 Persons)	5,902,561	12.41%

\* Less than 1%.

(1)

In care of our Company at 111 Ruthar Drive, Newark, Delaware 19711

(2)

To our best knowledge, as of the date hereof, such holders had the sole voting and investment power with respect to the voting securities beneficially owned by them, unless otherwise indicated herein. Includes the person's right to obtain additional shares of common stock within 60 days from the date hereof.

(3)

Based on 47,562,340 shares of common stock outstanding on March 29, 2012. Does not include shares underlying: (i) options to purchase shares of our common stock under our 2007 Plan, or (ii) outstanding warrants to purchase shares of our common stock.

(4)

If a person listed on this table has the right to obtain additional shares of common stock within 60 days from the date hereof, the additional shares are deemed to be outstanding for the purpose of computing the percentage of class owned by such person, but are not deemed to be outstanding for the purpose of computing the percentage of any other person.

(5)

Consists of 240,000 shares of common stock and an option to purchase up to 1,150,000 shares of common stock exercisable within 60 days from the date hereof.

(6)

Consists of 279,000 shares of common stock; an option to purchase up to 300,000 shares of common stock exercisable within 60 days from the date hereof.

(7)

Consists of 21,000 shares of common stock; and an option to purchase up to 400,000 shares of common stock exercisable within 60 days from the date hereof.

(8)

Consists of 43,424 shares of common stock; and an option to purchase up to 362,500 shares of common stock exercisable within 60 days from the date hereof.

(9)

Consists of an option to purchase up to 25,000 shares of common stock exercisable within 60 days from the date hereof.

(10)

Consists of an option to purchase up to 100,000 shares of common stock exercisable within 60 days from the date hereof.

We are not aware of any arrangements that could result in a change of control.

### **Securities Authorized for Issuance under Equity Compensation Plans**

Information regarding our compensation plans under which our equity securities are authorized for issuance can be found in Part II Item 5 of this report.

### **Item 13.**

#### **Certain Relationships and Related Transactions, and Director Independence.**

On January 8, 2010, Thomas P. Smith resigned as a member of our board of directors, and on January 8, 2010, our board of directors invited Mr. Philips W. Smith to be appointed as a member of our board of directors and as our full-time Non-Executive Chair of the Board of Directors. On January 13, 2010, Mr. Smith accepted the invitation to be appointed to those positions. Mr. Philips W. Smith is the father of then board member Thomas P. Smith. In exchange for serving as a member of our board of directors and as non-executive chair of our board of directors, Mr. Smith received as compensation a warrant to purchase up to 650,000 shares of our common stock at an exercise price of \$1.51 per share for a period of up to five years. In October 2011 Mr. Smith tendered his resignation as our full-time Non-Executive Chair of the Board of Directors and remained as a member of our board of directors until the end of 2011.

#### **Policies and Procedures for Related-Party Transactions**

Our Company does not have any formal written policies or procedures for related party transactions, however in practice, our board of directors reviews and approves all related party transactions and other matters pertaining to the integrity of management, including potential conflicts of interest, trading in our securities, or adherence to standards of business conduct.

#### **Director Independence**

Although we are currently listed on the Over-the-Counter Bulletin Board, our Board has reviewed each of the directors' relationships with our Company in conjunction with Section 121 of the listing standards of the NYSE Amex and has affirmatively determined that four of our directors, Ross Fasick,

Joseph A. Miller, William C. Pickett, III, and Thomas E. Zelibor, are independent directors in that they are independent of management and free of any relationship that would interfere with their independent judgment as members of our Board of Directors. Additionally, prior to his resignation, Philips W. Smith was determined to be such an independent director.

**Item 14.**

**Principal Accounting Fees and Services.**

Audit Fees.

The aggregate fees billed for the years ended December 31, 2011 and 2010 for professional services rendered by Morison Cogen, LLP for the audit of the Company's annual financial statements and review of financial statements included in the Company's Form 10-Q or services that are normally provided by Morison Cogen, LLP in connection with statutory and regulatory filings or engagements were \$49,000 for the year ended December 31, 2011; and \$45,700 for the year ended December 31, 2010.

Audit-Related Fees.

Fees billed for the years ended December 31, 2011 and December 31, 2010 for assurance and related services by Morison Cogen, LLP that are reasonably related to the performance of the audit or review of the Company's financial statements and are not reported under the category Audit Fees described above were \$0 for the year ended December 31, 2011 and \$0 for the year ended December 31, 2010.

Tax Fees.

Fees billed for the year ended December 31, 2011 for tax compliance by Morison Cogen, LLP was \$6,000; and for the year ended December 31, 2010 was \$6,000.

All Other Fees.

Fees billed for the years ended December 31, 2011 and December 31, 2010 for products and services provided by Morison Cogen, LLP, other than the services reported in the Audit Fees, Audit-Related Fees, and Tax Fees categories above were \$1,300 for year ended December 31, 2011 (S-1 filing review) and \$550 for the year ended December 31, 2010 (for annual shareholder meeting attendance).

Audit Committee Pre-Approval Policies.

The Company's audit committee currently does not have any pre-approval policies or procedures concerning services performed by Morison Cogen, LLP. All the services performed by Morison Cogen, LLP that are described above were pre-approved by the Company's audit committee.

None of the hours expended on Morison Cogen, LLP's engagement to audit the Company's financial statements for the years ended December 31, 2011 were attributed to work performed by persons other than Morison Cogen, LLP's full-time, permanent employees.

**PART IV**

**Item 15.**

**Exhibits And Financial Statement Schedules**

(a)

The following Audited Financial Statements are filed as part of this Form 10-K Report:

Report of Independent Registered Public Accounting Firm

Balance Sheets

Statements of Operations

Statement of Stockholders' Equity

Statements of Cash Flows

Notes to Financial Statements

(b)

The following exhibits are filed as part of this report.

- 3.1 Articles of Incorporation (incorporated by reference to Company's Form 10-SB filed April 13, 2007).
- 3.2 Certificate of Amendment to Articles of Incorporation (incorporated by reference to Company's Definitive Schedule 14C Information Statement filed on February 19, 2008).
- 3.3 Bylaws (incorporated by reference to Company's Form 10-SB filed April 13, 2007).
- 10.1 Employment Agreement - Frederick J. Goetz, Jr. (incorporated by reference to Company's Form 10-K filed on April 14, 2009).
- 10.2 Employment Agreement - Andrew J. Ashton (incorporated by reference to Company's Form 10-K filed on April 14, 2009).
- 10.3 Employment Agreement - James S. Marcelli (incorporated by reference to the Company's Form 8-K filed August 5, 2008).
- 10.4 Employment Agreement Renewal - James S. Marcelli (incorporated by reference to the Company's Form 8-K filed June 22, 2010).
- 10.5 Employment Agreement - David F. Eaton (incorporated by reference to the Company's Form 10-KSB filed April 10, 2008).
- 10.6 Employment Agreement Amendment - David F. Eaton (incorporated by reference to the Company's Form 10-K filed March 31, 2011).



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- 10.7 Employment Agreement Terry Turpin (incorporated by reference to the Company's Form 10-KSB filed April 10, 2008).
- 10.8 Employment Agreement Amendment Terry Turpin (incorporated by reference to the Company's Form 10-K filed March 31, 2011).
- 10.9 Employee Agreement Louis Glasgow (incorporated by reference to the Company's Form 8-K filed November 7, 2011).
  
- 10.10 Employee Agreement Philips W. Smith (incorporated by reference to the Company's Form 8-K filed January 13, 2010).
- 10.11 Director Agreement William C. Pickett, III (incorporated by reference to the Company's Form 8-K filed March 26, 2008).
- 10.12 Director Agreement Ross Fasick (incorporated by reference to the Company's Form 8-K filed July 22, 2008).
- 10.13 Director Agreement Thomas E. Zelibor (incorporated by reference to the Company's Form 8-K filed July 14, 2008).
- 10.14 Director Agreement Joseph A. Miller (incorporated by reference to the Company's Form 8-K filed May 16, 2011).
- 10.15 Photon-X, LLC Memorandum of Understanding (incorporated by reference to Company's Form 10-SB filed April 13, 2007).

- 10.16 Triple Play Communications Corporation Agreement (incorporated by reference to Company's Form 10-SB filed April 13, 2007).
- 10.17 2007 Employee Stock Plan (incorporated by reference to Company's Definitive Schedule 14C Information Statement filed on February 19, 2008).
- 10.18 2007 Employee Stock Plan Amendment (incorporated by reference to Company's Definitive Schedule 14A Proxy Statement filed on June 16, 2010).
  
- 31.1 Certification pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934 executed by the Principal Executive Officer of the Company (included herein).
- 31.2 Certification pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934 executed by the Principal Financial Officer of the Company (included herein).
- 32.1 Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Executive Officer of the Company (included herein).
- 32.2 Certification pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, executed by the Principal Financial Officer of the Company (included herein).

**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

LIGHTWAVE LOGIC, INC.

By: /s/ James S. Marcelli  
 James S. Marcelli,  
 Chief Executive Officer, President and Director

Date: April 2, 2012

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/James S. Marcelli James S. Marcelli	Chief Executive Officer,  Director	April 2, 2012
/s/Andrew J. Ashton Andrew J. Ashton	Senior Vice President &  Co-Founder, Treasurer,  Secretary, Director	April 2, 2012
/s/Thomas E. Zelibor Thomas E. Zelibor	Non-Executive Chair of The Board of Directors	April 2, 2012
/s/Ross Fasick Ross Fasick	Director	April 2, 2012
/s/William C. Pickett, III William C. Pickett, III	Director	April 2, 2012
/s/Joseph A. Miller		

Joseph A. Miller

Director

April 2, 2012

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LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

FINANCIAL STATEMENTS

DECEMBER 31, 2011 AND 2010





LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors

Lightwave Logic, Inc.

Wilmington, Delaware

We have audited the accompanying balance sheets of Lightwave Logic, Inc., as of December 31, 2011 and 2010 and the related statements of operations, stockholders' equity and cash flows for the years then ended and for the period from January 1, 2004 (inception of development stage) through December 31, 2011. Lightwave Logic, Inc.'s management is responsible for these financial statements. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audit included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Lightwave Logic, Inc., as of December 31, 2011 and 2010 and results of its operations and its cash flows for the years then ended and for the period from January 1, 2004 (inception of development stage) through December 31, 2011 in conformity with accounting principles generally accepted in the United States of America.

/s/ MORISON COGEN LLP

Bala Cynwyd, Pennsylvania

April 2, 2012

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## BALANCE SHEETS

	December 31, 2011	December 31, 2010
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
	\$	\$
Cash and cash equivalents	359,824	953,867
Prepaid expenses	41,756	74,189
	401,580	1,028,056
<b>PROPERTY AND EQUIPMENT - NET</b>	88,751	97,568
<b>OTHER ASSETS</b>		
Intangible assets - net	431,104	346,009
	\$	\$
<b>TOTAL ASSETS</b>	921,435	1,471,633
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
<b>CURRENT LIABILITIES</b>		
	\$	\$
Accounts payable	139,833	56,459
Accounts payable - related party	22,628	9,760
Accrued expenses	75,965	49,793
<b>TOTAL LIABILITIES</b>	238,426	116,012
<b>STOCKHOLDERS' EQUITY</b>		
Preferred stock, \$0.001 par value, 1,000,000 authorized No shares issued or outstanding	-	-
Common stock \$0.001 par value, 100,000,000 authorized 45,337,092 and 43,966,042 issued and outstanding at December 31, 2011 and December 31, 2010	45,337	43,966
Additional paid-in-capital	24,513,000	21,704,361
Accumulated deficit	(15,827)	(15,827)
Deficit accumulated during development stage	(23,859,501)	(20,376,879)
<b>TOTAL STOCKHOLDERS' EQUITY</b>	683,009	1,355,621

TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	\$	\$	921,435	1,471,633
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The accompanying notes are an integral part of these financial statements.

