RESEARCH FRONTIERS INC
Form 10-K
March 10, 2016

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, 2015 Commission File Number 1-9399

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

DELAWARE (State or other jurisdiction of incorporation or organization)	11-2103466 (I.R.S. Employer Identification No.)
240 CROSSWAYS PARK DRIVE WOODBURY, NEW YORK (Address of principal executive offices)	11797-2033 (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
Title of Class	on Which Registered
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 30, 2015 (the last business day of the registrant s most recently completed second fiscal quarter), computed based on the closing sale price of $5.34 was

$91,564,243. In making this computation, all direct and indirect shares known to be owned by directors and executive officers of the Company and all direct and indirect 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 7, 2016 the registrant had 24,043,846 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. Research Frontiers operates in a single business segment which is engaged in the development and marketing of technology and devices to control the flow of light (see Note 1). We develop and license our patented suspended particle device (SPD-Smart) light-control technology to other companies that manufacture and/or market the: (i) SPD-Smart chemical emulsion, (ii) light-control film made from the chemical emulsion, (iii) the light-control panels made by laminating the film, (iv) electronics to power end-products incorporating the film, or (v) lamination services for, and 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. In addition, in 2013 we launched our VariGuard business unit that markets and sells SPD-Smart products directly to customers for specialty uses such as the protection of artwork and light-sensitive documents in museums and private collections.

The Company has entered into a number of license agreements covering its light control technology. During 2015, three licensees accounted for 33%, 15%, and 9%, respectively, of fee income recognized for the year. In addition, during the year ended December 31, 2015, approximately 14% of revenues related to fees generated by a large architectural glass project. During 2014, five licensees accounted for 36%, 11%, 9%, 9%, and 5%, respectively of fee income recognized during the year. During 2013 six licensees accounted for 40%, 12%, 6% and 6%, 5%, and 5% respectively of fee income recognized for the year.

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 187 patents that have been 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 commercial applicability in many products where variable light-control is desired. Some existing product applications for SPD-Smart glass or plastic include the following:

Automotive:
sunroofs, sunvisors, side windows and rear windows;

Aerospace and marine:
windows, doors, partitions, sunvisors, and skylights.

Architectural:
commercial and residential windows, doors, skylights, and partitions for new construction, replacement, and retrofit applications;

In addition to the product applications listed above, SPD-SmartGlass technology may also offer potential benefits in the development of new flat panel displays, eyewear, self-dimming automotive rear-view mirrors and other reflective information displays. 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.

Some of our licensees consider the stage of development, product introduction strategies and timetables, and other plans to be proprietary or secret. Unless required to disclose such information, the Company may limit its disclosure of licensees activities until such licensees, or their customers, make their own public announcements of planned or actual product launches.

Some of the early sales and uses of SPD technology were to low volume commercial installations and some have involved concept and test installations by licensees and their customers. 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.

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. In early 2012, sales of the Magic Sky Control all glass roof option commenced on their Mercedes-Benz SL. In mid-2014, sales of the Magic Sky Control all glass roof option commenced on the new S-Class Coupe with other Mercedes-Benz S-Class variants began offering the Magic Sky Control all glass roof option in 2015.

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. Research Frontiers believes the largest and most predictable near and intermediate term market for its technology will be automotive glass.

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 operations 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 and vendors. 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 7, 2016 the Company had twelve 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 master s degree in chemistry, one has extensive industrial experience in electronics and electrical engineering, and one has majored in physics. Three employees also have additional postgraduate degrees in business administration. 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.

Smart Glass Industry Trends:

There are favorable converging global trends in the major near-term markets for smart glass and SPD-Smart products. The potential for smart glass products is significant and is expected to attain economies of scale with increasing high volume production. This increased production is also expected to bring down end product costs and expand market opportunities.

In both public and private sectors across the world, there are substantial efforts targeted toward the promotion and use of energy efficient smart glass materials, including those used in automobiles, windows and other architectural glazings, aircraft and boats. 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 interest in SPD-Smart technology.

