RESEARCH FRONTIERS INC
Form 10-K
March 12, 2013

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 AND EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2012 Commission File Number 1-9399

RESEARCH FRONTIERS INCORPORATED
(Exact name of registrant as specified in its charter)

DELAWARE	11-2103466
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

240 CROSSWAYS PARK DRIVE WOODBURY, NEW YORK	11797-2033
(Address of principal executive offices)	(Zip Code)

Registrant s telephone number, including area code (516) 364-1902

Securities registered pursuant to Section 12(b) of the Act:	Name of Exchange on Which Registered
Title of Class	
Common Stock, $0.0001 Par Value	The NASDAQ Stock Market

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

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

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 [ ] No [X]

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 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 [X] No [ ]

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

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 [X] Accelerated filer [ ] Non-accelerated filer [ ] Smaller reporting company

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 29, 2012 (the last business day of the registrant s most recently completed second fiscal quarter), computed based on the closing sale price of $3.12 was $55,578,494. In making this computation, all shares known to be owned by directors and executive officers of the Company and all shares known to be owned by other persons holding in excess of 5% of the Company s common stock have been deemed held by affiliates of the Company, and awards of restricted stock subject to vesting are assumed to have been fully issued and outstanding. Nothing herein shall prejudice the right of the Company or any such person to deny that any such director, executive officer, or stockholder is an affiliate.

On March 12, 2013 the registrant had 22,916,095 shares of Common Stock outstanding.

PART I

ITEM 1. BUSINESS

Forward-Looking Statements

Information included in this Annual Report on Form 10-K may contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are not statements of historical facts, but rather reflect our current expectations concerning future events and results. We generally use the words believes, expects, intends, plans, anticipates, likely, will and similar expressions to identify forward-looking statements. Such forward-looking statements, including those concerning our expectations, involve risks, uncertainties and other factors, some of which are beyond our control, which may cause our actual results, performance or achievements, or industry results, to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. These risks, uncertainties and factors include, but are not limited to, those factors set forth in this Annual Report on Form 10-K under Item 1A. Risk Factors below. Except as required by applicable law, including the securities laws of the United States, we undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. You are cautioned not to unduly rely on such forward-looking statements when evaluating the information presented in this Annual Report on Form 10-K.

General

As used herein, we, us, our, the Company or Research Frontiers means Research Frontiers Incorporated unless otherwise indicated develop and license our patented suspended particle device (SPD-Smart) light-control technology to other companies that manufacture and market either the SPD-Smart chemical emulsion, light-control film made from the chemical emulsion, lamination services, electronics to power end-products incorporating the film, or the end-products themselves such as smart windows, skylights and sunroofs. Research Frontiers currently has over 40 companies that, in the aggregate, are licensed to primarily serve four major SPD-Smart application areas (aerospace, architectural, automotive and marine products) in every country of the world.

Research Frontiers was incorporated in New York in 1965 to continue early work that Dr. Edwin Land, founder of Polaroid Corporation, and others had done in the area of light-control beginning in the 1930s. Research Frontiers was reincorporated in Delaware in 1989. Since 1965, Research Frontiers has actively worked to develop and license its own SPD technology, which it protects using patents, trade secrets and know-how. Although patent and trade secret protection is not a guarantee of commercial success, Research Frontiers currently has approximately 290 patents that have issued worldwide. In addition, the Company has current patent applications in the US and other countries that if granted, would add a significant number of additional patents to its portfolio. The Company has and continues to devote significant resources to develop, license and protect its intellectual property position.

SPD-Smart products use microscopic light-absorbing nanoparticles that are typically suspended in a film. These particles align when an electrical voltage is applied, thus permitting light to pass through the film. Adjustment of the voltage to the SPD film gives users the ability to quickly, precisely and consistently regulate the amount of light, glare and heat passing through the window, skylight, sunroof, window shade or other SPD-Smart end-product. This SPD film can be incorporated between two layers of glass or plastic, or combinations of both, to produce a laminate that has enhanced energy efficiency, light-control and security performance properties.

Research Frontiers believes that the SPD industry is in the initial phase of growth. SPD light-control technology may have wide commercial applicability in many types of products and industries where variable light-control is desired. SPD-Smart glass or plastic window products include the following:

- Automotive sunroofs, sunvisors, side windows and rear windows;
- Architectural commercial and residential windows, doors, skylights, and partitions for new construction, replacement, and retrofit applications;
- Aerospace and marine windows, doors, partitions and sunvisors.

Some of the early sales and uses of SPD technology have been low volume commercial installations and some have involved concept and test installations by licensees and their customers (see Trends and Recent Developments below). Some of our licensees consider the stage of development, product introduction strategies and timetables, and other plans to be proprietary or secret, and as such this information cannot be disclosed by Research Frontiers until such licensees, or their customers, make their own public announcements of planned or actual product launches.

Beginning in late 2011, higher volume sales of SPD products commenced with the launch by Daimler AG of the Magic Sky Control all glass roof option on their Mercedes-Benz SLK and SL vehicles. This roof is made with Research Frontiers SPD-SmartGlass technology. Research Frontiers believes that within the different industry applications listed above, automotive sunroofs and all glass roofs such as the recently launched Magic Sky Control roof on the Mercedes-Benz SLK and SL, sunvisors and side and rear windows for vehicles, aircraft window shades and certain architectural applications will be the earliest adopters of the Company s technology. The Company believes the largest and most predictable near and intermediate term market for its technology will be the automotive glass market.

In addition to the product applications listed above, SPD-SmartGlass technology could offer potential benefits in the development of new flat panel displays, eyewear, and self-dimming automotive rear-view mirrors. However, such products will need significant product design, engineering or testing before an evaluation of the commercial potential of such SPD-SmartGlass products can be determined.

Recent progress with regard to market development and commercialization activity has been the result of focused and active efforts by Research Frontiers and its key licensees who have invested in product development and improvements, production facilities, increased production capacity, durability, performance testing, quality control and assurance, and marketing programs. Licensees supplying film to end-product licensees have announced plans to establish new production capacity. Research Frontiers believes that with the normal progression of product and manufacturing improvements, and as licensees become more experienced at the lamination, fabrication and installation of SPD-Smart products for various applications, the adoption rates for SPD-Smart products will grow and accelerate, which we expect will increase the stream of royalty income for the Company.

As part of their marketing and branding programs, many of our licensees have developed their own trademarks for SPD-Smart emulsion, film, and end-products and these are listed in their respective press releases, product brochures, advertising and other promotional materials. Research Frontiers uses the following trademarks: SPD-Smart , SPD-SmartGlass , VaryFast , SPD-CleanTech , SPD Clean Technology , SmartGlass , The View of the Future - Everywhere you Look , Powered by SPD , Powered by SPD-CleanTech , Powered by SPD Clean Technology , SG Enabled , SPD Green and Clean , SPD On-Board , Speed Matters , VariGuard and Visit SmartGlass.com - to change your view of the world .

In each of the last three fiscal years the Company devoted substantially all of its time to the development of one class of products, namely SPD-Smart light-control technology, and therefore revenue analysis by class is not provided herein. Information about our operation and those of our licensees is included below and in our financial statements and notes thereto.

The Company does not believe that future sales will be seasonal in any material respect. The Company does not currently directly manufacture products on its own but rather depends on activities of its licensees. Due to the nature of the Company s business operations and the fact that the Company is not presently a manufacturer, there is no backlog of orders for the Company s products.

The Company believes that compliance with federal, state and local provisions which have been enacted or adopted regulating the discharge of materials into the environment, or otherwise relating to the protection of the environment, will not have a material effect upon the capital expenditures, earnings and competitive position of the Company. The Company has no material capital expenditures for environmental control facilities planned for the remainder of its current fiscal year or its next succeeding fiscal year.

Employees

On March 12, 2013 the Company had thirteen full-time employees, five of whom are technical personnel, and the rest of whom perform legal, finance, marketing, investor relations, and administrative functions. Of these employees, three have obtained doctorates in chemistry, one has a masters degree in chemistry, one has extensive industrial experience in electronics and electrical engineering, and one has majored in physics. Four employees also have additional postgraduate degrees in business administration, including one doctorate in organization and management. Also the Company s suppliers and licensees have people on their teams with advanced degrees in a number of areas relevant to the commercial development of products using the Company s technology. The success of the Company is dependent upon, among other things, the services of its senior management, the loss of which could have a material adverse effect upon the prospects of the Company.