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## STATEMENTS OF OPERATIONS

FOR THE YEARS ENDING DECEMBER 31, 2011 AND 2010 AND FOR THE PERIOD  
 JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011

	Cumulative Since Inception	For the Year Ending December 31, 2011	For the Year Ending December 31, 2010
	\$	\$	\$
NET SALES	3,200	-	3,200
<b>COST AND EXPENSE</b>			
Research and development	10,664,441	1,682,557	1,709,171
General and administrative	12,985,150	1,633,786	2,006,900
	23,649,591	3,316,343	3,716,071
<b>LOSS FROM OPERATIONS</b>	(23,646,391)	(3,316,343)	(3,712,871)
<b>OTHER INCOME (EXPENSE)</b>			
Interest income	30,498	375	196
Dividend income	1,551	-	-
Realized gain on investment	3,911	-	-
Realized gain on disposal of assets	637	-	-
Litigation settlement	(47,500)	-	-
Interest expense and commitment fee	(202,207)	(166,654)	(557)
	\$	\$	\$
<b>NET LOSS</b>	(23,859,501)	(3,482,622)	(3,713,232)
		\$	\$
Basic and Diluted Loss per Share		(0.08)	(0.09)
Basic and Diluted Weighted Average Number of Shares		44,386,149	42,253,450

The accompanying notes are an integral part of these financial statements.

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## STATEMENT OF STOCKHOLDERS EQUITY

FOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011

	Number of Shares	Common Stock	Paid-in Capital	Subscription Receivable/ Receivable for Issuance of Common Stock	Deferred Charges	Unrealized Loss on Securities	Accumulated Deficit	Deficit Accumulated During Development Stage	Total
ENDING BALANCE AT DECEMBER 31, 2003	100\$	1\$	- \$	- \$	- \$	- \$	(15,827)\$	- \$	(15,826)
Retroactive recapitalization upon reverse acquisition	706,973	706	(706)	-	-	-	-	-	-
BALANCE AT JANUARY 1, 2004	707,073	707	(706)	-	-	-	(15,827)	-	(15,826)
Common stock issued to founders	13,292,927	13,293	(13,293)	-	-	-	-	-	-
Common stock issued for future services in July 2004 at \$0.16/share	1,600,000	1,600	254,400	-	-	-	-	-	256,000
Common stock issued at merger	2,000,000	2,000	(2,000)	-	-	-	-	-	-

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Common stock issued for future services in August 2004 at \$0.12/share	637,500	638	74,362	-	-	-	-	-	75,000
Conversion of note payable in December 2004 at \$0.16/share	187,500	187	29,813	-	-	-	-	-	30,000
Net loss for the year ended December 31, 2004	-	-	-	-	-	-	-	(722,146)	(722,146)
<b>BALANCE AT DECEMBER 31, 2004</b>	<b>18,425,000</b>	<b>18,425</b>	<b>342,576</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>(15,827)</b>	<b>(722,146)</b>	<b>(376,972)</b>
Common stock issued in private placement in April 2005 at \$0.25/share	4,000,000	4,000	996,000	-	-	-	-	-	1,000,000
Conversion of notes payable in May 2005 at \$0.16/share	3,118,750	3,119	495,881	-	-	-	-	-	499,000
Subscription receivable	-	-	-	(6,500)	-	-	-	-	(6,500)
Common stock issued for future services in August 2005, valued at \$2.79/share	210,000	210	585,290	-	-	-	-	-	585,500
Common stock issued for future services in August 2005, valued at \$2.92/share	200,000	200	583,800	-	-	-	-	-	584,000
Warrants issued for services in May 2005, vested during 2005, valued at \$1.13/share	-	-	37,000	-	-	-	-	-	37,000
Warrants issued for services in September	-	-	24,200	-	-	-	-	-	24,200



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2005, vested during 2005, valued at \$1.45/share									
Warrants issued for services in October 2005, vested during 2005, valued at \$0.53/share	-	-	15,900	-	-	-	-	-	15,900
Warrants issued for future services in December 2005, vested during 2005, valued at \$1.45/share	-	-	435,060	-	-	-	-	-	435,060
Deferred charges for common stock issued for future services in August 2005, valued at \$2.92/share	-	-	-	-	(584,000)	-	-	-	(584,000)
Amortization of deferred charges	-	-	-	-	265,455	-	-	-	265,455
Exercise of warrants in December 2005 at \$0.25/share	300,000	300	74,700	-	-	-	-	-	75,000
Net loss for the year ended December 31, 2005	-	-	-	-	-	-	-	(1,721,765)	(1,721,765)
<b>BALANCE AT DECEMBER 31, 2005</b>	<b>26,253,750</b>	<b>26,254</b>	<b>3,590,407</b>	<b>(6,500)</b>	<b>(318,545)</b>	<b>-</b>	<b>(15,827)</b>	<b>(2,443,911)</b>	<b>831,878</b>
Common stock issued in private placement during 2006 at \$0.50/share	850,000	850	424,150	-	-	-	-	-	425,000
Common stock issued for future services	300,000	300	269,700	-	-	-	-	-	270,000

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in February 2006, valued at \$0.90/share									
Common stock issued for future services in May 2006, valued at \$1.55/share	400,000	400	619,600	-	-	-	-	-	620,000
Common stock issued for future services in June 2006, valued at \$1.45/share	25,000	25	36,225	-	-	-	-	-	36,250
Common stock issued for future services in November 2006, valued at \$0.49/share	60,000	60	29,340	-	-	-	-	-	29,400
Warrants issued for services in September 2005, vested during 2006, valued at \$1.45/share	-	-	66,500	-	-	-	-	-	-
Warrants issued for future services in June 2006, vested during 2006, valued at \$1.55/share	-	-	465,996	-	-	-	-	-	-
Options issued for services in February 2006, vested during 2006, valued at \$1.01/share	-	-	428,888	-	-	-	-	-	-
Contributed capital related to accrued interest	-	-	35,624	-	-	-	-	-	35,624
Subscription receivable	-	-	-	6,500	-	-	-	-	6,500
Amortization of deferred charges	-	-	-	-	318,545	-	-	-	318,545
Unrealized gain (loss) on	-	-	-	-	-	(26,000)	-	-	(26,000)

securities									
Net loss for the									
year ending									
December 31,	-	-	-	-	-	-	(2,933,809)	(2,933,809)	
2006									
BALANCE AT									
DECEMBER	27,888,750\$	27,889\$	5,966,430 \$	- \$	- \$	(26,000)\$	(15,827)\$	(5,377,720)\$	574,772
31, 2006									

The accompanying notes are an integral part of these financial statements.

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## STATEMENT OF STOCKHOLDERS' EQUITY

FOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011  
(CONTINUED)

	Number of Shares	Common Stock	Paid-in Capital	Subscription Receivable/ Receivable for Issuance of Common Stock	Deferred Charges	Unrealized Loss on Securities	Accumulated Deficit	Deficit Accumulated During Development Stage	Total
BALANCE AT DECEMBER 31, 2006	27,888,750	\$ 27,889	\$ 5,966,430	\$ -	\$ -	\$ (26,000)	\$ (15,827)	\$ (5,377,720)	574,772
Common stock issued in private placement during 2007 at \$0.50/share	2,482,000	2,482	1,238,518	-	-	-	-	-	1,241,000
Common stock issued in private placement during 2007 at \$0.60/share	1,767,540	1,768	1,058,756	-	-	-	-	-	1,060,524
Common stock subscription rescinded during 2007 at \$0.50/share	(400,000)	(400)	(199,600)	-	-	-	-	-	(200,000)
Common stock issued for future services in February	151,785	152	106,098	-	-	-	-	-	106,250

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2007, valued at \$0.70/share Common stock issued for future services in March 2007, valued at \$0.58/share Common stock issued for services and settlement for accounts payable in April 2007, valued at \$0.35/share Common stock issued for services in October 2007, valued at \$0.68/share Common stock issued for services in October 2007, valued at \$0.90/share Common stock issued for services in November 2007, valued at \$0.72/share Warrants issued for services in September 2005, vested during 2007, valued at \$1.45/share Warrants issued for services in March 2007, vested during 2007, valued at \$0.63/share Warrants issued for	1,000,000	1,000	579,000	-	-	-	-	-	580,000
100,000	100								
150,000	150	101,850	-	-	-	-	-	-	102,000
150,000	150	134,850	-	-	-	-	-	-	135,000
400,000	400	287,600	-	-	-	-	-	-	288,000
-	-	36,370	-	-	-	-	-	-	36,370
-	-	52,180	-	-	-	-	-	-	52,180
-	-	293,476	-	-	-	-	-	-	293,476

services in April 2007, vested during 2007, valued at \$0.69/share	-	-	140,490	-	-	-	-	-	140,490
Warrants issued for services in April 2007, vested during 2007, valued at \$0.63/share	-	-	52,946	-	-	-	-	-	52,946
Warrants issued for services in May 2007, vested during 2007, valued at \$0.56/share	-	-	61,449	-	-	-	-	-	61,449
Warrants issued for services in October 2007, vested during 2007, valued at \$0.61/share	-	-	52,292	-	-	-	-	-	52,292
Warrants issued for services in October 2007, vested during 2007, valued at \$0.78/share	-	-	1,159	-	-	-	-	-	1,159
Options issued for services in February 2006, vested during 2007, valued at \$1.01/share	-	-	17,589	-	-	-	-	-	17,589
Options issued for services in February 2006, vested during	-	-	43,757	-	-	-	-	-	43,757

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2007, valued at \$1.09/share									
Options issued for services in November 2007, vested during 2007, valued at \$0.60/share	-	-	41,653	-	-	-	-	-	41,653
Warrants issued for future services in April 2007, vested during 2007, valued at \$0.70/share	-	-	348,000	-	-	-	-	-	348,000
Deferred charges for common stock issued for future services in March 2007, valued at \$0.58/share	-	-	-	-	(928,000)	-	-	-	(928,000)
Amortization of deferred charges	-	-	-	-	773,333	-	-	-	773,333
Unrealized gain (loss) on securities	-	-	-	-	-	(32,610)	-	-	(32,610)
Net loss for the year ending December 31, 2007	-	-	-	-	-	-	-	(4,223,449)	(4,223,449)
<b>BALANCE AT DECEMBER 31, 2007</b>	<b>33,690,075</b>	<b>33,690</b>	<b>10,449,763</b>	<b>-</b>	<b>(154,667)\$</b>	<b>(58,610)</b>	<b>(15,827)</b>	<b>(9,601,169)</b>	<b>653,180</b>
Common stock issued in private placement during 2008 at \$0.60/share	690,001	690	413,310	-	-	-	-	-	414,000
Common stock issued for services in March 2008, valued at \$0.75/share	100,000	100	74,900	-	-	-	-	-	75,000

