ADVANCED PHOTONIX INC
Form 10-K
June 29, 2011

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-K

(Mark One)

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

For the fiscal year ended March 31, 2011
OR

o 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 1-11056

ADVANCED PHOTONIX, INC. ®
(Exact name of registrant as specified in its charter)

Delaware	33-0325826
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

2925 Boardwalk, Ann Arbor, Michigan 48104
(Address of principal executive offices)

(734) 864-5600
(Registrants' telephone number, including area code)

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

Title of each class	Name of each exchange on which registered
Common Stock, $0.001 par value	NYSE Amex: API

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

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

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

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 þ NO o

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 (§ 229.405 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 o NO o

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

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

Large accelerated filer o	Accelerated filer o	Non-accelerated filer o	Smaller reporting company þ
	(Do not check if a smaller reporting company)		

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

The aggregate market value of the voting stock held by non--affiliates of the registrant as of October 1, 2010 was approximately $22,279,200.

Number of shares outstanding of the registrant's Common Stock as of June 22, 2011: 30,692,546 shares of Class A Common Stock and zero shares of Class B Common Stock.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement to be filed pursuant to Regulation 14A promulgated under the Securities Exchange Act of 1934 in connection with the 2011 Annual Meeting of Stockholders of registrant have been incorporated by reference into Part III of this Form 10-K.

ADVANCED PHOTONIX, INC.
ANNUAL REPORT ON FORM 10-K
FISCAL YEAR ENDED MARCH 31, 2011

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PART I

The information in this annual report contains certain forward-looking statements, including statements related to our business prospects, the markets for our products, and trends in our business that involve risks and uncertainties. Our actual results may differ materially from the results discussed in these forward-looking statements. Factors that might cause such a difference include those discussed in “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” “Business” and elsewhere in this annual report.

Item 1. Business

General

Advanced Photonix, Inc. ® (the Company, we or API) was incorporated under the laws of the State of Delaware in June 1988. The Company is engaged in the development and manufacture of optoelectronic devices and value-added sub-systems and systems. The Company serves a variety of global Original Equipment Manufacturers (OEMs) in a variety of industries. The Company supports its customers from the initial concept and design phase of the product, through testing to full-scale production. API has two manufacturing facilities located in Camarillo, California and Ann Arbor, Michigan.

Products and Technology

Our Business

API is a leading supplier of optoelectronic semiconductors packaged into high-speed optical receivers, custom optoelectronic subsystems and Terahertz instrumentation, serving a variety of global OEM markets. Our patented high-speed optical receivers include Avalanche Photodiode technology (APD) and PIN photodiode technology based upon III-V materials, including InP, InAlAs, and GaAs. Our optoelectronic subsystems are based on our silicon Large Area Avalanche Photodiode (LAAPD), PIN (positive-intrinsic-negative) photodiode, FILTRODE® detectors and LED assemblies. Our Terahertz sensor product line is targeted at the industrial Non-Destructive Testing (NDT), quality control, homeland security and military markets. Using our patented fiber coupled technology and high speed Terahertz generation and detection sensors, we are engaged in transferring Terahertz technology from the application development laboratory to the factory floor.

We support the customer from the initial concept and design of the semiconductor, hybridization of support electronics, packaging and signal conditioning or processing from prototype through full-scale production and validation testing. The target markets served by us are Industrial Sensing/NDT, Military/Aerospace, Telecom, Medical and Homeland Security.

Technology & Manufacturing Capabilities

Our basic technologies and manufacturing capabilities include the following:

Optoelectronic semiconductor design and micro fabrication of III-V compound semiconductor (InP and GaAs) and Silicon (Si) devices including photodetectors and terahertz transmitters/receiver antenna,

MBE growth of high-speed III-V compound semiconductor material including GaAs, InAlAs and InP,

High speed semiconductor analog amplifier specification, evaluation and design for outside fabrication,

Coherent mixer and delay line interferometer (DLI) specification, evaluation and design for outside fabrication for use in 40Gb/s and 100 Gb/s line side optical receivers,

Opto-electronic hybrid packaging of semiconductor devices combining opto-electronic devices with high-speed electronics and fiber optics,

Vapor deposition and/or ion implantation for Silicon based PIN & APD photo-detectors,

Terahertz (THz) systems, subsystems, transmitters and receivers, transceivers and motion control hardware and software,

Femtosecond laser specification, valuation, design and manufacture and

Chromatic dispersion, polarization dispersion and optical delay management in complex optical systems.