Industry Trends

While economic activity around the world is still slowly recovering from a severe downturn, there also are favorable converging global trends in the major near-term markets for SPD-Smart products. These trends are gaining momentum and strength. In both public and private sectors across the world, there are substantial efforts targeted toward the promotion and use of energy efficient materials, including those used in automobiles, windows and other architectural glazings, aircraft and boats. For example, as part of its sustainable design strategies, the architectural community is actively increasing the use of daylight harvesting and building automation systems to more effectively capture and control natural light as part of energy reduction strategies to offset electricity used by artificial lighting. In addition to design, aesthetic and other benefits, this expanded use of glass also supports a growing body of research which finds that the presence of and control over incoming natural light improves the well-being and productivity of individuals. Products using SPD-Smart light-control technology sunroofs, windows, skylights, partitions and others can play an important role in supporting these converging global trends.

In the automotive industry, global trends include the introduction of larger sunroofs and panoramic roof panels in transportation vehicles, and a higher percentage of these vehicles having a sunroof or using more glass in the roof. In 2011, Daimler AG introduced its new Mercedes-Benz SLK and SL roadsters which offers as an option the Magic Sky Control glass roof using the Company s SPD-SmartGlass technology.

Automobile manufacturers are beginning to introduce “cielo” glass systems where the windshield of the vehicle joins with the glass in the roof of the vehicle to form one continuous piece of curved glass. The SPD-Smart component of these cielo systems can start with the blue band on the top of the windshield (the rest of the windshield would not use any kind of dark tint because regulations require that the main part of the windshield not have less than 70% light transmission at all times) and extend back to encompass the entire glass roof.

Some automakers have incorporated SPD-SmartGlass in concept vehicles, with some of these concept vehicles being exhibited at major auto shows:

- September 2012:

  BMW debut at the Paris Motor Show its new BMW Concept Active Tourer. This vehicle s entire composite glass roof uses patented SPD-SmartGlass technology.
- March 2012:

  Mercedes-Benz debut at the Geneva International Motor Show its public evaluation of the Limited Edition Viano Pearl. The use of SPD-SmartGlass technology in roof glass and on its windows offers many benefits including enhanced privacy on-demand, improved security, and increased energy savings due to lower heat build-up within the vehicle.
- September 2011:

  Audi debuted its A2 concept car at the Frankfurt International Auto Show in Frankfurt, Germany. The A2 is an electric-powered passenger car equipped with a large SPD-Smart panoramic glass roof.

SPD-SmartGlass has also been shown in armored automotive glass applications, and a new market is also beginning to develop for personalized custom conversions of automobiles for owners who wish to express themselves through the design of the cars they own and/or drive.

For architectural applications, various market forces and the distinctive features of SPD-SmartGlass are having a positive influence on interest for SPD-Smart products. Many architects are specifying more glass in their designs to satisfy building occupants desire for greater connectedness with the outside environment. In addition, there is increasing interest in improving energy efficiency in both commercial and residential buildings. Various studies indicate that buildings in the United States and Europe now account for an estimated 39-40% of total energy use and upwards of 70% or more of electricity consumption. Many architects and building owners are striving for sustainable, "green" buildings that are highly energy-efficient, reduce environmental impact, and improve occupant health and well-being. In addition, the design community is increasingly interested in advanced daylighting systems in buildings that lower electrical lighting usage and reduce heating and cooling loads. Because of this, the ability to control light, glare and heat in these building applications is very important and advanced solutions often are needed to optimize operating efficiencies. SPD-Smart architectural products instantly and precisely provide shading, glare control and heat management solutions for offices and homes, especially when these products are available for new construction, replacement and retrofit projects. These products include insulated glass units, single-panel retrofits, unusually shaped glazings, and products with advanced fabrications such as those with ballistic- and blast-resistant capabilities.

In the aerospace industry there is also a trend towards larger windows. In the transport category (primarily large commercial passenger aircraft) segment, the world's two largest aircraft manufacturers are both promoting the size of the windows in new aircraft platforms either already being delivered (e.g. Boeing 787) or in pre-production (e.g. Airbus A350). In the general aviation category (primarily private or chartered smaller aircraft) this trend is true as well, for example Gulfstream is promoting the size of the windows on the G650 platform. Several OEMs either already offer, or have announced their interest to include, electronic smart window shades in their aircraft including Boeing, Airbus, Bombardier, Hawker Beechcraft, HondaJet and Nextant.

SPD-Smart aircraft cabin windows have now been sold and installed on 30 different aircraft models, including turboprop airplanes (e.g. Hawker Beechcraft King Air), helicopters (e.g. Sikorsky S-92), general aviation jets (e.g. Bombardier Challenger), and commercial airline aircraft (Airbus A380 - Qantas Airlines has SPD-Smart window shades in first class lavatories in all of their A380s).

Some aircraft manufacturers have incorporated SPD-Smart cabin windows in mockups, with some of these mockups being exhibited at major aviation shows:

- November 2011:

Bombardier Aerospace featured SPD-Smart aircraft windows in their CSeries aircraft cabin mock-up at the 2011 Dubai Airshow, equipping the business class windows in its mock-up with SPD-Smart aerospace windows.

- October 2012:

Honda Aircraft featured HondaJet, displayed SPD-Smart cabin windows at the 2012 National Business Aviation Association (NBAA) Annual Meeting & Convention.

Electronic aircraft window shades may use SPD technology, or may use other smart window technologies such as liquid crystal or electrochromic technology. A window system using electrochromic technology was recently introduced in the Boeing 787. There have been concerns raised that this aircraft s electronic dimmable windows are not dark enough for long haul flights, transmits too much heat into the cabin, and have a switching speed that is too slow.

The Company believes its SPD technology offers important performance advantages over other technologies including faster, more uniform response time, greater light-blockage, maximum heat-rejection when the aircraft is parked on the ramp, and weight-savings. To date, SPD technology is also the only commercially available light-control smart window technology known to have passed the stringent safety and durability tests required by the aviation industry and to have received a Supplemental Type Certificate (STC) from the Federal Aviation Administration. Today SPD-Smart window shades are flying in 30 models of various aircraft including those used in commercial aviation, general aviation and military aviation. Two leading companies manufacturing electromechanical pleated window shades have announced new products that incorporate SPD dimmable windows into their designs.

In the marine application, where light-control needs are especially important, many yacht manufacturers currently employ less than ideal glazing solutions as they try to satisfy various shading and solar control objectives. For example, some report having to use as many as five different types of glass in a typical yacht to satisfy diverse glazing needs. SPD-Smart marine products can reduce the number of different types of glass used in these yachts because of its increased functionality, superior performance and versatility. SPD-Smart marine products provide an innovation that allows these operators to manage incoming light, glare and heat while achieving privacy or maintaining one s view as desired. In October 2011, Cheoy Lee Shipyards unveiled the Alpha, its most advanced production yacht, which is fully-equipped with the latest yacht design features including SPD-SmartGlass supplied by Research Frontiers licensee Diamond Sea Glaze. The Alpha has approximately 150 square feet of SPD-SmartGlass at various places throughout the vessel and it is the first large-scale production yacht to make such extensive use of SPD-SmartGlass.

Products using SPD-Smart technology continue to be exhibited at trade shows, conferences, and industry events, with such products not only being exhibited by our licensees but also by their customers and by OEMs. While there can be no assurance that these trends will continue, to the extent that they do continue, each is expected to have a beneficial effect on future fee income for the Company.

In January 2012, Freedonia Group (a leading market research firm) issued a global flat glass study that projects 6.0 percent annual growth for this market through 2016 (valued at $90 billion). This study indicated that Flat Glass demand over this time period will be influenced by favorable expectations in building construction. The Advanced Flat Glass market, a specialty segment of the Flat Glass market, is expected to grow at a faster rate.

Historical Background and Recent Developments

SPD-Smart Film Production

An important material used in SPD-Smart end-products is SPD light-control film that varies the tint of glass or plastic. In early 2007, our licensee Hitachi Chemical began producing their initial SPD-Smart light-control film on their first factory line. During the second half of 2009, Hitachi Chemical announced that they had begun mass production on their new, larger capacity production line and expanded their annual production capacity to 400,000 square meters (over 4.3 million square feet). Unlike prior production lines, Hitachi Chemical s new production line is dedicated exclusively to the production of SPD-Smart film. In July 2009, Hitachi Chemical launched its website dedicated to its SPD-Smart light control film and during 2009, Hitachi Chemical outlined in its press releases and public presentations that it plans to “accelerate the use of SPD film, which holds significant potential for growth” and noted that “SPD film is positioned as one of the key emerging products promoted by Hitachi Chemical to become a future leading product for the company.” Customers for Hitachi Chemical's SPD-Smart film are end-product licensees of Research Frontiers. These licensees receive the film, laminate it between glass or plastic substrates, and then fabricate end-products which are sold into various industries. Most end-product licensees pay Research Frontiers a royalty on the sale of these end-products that typically range from 10-15%.