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Common stock issued for services in August 2008, valued at \$1.80/share	200,000	200	359,800	-	-	-	-	-	360,000
Exercise of warrants at \$0.25/share	320,000	320	79,680	-	-	-	-	-	80,000
Exercise of warrants at \$0.25/share, pursuant to November 2008 adjusted stock offering	641,080	641	159,629						160,270
Exercise of warrants at \$0.50/share	270,000	270	134,730	-	-	-	-	-	135,000
Warrants issued for services in September 2005, vested during 2008, valued at \$1.45/share	-	-	27,014	-	-	-	-	-	27,014
Warrants issued for services in March 2007, vested during 2008, valued at \$0.63/share	-	-	10,885	-	-	-	-	-	10,885
Warrants issued for services in April 2007, vested during 2008, valued at \$0.69/share	-	-	121,713	-	-	-	-	-	121,713
Warrants issued for services in April 2007, vested during 2008, valued at \$0.63/share	-	-	48,738	-	-	-	-	-	48,738
Warrants issued for services in May	-	-	31,444	-	-	-	-	-	31,444



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2007, vested during 2008, valued at \$0.56/share									
Warrants issued for services in December 2007, valued at \$0.55/share	-	-	12,487	-	-	-	-	-	12,487
Options issued for services in November 2007, valued at \$0.55/share	-	-	286,803	-	-	-	-	-	286,803
Options issued for services in January 2008, vested during 2008, valued at \$0.60/share	-	-	30,750	-	-	-	-	-	30,750
Options issued for services in July 2008, vested during 2008, valued at \$1.48/share	-	-	114,519	-	-	-	-	-	114,519
Options issued for services in August 2008, vested during 2008, valued at \$1.36/share	-	-	525,263	-	-	-	-	-	525,263
Options issued for services in November 2008, vested during 2008, valued at \$0.50/share	-	-	6,439	-	-	-	-	-	6,439
Warrants issued for future services in March 2008, vested through September 2008, valued at	-	-	332,000	-	(332,000)	-	-	-	-

0.83/share									
Warrants									
issued for									
services in May									
2008, vested	-	-	976,193	-	-	-	-	-	976,193
through									
September									
2008, valued at									
1.63/share									
Amortization									
of deferred	-	-	-	-	431,337	-	-	-	431,337
charges									
Receivable for									
the issuance of	-	-	-	(12,500)	-	-	-	-	(12,500)
common stock									
Realized loss									
reclassification	-	-	-	-	-	58,610	-	-	58,610
Net loss for the									
year ending	-	-	-	-	-	-	-	(4,340,607)	(4,340,607)
December 31,									
2008									
BALANCE AT									
DECEMBER	35,911,156\$	35,911	\$14,196,060	\$ (12,500)	\$ (55,330)	\$ -	\$ (15,827)	\$ (13,941,776)	\$ 206,538
31, 2008									

The accompanying notes are an integral part of these financial statements.

## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## STATEMENT OF STOCKHOLDERS EQUITY

FOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011  
(CONTINUED)

	Number of Shares	Common Stock	Paid-in Capital	Subscription Receivable/ Receivable for Issuance of Common Stock	Deferred Charges	Unrealized Loss on Securities	Accumulated Deficit	Deficit Accumulated During Development Stage	Total
BALANCE AT DECEMBER 31, 2008		\$	\$	\$	\$	\$	\$	\$	\$
	35,911,156	35,911	14,196,060	(12,500)	(55,330)	-	(15,827)	(13,941,776)	206,538
Rights to purchase shares issued in January 2009, vested during 2009, valued at \$0.33/share	-	-	132,058	-	-	-	-	-	132,058
Common stock issued for services in January 2009, valued at \$0.58/share	100,000	100	57,900	-	-	-	-	-	58,000
Common stock issued for services & settlement for accounts payable	100,000	100	24,900	-	-	-	-	-	25,000

January 2009 valued at \$0.25/share Exercise of purchase right agreement in January 2009 at \$0.25/share	180,550	181	44,957	-	-	-	-	-	45,138
Exercise of warrants at \$0.25/share, pursuant to November 2008 adjusted stock offering	1,279,336	1,279	318,555	-	-	-	-	-	319,834
Exercise of warrants at \$0.001/share	400,000	400	-	-	-	-	-	-	400
Exercise of warrants at \$1.00/share	355,000	355	354,645	-	-	-	-	-	355,000
Options issued for services in November 2007, vested during 2009, valued at \$0.60/share	-	-	199,234	-	-	-	-	-	199,234
Options issued for services in January 2008, vested during 2009, valued at \$0.60/share	-	-	13,583	-	-	-	-	-	13,583
Options issued for services in July 2008, vested during 2009, valued at \$1.48/share	-	-	67,838	-	-	-	-	-	67,838
Options issued for services in August 2008, vested during 2009, valued at \$1.36/share	-	-	623,246	-	-	-	-	-	623,246
	-	-	61,346	-	-	-	-	-	61,346

Options issued for services in November 2008, vested during 2009, valued at \$0.50/share									
Options issued for services in January 2009, vested during 2009, valued at \$0.53/share	-	-	13,136	-	-	-	-	-	13,136
Options issued for services in February 2009, vested during 2009, valued at \$0.38/share	-	-	9,583	-	-	-	-	-	9,583
Options issued for services in June 2009, vested during 2009, valued at \$0.85/share	-	-	21,085	-	-	-	-	-	21,085
Warrants issued for services in June 2009, vested during 2009, valued at \$0.85/share	-	-	177,881	-	-	-	-	-	177,881
Contribution of accrued payroll in February 2009	-	-	52,129	-	-	-	-	-	52,129
Amortization of deferred charges	-	-	-	-	55,330	-	-	-	55,330
Payment for the issuance of common stock	-	-	-	12,500	-	-	-	-	12,500
Common stock issued	116,000	116	39,884	-	-	-	-	-	40,000

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for services in June 2009, valued at \$0.34/share Common stock issued for services & settlement for accounts payable June 2009 valued at \$0.34/share Common stock issued in private placement during June 2009 at \$0.34/share Common stock issued for services in July 2009, valued at \$0.75/share Net loss for the year ending December 31, 2009	145,000	145	49,855	-	-	-	-	-	50,000
	2,479,500	2,480	852,520	-	-	-	-	-	855,000
	100,000	100	74,900	-	-	-	-	-	75,000
	-	-	-	-	-	-	-	(2,721,871)	(2,721,871)
<b>BALANCE AT December 31, 2009</b>	<b>41,166,542</b>	<b>41,167</b>	<b>17,385,295</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>(15,827)</b>	<b>(16,663,647)</b>	<b>746,988</b>
Options issued for services in November 2007, vested during 2010, valued at \$0.60/share Options issued for services in January 2008, vested during 2010, valued at \$0.60/share	-	-	174,866	-	-	-	-	-	174,866
	-	-	14,873	-	-	-	-	-	14,873
	-	-	74,061	-	-	-	-	-	74,061

Options issued for services in July 2008, vested during 2010, valued at \$1.48/share									
Options issued for services in August 2008, vested during 2010, valued at \$1.36/share	-	-	643,812	-	-	-	-	-	643,812
Options issued for services in November 2008, vested during 2010, valued at \$0.50/share	-	-	31,478	-	-	-	-	-	31,478
Warrants issued for services in June 2009, vested during 2010, valued at \$0.85/share	-	-	213,459	-	-	-	-	-	213,459
Warrants issued for services in January 2010, vested during 2010, valued at \$1.83/share			580,167			-			580,167
Warrants issued for services in March 2010, vested during 2010, valued at \$1.86/share	-	-	214,063	-	-	-	-	-	214,063
Options issued for services in August 2010, vested during 2010, valued at \$1.31/share	-	-	27,434	-	-	-	-	-	27,434
	-	-	286,002	-	-	-	-	-	286,002

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Options issued for services in December 2010, vested during 2010, valued at \$1.14/share									
Exercise of warrants at \$0.25/share	947,200	947	235,853	-	-	-	-	-	236,800
Exercise of options at \$0.25/share	15,000	15	3,735	-	-	-	-	-	3,750
Exercise of warrants at \$0.345/share	10,000	10	3,440	-	-	-	-	-	3,450
Exercise of warrants at \$0.50/share	25,000	25	12,475	-	-	-	-	-	12,500
Exercise of warrants at \$1.00/share	282,500	283	282,218	-	-	-	-	-	282,500
Common stock issued in private placement during 2010 at \$1.00/share	1,500,000	1,500	1,498,500	-	-	-	-	-	1,500,000
Common stock issued for services in August 2010, valued at \$1.25/share	4,800	4	5,996	-	-	-	-	-	6,000
Common stock issued for services in November 2010, valued at \$0.93/share	5,000	5	4,645	-	-	-	-	-	4,650
Common stock issued for services in December 2010, valued at \$01.20/share	10,000	10	11,990	-	-	-	-	-	12,000
Net loss for the year ending	-	-	-	-	-	-	-	-	(3,713,232)



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December 31,  
2010

BALANCE  
AT  
DECEMBER  
31, 2010

	\$	\$	\$	\$	\$	\$	\$	\$	
	43,966,042	43,966	21,704,361	-	-	-	(15,827)	(20,376,879)	1,355,621

The accompanying notes are an integral part of these financial statements

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## STATEMENT OF STOCKHOLDERS EQUITY

FOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011  
(CONTINUED)

	Number of Shares	Common Stock	Paid-in Capital	Subscription Receivable/ Receivable for Issuance of Common Stock	Deferred Charges	Unrealized Loss on Securities	Accumulated Deficit	Deficit Accumulated During Development Stage	Total
		\$	\$	\$	\$	\$	\$	\$	\$
BALANCE AT DECEMBER 31, 2010	43,966,042	43,966	21,704,361	-	-	-	(15,827)	(20,376,879)	1,355,621
Common stock issued for services in March 2011, valued at \$1.45/share	10,000	10	14,490	-	-	-	-	-	14,500
Options issued for services in January 2008, vested during 2011, valued at \$0.60/share	-	-	285	-	-	-	-	-	285
Options issued for services in July 2008, vested during 2011, valued at \$1.48/share	-	-	39,829	-	-	-	-	-	39,829
Options issued for	-	-	383,881	-	-	-	-	-	383,881

services in August 2008, vested during 2011, valued at \$1.36/share									
Options issued for services in November 2008, vested during 2011, valued at \$0.50/share	-	-	26,648	-	-	-	-	-	26,648
Warrants issued for services in January 2010, vested during 2011, valued at \$1.83/share	-	-	306,765	-	-	-	-	-	306,765
Warrants issued for services in March 2010, vested during 2011, valued at \$1.86/share	-	-	64,983	-	-	-	-	-	64,983
Options issued for services in August 2010, vested during 2011, valued at \$1.31/share	-	-	65,447	-	-	-	-	-	65,447
Options issued for services in December 2010, vested during 2011, valued at \$1.14/share	-	-	212,136	-	-	-	-	-	212,136
Warrants issued for services in January 2011, vested during 2011, valued at \$1.05/share	-	-	36,585	-	-	-	-	-	36,585
Warrants issued for	-	-	109,820	-	-	-	-	-	109,820

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services in April 2011, vested during 2011, valued at \$0.98/share									
Options issued for services in May 2011, vested during 2011, valued at \$0.97/share	-	-	79,702	-	-	-	-	-	79,702
Options issued for services in August 2011, vested during 2011, valued at \$0.82/share	-	-	17,204	-	-	-	-	-	17,204
Options issued for services in November 2011, vested during 2011, valued at \$0.53/share	-	-	4,384	-	-	-	-	-	4,384
Options issued for services in December 2011, vested during 2011, valued at \$0.82/share	-	-	53,124	-	-	-	-	-	53,124
Warrants issued for services in December 2011, vested during 2011, valued at \$1.05/share	-	-	1,288	-	-	-	-	-	1,288
Common stock issued for commitment shares, valued at \$1.08/share	150,830	151	162,746	-	-	-	-	-	162,896
Common stock issued	185,185	185	199,815	-	-	-	-	-	200,000