In December 2015, ResearchandMarkets issued *Smart Glass Market by Technology (SPD, Electrochromic, PDLC, Thermochromic), Application (Architecture, Transportation, Solar Power Generation, Electronics & Others), & Geography - Global Trend & Forecast to 2020*. This reports indicates: The emerging automobile and architectural buildings applications are creating a huge demand for smart glass market across the world. The major factors driving the growth of the smart glass market are the need for energy-efficient solutions, and government regulations for green buildings. Furthermore, the rising automotive sector is expected to drive the smart glass market in the coming years. ResearchandMarkets estimates that the Smart Glass market is expected to reach $5.81 billion by 2020 at an estimated Compound Annual Growth Rate (CAGR) of 19.5% from 2015 to 2020.

Automotive Market:

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. SPD-SmartGlass has also been shown in armored automotive glass applications, recreational vehicles, 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.

Aircraft Market:

In the aircraft industry there is a trend towards larger windows with more passenger control and functionality. 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 already being delivered (e.g. Boeing 787 and Airbus A350). In the general aviation category (primarily business jets, private or chartered smaller aircraft) this trend is true as well. For example, Gulfstream is promoting the size of the windows on their G650 platform, and Bombardier highlights the size of the cabin window on the upcoming Global 7000 and 8000 platforms. Several OEMs either already offer, or have announced their interest to include, electronically dimmable windows in their aircraft including Boeing, Airbus, Bombardier, Embraer, Beechcraft, HondaJet, Airbus Helicopter, Dassault, Nextant and Epic.

Electronically dimmable windows for aircraft 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 introduced in the Boeing 787. There have been concerns raised that this aircraft's electronically dimmable windows are not dark enough for long haul flights, transmit 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, superior heat-rejection when the aircraft is parked on the ramp, superior acoustic insulation, an automated dimming system to continuously maintain a constant level of light in the cabin in real-time, and weight-savings. Leading companies manufacturing electromechanical pleated window shades have products that incorporate SPD-Smart windows into their designs, and Tier 1 suppliers of other cabin systems (e.g. cabin management systems) are featuring SPD-Smart electronically dimmable windows in mockups.

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 electronically dimmable windows are flying in 33 models of various aircraft including those used in commercial aviation, general aviation and military aviation. SPD-Smart products have recently been selected by aircraft manufacturers as standard equipment on new production platforms including Honda Aircraft s HondaJet and Textron-Beechcraft King Air 250, 350i and C90GTx. In addition, starting in 2020, SPD-Smart skylights have been selected by Dassult Aviation for its new Falcon 5X.

Architectural Market:

The architectural community is actively increasing the use of daylight harvesting, green building technologies and building automation systems to more effectively capture and control natural light as part of energy reduction strategies to offset cooling/heating costs and electricity used by artificial lighting. In addition to design, aesthetic and other benefits, the expanded use of glass also supports a growing body of research which finds that the presence of and control over incoming natural light improves an individual s well-being and productivity. Products using SPD-Smart light-control technology sunroofs, windows, skylights, partitions and others can play an important role in supporting these converging global trends.

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.

Research Frontiers patented SPD-SmartGlass technology was selected as the exclusive smart glass for the USA Pavilion at the most recent World s Fair, Expo Milano 2015 from May through October, 2015. The USA Pavilion featured 312 large panels of SPD-SmartGlass manufactured under license from Research Frontiers by Isoclima S.p.A. Each panel measures approximately 1 meter by 3 meters, making the total surface area in the roof more than 10,000 square feet. This is the largest known installation of smart glass in the world for a roof application and was seen by over 6 million people.

Marine Market:

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.

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).

Hitachi Chemical s 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 versions of the films provide a high range of visible light transmission. The 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 end-product applications.

In December 2014, Research Frontiers was granted a patent 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. Neither of these companies has yet announced commercial SPD film products for sale.

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, Saint-Gobain Vision Systems, Tint-It JSC and Advnanotech. The Company s automotive glass licensees account for the majority of all glass produced for the automotive market throughout the world.