In 2010, Hitachi Chemical expanded its SPD film product portfolio by initiating commercial production of a lighter version of its film. Both the SPD dark and light films provide very high ranges of visible light transmission. SPD dark film has a range of approximately 0.5% to 55.0%, and SPD light film has a range of approximately 2% to 65%. This leads to contrast ratios (the ratio of clear to dark light transmission) of up to 110:1. The commercialization of both dark and light versions of SPD-film provides greater design and performance options for various end-product applications. In addition, in February 2012 the Company filed a patent application relating to the production of SPD-films with even higher light and dark transmission states than currently are available commercially.

Two other companies are currently developing SPD-Smart light-control film under license from Research Frontiers using SPD-Smart emulsion. These two companies are licensed to sell SPD-Smart light-control film to other licensees of Research Frontiers.

SPD-Smart Automotive Products

Research Frontiers and its licensees are currently working with multiple automotive manufacturers to introduce SPD-Smart windows, sunroofs and roof systems on both concept and production vehicles. Research Frontiers end-product licensees in this sector include: American Glass Products, Asahi Glass, BOS Automotive, Custom Glass, Daimler AG, DuPont, GKN Aerospace Transparency Systems, Isoclima, Pilkington Glass, Pittsburgh Glass Works (formerly the automotive glass division of PPG Industries) and Vision Systems. The Company s automotive glass licensees account for the majority of all glass produced for the automotive market throughout the world.

In September 2008, the automotive glass business of PPG Industries (now known as Pittsburgh Glass Works, LLC), was licensed to make SPD-Smart automotive glass products, including windows, sunroofs and roof glass systems. Pittsburg Glass Works (PGW) is North America s largest automotive glass producer. PGW cited the importance of this work with SPD-Smart automotive products in their October 2009 press release highlighting milestones achieved during their first year as an independent company after being previously a wholly-owned subsidiary of PPG Industries.

In September 2009, Pilkington Group Limited, a subsidiary of Nippon Sheet Glass (the world s largest supplier of glass used in buildings and cars), expanded its license for SPD-Smart architectural products to include automotive end-products. In March 2011, Pilkington Automotive introduced its brand SPD-SmartGlass automotive glazing products known as Sundym Select . Pilkington describes Sundym Select as providing the highest level of solar protection available in any, mass produced, vehicle glazing to date. Pilkington and its parent company Nippon Sheet Glass (also a licensee of Research Frontiers) are now supplying Sundym Select for the Mercedes-Benz SLK and SL Magic Sky Control roofs.

In 2011, Daimler AG began using SPD-SmartGlass technology in its Magic Sky Control panoramic glass roof as an option on its new Mercedes-Benz 2012 SLK. In late 2011, Daimler AG also began offering its Magic Sky Control panoramic glass roof as an option on its new Mercedes-Benz 2013 SL. These SPD products allow drivers and passengers to change the tint of the car roof from dark to clear quickly with a touch of a button. The SLK and SL are the first large-scale series production vehicles to offer SPD-SmartGlass. The Research Frontiers licensees involved with the production of the Magic Sky Control roof for the SLK and SL include Hitachi Chemical, which manufactures the SPD-Smart light-control film in Japan. Automotive glass companies Nippon Sheet Glass in Japan and Pilkington in the UK and Germany then process and laminate Hitachi s SPD film into the glass for the Magic Sky Control roof.

In January 2010, Vision Systems acquired a license from the Company to manufacture and sell SPD-Smart products for markets including recreational vehicles, buses, trucks, mobile cranes and construction vehicles in all countries of Europe. In June 2011, Vision Systems SPD-Smart aircraft window shades were featured in the business class section of the Bombardier C Series aircraft mockup at the 49th International Paris Air Show (Le Bourget Airport in France). Vision Systems aerospace and ground transportation products were exhibited in October 2011 at the NBAA 2011 the National Business Aviation Association s 64th Annual Meeting and Convention (Las Vegas, Nevada) where HondaJet also exhibited this licensees SPD-Smart products in its mock-up. During that month, SAFRA SAS exhibited bus roof glass produced with Vision Systems SPD-Smart Nuance product for the transportation industry at the 23rd National Meeting of Public Transport (Strasbourg, France), and another automotive OEM exhibited a skydome for a motorhome made with Vision Systems SPD-SmartGlass at the 46th Salon de Vehicules de Loisirs (Paris, France). In November 2011, Bombardier Aerospace featured Vision Systems SPD-Smart aircraft windows in CSeries aircraft cabin mock-up at the 2011 Dubai Airshow (Dubai, United Arab Emirates).

Vision Systems announced in January 2012 that Notin, manufacturer of motorhomes and campers, has selected Visions Systems Nuance brand of SPD-SmartGlass for the skylight of Notin's Angara luxury motorhome. The SPD-Smart skylight is standard equipment on the Angara. In February 2012, Vision Systems SPD-Smart aerospace products were exhibited at the 2012 Singapore Airshow (Changi International Airport, Singapore). In July 2012, Vision Systems announced plans to add a dedicated SPD production facility in France and plans to establish a second production facility in the United States. Vision Systems exhibited its SPD-Smart transportation products at Transports Publics 2012, in June 2012, and in September it debuted its SPD-SmartGlass transportation products with multi-zone management at InnoTrans 2012.

While the highest volume market for which SPD-Smart technology is being developed is new car production by the world s automakers, the aftermarket upgrade market also presents near-term opportunities in the automotive market. Research Frontiers licensee American Glass Products (AGP) is offering its Vario Plus Sky SPD-SmartGlass to the automotive aftermarket.

Within the automotive market, a potentially additional sector is the armored glass market. Armored glass (sometimes referred to as transparent armor and bullet-resistant glass) encompasses the military, non-military government, and civilian markets. In addition, SPD-Smart technology in this market not only provides the benefits of light-control and UV blockage, it also enhances security by introducing darker tints and privacy. A number of the Company s licensees including American Glass Products, GKN, Isoclima and Pittsburgh Glass Works are recognized industry leaders in the armored glass market.

In February 2008, GKN Aerospace Transparency Systems acquired a license from us covering SPD-Smart armored glass for vehicles (as discussed below, this license was also expanded in late 2010 to also include aircraft products). GKN is a world leader in armored transportation vehicles for both military and civilian vehicles. Since then, GKN has exhibited their armored SPD-Smart automotive glass at various military and industry trade shows. In September 2009, GKN announced that it had been awarded a $425,000 contract by the Combating Terrorism Technical Support Office (CTTSO) of the United States Department of Defense to develop instantly dimmable SPD-Smart bullet resistant windows. GKN reported that it has successfully moved to the next phase of this government project. In October 2011, GKN exhibited its SPD-Smart armored automotive window at AUSA 2011 in Washington, D.C. and is pursuing commercial opportunities for its SPD-based products.

At the 2011 Frankfurt International Auto Show (Frankfurt, Germany), auto manufacturer Mercedes-Benz exhibited its Viano Vision Pearl luxury concept van using SPD-SmartGlass technology. The Viano Vision Pearl luxury van on display featured SPD-SmartGlass technology in the three glass roof panels, the rear window, and four side windows. All of these glazings were supplied by Research Frontiers licensee Isoclima S.p.A. In September 2012, Isoclima debuted its CromaLite brand of SPD-SmartGlass railway windows at InnoTrans 2012, and in October it exhibited its VebLite brand of SPD-SmartGlass For military applications at the 2012 Land Warfare Conference. VebLite is Isoclima s SPD-Smart solar control and privacy glazing product that functions like a venetian blind. It has multiple segments that provide instantly customizable shading fully controlled by the passenger and can be operated individually to create the effect of a shade being raised or lowered or moved to the side. This precisely controls where incoming heat and glare enter a military vehicle, and also controls where and to what degree people outside the vehicle can see into it.

SPD-Smart Architectural Products

Research Frontiers and its licensees are currently working with multiple architectural customers to introduce SPD-Smart products including windows, skylights, partitions and doors. The architectural markets for these products are highly fragmented and in general have a high sensitivity to price. In the near term, the Company expects SPD-SmartGlass products primarily will be commercialized in specialty applications and/or sectors that value its distinctive performance attributes including fast switching speed regardless of window size, a very wide range of visible light transmission, infinite light-control between its dark and clear states, and availability in unusual shapes and sizes. Research Frontiers end-product licensees in this sector include: Advnanotech (ADV), American Glass Products (AGP), Asahi Glass, Cricursa Cristales Curvados, ID Research Pty Ltd, Innovative Glass, LTI SmartGlass, Prelco, Isoclima, Traco (a business unit of Alcoa), SmartGlass International Ltd. iGlass , and Tint-It JSC.