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to institutional investor, valued at \$1.08/share									
Common stock issued for additional commitment shares, valued at \$1.15/share	3,017	3	3,467	-	-	-	-	-	3,470
Common stock issued for services in June 2011, valued at \$1.04/share	10,000	10	10,390	-	-	-	-	-	10,400
Common stock issued in private placement during 2011 at \$1.00/share	1,000,000	1,000	999,000	-	-	-	-	-	1,000,000
Common stock issued for services in September 2011, valued at \$1.45/share	10,000	10	14,490	-	-	-	-	-	14,500
Common stock issued for services in May 2011 through August 2011, valued at \$0.90/share to \$1.25/share	2,018	2	2,161	-	-	-	-	-	2,163
Net loss for the nine months ending December 31, 2011	-	-	-	-	-	-	-	(3,482,622)	(3,482,622)
BALANCE AT DECEMBER 31, 2011	\$ 45,337,092	\$ 45,337	\$ 24,513,000	\$ -	\$ -	\$ -	\$ (15,827)	\$ (23,859,501)	\$ 683,009

The accompanying notes are an integral part of these financial statements

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## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

STATEMENTS OF CASH FLOW  
FOR YEARS ENDING DECEMBER 31, 2011 AND 2010 AND

FOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011

	Cumulative Since Inception	For the Year Ending December 31, 2011	For the Year Ending December 31, 2010
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>			
Net loss	\$ (23,859,501)	\$ (3,482,622)	\$ (3,713,232)
Adjustment to reconcile net loss to net cash used in operating activities			
Amortization of deferred charges	4,392,456	-	-
Amortization of prepaid expenses	75,000	-	37,500
Warrants issued for services	3,767,447	519,441	1,007,689
Stock options issued for services	4,973,378	882,640	1,252,526
Common stock issued for services and fees	1,323,871	207,929	22,650
Purchase right agreement amortization	132,058	-	-
Depreciation and amortization of patents	143,427	35,394	30,166
Realized gain on investments	(3,911)	-	-
Realized gain on disposal of assets	(637)	-	-
(Increase) decrease in assets			
Receivables	(30,461)	-	-
Prepaid expenses and other current assets	(41,756)	32,433	(58,316)
Increase (decrease) in liabilities			
Accounts payable	272,748	83,374	(14,271)
Accounts payable - related party	22,628	12,868	(2,361)
Accrued expenses	62,579	26,172	968
Net cash used in operating activities	(8,770,674)	(1,682,371)	(1,436,681)
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>			
Cost of intangibles	(439,787)	(93,778)	(84,794)
Proceeds from sale of available for sale securities	203,911	-	-
Proceeds from receipt of note receivable	100,000	-	-
Purchase of available for sale securities	(200,000)	-	-

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Purchase of equipment, furniture and leasehold improvements	(186,245)	(17,894)	(23,647)
Net cash used in provided by investing activities	(522,121)	(111,672)	(108,441)
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>			
Issuance of common stock, private placement	7,495,524	1,000,000	1,500,000
Common stock rescinded, private placement	(200,000)	-	-
Issuance of common stock, exercise of options and warrants	1,577,004	-	539,000
Issuance of common stock, exercise of purchase right agreement	45,138	-	-
Issuance of common stock, institutional investor	200,000	200,000	-
Repayment of notes payable	(14,970)	-	-
Proceeds from subscription receivable	19,000	-	-
Advances to stockholders	(4,933)	-	-
Proceeds from convertible notes	529,000	-	-
Advances from officers	1,498	-	-
Net cash provided by financing activities	9,647,261	1,200,000	2,039,000
<b>NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS</b>	<b>354,466</b>	<b>(594,043)</b>	<b>493,878</b>
<b>CASH AND CASH EQUIVALENTS - BEGINNING OF PERIOD</b>	<b>5,358</b>	<b>953,867</b>	<b>459,989</b>
<b>CASH AND CASH EQUIVALENTS - END OF PERIOD</b>	<b>\$ 359,824</b>	<b>\$ 359,824</b>	<b>\$ 953,867</b>

The accompanying notes are an integral part of these financial statements.



## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

STATEMENTS OF CASH FLOW  
FOR YEARS ENDING DECEMBER 31, 2011 AND 2010 ANDFOR THE PERIOD JANUARY 1, 2004 (INCEPTION OF DEVELOPMENT STAGE) TO DECEMBER 31, 2011  
(CONTINUED)

	Cumulative Since Inception	For the Year Ending December 31, 2011	For the Year Ending December 31, 2010
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION			
CASH PAID DURING THE PERIOD FOR:			
	\$	\$	\$
Interest	23,232	288	557
SUPPLEMENTAL DISCLOSURE OF NON-CASH INVESTING AND FINANCING ACTIVITIES			
	\$	\$	\$
Common stock issued in exchange for deferred charges	3,142,400	-	-
	\$	\$	\$
Warrants issued in exchange for deferred charges	1,581,056	-	-
	\$	\$	\$
Common stock issued as settlement for accounts payable	74,708	-	-
	\$	\$	\$
Increase/(Decrease) in fair value of investment securities	-	-	-

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	\$	\$	\$	
Accrued interest contributed as capital		35,624	-	-
	\$	\$	\$	
Common stock issued in the conversion of notes payable		529,000	-	-
	\$	\$	\$	
Acquisition of automobile through loan payable		24,643	-	-
Common stock issued upon exercise of a warrant				
in exchange for receivable	\$	75,000	-	-
	\$	\$	\$	
Insurance company pay off of note payable		9,673	-	-
	\$	\$	\$	
Receivable for issuance of common stock		10,000	-	-
	\$	\$	\$	
Contribution of officer accrued payroll		52,129	-	-
	\$	\$	\$	
Common stock issued for prepaid expense		75,000	-	-

The accompanying notes are an integral part of these financial statements.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 1- SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

**History and Nature of Business**

Lightwave Logic, Inc., formerly Third-Order Nanotechnologies, Inc., formerly PSI-Tec Holdings, Inc., formerly Eastern Idaho Internet Service, Inc. (the Company) was organized under the laws of the State of Nevada in 1997. The Company was engaged in the business of marketing internet services until June 30, 1998, at which time the principal assets of the business were sold and operations were discontinued. The Company was inactive until the acquisition of PSI-TEC Corporation ( PSI-TEC ) on July 14, 2004, at which time the name was changed to PSI-TEC Holdings, Inc.

**Development Stage**

PSI-TEC was incorporated in 1995 under the laws of the State of Delaware. PSI-TEC primarily conducted research for the United States Government under a contract, which expired in 2003. Beginning January 1, 2004, PSI-TEC was engaged in the development of electro-optic polymers for application in the electro-optic device markets. PSI-TEC is considered a development stage company as defined in Financial Accounting Standards Board Accounting Standards Codification ( FASB ASC ) 915 Development Stage Entities from the inception of the development stage on January 1, 2004.

**Merger**

On July 14, 2004, the Company acquired PSI-TEC. Under the terms of the merger agreement, the stockholders of PSI-TEC received 15,600,000 shares of common stock in exchange for its 2,206,280 shares. Following the merger, the Company changed its name to PSI-TEC Holdings, Inc. Under accounting principles generally accepted in the United States, the share exchange is considered to be a capital transaction in substance rather than a business combination. That is, the share exchange is equivalent to the issuance of stock by PSI-TEC Holdings, Inc. for the net monetary assets of PSI-TEC, accompanied by a recapitalization, and is accounted for as a change of capital structure. Accordingly, the accounting for the share exchange was identical to that resulting from a reverse acquisition, except no goodwill was recorded. Under reverse takeover accounting, the post-reverse acquisition comparative historical

financial statements of the legal acquirer, PSI-TEC Holdings, Inc., are those of the legal acquiree, PSI-TEC, which is considered to be the accounting acquirer. On October 20, 2006, PSI-TEC Holdings, Inc. and PSI-TEC merged and changed its name to Third-Order Nanotechnologies, Inc. On March 10, 2008, Third-Order Nanotechnologies, Inc. changed its name to Lightwave Logic, Inc.

### **Estimates**

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying disclosures. Although these estimates are based on management's best knowledge of current events and actions the Company may undertake in the future, actual results could differ from the estimates.

### **Cash Equivalents**

For the purposes of the statement of cash flows, the Company considers all highly liquid instruments with maturities of three months or less at the time of purchase to be cash equivalents.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 1- SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)**

**Concentration of Credit Risk**

Certain financial instruments potentially subject the Company to concentrations of credit risk. These financial instruments consist primarily of cash. At December 31, 2011, the Company did not have deposits with a financial institution that exceed the FDIC deposit insurance coverage.

**Property and Equipment**

Equipment is stated at cost. Depreciation is principally provided by use of straight-line methods for financial and tax reporting purposes over the estimated useful lives of the assets, generally 5 years.

**Intangible Assets**

Definite-lived intangible assets are stated at cost. Patents are amortized over their estimated useful lives, generally 20 years.

**Fair Value of Financial Instruments**

The Company's financial instruments consist of cash, accounts payable and accrued expenses. The carrying values of cash, accounts payable and accrued expenses approximate fair value because of their short maturities.

**Income Taxes**

The Company follows FASB ASC 740, Income Taxes, which requires an asset and liability approach to financial accounting and reporting for income taxes. Deferred income tax assets and liabilities are computed annually for

temporary differences between the financial statement and tax bases of assets and liabilities that will result in taxable or deductible amounts in the future based on enacted tax laws and rates applicable to the periods in which the differences are expected to affect taxable income. Valuation allowances are established when necessary to reduce deferred tax assets to the amount expected to be realized. Income tax expense is the tax payable or refundable for the period plus or minus the change during the period in deferred tax assets and liabilities.

### **Loss Per Share**

The Company follows FASB ASC 260, *Earnings per Share*, resulting in the presentation of basic and diluted earnings per share. Because the Company reported a net loss in 2011 and 2010, common stock equivalents, including stock options and warrants were anti-dilutive; therefore, the amounts reported for basic and dilutive loss per share were the same.

### **Recoverability of Long Lived Assets**

The Company follows FASB ASC 360 *Property, Plant, and Equipment*. Long-lived assets to be held and used are reviewed for impairment whenever events or changes in circumstances indicate that the related carrying amount may not be recoverable. When required, impairment losses on assets to be held and used are recognized based on the excess of the asset's carrying amount.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 1- SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)**

**Comprehensive Income**

The Company follows FASB ASC 220.10, Reporting Comprehensive Income. Comprehensive income is a more inclusive financial reporting methodology that includes disclosure of certain financial information that historically has not been recognized in the calculation of net income. Since the Company has no items of other comprehensive income, comprehensive income (loss) is equal to net loss.

**Recently Adopted Accounting Pronouncements**

As of December 31, 2011 and for the year then ended, there were no recently adopted accounting pronouncements that had a material effect on the Company's financial statements.

**Recently Issued Accounting Pronouncements Not Yet Adopted**

As of December 31, 2011, there are no recently issued accounting standards not yet adopted which would have a material effect on the Company's financial statements.