Automotive OEMs:

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 2012, Daimler AG 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 its subsidiary, Pilkington, in the UK and Germany then process and laminates Hitachi s SPD film into the glass for the Magic Sky Control roof.

In late 2014, Daimler AG began offering its Magic Sky Control as an option on the new Mercedes-Benz S-Class Coupe. In 2015 other S-Class variants (i.e. Standard Wheel base W222, Long Wheel Base V222, Maybach S600 X222 and the Maybach Pullman Limousine) began offering Magic Sky Control as an option. The all-new Mercedes-Benz S-Class is the third large-scale serial production vehicle to offer Magic Sky Control using SPD-Smart technology. The Research Frontiers licensees involved with the production of the Magic Sky Control roof for the S-Class include Hitachi Chemical, which manufactures the SPD-Smart light-control film and Asahi Glass Corporation which then process and laminates Hitachi s SPD film into the glass for the Magic Sky Control roof.

The S-Class offers the largest panoramic Magic Sky Control roof ever put into serial production. The surface area of the panoramic roof using SPD-SmartGlass technology on the S-Class is approximately three times the size of the roof glass used on the current SLK and SL roadster, and third-party market forecasters estimate that the total vehicle production volumes for the S-Class is higher than the SLK and SL roadsters combined.

A key factor in the broad adoption of SPD technology in various automotive windows is its cost. Typically, the cost for new technology products decrease as production volumes increase. The price per square foot of SPD-SmartGlass reported by our licensees has gone down over time in the automotive market. Royalties from the Magic Sky Control panoramic roofs for the S-Class vehicles are generally between $150-250/car. Royalties from the Magic Sky Control roofs for the SLK and SL vehicles are between $100-150/car. The roofs on the S-Class is approximately three times the surface area of the roofs on the SLK and SL vehicles.

Research Frontiers believes that the addition of the S-Class car model is also significant since it applies our SPD-Smart light-control technology to the broader class of vehicles by moving beyond roadsters to coupes and passenger sedans. Historically, since its debut over 40 years ago, the S-Class represents the premier platform to introduce new technologies to the customer, which in many cases expand to the other less expensive model lines within the Mercedes-Benz brand.

In November 2015 at the Los Angeles Auto Show, Mercedes-Benz launched a refreshed Mercedes-Benz SL. The press release from Mercedes-Benz it stated, Another feature which has been retained is the unique optional extra MAGIC SKY CONTROL: when closed, the panoramic vario-roof automatically changes from dark to transparent or vice-versa within just a few seconds. The MAGIC SKY CONTROL feature is a carry-over from the previous model. Other new features include a new front end, new headlamps, more powerful engines, a new transmission, among many others.

In January 2016 at the North American International Auto Show in Detroit, Mercedes-Benz premiered the new Mercedes-Benz SLC, which will be available in the spring of 2016. The press release from Mercedes-Benz when the SLC was first announced stated, A feature that continues to be unique to the SLC is the panoramic vario-roof with Magic Sky Control this glass roof is lightened or darkened at the touch of a button. This means that it provides an open-air feeling at any time, but when required gives welcome shade under a hot sun. The Magic Sky Control feature, using Research Frontiers SPD-SmartGlass technology, is a carry-over from the SLC s predecessor model, the SLK roadster.

Other automakers continue to develop and evaluate the use of SPD technology in their windows systems. Such window systems include sunroofs, side-windows, rear-windows and front-window visors.

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

January 2016:

Continental Corporation showcased its Intelligent Glass Control system on a demonstration vehicle at a special event at the Consumer Electronics Show (CES) in Las Vegas. This vehicle, a Ford Mondeo station wagon, used SPD-SmartGlass technology to enable the glass in all eleven side and rear windows and in the top sunvisor portion of the windshield to change its transparency and darken instantly through electric control signals.