SPD-Smart windows, skylights, doors and partitions offer various benefits in architectural applications. During 2009, independent tests were conducted by DSET Laboratories, a division of Atlas Material Testing Technology, in accordance with ASTM and ASHRAE testing and calculation protocols. These test results demonstrate that SPD-Smart windows have excellent solar heat rejection and control capabilities.

In January 2011, SmartGlass International announced that a new study published by the Department of Engineering at the University of Cambridge concluded that SPD-Smart light-control windows are exceptionally energy efficient, reducing solar heat gain by as much as 90%. The Cambridge study indicated that the real-world testing “confirms theoretical predictions that SPD glass holds great energy saving potential and is a technology that can really help to reduce energy wastage of glass facades.” In addition to SPD-Smart technology, the Cambridge study discussed alternative dynamic glazing technologies that could be used in windows (e.g. electrochromics) and reported that SPD-Smart technology did not have the disadvantages that limited the potential of these alternative technologies. For example, the study cited that an electrochromic window that is 2.4 square meters can take up to 30 minutes to change from clear to dark.

Research Frontiers licensee SmartGlass International has announced completion of several high visibility SPD-SmartGlass installations. During February 2012, the company announced installation of SPD-SmartGlass at CERN, the European Organization for Nuclear Research, which is one of the world s largest and most respected centers for scientific research. SmartGlass International installed SPD-SmartGlass in CERN s Globe of Science and Innovation that will house a permanent exhibition and is intended to serve as a venue for a wide range of activities, conferences and other events, In February 2011, SmartGlass International announced it supplied retrofit SPD-SmartGlass to five London television studios of the Associated Press. The SPD-SmartGlass used in these projects harvests daylight when it's needed, improves occupant comfort by providing controllable solar shading during peak light conditions, and preserves views. Just prior to this installation, it was announced that SmartGlass International installed retrofit SPD-SmartGlass panels at the set of “Daybreak,” the breakfast anchor program from ITV, one of the UK's largest commercial television networks.

In November 2011, Research Frontiers licensee Innovative Glass Corporation was awarded two 2010 Crystal Achievement Awards for their smart window product line using our SPD-Smart light-control technology. In October 2010, their SPD-SmartGlass product was awarded WFX s (Worship Facilities Conference & Expo) New Product award for Best Building System Material Product/Window. Innovative Glass has completed or is working on a variety of SPD-SmartGlass projects in the commercial, residential and institutional markets. In March 2013, Innovative Glass exhibited its SPD-SmartGlass architectural products at Glass Expo Northeast in Hauppauge, New York. Glass Expo Northeast is the region s largest conference and trade show dedicated to the architectural glass and metal industry.

In November 2012, licensee LTI Smart Glass exhibited SPD-SmartGlass at the 2012 ArchitectureBoston Expo (formerly known as Build Boston) architectural trade event. Known as a pioneer in the processing and laminating of electrified films, the LTI Smart Glass product line includes high-performance SPD-Smart ballistic- and blast-rated glazings, in addition to conventional SPD-Smart windows, doors, skylights and partitions.

In February 2010, iGlass acquired a license from Research Frontiers granting it the right to manufacture and sell SPD-Smart architectural end-products in Australia, New Zealand and South Africa. The license also grants ID Research Pty Ltd the worldwide right to manufacture and sell SPD emulsion and film to end-product licensees of Research Frontiers. The license follows a $1.5 million grant to ID Research Pty Ltd from the Government of Victoria's Science Agenda (VSA) Investment Fund for “Electro Responsive Material Coatings for Switchable Automotive Tinted Glass.” The proceeds of this investment are to upgrade and modify the company s factory to produce SPD light-control film.

SPD-Smart Aircraft Products

Research Frontiers worldwide presence in the aviation industry includes five end-product licensees: GKN Aerospace, InspecTech Aero Service, IsoClima, SmartGlass International (in partnership with Schott AG) and Vision Systems. Research Frontiers, its licensees, and strategic partners of its licensees are currently working with transport category (primarily large commercial aircraft) and general aviation category (primarily private and chartered smaller aircraft) aerospace customers to introduce SPD-Smart aircraft products including windows and partitions. The SPD aviation infrastructure is actively working in both new aircraft production and aftermarket installation programs.

InspecTech Aero Service Inc.

Research Frontiers' licensee InspecTech Aero Service Inc. markets its iShade brand of SPD-Smart windows to both the OEM new production segment and aftermarket segment of the aviation industry. Building on previously announced milestones including the selection by Hawker Beechcraft Corporation of InspecTech smart window shades for aftermarket installation on King Air aircraft, and receiving a Supplemental Type Certificate (STC) for all models of King Air aircraft by the FAA, InspecTech and its strategic partners are working with a growing number of aircraft manufacturers and their customers and are selling SPD-Smart dimmable windows for fixed wing aircraft and helicopters. InspecTech s SPD-Smart products have been installed on 30 models of helicopters and commercial, corporate, and military aircraft.

InspecTech s SPD-Smart aircraft windows are the industry s only dynamic switchable window shades that are now available for any aircraft as an aftermarket installation worldwide, and for new production aircraft. In the transport category of the industry, InspecTech s SPD-Smart products have been installed in selected areas on all Airbus A380 aircraft delivered by Airbus to Qantas Airlines to date, making SPD-Smart window shades the first and only instantly dimmable window shade flying on commercial airlines.

In 2012, InspecTech marked the 11-year anniversary of the world s first dimmable aircraft windows. SPD-Smart iShades installed in 2001 are still in service, validating the superior durability of iShades over any other shading system. InspecTech s SPD-Smart product line has evolved as a result of working closely with aircraft OEMs, private jet owners, and the changing certification requirements of the FAA. Recent improvements include:

- April 2011:

InspecTech announced a new model of its SPD-Smart iShade window, branded iShade iQ. This model, in addition to the light, glare and heat control, also reduces noise levels in the cabin.

- October 2012:

InspecTech announced improvements to its iShade iQ including a higher light transmission, greater contrast ratio, unprecedented optical clarity, superior acoustic and thermal insulation properties, and lighter weight.

- October 2012:

InspecTech announced enhancements to its electronics architecture used to control iShades to enable the SPD–Smart windows to switch to their clearest state in the event of a power loss – that was a request made by certain OEMs. InspecTech s iShades now offer the best of both worlds - when unpowered on the ramp, the windows automatically switch to their darkest, maximum heat-rejecting state, and when in the air, they instantly switch to the clear state in the event of a loss of power.

In March 2012, InspecTech s strategic partner MSA Aircraft Products showcased SPD-Smart shades at the 2012 Aircraft Interiors Expo in Hamburg, Germany. MSA s products combine InspecTech s SPD-Smart iShade dimmable window with a pleated shade. The integration of InspecTech s SPD-Smart iShade greatly enhances the flexibility and light-control capability now available to MSA Aircraft Products customers. MSA s SPD-Smart products offer a combination of performance benefits in a single system – view preservation, variable shading, complete privacy, and a broader set of interior design options with the addition of a pleated shade. This integration highlights the creative potential and adaptability of SPD technology.

In May, 2012, InspecTech s strategic partner Lou Martin and Associates (LMA) showcased its SPD-Smart E3 Shades at the 2012 European Business Aviation Conference and Exhibition (EBACE) in Geneva. This aircraft cabin window shading system integrates LMA s electromechanical pleated shade with InspecTech s SPD-Smart iShade dimmable window. Aircraft owners and operators can maintain the soft fabrics and warm colors of LMA s shades and benefit from the SPD-Smart film technology used in InspecTech s iShades.

At the end of 2012, InspecTech s sales of its iShade brand of SPD-Smart dimmable windows had extended to installation on 30 different aircraft models, and its mature SPD-Smart dimmable windows had been on in-service aircraft for eleven years.

Vision Systems

In November 2011, licensee Vision Systems exhibited its Nuance and Noctis brands of SPD-Smart aircraft cabin windows at the Dubai Airshow in Dubai, United Arab Emirates. Nuance and Noctis SPD-Smart aerospace windows offer instant and precise light-control at every level which provides OEMs and private aircraft owners a solar protection solution that enhances flying comfort and supports fuel efficiency. These electronically dimmable aircraft and helicopter window shades and cabin dividers are impact-resistant, completely silent, available in flat and curved surfaces, and can be controlled by the cabin management system or by passengers. Vision Systems Noctis SPD-Smart product line offers enhanced blackout solar protection and complete privacy.

At the November 2011 Dubai Airshow, Vision Systems announced that Bombardier Aerospace was featuring Vision Systems SPD-Smart aircraft windows in Bombardier s CSeries aircraft cabin mock-up. Bombardier equipped the business class windows in its mock-up with Vision Systems SPD-Smart Noctis aerospace windows. Developed for the 100- to 149-seat market segment, the CSeries family of aircraft is Bombardier s all new mainline transport solution.