**NOTE 2 EQUIPMENT**

Equipment consists of the following:

	December 31, 2011	December 31, 2010
	\$	\$
Office equipment	12,816	12,816
Lab equipment	169,028	151,134
Furniture	3,494	3,494
Leasehold improvements	5,368	5,368
	190,706	172,812
Less: Accumulated depreciation	101,955	75,244
	\$	\$
	88,751	97,568

Depreciation expense for the years ending December 31, 2011 and 2010 was \$26,711 and \$30,166.



LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 3 INTANGIBLE ASSETS**

This represents legal fees and patent fees associated with the registration of patents. The Company has recorded amortization expenses on the Spacer and Chromophore patent applications accepted by the United States Patent and Trademark Office in February 2011 and April 2011 which are amortized over its legal life of 20 years. No amortization expense has been recorded on the remaining patents since the patents have yet to be declared effective. Once issued, the cost of the patents will be amortized over their remaining legal lives, which is generally 20 years.

Patents consists of the following:

	December 31, 2011	December 31, 2010
	\$	\$
Patents	439,787	346,009
Less: Accumulated amortization	8,683	-
	\$	\$
	431,104	346,009

Amortization expense for the years ending December 31, 2011 and 2010 was \$8,683 and \$0.

**NOTE 4 COMMITMENTS**

The Company is obligated under an operating lease for laboratory space expiring June 30, 2012. Aggregate minimum future lease payments are as follows:

YEAR ENDING DECEMBER 31,	AMOUNT
2011	\$4,838

Rent expense approximating \$9,910 and \$9,257 is included in research and development expenses for the years ended December 31, 2011 and 2010.

## LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

## NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 5 INCOME TAXES**

As discussed in Note 1, the Company utilizes the asset and liability method of accounting for income taxes in accordance with FASB ASC 740. The reconciliation of the statutory federal rate to the Company's effective Income tax rate is as follows:

	2011		2010	
	Amount	%	Amount	%
Income tax benefit at U.S.	\$		\$	
federal income tax rate	(1,184,000)	(34)	(1,262,000)	(34)
State tax, net of federal tax effect	(313,000)	(9)	(334,000)	(9)
Non-deductible share-based compensation	-	-	244,000	7
Change in valuation allowance	1,497,000	43	1,352,000	36
	\$		\$	
	-	-	-	-

The components of deferred tax assets as of December 31, 2011, and December 31, 2010 are as follows:

	2011	2010
	\$	\$
Deferred tax asset for NOL carryforwards	7,084,000	6,189,000
Share-based compensation	2,390,000	1,788,000
Accrued expenses	17,000	17,000
Valuation allowance	(9,491,000)	(7,994,000)

\$

\$

-

-

The valuation allowance for deferred tax assets as of December 31, 2011 and 2010 was \$9,491,000 and \$7,994,000, respectively. The change in the total valuation for the years ended December 31, 2011 and 2010 was an increase of \$1,497,000 and \$1,352,000, respectively. In assessing the realization of deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependant upon the generation of future taxable income during the periods in which the net operating losses and temporary differences become deductible. Management considered projected future taxable income and tax planning strategies in making this assessment. The value of the deferred tax assets was offset by a valuation allowance, due to the current uncertainty of the future realization of the deferred tax assets.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 5 INCOME TAXES (CONTINUED)**

As of December 31, 2011, the Company had net operating loss carry forwards of approximately \$16,500,000, expiring through the year ending December 31, 2031. This amount can be used to offset future taxable income of the Company.

The timing and manner in which the Company can utilize operating loss carryforwards in any year may be limited by provisions of the Internal Revenue Code regarding changes in ownership of corporations. Such limitation may have an impact on the ultimate realization of its carryforwards and future tax deductions.

On January 1, 2007, the Company adopted FASB ASC 740.10, which provides guidance for the recognition and measurement of certain tax positions in an enterprise's financial statements. Recognition involves a determination of whether it is more likely than not that a tax position will be sustained upon examination with the presumption that the tax position will be examined by the appropriate taxing authority having full knowledge of all relevant information. The adoption of FASB ASC 740.10 did not require an adjustment to the Company's financial statements.

The Company's policy is to record interest and penalties associated with unrecognized tax benefits as additional income taxes in the statement of operations. As of January 1, 2011, the Company had no unrecognized tax benefits and no charge during 2011, and accordingly, the Company did not recognize any interest or penalties during 2011 related to unrecognized tax benefits. We do not have an accrual for uncertain tax positions as of December 31, 2011.

The Company files U.S. income tax returns and a state income tax return. With few exceptions, the U.S. and state income tax returns filed for the tax years ending on December 31, 2007 and thereafter are subject to examination by the relevant taxing authorities.

## **NOTE 6 STOCKHOLDERS EQUITY**

### **Preferred Stock**

Pursuant to our Company's Articles of Incorporation, our board of directors is empowered, without stockholder approval, to issue series of preferred stock with any designations, rights and preferences as they may from time to time determine. The rights and preferences of this preferred stock may be superior to the rights and preferences of our common stock; consequently, preferred stock, if issued could have dividend, liquidation, conversion, voting or other rights that could adversely affect the voting power or other rights of the common stock. Additionally, preferred stock, if issued, could be utilized, under special circumstances, as a method of discouraging, delaying or preventing a change in control of our business or a takeover from a third party.

### **Common Stock and Warrants**

The stockholders' deficit at January 1, 2004 has been retroactively restated for the equivalent number of shares received in the reverse acquisition at July 14, 2004 (Note 1) after giving effect to the difference in par value with the offset to additional paid-in-capital.

In July 2004, the Company issued 1,600,000 shares of its common stock for professional services valued at \$256,000, fair value.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

In August 2004, the Company issued 637,500 shares of its common stock for professional services valued at \$75,000, fair value.

In December 2004, the Company converted a note payable of \$30,000 into 187,500 shares of common stock at a conversion price of \$0.16 per share.

In April 2005, the Company issued 4,000,000 shares of its common stock in a private placement for proceeds of \$1,000,000.

On May 4, 2005, the Company converted the notes payable of \$499,000 into 3,118,750 shares of common stock at a conversion price of \$0.16 per share. An unpaid note payable in the amount of \$6,500 has been reflected as a subscription receivable. During 2006, the Company deemed this \$6,500 outstanding subscription receivable to be uncollectible.

During August 2005, the Company issued 210,000 shares of common stock for professional services rendered valued at \$585,500, fair value. Consulting expense of \$375,500 was recognized during 2005, and at December 31, 2005, the remaining balance of \$210,000 is reflected as a deferred charge on the balance sheet. During 2006, consulting expense of \$210,000 was recognized. This agreement ended in May 2006.

In August 2005, in conjunction with a management services contract with a related party, the Company issued 200,000 shares of common stock valued at \$584,000. Management expense of \$265,455 was recognized during 2005, and at December 31, 2005, the remaining balance of \$318,545 is reflected as a deferred charge in a contra-equity account. During 2006, management expense of \$318,545 was recognized. This agreement ended in June 2006.

During May 2005, the Company issued Stock Purchase Warrants to purchase 100,000 shares of common stock at an exercise price of \$2.10 in exchange for consulting services. The warrants are exercisable until May 2008 and vest as follows: 50,000 shares during the first year of the agreement, 25,000 shares during the second year of the agreement, and 25,000 shares during the third year. In accordance with the fair value method, the Company used the Black-Scholes model to calculate the grant-date fair value, with the following assumptions: no dividend yield, expected volatility of 60%, risk-free interest rate of 3.8% and expected life of option of three years. The fair market value of the warrants was \$113,250. In accordance with the fair value method as described in accounting requirements of FASB ASC 718 Stock Compensation, the Company recognized consulting expense of \$37,000 in 2005. This warrant was cancelled during 2006.



LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During September 2005, the Company issued Stock Purchase Warrants to purchase 100,000 shares of common stock at an exercise price of \$2.00 in exchange for consulting services. The warrants expire in September 2008 and vest as follows: 50,000 shares during the first year of the agreement, 25,000 shares during the second year of the agreement, and 25,000 shares during the third year of the agreement. In accordance with the fair value method, the Company used the Black-Scholes model to calculate the grant-date fair value, with the following assumptions: no dividend yield, expected volatility of 60%, risk-free interest rate of 3.8% and expected life of option of three years. The fair market value of the warrants was \$145,100. The Company recognized consulting expense of \$27,014, \$36,370, \$66,500 and \$24,200 for the years ended December 31, 2008, 2007, 2006 and 2005 in conjunction with this agreement. These warrants expired in September 2008.

On October 15, 2005, the Company issued Stock Purchase Warrants to purchase 30,000 shares of common stock at an exercise price of \$1.40 in exchange for consulting services. The warrants expire in October 2006 and are exercisable immediately. In accordance with the fair value method, the Company used the Black-Scholes model to calculate the grant-date fair value, with the following assumptions: no dividend yield, expected volatility of 60%, risk-free interest rate of 4.15% and expected life of option of one year. The fair market value of the warrants was \$15,900. In accordance with the fair value method as described in accounting requirements of FASB ASC 718 Stock Compensation, the Company recognized consulting expense of \$15,900 during 2005. These warrants expired in October 2006.

In December 2005, in conjunction with a consulting contract, the Company issued Stock Purchase Warrants to purchase 300,000 shares of common stock at an exercise price of \$0.25 per share valued at \$435,060, fair value. The warrants expire in December 2007 and were exercisable immediately. In accordance with the fair value method, the Company used the Black-Scholes model to calculate the grant-date fair value, with the following assumptions: no dividend yield, expected volatility of 60%, risk-free interest rate of 4.41% and expected life of option of two years. In accordance with the fair value method as described in accounting requirements of FASB ASC 718 Stock Compensation, the Company recognized consulting expense of \$199,435, and at December 31, 2005, the remaining balance in deferred charges amounted to \$235,625. The 300,000 warrants were fully exercised on December 31, 2005 for \$75,000. The Company recognized \$18,128 and \$217,497 in consulting expense in conjunction with this agreement for the years ended December 31, 2007 and 2006, which was cancelled during 2007.

During 2006, the Company issued 850,000 shares of common stock and warrants to purchase 425,000 shares of common stock for proceeds of \$425,000 in accordance to a private placement memorandum amended December 18, 2006. Pursuant to the terms of the amended offering, up to 20 units were offered at the offering price of \$50,000 per unit, with each unit comprise of 100,000 shares and a warrant to purchase 50,000 shares of common stock at \$0.50 per share. In November 2007, 400,000 shares of common stock and warrants to purchase 200,000 shares of common stock were rescinded. As of December 31, 2008, warrants to purchase 210,000 shares of common stock were fully exercised for proceeds of \$105,000, and warrants to purchase 15,000 shares expired.

During February 2006, the Company issued 300,000 shares of common stock for professional services rendered valued at \$270,000, fair value. The Company recognized consulting expense of \$16,875 and \$118,125 and legal expense of \$16,875 and \$118,125 during 2007 and 2006. The contracts expired during 2007. The legal services were provided by a related party.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During May 2006, the Company issued 400,000 shares of common stock for professional services rendered valued at \$620,000, fair value. The Company recognized consulting expense of \$258,333 and \$361,667 during 2007 and 2006, and at December 31, 2006. The contracts expired during 2007.

During June 2006, the Company issued 25,000 shares of common stock to a related party for professional services rendered valued at \$36,250, fair value. The Company recognized legal expense of \$16,615 and \$19,635 during 2007 and 2006, and at December 31, 2006. The contracts expired during 2007.

During November 2006, the Company issued 60,000 shares of common stock for professional services valued at \$29,400, fair value. The Company recognized investor relations expense of \$25,480 and \$3,920 during 2007 and 2006. The contract expired during 2007.