Core Products

The core product technologies used in the majority of our products are opto-electronic semiconductor devices, including photodiodes and antennae made of Si or III-V compound semiconductor material and high speed semiconductor analog amplifiers. Photodiodes and antennae sense light of varying wavelengths and intensity and convert that light and/or Terahertz wave into electrical signals. Analog amplifiers increase the converted electrical signals output power to a level required to communicate with follow on electrical components. We manufacture photodiodes of varying complexity, from basic PIN photodiode to the more sophisticated APD and antennae that transmit and receive Terahertz signals (Transceiver). The APD is a specialized photodiode capable of detecting very low light levels due to an internal gain phenomenon known as avalanching. All photodiode and THz devices are designed by our experienced engineering staff, and fabricated in state-of-the-art clean rooms. Some of our analog amplifiers are specified and tested by our engineering staff, designed by subcontractors and fabricated by outside suppliers. Our products include the following:

High Speed Optical Receivers (10Gb/s, 40Gb/s & 100Gb/s) which are packaged InP, InAlAs, or GaAs PIN and/or APD photodiodes with amplifiers

Packaged PIN and APD photodiodes in Si and III-V materials (InP, InAlAs, GaAs)

Packaged Si APD components, with and without thermo-electric coolers

Packaged Si LAAPD components

Packaged Si photodiodes with patented FILTRODE® technology integrating optical filters directly on photodiode chips

Terahertz Systems & subsystems utilizing III-V materials for Terahertz transmitters &/or receivers

Terahertz Technology

One of the high growth technologies the Company is pursuing is Terahertz (THz) based on our T-Ray® 4000 product platform. THz is a region of the electromagnetic (EM) Spectrum that lies between microwave and infrared waves, which is in the early stages of adoption. While microwaves and infrared waves have been explored and commercialized for decades, THz waves are in the early stages of being explored and commercialized due to the fact that they have historically been very difficult to generate and detect. Recent advances in femtosecond lasers and ultra-fast semiconductor and electro-optic devices combined with fiber-optic packaging technologies have enabled the development of practical T-Ray® instrumentation for the research market and as a result application/market development of THz technology, led by traditional early adopters such as the military and aerospace markets, is accelerating. THz can be used to “look” through and beneath materials with high 2-dimensional (2-D) and 3-dimensional (3-D) spatial resolution roughly equivalent to the resolution of the human eye or better. It can also uniquely identify the chemical composition of many hidden or subsurface objects and has been determined to have non-ionizing radiation, which is not harmful to humans at the power levels commonly used today. THz imaging and spectroscopy market applications include industrial quality control through non-destructive testing (including aerospace and pharmaceutical markets); homeland security and defense screening of people, packages and bags for weapons and weapons of mass destruction; medical imaging and other scientific applications.

We have had significant Terahertz technology and product development since 1997, resulting in over 64 patents or patents pending to date. In 2001, we sold the first commercial THz product, the T-Ray®2000, as a laboratory bench top instrument for application development with spectroscopy and imaging capabilities targeted at the research and development and off-line diagnostic markets. In 2004, we sold the first T-Ray Manufacturing Inspection System (QA1000) for on-line, real-time inspection to NASA for the space shuttle fuel tank inspection in the Return to Flight Program. In March 2008, the Company shipped its next generation THz imaging and spectroscopy system (T-Ray® 4000). The T-Ray® 4000 is significantly smaller, lighter, and more powerful than previous THz generations and incorporates significant technological advancements. The system weighs 55 pounds and is the size of a briefcase,