In February 2012, Vision Systems SPD-Smart aerospace products were exhibited at the 2012 Singapore Airshow at Changi International Airport, Singapore. Eltra Aeronautics, a Visions Systems sales representative in Asia, featured Vision Systems SPD-Smart Nuance and Noctis products. Eltra Aeronautics is a leading aviation services company that offers airlines and MRO (Maintenance, Repair and Operations) organizations a wide range of aftermarket support services.

In March 2012, Vision Systems announced that the company has invested over $750,000 to expand its existing factory in France to add a production facility dedicated to the manufacture of its SPD-Smart Nuance and Noctis aerospace and transportation windows and cabin dividers. To meet anticipated demand for its SPD-Smart products, Vision Systems also announced plans to establish a similar factory in the United States with production of SPD-Smart products commencing in 2013. Both facilities will have state-of-the-art equipment and processes to ensure the highest standards of product quality over larger production volumes.

In March 2012, Vision Systems exhibited its SPD-Smart products at the 2012 Aircraft Interiors Expo in Hamburg, Germany. Vision Systems featured its Nuance and Noctis SPD-Smart windows, which were controlled using an app installed by the user on an Apple or Android device.

In October 2012, Vision Systems featured its SPD-Smart Nuance and Noctis aircraft and helicopter window shades at the NBAA Annual Meeting and Convention, an also exhibited its SPD-Smart products and cabin management systems working with these products. The Nuance and Noctis dimmable windows were operated by VisiSmart, an application for personal electronic devices developed by Vision Systems. VisiSmart makes it possible for airlines to offer in-flight entertainment, and control of cabin management systems such as lighting, on passenger-owned handheld devices. The company also exhibited its SPD-Smart Nuance dimmable window combined with its Comfort Shade product for additional interior design options including colors.

At the October 2012 NBAA, Vision Systems Nuance brand of SPD-Smart dimmable windows was featured in Honda Aircraft Company s HondaJet aircraft cabin window mock-up. The HondaJet aircraft is currently scheduled to enter service in late 2013.

In December 2012, Vision Systems exhibited its SPD-Smart electronically dimmable windows at the 2012 Middle East Business Aviation (MEBA) exhibition at Al Maktoum International Airport in Dubai, the United Arab Emirates.

GKN Aerospace Transparency Systems

In January 2011, Research Frontiers and GKN Aerospace Transparency Systems publicly announced the expansion of the scope of the former license agreement to include the sale of SPD-Smart windows, window shades, interior partitions, cabin dividers and other products for aircraft. The earlier license agreement with GKN focused on SPD-Smart products for armored transportation applications. GKN Aerospace is the world-leading supplier of cockpit transparencies and passenger cabin windows.

In October 2011, GKN exhibited at NBAA 2011 and showed its SPD-Smart aircraft window to select visitors to its booth.

SmartGlass International Ltd.

In 2010, Research Frontiers and SmartGlass International Ltd. announced an agreement to expand the scope of SmartGlass International s license. Under this agreement, SmartGlass International is authorized to manufacture and offer SPD-Smart products, including aerospace windows, worldwide. Prior to this agreement, SmartGlass International was licensed to offer SPD-Smart architectural products worldwide outside of North America.

In April 2011, SmartGlass International s SPD-Smart aircraft products were exhibited at the Aircraft Interiors Expo in Hamburg, Germany, at the booth of SmartGlass International s strategic sales and marketing partner SCHOTT AGSmartGlass International and the SCHOTT Group have an agreement granting SCHOTT the right to sell SmartGlass International s SPD-Smart products. In business for more than 125 years, SCHOTT is a world leader in the specialty glass industry and brings its extensive infrastructure of sales, distribution and service including over 50 sales offices spanning 125 countries to SmartGlass International and its award-winning SPD-Smart product line.

Isoclima, S.p.A.

In March 2012, at the 2012 Aircraft Interiors Expo in Hamburg, Germany, Isoclima S.p.A. announced that Isoclima s CromaLite brand of SPD-Smart aerospace windows made their world premier. CromaLite is Isoclima s SPD-Smart solar control glazing product and enables users to efficiently control the transmitted solar radiation in both the visible and the solar range. Dr. Alberto Bertolini, Executive Director of Isoclima, commented: Our CromaLite brand of SPD-Smart window offers many valuable light-control benefits: instant shading, glare control, UV rejection, the desire for passenger comfort, and keeping aircraft cool when they are on the ground. We are very excited by the reactions we have received from OEMs and cabin designers who are here at the Aircraft Interiors Expo, and are excited about our growing portfolio of SPD-Smart CromaLite solutions for the transportation and architectural markets.

In July 2012, Research Frontiers marked the opening of the 2012 Farnborough International Airshow by announcing the availability of new SPD-Smart electronically dimmable aircraft windows with an unprecedented combination of instant switching speed, and light-, noise- and heat-blocking capabilities. The latest generation provides the aircraft industry's only complete solution to managing in real-time the environmental challenges that outside conditions inflict on the cabin interior and passengers including light, glare, heat and noise.

Level of darkness:

Solar radiation onboard aircraft is extreme, and requires a dimmable window that creates an environment dark enough for passengers to sleep, even during daylight hours. Research Frontiers licensees now offer SPD-Smart windows that can be set to block over 99.96% of incoming light – achieving cabin blackout conditions whenever desired – to meet the needs of OEMs and their customers.

Switching speed:

Whenever a passenger wants relief from glare, SPD-Smart aircraft windows offer immediate response. Due to instant switching, an infinite number of light-transmission states can be selected by the passenger or flight crew, from clear to blackout, and any level of view-preserving tint in between.

Heat-blocking:

Aircraft cabins can become hot when the aircraft is parked because of solar heat streaming through windows. The result is an uncomfortably warm cabin upon boarding or the need to use jet fuel or auxiliary power units before boarding to cool down the cabin. SPD-Smart aircraft windows automatically switch to their maximum heat-blocking state, even when the aircraft is parked unpowered, and the cabin remains cool.

Other performance benefits:

Additional challenges stated by OEMs and their customers that have been successfully met by SPD-Smart dimmable aircraft windows include:

- Noise-blocking: the ability to reduce the amount of noise transmitted through windows
- Curved shapes: the ability to offer curved windows to meet interior design needs
- Weight-reduction: the ability to fabricate dimmable windows using lightweight plastics
- FAA certification: the ability to demonstrate full compliance with all FAA requirements

SPD-Smart Marine Products

Research Frontiers and its licensees are currently working with marine customers to introduce SPD-Smart products including windows, doors and partitions. In December 2010, Diamond Sea Glaze Manufacturing Ltd. acquired a license from Research Frontiers granting it the right to manufacture and sell SPD-Smart marine end-products worldwide. When our patented SPD-Smart light-control technology is used in yacht windows and other products, users can quickly and precisely control and tune the amount of light, glare and heat coming through their windows, while preserving their view. Diamond Sea-Glaze Manufacturing commenced marketing activities for products using SPD technology during the

second quarter of 2011. In October 2011, Cheoy Lee Shipyards unveiled the Alpha, its most advanced production yacht, which is fully-equipped with the latest yacht design features including SPD-SmartGlass supplied by Research Frontiers licensee Diamond Sea Glaze. The Alpha has approximately 150 square feet of SPD-SmartGlass at various places throughout the vessel and it is the first large-scale production yacht to make such extensive use of SPD-SmartGlass.

In October 2012, Cheoy Lee Shipyards exhibited two yachts the Alpha 76 Express and the Alpha 76 Flybridge at the 2012 Fort Lauderdale International Boat Show. These production yachts featured Research Frontiers licensee Diamond Sea Glaze s DiamondSmart brand of SPD-SmartGlass. In November 2012, licensee Isoclima exhibited its VebLite brand of SPD-SmartGlass for marine applications at the Marine Equipment Trade (METS) Show 2012 in The Netherlands. VebLite is Isoclima s SPD-Smart solar control and privacy glazing product that functions like a venetian blind. It has multiple segments that provide instantly customizable shading fully controlled by the passenger and can be operated individually to create the effect of a shade being raised or lowered or moved to the side. This precisely controls where incoming heat and glare enter a yacht or boat through a window or rooflite, and also controls privacy levels.

In addition to exhibiting its SPD-Smart marine products at METS 2012, licensee Vision Systems SPD-Smart Nuance dimmable marine window was named the category winner in the prestigious METS 2012 Design Award METS (DAME) competition for interior equipment, furnishing, materials and electrical fittings used in cabins. DAME is considered the world s most prestigious design competition for new marine equipment and accessories. In METS news release about the DAME award, it was noted The Jury felt that Nuance is major innovation that will benefit designers and owners greatly - with comparatively little increase in cost.