In June 2006, in conjunction with an addendum to an existing consulting contract effective December 2005, the Company issued Stock Purchase Warrants to purchase 300,000 shares of common stock at an exercise price of \$0.25 per share. The warrants expire in June 2008 and were exercisable immediately. In accordance with the fair value method, the Company used the Black-Scholes model to calculate the grant-date fair value, with the following assumptions: no dividend yield, expected volatility of 186%, risk-free interest rate of 4.41% and expected life of option of two years. The fair market value of the warrants was \$465,996. During 2007 and 2006, the Company recognized consulting expense of \$330,948 and \$135,048 in conjunction with this agreement. The contract was cancelled during 2007. The 300,000 warrants were fully exercised on March 12, 2008 for proceeds of \$75,000.

During 2006, the Company cancelled a warrant issued during May 2005 to purchase 100,000 shares of the Company's common stock at an exercise price of \$2.10, and issued an option to purchase 500,000 shares of the Company's common stock at an exercise price of \$1 per share and the same option's expiration and vesting terms were modified during November 2006. This option expired in June 2007. The incremental cost of the modified option was \$394,030

and will be expensed over the vesting terms. The Company recognized \$17,589 and \$406,215 as a consulting expense in 2007 and 2006, which includes \$337,290 of the incremental cost of the modified option.

During February 2006, the Company awarded an employee with an option to purchase 200,000 shares of common stock at an exercise price of \$1.00 per share under the 2005 Employee Stock Option Plan. These options were valued at \$217,628 using the Black-Scholes Option Pricing Formula. The employee compensation expense recognized during 2007 and 2006 is \$43,757 and \$22,673. In June 2007, the employee was terminated and the vesting ceased. After September 2007, the vested options expired.

During 2006, the Company recognized contributed capital of \$35,624 related to the conversion of accrued interest payable.

During 2006, the Company deemed a May 2005 outstanding subscription receivable of \$6,500 to be uncollectible.

LIGHTWAVE LOGIC, INC.

(A Development Stage Company)

NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During 2007, the Company issued 2,482,000 shares of common stock and warrants to purchase 1,241,000 shares of common stock for proceeds of \$1,241,000 in accordance to a private placement memorandum amended December 18, 2006. Pursuant to the terms of the amended offering, up to 20 units were offered at the offering price of \$50,000 per unit, with each unit comprised of 100,000 shares and a warrant to purchase 50,000 shares of common stock at \$0.50 per share. For the six month ending June 30, 2009, the remaining 600,000 outstanding warrants expired.

During 2007, the Company issued 1,767,540 shares of common stock and warrants to purchase 883,770 shares of common stock for proceeds of \$1,060,524 in accordance to a private placement memorandum issued on October 3, 2007. Pursuant to the terms of the offering, up to 20 units were offered at the purchase price of \$60,000 per unit, with each unit comprised of 100,000 shares and a warrant to purchase 50,000 shares of common stock at \$1.00 per share.

During 2009 and 2008, 416,000 and 82,770 warrants were exercised, respectively. For the year ending December 31, 2009, the remaining 385,000 outstanding warrants expired.

During 2007, as previously described, a shareholder that was issued 400,000 shares of the Company's common stock and a warrant to purchase 200,000 shares of common stock at \$0.50 per share rescinded his shares and warrant.

During February 2007, the Company issued 151,785 shares of common stock for investor relations services valued at \$106,250, fair value, which was recorded as a deferred charge and amortized over one year, the term of the services contract. During 2007, the Company recognized \$97,396 in investor relations expense. During 2008, the Company recognized \$8,854 in investor relations expense. This contract expired in February 2008.

During February 2007, the Company terminated its then CEO. The option to purchase 56,000 shares of common stock that was recorded as deferred charges of \$42,730 were not vested and were forfeited. The option to purchase 444,000 shares of common stock that were vested expired during 2007.

During March 2007, the Company issued 1,000,000 shares of common stock to a related party for management consulting services valued at \$580,000, fair value. During April 2007, the Company issued 500,000 warrants as an addendum to the original contract for management consulting services valued at \$348,000, fair value. This contract was recorded as a contra-equity deferred charges account and is amortized over one year, the term of the contract. Management consulting expense recognized during 2008 and 2007 is \$154,667 and \$773,333. This contract was renewed in March, 2008. In December 2010, the warrant was partially exercised to purchase 100,000 shares of common stock for proceeds of \$25,000. As of December 31, 2011, warrants to purchase 400,000 shares of common stock are still outstanding.

During April 2007, the Company issued 100,000 shares of common stock for legal services to a related party valued at \$35,000, fair value, to settle \$29,708 of accounts payable and as payment for \$5,292 of legal services incurred in April 2007.

During October 2007, the Company issued 150,000 shares of common stock for investor relations services valued at \$102,000, fair value to a related party. During 2007 the Company recognized \$102,000 in investor relation expense.

LIGHTWAVE LOGIC, INC.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During October 2007, the Company issued 150,000 shares of common stock for investor relations services valued at \$135,000, fair value. During 2007, the Company recognized \$135,000 in investor relations expense.

During November 2007, the Company issued 400,000 shares of common stock under the 2007 Stock Option Plan to the acting Chief Executive Officer for services rendered valued at \$288,000, fair value. The Company recognized \$288,000 in consulting expense during 2007.

During March 2007, the Company issued a warrant to purchase 100,000 shares of common stock for consulting services at an exercise price of \$0.25 per share. The warrant was valued at \$63,065 using the Black-Scholes Option Pricing Formula and expensed over the life of the contract associated with the consulting services, which is one year. The consulting expense recognized during 2008 and 2007 is \$10,885 and \$52,180. In April 2010, the warrant was exercised to purchase 100,000 shares of common stock for proceeds of \$25,000.

During April 2007, the Company issued warrants to purchase 900,000 shares of common stock for consulting services at an exercise price of \$0.25 per share. The warrants were valued at \$604,416 using the Black-Scholes Option Pricing Formula and expensed over the life of the contracts associated with the consulting services, which is one year. The consulting expense recognized during 2008 and 2007 is \$170,451 and \$433,966. In July 2008, the warrant was partially exercised to purchase 20,000 shares of common stock for proceeds of \$5,000. In April 2010, the warrant was partially exercised to purchase 380,000 shares of common stock for proceeds of \$95,000. The remaining warrant to purchase 500,000 shares of common stock is still outstanding as of December 31, 2011.

During May 2007, the Company issued a warrant to purchase 150,000 shares of common stock for consulting services at an exercise price of \$0.25 per share. The warrant was valued at \$84,390 using the Black-Scholes Option Pricing Formula and expensed over the life of the contract associated with the consulting services, which is one year. The consulting expense recognized during 2008 and 2007 is \$31,444 and \$52,946. In April 2010, the warrant was exercised to purchase 150,000 shares of common stock for proceeds of \$37,500.

During October 2007, the Company issued a warrant to purchase 100,000 shares of common stock at a purchase price of \$0.25 per share for accounting services rendered. The warrant was valued at \$61,449 using the Black-Scholes Option Pricing Formula. The Company recognized \$61,449 in accounting expense during 2007. The warrant is still outstanding as of December 31, 2011.

During October 2007, the Company issued a warrant to purchase 67,200 shares of common stock at a purchase price of \$0.25 per share for consulting services rendered. The warrant was valued at \$52,292 using the Black-Scholes Option Pricing Formula. During 2007, the Company recognized \$52,292 in consulting expense. In October 2010, the warrant was exercised to purchase 67,200 shares of common stock for proceeds of \$16,800.



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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During December 2007, the Company issued a warrant to purchase 25,000 shares of common stock at a purchase price of \$0.50 per share for accounting services rendered. The warrant was valued at \$13,646 using the Black-Scholes Option Pricing Formula and expensed over the life of the contract, which is one year. The Company recognized \$12,487 and \$1,159 in consulting expense during 2008 and 2007. In June 2010, the warrant was exercised to purchase 25,000 shares of common stock for proceeds of \$12,500.

During November 2007, under the 2007 Employee Stock Option Plan, the Company issued options to purchase 1,752,000 shares of common stock at a purchase price of \$0.72 per share. The options were valued at \$1,045,077 using the Black-Scholes Option Pricing Formula. During 2008, an option to purchase 750,000 shares of common stock, of which 125,000 shares were vested, forfeited. The consulting expense recognized during 2010, 2009, 2008 and 2007 is \$174,866, \$199,233, \$286,803 and \$41,653. The options are still outstanding as of December 31, 2011.

In January 2008, under the 2007 Employee Stock Option Plan, the Company issued an option to purchase 100,000 shares of common stock at a purchase price of \$0.72 per share. The option was valued at \$59,490, fair value, using the Black-Scholes Option Pricing Formula and is being recognized based on vesting terms over a three year period. The expense recognized during 2010, 2009 and 2008 is \$14,873, \$13,582 and \$30,750. For the year ending December 31, 2011 and 2010, the Company recognized \$285 and \$14,873 of expense. The options are still outstanding as of December 31, 2011.

During 2008, the Company issued 690,001 shares of common stock and warrants to purchase 345,001 shares of common stock for proceeds of \$414,000 in accordance to a private placement memorandum issued on October 3,

2007. Pursuant to the terms of the offerings, up to 25 units were offered at the purchase price of \$60,000 per unit, with each unit comprised of 100,000 shares and a warrant to purchase 50,000 shares of common stock at \$1.00 per share. During 2009 and 2008, the warrant was partially exercised to purchase 25,834 and 20,000 shares of common stock for proceeds of \$25,834 and \$20,000. In April 2010, the warrant was partially exercised to purchase 282,500 shares of common stock for proceeds of \$282,500. During the six month ending June 30, 2010, the remaining warrants to purchase 16,667 shares of common stock expired.

During March 2008, the Company issued a warrant to purchase 400,000 shares of common stock as an addendum to the original contract for management consulting services provided by a related party, valued at \$332,000, fair value using Black-Scholes Option Pricing Formula, vesting immediately. This contract was recorded as a contra-equity deferred charges account and is amortized over one year beginning February 28, 2008, the term of the contract. For the year ending December 31, 2009 and 2008, the Company recognized \$55,330 and \$276,670 of management consulting expense. In January 2009, the warrant was fully exercised to purchase 400,000 shares of common stock for proceeds of \$400.

During March 2008, the Company issued 100,000 shares of common stock for legal services to a related party valued at \$75,000, fair value. The Company recognized \$75,000 of legal expense for the year ending December 31, 2008.

LIGHTWAVE LOGIC, INC.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During April 2008, the Company issued a warrant to purchase 600,000 shares of common stock at a purchase price of \$0.73 per share for consulting services rendered. The warrant was valued at \$976,193, fair value, using the Black-Scholes Option Pricing Formula, vesting immediately. For the year ended December 31, 2008, the Company recognized \$976,193 in consulting expense. The warrant is still outstanding as of December 31, 2011.

In July 2008, the Company issued options to purchase 200,000 shares of common stock at a purchase price of \$1.75 per share to members of the board of directors, under the 2007 Employee Stock Option Plan. Using the Black-Scholes Option Pricing Formula, the options were valued at \$296,247, fair value, vesting 50,000 immediately and the remaining in annual equal installments of 50,000 over the next three years. The expense is being recognized based on vesting terms over a three year period. The expense recognized during 2010, 2009 and 2008 is \$74,061, \$67,840 and \$114,519. For the year ending December 31, 2011 and 2010, the Company recognized \$39,829 and \$74,061 of expense. The options are still outstanding as of December 31, 2011.