which is a significant reduction from the 800 pound refrigerator size QA 1000. This system is targeted at the research and industrial NDT quality control market. The T-Ray® 4000 product will also serve as a platform for future industrial process and quality control, homeland security and defense applications. In 2009, the Company entered into a multi-year application development contract with the U.S. Air Force for use of the T-Ray® 4000 product platform for manufacturing quality control on the next generation joint strike fighter (F-35). In November 2010, the Company entered into a twelve month development agreement with In-Q-Tel Inc. (In-Q-Tel) for the delivery of three (3) Anomaly Detection Systems, using the T-Ray® 4000 product platform, for evaluation purposes by the Transportation Security Administration (TSA). In January 2011, the Company's T-Ray ®4000 product platform was selected by a leading manufacturer to assist it in improving its manufacturing process and in saving materials.

Markets

Our products serve customers in a variety of global markets, typically North America, Asia, Europe and Australia. The target markets and applications served by us are as follows:

Military:	
	Space
	Defense
Industrial/NDT:	
	Manufacturing
	Instrumentation
	Display
Medical:	
	Diagnostic & Monitoring
	Ophthalmic Equipment
	Medical Imaging
Telecommunications:	
	Telecom Equipment
	Test and Measurement
Homeland Security:	
	Baggage/Cargo Scanning
	Passenger Screening

Recent Developments

S-3 Filing - On January 6, 2011, the Company entered into an underwriting agreement (the "Underwriting Agreement") with B. Riley & Co., LLC, (the "Underwriter") as sole underwriter for the offer and sale in a firm commitment underwritten public offering of 2,702,703 shares of the Company's Class A Common Stock, par value $0.001 per share (the "Common Stock") at a price to the public of $1.48 per share ($1.391 per share, net of underwriting discounts) (the " January Offering"). Pursuant to the January Underwriting Agreement, the Company also (i) granted to the Underwriter a 30-day option to purchase up to an additional 405,405 shares of Common Stock to cover over-allotments, if any, at the same price and (ii) agreed to reimburse the Underwriter for certain of its out-of-pocket expenses. The January Underwriting Agreement also contains customary (i) representations, warranties, and agreements by the Company, (ii) conditions to closing, and (iii) indemnification provisions of the Company and the Underwriter, including for liabilities under the Securities Act of 1933, as amended (the Security Act).

The January Offering was made pursuant to a prospectus supplement dated January 6, 2011, an additional prospectus supplement dated January 11, 2011 and an accompanying prospectus dated December 23, 2010 pursuant to the Revised Registration Statement.

On January 10, 2011, the Underwriter gave notice to the Company that it was exercising its over-allotment option to purchase an additional 405,405 shares of the Company's Common Stock.

The net proceeds to the Company from the January Offering, completed during the 4th quarter of fiscal 2011, after underwriting discounts and transaction expenses, were approximately $4,154,000. The Company intends to use the net proceeds of the January Offering for general corporate purposes including, but not limited to, reducing its outstanding indebtedness, increasing its working capital and expanding its products. The January Offering was expected to close on or about January 18, 2011, or such earlier date as the Underwriter and the Company agreed to, subject to the satisfaction of customary closing conditions including, but not limited to, NYSE Amex approval of the Company's additional listing application to list the Common Stock issued accordance with the Underwriting Agreement on NYSE Amex (the "January Additional Listing Application"). On January 10, 2011, NYSE Amex approved the January Additional Listing Application and the January Offering closed on January 11, 2011, when the Company and Underwriter satisfied the other closing conditions.

On February 25, 2011, the Company entered into an underwriting agreement (the "February Underwriting Agreement") with B. Riley & Co., LLC, (the "Underwriter") as sole underwriter for the offer and sale in a firm commitment underwritten public offering of 1,200,000 shares of the Company's Class A Common Stock, par value $0.001 per share (the "Common Stock") at a price to the public of $1.97 per share ($1.8518 per share, net of underwriting discounts) (the "February Offering"). Pursuant to the February Underwriting Agreement, the Company also agreed to reimburse the Underwriter for certain of its out-of-pocket expenses. The February Underwriting Agreement also contains customary (i) representations, warranties, and agreements by the Company, (ii) conditions to closing, and (iii) indemnification provisions of the Company and the Underwriter, including for liabilities under the Securities Act of 1933, as amended.