In February 2013, licensee Isoclima demonstrated its VebLite brand of SPD-SmartGlass for marine applications at SEATEC 2013 in Italy. SEATEC 2013 is a leading international exhibition of technology and design for boats, megayachts and ships.

Marketing Activities and Licensee Support

In addition to supporting the efforts of its licensees, the Company also recognizes the need to develop the SPD industry as a whole. As such, the Company continues to plan and execute complementary programs that build awareness and interest in smart glass generally and demand for SPD-Smart products specifically. These programs include presentations at various general industry conferences, participation in panel presentations and discussions hosted by academia, development of trade association educational materials, and presentations to architects, designers, and other influential specifiers. In May 2012, the Company gave a presentation and participated in a panel discussion at the 2012 Buildings New York Conference and Exhibition. In October 2012, the Company gave a presentation about its SPD-SmartGlass at Glasstec 2012. Glasstec is the world s largest trade event for the glass industry. In April 2013, the Company will give presentations at the Buildings New York Conference and Exhibition and at the Society of Vacuum Coaters Technical Conference. The Company expects to participate in additional conferences and events in 2013.

The Company s market development department has a number of other initiatives in place. To help guide and prioritize its technical and marketing investments, the Company periodically retains outside strategic marketing and other consultants to help generate increased short- and medium-term market penetrations for each of the major markets for the Company s light-control technology, and to provide support and guidance to the Company s licensees worldwide.

The Company has emerged as a leading resource for market research information on the subject of smart glass. Research Frontiers lectures and presents at industry conferences in areas of energy efficiency, daylight harvesting and sustainability. The Company has published independent test data about SPD-SmartGlass, shared the results of its research studies and test data with industry and the media, posted various reference materials to the Company s website for global dissemination, and published presentations, data and bylined articles.

Research Frontiers maintains an active role with various standards-setting organizations, including ASTM International which has an active committee developing standards for smartglass.

In addition to Research Frontiers providing overarching support of licensees sales efforts by developing the SPD industry as a whole, leveraging its prominence as a leading resource on the topic of smart glass, and maintaining an active role with standards organizations, Research Frontiers also supports licensees marketing and sales efforts directly. Activities include advising and assisting with branding strategies and advertising campaigns, website development and other marketing materials, joint presentations to prospective customers, and additional support. As a focal point of interest in smart glass, resulting in many consumer and business inquiries, Research Frontiers has an active referral program to generate customer leads for its licensees.

As part of this mission to develop the industry and to support our licensees acquiring SPD projects, in March of 2009 Research Frontiers announced the completion of the SPD-SmartGlass Design Center. Research Frontiers and its licensees have begun to host a series of events at this new facility which has drawn visitors from throughout the world. This Center is also configured as an interactive and energy-efficient “smart” executive office and conference room, and is located at the Company's corporate headquarters in Woodbury, New York. The SPD-SmartGlass Design Center features leading-edge SPD-Smart windows of different sizes (some floor-to-ceiling) and framing materials. It has a multi-functional electronic controller system for manual, remote, and automatic SPD-SmartGlass switching, and windows that can be controlled

remotely over the internet or using a smart phone. This interactive area also contains other types of smart glass, such as those using liquid crystal and electrochromic technologies, allowing users to operate and experience first-hand the differences in performance characteristics of different types of smart glass. Additional showcases of SPD-SmartGlass are being established in other geographic locations to make it convenient for even more people to experience the benefits of SPD-SmartGlass technology.

Research Frontiers Design Center is the only known public forum where designers, specifiers and end-users can compare performance between SPD-Smart technology and products using other light-control technologies. Research Frontiers believes that the growth of the smart glass industry will accelerate as more information is made available through direct comparisons. Research Frontiers believes that SPD products will be strongly preferred over competing technologies once a direct comparison is available to potential buyers. Research Frontiers continues to encourage its competitors to participate in public forums where consumers of electronically tintable products can see the relative performance of products that are available.

Licensees of Research Frontiers

Currently, the Company s licensees are categorized into four main areas: materials for making films (emulsions), film, lamination of film to glass or plastic, and end-products. Emulsion makers produce and combine the necessary materials (i.e. SPD particles and various liquids and special polymers) from which SPD-Smart films are made. The film makers coat a thin layer of emulsion between two sheets of plastic film, each of which has a transparent conductive coating. This emulsion is then partly solidified to form an SPD film that allows users to control the amount of light, glare and heat passing through this film. The end-product licensees then integrate this film into a variety of SPD-Smart products, or make electronic systems to control such SPD-Smart products. Some of these end-product licensees do their own lamination of the SPD light-control film to glass or plastic, and some outsource this lamination to other companies. The names of this growing list of licensees, and the year that their license agreements were entered into, are contained in the Exhibit section of this Annual Report on Form 10-K.

Licensees of Research Frontiers that incorporate SPD technology into end-products will pay Research Frontiers a royalty of 5-15% of net sales of licensed products under license agreements currently in effect, and may also be required to pay Research Frontiers fees and minimum annual royalties. Licensees that sell components (such as SPD emulsion or film) or lamination services to other licensees of Research Frontiers do not pay a royalty on such sale or service, and Research Frontiers will collect a royalty from the licensee incorporating these components into their own SPD-Smart end-products. Research Frontiers license agreements typically allow the licensee to terminate the license after some period of time, and give Research Frontiers only limited rights to terminate before the license expires. The licenses granted by the Company are non-exclusive and generally last as long as Research Frontiers patents remain in effect. Due to their bankruptcy filings or other termination of their general business activities or for other reasons, the Company does not believe that Polaroid Corporation, Kerros Limited, ThermoView Industries, BRG Group, SPD Technologies, SPD Systems, and Film Technologies International are pursuing business activities with respect to SPD technology. Also the Company and licensee N.V. Bekaert, S.A mutually agreed to terminate their license agreement during 2008 for reasons unrelated to SPD technology. Some of the Company s other licensees are currently inactive with respect to SPD technology, but may hereafter become active again. To date, the Company has not generated sufficient revenue from its licensees to profitably fund its operations. All of the Company s license agreements are included as exhibits to the Company s periodic reports filed with the United States Securities and Exchange Commission (the SEC).

The Company plans to continue to exploit its SPD-Smart light-control technology by entering into additional license and other agreements with end-product manufacturers such as manufacturers of flat glass, flat panel displays and automotive products, and with other interested companies who may wish to acquire rights to manufacture and sell the Company s proprietary emulsions and films. Although the Company believes based upon the status of current negotiations that additional license agreements with third parties will be entered into, there can be no assurance that any such additional license agreements will be consummated, or of the extent to which any current or future licensee of the Company will produce or sell commercial products using the Company s technology or generate meaningful revenue from sales of such licensed products.

The Company s plans also call for further development of its technology and the provision of additional technological and marketing assistance to its licensees to develop commercially viable SPD-Smart products, and expand the markets for such products. The Company cannot predict when or if new license agreements will be entered into or the extent to which commercial products will result from its existing or future licensees because of general economic conditions and the risks inherent in the developmental process and because commercialization is dependent upon the efforts of its licensees as well as on the continuing research and development efforts of the Company.

Competitive Technologies

The Company believes that its SPD light-control technology has certain performance advantages over other smart glass technologies which electrically vary the amount of light passing through windows and other smart products.

The Company believes that pricing and product performance are the two main factors critical to the adoption of smart glass products. Because the non-SPD smart glass technologies listed below do not have published, consistent pricing or cost data that can be relied upon, the Company cannot accurately report its price position relative to these other technologies. In terms of product performance, the Company believes that SPD-SmartGlass technology offers numerous advantages over other smart glass technologies as discussed below.

Variable light transmission technologies can be classified into two basic types: active technologies that can be controlled electrically by the user either automatically or manually, and passive technologies that can only react to ambient environmental conditions such as changes in lighting or temperature. One type of passive variable light transmission technology is photochromic technology; such devices change their level of transparency in reaction to external ultra-violet radiation. As compared to photochromic technology, the Company s SPD technology permits the user to adjust the amount of light passing through the viewing area of the device, rather than the viewing area of the photochromic device merely reacting to external radiation without control by the user. In addition, the reaction time necessary to change from light to dark with SPD-Smart technology can be almost instantaneous, as compared to the much slower reaction time for photochromic devices. Also, unlike SPD technology, photochromic technology does not function well at the high and low ends of the temperature range in which smart windows and other devices are normally expected to operate, nor does photochromic technology perform well in vehicles or other enclosed settings where existing glass is blocking incoming ultra-violet light which is required for photochromic devices to operate.