In August 2008, under the 2007 Employee Stock Option Plan, the Company issued options to purchase 550,000 and 1,050,000 shares of common stock at a purchase price of \$1.42 and \$1.75 per share to members of the board of directors and the Chief Executive Officer, vesting 212,500 immediately and the remaining in annual equal installments of 112,500 over the next three years and vesting in quarterly equal installments of 87,500 commencing November 1, 2008, respectively. The options were valued at \$2,176,201, fair value, using the Black-Scholes Option Pricing Formula and are being recognized based on vesting terms over a three year period. The expense recognized during 2010, 2009 and 2008 is \$643,812, \$623,246 and \$525,263. For the year ending December 31, 2011 and 2010, the Company recognized \$383,881 and \$643,812 of expense. The options are still outstanding as of December 31, 2011.

In August 2008, the Company issued 200,000 shares of common stock under the 2007 Stock Option Plan to its new Chief Executive Officer as part of the employment agreement valued at \$360,000, fair value. The Company recognized \$360,000 in consulting expense for the year ending December 31, 2008.

In 2008, January through August warrant holders exercised warrants to purchase 270,000 shares at \$0.50 per share for proceeds of \$135,000.

On October 28, 2008, the Company's board of directors authorized the Company to raise up to \$600,000 of capital through an Adjusted Common Stock Offering to certain warrant holders. This offering provided eligible warrant holders with the opportunity to purchase four (4) shares of common stock for each dollar invested pursuant to their existing warrant agreement. As of December 31, 2008, warrants to purchase 641,080 shares of common stock were exercised with proceeds of \$160,270. For the three month period ending March 31, 2009, warrants to purchase 1,279,336 shares of common stock were exercised with proceeds of \$319,834. In January 2009, the term of the 2008 Adjusted Common Stock offering was extended until January 31, 2009.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

In November 2008, the Company issued an option to purchase 250,000 shares of common stock under the 2007 Stock Option Plan at a purchase price of \$.65 per share to a new member of its board of directors. Using the Black-Scholes Option Pricing Formula, the options were valued at \$125,911, fair value, vesting 62,500 immediately and the remaining in annual equal installments of 62,500 over the next three years. The expense is being recognized based on vesting terms over a three year period. The expense recognized during 2010, 2009 and 2008 is \$31,478, \$61,346 and \$6,439. For the year ending December 31, 2011 and 2010, the Company recognized \$26,648 and \$31,478 of expense. The options are still outstanding as of December 31, 2011.

In January 2009, an employee was granted with an option to purchase up to 25,000 shares of common stock at a purchase price of \$.25 per share. Using the Black-Scholes Option Pricing Formula, the options were valued at \$13,136, fair value. These options expire in 5 years and vest immediately. The expense recognized during 2010 and 2009 is \$0 and \$13,136. In May 2010, the option was partially exercised to purchase 15,000 shares of common stock for proceeds of \$3,750. As of December 31, 2011, options to purchase 10,000 shares of common stock are still outstanding.

During January 2009, the Company issued 100,000 shares of common stock to an officer, under the 2007 Stock Option Plan, for services rendered valued at \$58,000, fair value.

During January 2009, the Company issued 100,000 shares of common stock for legal services to a related party valued at \$25,000, to settle accounts payable for \$10,000 and \$15,000 for legal services.

During January 2009, the officers, directors, and employees of the Company were each given the right to purchase from the Company's 2007 Employee Stock Plan up to 40,000 shares of common stock at a purchase price of \$.25 per share, 400,000 shares in the aggregate, all of which were valued at \$132,058, fair value using the Black-Scholes Option Pricing Formula. The rights to purchase vested immediately. A total of 180,550 shares were purchased pursuant to the rights to purchase with total proceeds of \$35,138 and a common stock receivable of \$10,000 which was paid in May, 2009. The rights to purchase the remaining 219,450 shares expired on January 31, 2009.

At December 31, 2008 the Company had accrued officer salaries and payroll taxes of \$98,205. On February 19, 2009, two officers, who are also shareholders, agreed to waive their rights to unpaid wages and salary amounting to \$52,129. Accordingly in the first quarter 2009, the accrued expense was adjusted from \$98,205 to \$42,088 with the \$52,129 treated as contributed capital and \$3,988 reversed from payroll taxes.

In February 2009, an employee was granted with an option to purchase up to 25,000 shares of common stock at a purchase price of \$.45 per share. Using the Black-Scholes Option Pricing Formula, the options were valued at valued at \$9,583, fair value. These options expire in 5 years and vest immediately. The expense recognized during 2009 is \$9,583. The options are still outstanding as of December 31, 2011.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During June 2009, in accordance to private placement memorandum, the Company issued 2,479,500 shares of common stock for proceeds of \$855,000 dated June 10, 2009. Pursuant to the terms of the offering, up to 18 units were offered at the offering price of \$50,000 per unit, with each unit comprised of 145,000 shares to purchase at \$0.34 per share.

During June 2009, the Company issued a warrant to purchase 464,000 shares of common stock at a purchase price of \$0.34 per share for accounting services rendered. The warrant was valued at \$391,342 using the Black-Scholes Option Pricing Formula, vesting 46,400 immediately and the remaining on equal monthly installments of 23,200 over the next eighteen months. The warrant expires in 5 years. The expense is being recognized based on service terms of the agreement over a twenty two month period. The expense recognized during 2010 and 2009 is \$213,459 and \$177,883. In April 2010, the warrant was partially exercised to purchase 10,000 shares of common stock for proceeds of \$3,450. As of December 31, 2011, warrants to purchase 454,000 shares of common stock are still outstanding.

In June 2009, an employee was granted with an option to purchase up to 25,000 shares of common stock at a purchase price of \$.34 per share. Using the Black-Scholes Option Pricing Formula, the options were valued at valued at \$21,085, fair value. These options expire in 5 years and vest immediately. The expense recognized during 2009 is \$21,085. The option is still outstanding as of December 31, 2011.

During June 2009, the Company issued 145,000 shares of common stock for legal services to a related party valued at \$50,000, to settle accounts payable for \$35,000 and \$15,000 for legal services.

During June 2009, the Company issued 116,000 shares of common stock for accounting services valued at \$40,000, fair value. The Company recognized \$40,000 of accounting expense for the year ending December 31, 2009.

During July 2009, the Company issued 100,000 shares of common stock for investor relation services valued at \$75,000, fair value vesting 25,000 shares each quarter commencing July 1, 2009. The investor relation expense recognized during 2010 and 2009 is \$37,500 and \$37,500. For the year ending December 31, 2011 and 2010, the Company recognized \$0 and \$37,500 of investor relation expense.

In January 2010, the Company issued a warrant to purchase 650,000 shares of common stock at a purchase price of \$1.51 per share to a new member of its board of directors serving as the Company's full-time non-executive chair of the board of directors. Using the Black-Scholes Option Pricing Formula, the warrants were valued at \$1,188,000, fair value, vesting 162,500 immediately and the remaining in annual equal installments of 162,500 over the next three years. The warrant expires in 5 years. During 2011, the warrant to purchase 650,000 shares of common stock, of which 487,500 shares were vested, forfeited. The consulting expense recognized during 2010 is \$580,167. For the year ending December 31, 2011 and 2010, the Company recognized \$306,765 and \$580,167 of expense. The warrant to purchase 487,500 shares of common stock is still outstanding as of December 31, 2011.



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DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

In March 2010, the Company issued a warrant to purchase 150,000 shares of common stock for consulting services at an exercise price of \$0.25 per share. Using the Black-Scholes Option Pricing Formula, the warrants were valued at \$279,045, fair value, vesting immediately. The warrant expires in 3 years. The consulting expense recognized during 2010 is \$214,063. For the year ending December 31, 2011 and 2010, the Company recognized \$64,983 and \$214,063 of expense. In June and July 2010, the warrant was fully exercised to purchase 150,000 shares of common stock for proceeds of \$37,500.

In June 2010, an employee was granted with an option to purchase up to 100,000 shares of common stock at a purchase price of \$1.50 per share. Using the Black-Scholes Option Pricing Formula, the options were valued at \$131,075, fair value. These options expire in 5 years and vest in equal installments of 12,500 over the next two years commencing August 1, 2010. The expense recognized during 2010 is \$27,434. For the year ending December 31, 2011 and 2010, the Company recognized \$65,447 and \$27,434 of expense. The options are still outstanding as of December 31, 2011.

During 2010, the Company issued 1,500,000 shares of common stock and warrants to purchase 375,000 shares of common stock with 156,250 warrants expiring September 2011 and 218,750 warrants expiring December 2011 for proceeds of \$1,500,000 in accordance to a private placement memorandum as amended on September 14, 2010. Pursuant to the terms of the offerings, up to 30 units were offered at the purchase price of \$50,000 per unit, with each unit comprised of 50,000 shares and a warrant to purchase 12,500 shares of common stock at \$1.25 per share. During September 2011, all warrants were extended one year expiring September 2012 and December 2012. The warrants to purchase 375,000 shares of common stock at \$1.25 per share are still outstanding as of December 31, 2011.

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Effective July 8, 2010, the number of shares of the Company's common stock available for issuance under the 2007 Employee Stock plan was increased from 3,500,000 to 6,500,000 shares.

During August 2010, the Company issued 4,800 shares of common stock for investor relations services valued at \$6,000, fair value. The Company recognized \$6,000 of investor relations expense for the year ending December 31, 2010.

In November 2010, the board of directors approved a grant to employees of options to purchase up to 250,000 shares of common stock at a purchase price of \$1.00 per share. These options were granted on December 13, 2010. Using the Black-Scholes Option Pricing Formula, the options were valued at \$283,787, fair value. These options expire in 5 years with 125,000 vesting on December 13, 2010 and 125,000 vesting on June 13, 2011. The expense recognized during 2009 and 2010 is \$0 and \$156,707. For the year ending December 31, 2011 and 2010, the Company recognized \$127,080 and \$156,707 of expense. The options are still outstanding as of December 31, 2011.

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LIGHTWAVE LOGIC, INC.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

In November 2010, the board of directors approved a grant to employees of options to purchase up to 35,000 shares of common stock at a purchase price of \$1.00 per share. These options were granted on December 13, 2010. Using the Black-Scholes Option Pricing Formula, the options were valued at \$39,730, fair value. These options expire in 5 years and vest on December 13, 2010. The expense recognized during 2010 is \$39,730. The options are still outstanding as of December 31, 2011.

In November 2010, the board of directors approved a grant to three outside directors of options to purchase up to 300,000 shares of common stock at a purchase price of \$1.00 per share. These options were granted on December 13, 2010. Using the Black-Scholes Option Pricing Formula, the options were valued at \$340,545, fair value. These options expire in 5 years and vest 75,000 on December 13, 2010 and the remaining in equal annual installments of 75,000 over the next three years commencing November 4, 2011. The consulting expense recognized during 2010 is \$89,565. For the year ending December 31, 2011 and 2010, the Company recognized \$85,056 and \$89,565 of expense. The options are still outstanding as of December 31, 2011.

In November 2010, 5,000 shares of common stock were issued for investor relation services valued at \$4,650, fair value. The Company recognized \$4,650 of investor relations expense for the year ending December 31, 2010.

During December 2010, the Company issued 10,000 shares of common stock for investor relations services valued at \$12,000, fair value. The Company recognized \$12,000 of investor relations expense for the year ending December 31, 2010.