The February Offering was made pursuant to a prospectus supplement dated February 25, 2011 and an accompanying prospectus dated December 23, 2010 pursuant to the Revised Registration Statement.

The net proceeds to the Company from the February Offering, completed during the 4th quarter of fiscal 2011, after underwriting discounts and transaction expenses, were approximately $2,136,000. The Company intends to use the net proceeds of the February Offering for general corporate purposes including, but not limited to, (i) working capital needed to support the rapid growth of the Company's HSOR products in foreign markets, (ii) accelerated development and marketing of Terahertz applications, (iii) capital expenditures needed to further automate the Company's manufacturing processes, and increase the Company's productivity.

Deregistration of Revised Registration Statement

On March 28, 2011, the Company filed a post-effective amendment on Form S-3 (the Post-Effective Amendment) to deregister the remaining securities under our Revised Registration Statement. On March 28, 2011, the Post-Effective Amendment was declared effective by the SEC.

Raw Materials

The principal raw materials used by the Company in the manufacture of its semiconductor components and sensor assemblies are silicon and III-V material (InP, GaAs) wafers, chemicals, gases and metals used in processing wafers, gold wire, solders, electronic components, high speed specialized semiconductor amplifiers and a variety of packages and substrates, including metal, printed circuit board, flex circuits, ceramic and plastic packages. All of these raw materials can be obtained from several suppliers. However, we depend on suppliers whose components have been qualified into our products and who could disrupt our business if they stop, decrease or delay shipments or if the components they ship have quality or consistency issues. From time to time, particularly during periods of increased industry-wide demand, silicon wafers, III-V wafers (InP, GaAs), certain metal packages and other materials have been in short supply. During fiscal 2011, the Company experienced increasing demand in the HSOR product platform. The Company is closely monitoring supply chain lead times which have been increasing primarily due to rising demand combined with capacity reductions caused by the natural disaster that occurred in Japan in 2011. As is

typical in the industry, the Company allows for a significant lead-time (2 months or greater) between order and delivery of raw materials. In the short term, any significant increase in lead times on critical components could reduce future growth.

Research and Development

Since its inception in June 1988, the Company has incurred material research and development (R&D) expenses, with the intent of commercializing these investments into profitable new standard and custom product offerings. During the fiscal years ended in 2011 and 2010, the Company's research and development expenses were $5.6 million and $4.7 million, respectively, which we believe was adequate to maintain the necessary investment in our future growth platforms. The Company expects that an increase in research and development funding will be required for new projects/products as well as the continuing development of new derivatives of the Company's current product line. The Company has in the past, and will continue to pursue government funded, as well as internally funded, research and development projects when they are in support of the Company's development objectives.

As the Company begins the new 2012 fiscal year, the following research and development projects are currently underway:

HSOR - next generation photodiodes and high-speed optical receivers for both the 40G and 100G telecommunications market:

- 1st generation 100G DP-QPSK long haul and metro markets
- 1st generation 100G NRZ short reach market
- 2nd generation integrated 40G DPSK and DQPSK long haul and metro markets
- 4th generation integrated 40G NRZ short reach market
- Cost Reduction and performance enhancements through vertical integration of strategic 40G and 100G components, including amplifiers and integrated passive optical components (i.e.: Delay Line Interferometers and optical mixers)

THz –

- Application development utilizing the T-Ray® 4000 product platform for industrial quality and process control targeted at the aerospace, industrial and consumer product markets
- T-Ray® 4000 cost reduction, including laser and sub-systems initiatives for high volume markets
- T-Ray® 4000 product platform research and development for homeland security and military markets

Custom optoelectronics - Si PIN and APD photodiode developments to meet unique customer requirements, such as higher speeds, lower electrical noise, and unique multi-element geometries.