Similarly, thermochromic smart windows are passive systems which change their light transmission properties as sunlight heats or cools the glass. Because the light transmission properties of thermochromic systems are not controlled by the user, their ability to adapt to the specific needs of occupants is very limited. For example, thermochromic glazings will remain tinted on hot days even when occupants desire more daylight to enter the building or when they want to preserve their views. SPD-Smart windows, which require very low amounts of power to operate, allow for much greater control of incoming light, glare and heat and can be adjusted to any level of light transmission from dark to clear at any time. In addition, SPD-Smart windows can block up to 99.5% of incoming light, a level many times darker than thermochromic systems. The added advantage offers much higher levels of privacy and control over incoming solar energy. Companies involved in thermochromic technology include Pleotint, Suntek and Ravenbrick.

Active, user-controllable technologies, sometimes referred to as smart technologies, are generally more useful than passive technologies because they allow the user to actually control the state of the window. This control is achieved with a manual adjustment, or automatically when coupled with a timer or sensing device such as a photocell, motion detector, thermostat or other intelligent building system. There are three main types of active devices which are compared below:

- Electrochromic devices (EC)
- Liquid crystal devices (LC)
- Suspended-particle devices (SPD)

Electrochromic Technology: Electrochromic windows and rear-view mirrors use a direct current voltage to alter the molecular structure of electrochromic materials (which can be in the form of either a liquid, gel or solid film) causing the material to darken. When compared to electrochromic devices, SPD technology is expected to have numerous potential performance and manufacturing advantages, including some or all of the following:

- significantly faster response time, especially compared to larger electrochromic glazings
- ability to precisely tune an infinite number of intermediate light-transmission states
- consistent and uniform switching speed regardless of size of glazing area
- more reliable performance over a wider temperature range
- higher contrast ratios and the capability of achieving darker shaded states for large area product applications
- unpowered state is dark, maximizing solar heat gain benefits when the room, office or vehicle is not in use
- lower electrical current drain
- higher estimated battery life in applications where batteries are used
- no iris effect (where light transmission changes first occur at the outer edges of a window or mirror and then work their way toward the center) when changing from clear to dark and back again
- SPD technology is a film-based technology that can be applied to plastic as well as glass, and which can be applied to curved as well as flat surfaces
- available in single panels for retrofitting existing windows, skylights and doors

Many companies with substantially greater resources than Research Frontiers such as 3M, Gentex Corp., Pilkington, PPG Industries, Saint-Gobain Glass and other large corporations have pursued or are pursuing projects in the electrochromic area. While some of these companies have reportedly discontinued or substantially curtailed their work on electrochromics due to technical problems and issues relating to the expense of these technologies, at least four companies (Gentex, PPG Industries, View (formerly known as Soladigm), and Sage Electrochromics) are currently working to commercialize electrochromic window products. In May 2012, Saint-Gobain acquired Sage Electrochromics and combined all of their respective electrochromic manufacturing and developmental efforts.

Liquid Crystal Technology: To date, the main types of liquid crystal smart windows have been produced by Taliq Corp. (a subsidiary of Raychem Corp. which has since discontinued its liquid crystal operations and licensed its technology to others), Asahi Glass Co., Nippon Sheet Glass, Saint-Gobain Glass, iGlass Projects Pty Limited, Polytronix, Inc., DMDisplays, and 3M (which has also reportedly discontinued its liquid crystal film making operations). The first four companies listed above are also licensees of Research Frontiers Inc. for SPD-Smart technology. Liquid crystal windows only change from a cloudy, opaque milky-white to a clear state, are hazy when viewed at an angle and have no useful intermediate states. As compared to liquid crystal windows, SPD smart windows are expected to have some or all of the following advantages:

- have less haze
- provide shading without loss of view
- operate over a wider temperature range
- use less power
- have higher contrast ratios
- absorb and block more light, rather than simply scatter it
- permit an infinite number of intermediate states between a transparent state and a dark blue state, rather than being just two states.
- offer superior solar heat gain control

In the flat panel display market, further development (such as the achievement of faster switching speeds sufficient for full-motion video applications) is required if the Company expects to compete against display technologies that are currently being used commercially such as liquid crystal displays (LCDs) and organic light-emitting diodes (OLEDs). Some of the advantages that SPD displays might have include the ability to make displays without using sheet polarizers or alignment layers, and lower light loss and a corresponding reduction in backlighting requirements. However, such products need additional product design, engineering or testing before an evaluation of the commercial potential of such SPD-SmartGlass products can be determined and when, or if, its licensees may begin to penetrate the flat panel display market.

LCDs and other types of displays, liquid crystal windows, as well as electrochromic self-dimmable rear-view mirrors, are already on the market, whereas products incorporating SPD technology (as well as electrochromic windows) have only begun to appear in the marketplace. Therefore, the long-term durability and performance of SPD-Smart displays have not yet been fully ascertained. The companies manufacturing LCD and other display devices, liquid crystal windows, and electrochromic self-dimmable rear-view mirrors and windows, have substantially greater financial resources and manufacturing experience than the Company. There is no assurance that comparable systems having the same advantages of the Company s SPD technology could not be developed by competitors at a lower cost or that other products could not be developed which would render the Company s products difficult to market or otherwise render our products obsolete.

Research and Development

As a result of the Company s research and development efforts, the Company believes that its SPD technology is now, or with additional development will become, usable in a number of commercial products. Such products may include one or more of the following fields: smart windows, doors, skylights and partitions; variable light transmission eyewear such as sunglasses and goggles; self-dimmable automotive sunroofs, sunvisors, and mirrors; display cases/frames; and instruments and other information displays that use digits, letters, graphic images, or other symbols to supply information, including scientific instruments, aviation instruments, automobile dashboard displays and, if certain improvements can be made in various features of the Company s SPD technology that increases switching speed to the levels needed for video applications, portable computer displays and flat panel television displays.

Even though the Company s SPD technology has much faster switching speeds than electrochromic technology, current switching speeds are not fast enough for such video applications. The Company believes that most of its research and development efforts have applicability to products that may incorporate the Company s technology. At its current state of development, the Company s technology has been judged sufficiently advanced by various of its licensees and their customers for them to proceed with the development, introduction and sale of SPD-Smart products. However, the Company is continuously investing in research and development because it believes that further improvements will result in accelerated and increased market penetration. The Company intends to continue its research and development efforts for the foreseeable future to improve its SPD light-control technology and thereby assist our licensees in the product development, sales and marketing of various existing and new SPD-Smart products.

During the past few years, and during the past year in particular, the Company and/or its licensees have made significant advances relating to materials to enable (1) improved stability of SPD emulsions, (2) a wider range of light transmission, (3) improved film adhesion and cohesion and (4) increased durability of SPD films/laminates, and (5) cost reductions.

The Company has devoted most of the resources it has heretofore expended to research and development activities with the goal of producing commercially viable SPD products and has developed working prototypes of SPD-Smart products for several different applications, with primary emphasis on smart windows for various industries. In addition to working with the Company s licensees, Research Frontiers has also expanded its efforts to also work directly with some of our licensees major customers.

Research Frontiers main goals in its research and development include:

- developing wider ranges of light transmission and quicker switching speeds
- developing different colored particles
- reducing the voltage required to operate SPDs
- obtaining data and developing improved materials regarding environmental stability and longevity
- quantifying the degree of energy savings expected by users of the Company s technology including the degree that SPD technology can control heat and its contribution to energy savings directly and through daylight harvesting strategies in sustainable building designs.
- Continually striving to improve the performance and reducing material/production costs associated with making SPD-Smart products

Excluding non-cash expenses of approximately $143,000, $108,000, and $170,000, associated with the grant of stock options to the Company s technical personnel, Research Frontiers incurred approximately $1,529,000, $1,283,000, and $1,235,000, during the years ended December 31, 2012, 2011, and 2010, respectively, for research and development. Research Frontiers plans to engage in substantial continuing research and development activities to invest in future improvements in SPD light-control technology and to expand for its licensees the capabilities of SPD-Smart technology and the markets for SPD-Smart products.

Patents and Proprietary Information

Research Frontiers continues to make substantial investments to develop, license and protect its intellectual property position. The Company has 30 United States and 255 foreign patents in force. The Company s United States patents expire at various dates from 2013 through 2025, while its foreign patents expire at various dates from 2013 through 2026. The Company has current US and foreign patent applications that, if granted, would add a significant number of additional patents to its portfolio. The Company believes that its SPD light-control technology is adequately protected by its patent position and by its proprietary technological know-how. However, the validity of the Company s patents has never been contested in any litigation. The Company also possesses know-how and relies on trade secrets and nondisclosure agreements to protect its technology. The Company generally requires any employee, consultant, or licensee having access to its confidential information to execute an agreement whereby such person agrees to keep such information confidential.