In January 2011, the Company issued a warrant to a related party to purchase 10,000 shares of common stock for legal services at an exercise price of \$1.25 per share. Using the Black-Scholes Option Pricing Formula, the warrants were valued at \$10,453, fair value. These warrants expire in 3 years and vest immediately. For the year ending December 31, 2011, the Company recognized \$10,453 of expense. The warrants are still outstanding as of December 31, 2011.

In January 2011, the Company issued a warrant to purchase 25,000 shares of common stock for research and development at an exercise price of \$1.25 per share. Using the Black-Scholes Option Pricing Formula, the warrants were valued at \$26,132, fair value. These warrants expire in 3 years and vest immediately. For the year ending December 31, 2011, the Company recognized \$26,132 of expense. The warrants are still outstanding as of December 31, 2011.

During March 2011, the Company issued 10,000 shares of common stock for investor relations expense valued at \$14,500, fair value. For the year ending December 31, 2011, the Company recognized \$14,500 of investor relations expense.

LIGHTWAVE LOGIC, INC.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During April 2011, the Company issued warrants to purchase 150,000 shares of common stock at a purchase price of \$1.18 per share for accounting services rendered commencing January 1, 2011. The warrant was valued at \$146,425 using the Black-Scholes Option Pricing Formula, vesting 37,500 immediately and the remaining on equal monthly installments of 9,375 over the next twelve months expiring in 5 years. The expense is being recognized based on service terms of the agreement over a sixteen month period. For the year ending December 31, 2011, the Company recognized \$109,820 of expense. The warrants are still outstanding as of December 31, 2011.

In May 2011, the board of directors approved a grant to a new outside director of an option to purchase up to 200,000 shares of common stock at a purchase price of \$1.12 per share. Using the Black-Scholes Option Pricing Formula, the option was valued at \$193,686, fair value. The option expires in 5 years and vests 50,000 immediately and the remaining in annual equal installments of 50,000 over the next three years. For the year ending December 31, 2011, the Company recognized \$79,702 of expense. As of December 31, 2011, options to purchase 200,000 shares of common stock are still outstanding.

In May 2011, the Company has signed an agreement with an institutional investor to sell up to \$20 million of common stock. Under the agreement subject to certain conditions and at the Company's sole discretion, the institutional investor has committed to invest up to \$20 million in the Company's common stock over a 30-month period. The Company filed a registration statement with the U.S. Securities and Exchange Commission covering the resale of the shares that may be issued to the institutional investor. The institutional investor is obligated to make purchases as the Company directs in accordance with the agreement, which may be terminated by the Company at any time, without cost or penalty. Sales of shares will be made in specified amounts and at prices that are based upon the market prices of the Company's common stock immediately preceding the sales to the institutional investor. The Company has issued 150,830 shares of common stock to the institutional investor as an initial commitment fee valued at \$162,896, fair value and 301,659 shares of common stock are reserved for additional commitment fees to the institutional investor in accordance with the terms of the agreement. On June 23, 2011, the institutional investor purchased

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185,185 shares of common stock for proceeds of \$200,000. The Company issued 3,017 shares of common stock as additional commitment fee, valued at \$3,470, fair value, leaving 298,642 in reserve for additional commitment fees.

During June 2011, the Company issued 10,000 shares of common stock for investor relations expense valued at \$10,400, fair value. For the year ending December 31, 2011, the Company recognized \$10,400 of investor relations expense.

In August 2011, the board of directors approved a grant to a new employee of an option to purchase up to 150,000 shares of common stock at a purchase price of \$1.01 per share. Using the Black-Scholes Option Pricing Formula, the option was valued at \$123,241, fair value. The option expires in 5 years and vests in equal quarterly installments of 12,500 over the next three years beginning November 1, 2011. For the year ending December 31, 2011, the Company recognized \$17,204 of expense. As of December 31, 2011, options to purchase 150,000 shares of common stock are still outstanding.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 6 STOCKHOLDERS EQUITY (CONTINUED)**

**Common Stock and Warrants (Continued)**

During September 2011, the Company issued 10,000 shares of common stock for investor relations expense valued at \$14,500, fair value. For the year ending December 31, 2011, the Company recognized \$14,500 of investor relations expense.

During 2011, the Company issued 2,018 shares of common stock to a director serving as a member of the Company's Operations Committee valued at \$2,163, fair value. For the year ending December 31, 2011, the Company recognized \$2,163 of expense.

During 2011, the Company issued 1,000,000 shares of common stock and warrants to purchase 1,000,000 shares of common stock expiring September 2013 for proceeds of \$1,000,000 in accordance to a private placement memorandum dated August 26, 2011. Pursuant to the terms of the offerings, up to 4 units were offered at the purchase price of \$250,000 per unit, with each unit comprised of 250,000 shares and a warrant to purchase 125,000 shares of common stock at \$1.00 per share and a warrant to purchase 125,000 shares of common stock at \$1.25 per share. The warrants to purchase 500,000 shares of common stock at \$1.00 and the warrants to purchase 500,000 shares of common stock at \$1.25 per share are still outstanding as of December 31, 2011.

In November 2011, the board of directors approved a grant to a new employee of an option to purchase up to 150,000 shares of common stock at a purchase price of \$0.63 per share. Using the Black-Scholes Option Pricing Formula, the option was valued at \$78,764, fair value. The option expires in 5 years and vests in equal quarterly installments of 12,500 over the next three years beginning February 1, 2012. For the year ending December 31, 2011, the Company recognized \$4,384 of expense. As of December 31, 2011, options to purchase 150,000 shares of common stock are still outstanding.

In December 2011, the board of directors approved a grant to the member of its board of directors serving as the Company's non-executive chair of the board of directors of an option to purchase up to 250,000 shares of common stock at a purchase price of \$1.01 per share. Using the Black-Scholes Option Pricing Formula, the option was valued at \$205,197, fair value. The option expires in 5 years and vests 62,500 immediately and the remaining in annual equal installments of 62,500 over the next three years. For the year ending December 31, 2011, the Company recognized \$53,124 of expense. As of December 31, 2011, options to purchase 250,000 shares of common stock are still outstanding.

In December 2011, the board of directors approved a grant to a senior advisor of a warrant to purchase up to 150,000 shares of common stock at a purchase price of \$1.30 per share. Using the Black-Scholes Option Pricing Formula, the warrant was valued at \$158,415, fair value. The warrant expires in 5 years and vests 37,500 immediately and the remaining in annual equal monthly installments of 9,375 over the next year. For the year ending December 31, 2011, the Company recognized \$1,288 of expense. As of December 31, 2011, warrants to purchase 150,000 shares of common stock are still outstanding.



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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 7 STOCK BASED COMPENSATION**

The Company uses the Black-Scholes option pricing model to calculate the grant-date fair value of an award, with the following assumptions for 2011 and 2010: no dividend yield in both years, expected volatility, based on the Company's historical volatility, between 115% and 125% in 2011 and between 123% and 134% in 2010, risk-free interest rate between 0.82% and 2.15% in 2011 and between 1.64% and 2.55% in 2010 and expected option life of three to five years in 2011 and 2010.

As of December 31, 2011, there was \$844,322 of unrecognized compensation expense related to non-vested market-based share awards that is expected to be recognized through December 2014.

The following tables summarize all stock option and warrant activity of the Company since December 31, 2004:

## LIGHTWAVE LOGIC, INC.

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## NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 7 STOCK BASED COMPENSATION (CONTINUED)**

## Non-Qualified Stock Options and Warrants Outstanding and Exercisable

	Number of Shares	Exercise Price	Weighted Average Exercise Price
			\$
Outstanding, December 31, 2004	-	\$ -	-
			\$
Granted	680,000	\$0.25 - \$2.10	0.99
			\$
Exercised	(300,000)	\$ 0.25	0.25
			\$
Outstanding, December 31, 2005	380,000	\$1.40 - \$2.10	0.68
			\$
Granted	1,425,000	\$0.25 - \$1.00	0.70
			\$
Cancelled	(260,000)	\$1.40 - \$2.10	(0.48)
			\$
Expired	(70,000)	\$1.40 - \$2.00	(0.12)
			\$
Outstanding, December 31, 2006	1,475,000	\$0.25 - \$2.00	0.83
			\$
Granted	5,768,971	\$0.25 - \$0.72	0.48

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			\$	
Rescinded	(200,000)	\$ 0.50		0.50
			\$	
Forfeited	(125,019)	\$ 1.00		1.00
			\$	
Expired	(574,981)	\$ 1.00		1.00
			\$	
Outstanding, December 31, 2007	6,343,971	\$0.25 - \$2.00		0.48
			\$	
Granted	3,495,001	\$0.001 - \$1.75		1.16
			\$	
Expired	(115,000)	\$0.50 - \$2.00		0.07
			\$	
Forfeited	(750,000)	\$ 0.72		0.72
			\$	
Exercised	(807,770)	\$0.25 - \$0.50		0.53
			\$	
Outstanding, December 31, 2008	8,166,202	\$0.001 - \$1.75		0.79
			\$	
Granted	939,000	\$0.25 - \$0.45		0.30
			\$	
Expired	(1,204,451)	\$0.25 - \$1.00		0.61
Forfeited	-			
			\$	
Exercised	(1,488,384)	\$0.001 - \$1.00		0.20
			\$	
Outstanding, December 31, 2009	6,412,367	\$0.25 - \$1.75		0.83
			\$	
Granted	1,860,000	\$0.25 - \$1.51		1.20
Expired	(16,667)	\$ 1.00		

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Forfeited	-	-	\$	1.00 -
Exercised	(1,279,700)	\$0.25 - \$1.00	\$	0.42
Outstanding, December 31, 2010	6,976,000	\$0.25 - \$1.75	\$	1.00
Granted	2,085,000	\$0.63 - \$1.30		1.09
Expired	-	-	\$	-
Forfeited	(162,500)	\$ 1.51		1.51
Exercised	-	-	\$	-
Outstanding, December 31, 2011	8,898,500	\$0.25 - \$1.75	\$	1.01
Exercisable, December 31, 2011	7,948,500	\$0.25 - \$1.75		1.01

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LIGHTWAVE LOGIC, INC.

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NOTES TO FINANCIAL STATEMENTS

DECEMBER 31, 2011

**NOTE 7 STOCK BASED COMPENSATION (CONTINUED)**

Range of Exercise Prices	Non-Qualified Stock Options and Warrants Outstanding		
	Number Outstanding Currently Exercisable at December 31, 2011	Weighted Average Remaining Contractual Life	Weighted Average Exercise Price of Options and Warrants Currently Exercisable
			\$
\$0.25 - \$1.75	7,948,500	2.01	1.01

**NOTE 8 RELATED PARTY**

At December 31, 2011 the Company has accrued salaries to one officer and two beneficial owners of \$47,588.

**NOTE 9 SUBSEQUENT EVENTS**

During January through April 2, 2012, the institutional investor under the Company's May 2011 agreement purchased 1,989,849 shares of common stock for proceeds of \$3,199,998 with \$200,000 settling April 2, 2012. The Company issued 48,271 shares of common stock as additional commitment fee, valued at \$101,836, fair value, leaving 250,371 in reserve for additional commitment fees.

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During January 2012, warrants to purchase 40,000 shares of common stock were exercised with total proceeds of \$50,000.

During January 2012, options to purchase 250,000 shares of common stock were exercised with total proceeds of \$162,500.

During February 2012, the Company issued 1,406 shares of common stock to a director serving as a member of the Company's Operations Committee valued at \$1,607, fair value.

During February 2012, warrants to purchase 20,000 shares of common stock were exercised with total proceeds of \$6,900.