Environmental Regulations

The photonics industry, as well as the semiconductor industry in general, is subject to governmental regulations for the protection of the environment, including those relating to air and water quality, solid and hazardous waste handling, and the promotion of occupational safety. Various federal, state and local laws and regulations require that the Company maintain certain environmental permits. The Company believes that it has obtained all necessary environmental permits required to conduct its manufacturing processes. Changes in the aforementioned laws and regulations or the enactment of new laws, regulations or policies could require increases in operating costs and additional capital expenditures and could possibly entail delays or interruptions of operations.

Backlog and Customers

The Company’s sales are made primarily pursuant to standard purchase orders for delivery of products. A substantial portion of our revenues are derived from sales to OEMs pursuant to individual purchase orders with short lead times. However, by industry practice, orders may be canceled or modified at any time. Accordingly, we do not believe that the backlog of undelivered product under these purchase orders is a meaningful indicator of our future financial performance. When customers cancel an order, they are responsible for all finished goods, all costs, direct and indirect, incurred by the Company, as well as a reasonable allowance for anticipated profits. No assurance can be given that the Company will receive these amounts after cancellation.

Customers normally purchase the Company’s products and incorporate them into products that they in turn sell in their own markets on an ongoing basis. As a result, the Company’s sales are dependent upon the success of its customers’

products and our future performance is dependent upon our success in finding new customers and receiving new orders from existing customers.

Marketing

The Company markets its products in the United States and Canada through its own technical sales engineers and through independent sales representatives. International sales, including Europe, the Middle East, Far East and Asia, are conducted directly by the Company and through foreign distributors and representatives. The Company's products are primarily sold as components or sub-assemblies to OEM's. The Company markets its products and capabilities through industry specific channels, including the Internet, industry trade shows, and in print through trade journals.

Competition

In its target markets, the Company competes with different companies in each of its product platforms; custom optoelectronic, high-speed optical receiver and THz systems. The Company believes that its principal competitors for sales of custom optoelectronic products are small private companies and medium size public companies. In the high-speed optical receiver market the Company believes that its competitors are small private companies and medium to large size public companies. Because the THz product offering includes developing technology applications and markets, the Company believes the competition is mainly from small private companies and divisions of large public companies.

Because the Company specializes in devices requiring a high degree of engineering expertise to meet the requirements of specific applications, it generally does not compete with other large United States, European or Asian manufacturers of standard “off the shelf” optoelectronic components or silicon photodetectors.

Proprietary Technology

The Company utilizes proprietary design rules and processing steps in the development and fabrication of its PIN and APD photodiodes, THz transmitters and receivers, fiber-coupled THz subsystems/systems, and THz applications. The Company has a significant number of patents pending and owns the following patents and registered trademarks:

Patent #	Title	Issue Date
142,195	HIGHLY-DOPED P-TYPE CONTACT FOR HIGH-SPEED, FRONT-SIDE ILLUMINATED PHOTODIODE (US)	Apr-05
660,471	HIGHLY-DOPED P-TYPE CONTRACT FOR HIGH-SPEED, FRONT-SIDE ILLUMINATED PHOTODIODE (KOREA)	Apr-06
726,387	TRADEMARK APPLICATION FOR T-RAY	Oct-08
765,715	HIGHLY-DOPED P-TYPE CONTACT FOR HIGH-SPEED, FRONT-SIDE ILLUMINATED PHOTODIODE (AUSTRIA)	Jan-04
766,174	ENHANCED PHOTODETECTOR (KOREA)	Oct-07
809,655	METHOD AND APPARATUS TO MONITOR PHASE CHANGES IN MATTER WITH TERAHERTZ RADIATION (KOREA)	Feb-08
811,365	PLANAR AVALANCHE PHOTODIODE (KOREA)	Feb-08
817,638	FOCUSING FIBER OPTIC (KOREA)	Mar-08
934,665	TRADEMARK APPLICATION FOR T-RAY TRADEMARK (MADRID PROTOCOL)	Aug-07