Research Frontiers licensees have directed the Company not to reveal aspects of their activities or those of their customers, which limits the Company s ability to disclose certain information.

Rights Plan

In February 2013, the Company s Board of Directors adopted a Stockholders Rights Plan (the Rights Plan) and declared a dividend distribution of one right (a Right) for each outstanding share of Company common stock to stockholders of record at the close of business on March 3, 2003. Subject to certain exceptions listed in the Rights Plan, if a person or group has acquired beneficial ownership of, or commences a tender or exchange offer for, 15% or more of the Company s common stock, unless redeemed by the Company s Board of Directors, each Right entitles the holder (other than the acquiring person) to purchase from the Company $80 worth of common stock for $40. If the Company is merged into, or 50% or more of its assets or earning power is sold to, the acquiring company, the Rights will also enable the holder (other than the acquiring person) to purchase $80 worth of common stock of the acquiring company for $40. The Rights will expire at the close of business on February 11, 2023, unless the Rights Plan is extended by the Company s Board of Directors or unless the Rights are earlier redeemed by the Company at a price of $.0001 per Right. The Rights are not exercisable during the time when they are redeemable by the Company. The above description highlights some of the features of the Company s Rights Plan and is not a complete description of the Rights Plan. A more detailed description and copy of the Rights Plan has been filed with the SEC and is available from the Company upon request.

Available Information

Our principal executive offices are located at 240 Crossways Park Drive, Woodbury, New York 11797, our telephone number is (516) 364-1902, and our Internet website address is www.SmartGlass.com. We make available free of charge on or through our Internet website our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, proxy statements on Schedule 14A, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable after we electronically file such materials with, or furnish them to, the SEC.

ITEM 1A. RISK FACTORS

In addition to the other information in this Annual Report on Form 10-K, you should carefully consider the following factors in evaluating us and our business. This Annual Report contains, in addition to historical information, forward-looking statements that involve risks and uncertainties, some of which are beyond our control. Should one or more of these risks and uncertainties materialize or should underlying assumptions prove incorrect, our actual results could differ materially. Factors that could cause or contribute to such differences include, but are not limited to, those discussed below, as well as those discussed elsewhere in this Annual Report, including the documents incorporated by reference.

There are risks associated with investing in companies such as ours who are primarily engaged in research and development. In addition to risks which could apply to any company or business, you should also consider the business we are in and the following:

Source and Need for Capital.

As of December 31, 2012, we had approximately $13.4 million in cash, cash equivalents and short-term investments. As we take steps in the commercialization and marketing of our technology, or respond to potential opportunities and/or adverse events, our working capital needs may change. We anticipate that if our cash and cash equivalents are insufficient to satisfy our liquidity requirements, we will require additional funding to sustain our ongoing operations and to continue our SPD technology research and development activities.

We have funded most of our activities through sales of our common stock to investors, and upon the exercise of options and warrants. Eventual success of the Company and generation of positive cash flow will be dependent upon the extent of commercialization of products using the Company's technology by the Company's licensees and payments of continuing royalties on account thereof. We can give no assurances that we will generate sufficient revenues in the future (through sales of our common stock, exercise of options and warrants, royalty fees, or otherwise) to satisfy our liquidity requirements or sustain future operations, or that additional funding, if required, will be available when needed or, if available, on favorable terms.

History of Operating Losses.

We have experienced net losses from operations, and we may continue to incur net losses from operations in the future. We have incurred substantial costs and expenses in researching and developing our SPD technology. As of December 31, 2012, we had a cumulative net loss of $87,471,887 since our inception. Our net loss was $3,063,601 in 2012, $4,134,068 in 2011 and $3,874,865 in 2010 (which includes non-cash accounting charge in 2012, 2011 and 2010 of $878,578, $702,837, and $772,604, respectively, resulting from the expensing of grants of restricted stock and stock options).

We have never declared a cash dividend and do not intend to declare a cash dividend in the foreseeable future.

We have never declared or paid cash dividends on our common stock. Payment of dividends on our common stock is within the discretion of our Board of Directors and will depend upon our future earnings, capital requirements, financial condition and other relevant factors. We do not anticipate declaring or paying any cash dividends on our common stock in the foreseeable future.

We do not directly manufacture products using SPD technology. We currently depend upon the activities of our licensees and their customers in order to be profitable.

We do not directly manufacture products using SPD technology. We currently depend upon the activities of our licensees in order to be profitable. Although a variety of products have been sold by our licensees, and because it is up to our licensees to decide when and if they will introduce products using SPD technology, we cannot predict when and if our licensees will generate substantial sales of such products. Our SPD technology is currently licensed to over 40 companies. Other companies are also evaluating SPD technology for use in various products. In the past, some companies have evaluated our technology without proceeding further. While we expect that our licensees would be primarily responsible for manufacturing and marketing SPD-Smart products and components, we are also engaging in market development activities to support our licensees and build the smart glass industry. We cannot control whether or not our licensees will develop SPD products. Some of our licensees appear to be more active than others, some appear to be better capitalized than others, and some licensees appear to be inactive. There is no guarantee when or if our licensees will successfully produce any commercial product using SPD technology in sufficient quantities to make the Company profitable.

SPD-Smart products have only recently been introduced.

Products using SPD technology have only recently begun to be introduced into the marketplace. Developing products using new technologies can be risky because problems, expenses and delays frequently occur, and costs may or may not come down quickly enough for such products using new technologies to rapidly penetrate mass market applications.

SPD-Smart products face intense competition, which could affect our ability to increase our revenues.

The market for SPD-Smart products is intensely competitive and we expect competition to increase in the future. We compete based on the functionality and the quality of our product. Many of our current and potential competitors have significantly greater financial, technical, marketing and other resources than we have. In addition, many of our competitors have well-established relationships with our current and potential customers and have extensive knowledge of our industry. If our competitors develop new technologies or new products, improve the functionality or quality of their current products, or reduce their prices, and if we are unable to respond to such competitive developments quickly either because our research and development efforts do not keep pace with our competitors or because of our lack of financial resources, we may be unable to compete effectively.

Declining production of automobiles, airplanes, boats and real estate could harm our business.

Our licensees commercialization efforts of SPD-Smart products could be negatively impacted if the global production of automobiles, airplanes, boats and real estate construction declines significantly. If such commercialization is reduced, our revenues, results of operations and financial condition could be negatively impacted.

Single source of SPD film.

Our end-product licensees require a source of SPD film to manufacture finished products. Currently, Hitachi Chemical is the sole source of commercial quantities of SPD-film. There are several other companies that are licensed to manufacture SPD-film, but they have not begun commercial production of this film. Our end-product licensees ability to sell SPD products could be negatively impacted if there was a prolonged disruption in SPD-film availability. Such a disruption could also negatively impact our revenues, results of operations and financial condition.

We are dependent on key personnel.

Our continued success will depend, to a significant extent, on the services of our directors, executive management team, key personnel and certain key scientists. If one or more of these individuals were to leave the Company, there is no guarantee that we could replace them with qualified individuals in a timely or economically satisfactory manner or at all. The loss or unavailability of any or all of these individuals could harm our ability to execute our business plan, maintain important business relationships and complete certain product development initiatives, which would have a material adverse effect on our business, results of operations and financial conditions.

Dependence on SPD-Smart technology.

Because SPD technology is the only technology we work with, our success depends upon the viability of SPD technology which has yet to be fully proven. We have not fully ascertained the performance and long-term reliability of our technology, and therefore there is no guarantee that our technology will successfully be incorporated into all of the products which we are targeting for use of SPD technology. We expect that different product applications for SPD technology will have different performance and reliability specifications. We expect that our licensees will primarily be responsible for reliability testing, but that we may also continue to do reliability testing so that we can more effectively focus our research and development efforts towards constantly improving the performance characteristics and reliability of products using SPD technology.

Our patents and other protective measures may not adequately protect our proprietary intellectual property, and we may be infringing on the rights of others.

Our intellectual property, particularly our proprietary rights in our SPD technology, is critical to our success. We have received various patents, and filed other patent applications, for various applications and aspects of our SPD technology. In addition, we generally enter into confidentiality and invention agreements with our employees and consultants. Such patents and agreements and various other measures we take to protect our intellectual property from use by others may not be effective for various reasons generally applicable to patents and their granting and enforcement. In addition, the costs associated with enforcing patents, confidentiality and invention agreements or other intellectual property rights may be expensive. Our inability to protect our proprietary intellectual property rights or gain a competitive advantage from such rights could harm our ability to generate revenues and, as a result, our business and operations.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None

ITEM 2. PROPERTIES

The Company currently occupies approximately 9,500 square feet of space at an annual rental which in 2012 was approximately $200,000 for its executive office, research facility and SPD-Smart Glass Design Center at 2