March 2015:

The Lincoln Motor Company, the luxury automotive brand of the Ford Motor Company, introduced the Lincoln Continental Concept car using an SPD-SmartGlass electronically tinting sunroof. This Lincoln Continental Concept car featuring SPD-SmartGlass also made its Asian debut at Auto Shanghai in April 2015.

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 debuted at the Geneva International Motor Show its public evaluation of the Limited Edition Viano Pearl. This vehicle displays the capabilities and conceptual use of SPD-SmartGlass on the side glass of vehicles from Mercedes-Benz.

December 2011:

Toyota debuted its FS Hybrid Concept at the 2011 Tokyo Motor Show in Tokyo, Japan. The FS Hybrid Concept demonstrated the use of SPD-Smart technology in side glass.

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.

Automotive Aftermarket:

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. In March of 2013 Research Frontiers announced that it had added two new licensees, Tint-It JSC and Advnanotech, both of whom are targeting the automotive aftermarket in Russia.

Recreational Vehicles//Motor Homes:

In September 2014, Global Caravan Technologies, Inc. unveiled the CR-1 Carbon which features the MagicView roof and MagicView windshield with SPD-SmartGlass. This special glass which totals 28 square feet, was jointly developed with Research Frontiers licensee Vision Systems. SPD nanotechnology on this vehicle allows infinitely variable control of privacy between blackout and clear, and can be controlled by any smart-phone or other smart-devices. In addition to controlling the level of light and glare coming into the RV, the MagicView SPD-SmartGlass on RVs offers many other advantages. This technology provides unsurpassed thermal insulation: SPD-SmartGlass substantially rejects solar heat from entering RVs through windows. The SPD-SmartGlass achieves its maximum dark state when the RV is parked/turned off and no power is consumed.

Vision Systems announced in January 2012 that Notin, manufacturer of motorhomes and campers, selected Visions Systems Nuance brand of SPD-SmartGlass for the skylight of Notin's Angara luxury motorhome. In October 2013 at Busworld 2013, Vision Systems showcased a new sun visor using SPD-Smart light-control film technology and a light sensor to automatically and dynamically adjust the sun visor to deal with changing light and glare conditions. Vision Systems indicated that they have been working for almost two years with a major automotive OEM to test the ease of installation, reliability, design and performance of their new sun visor in real world conditions. They further indicated that customer reaction regarding the effectiveness and ease of use of this product has been excellent. The fact that this feature can be installed in the aftermarket should bring these benefits to a wider range of drivers.

Rail Transport:

In September 2014, Poma (a leading supplier of cable transport systems) showcased at Innotrans 2014 its Cabine H2 cable car. The windows in this cable transport vehicle used Research Frontiers licensee Vision Systems' "Nuance" SPD solution. Innotrans 2014 is the largest international trade fair for rail transport technology with over 160,000 visitors and is held every two years in Berlin, Germany. At this fair Bombardier, featured their "FLEXITY 2" tram platform using an electronically dimmable window produced by Vision Systems. In addition, AGC, one of the largest producers of flat glass in the world, featured its "WONDERLITE" SPD-SmartGlass train window.

Automotive Armored Glass Market:

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.

SPD-Smart Aircraft Products:

Three aircraft manufacturers have announced that they have selected SPD-Smart dimmable window products as standard equipment in new or upcoming production aircraft:

Honda Aircraft Company:

The new HondaJet, with first delivery in December 2015, comes with SPD-Smart electronically dimmable windows as standard equipment on all passenger windows.

Textron-Beechcraft will have SPD-Smart electronically dimmable windows as standard equipment on all models of its King Air aircraft:

The King Air 250 with first production during 2015;
The King Air 350i with first production during 2015;
The King Air C90GTx with first deliveries during the first quarter first quarter of 2016.

Dassault Aviation:

The new Falcon 5X, with first deliveries expected in 2020, will come with SPD-Smart electronically dimmable skylights as standard equipment.

Aircraft manufacturers have incorporated SPD-Smart electronically dimmable windows in mockups, with some of these mockups being exhibited at major aviation shows:

April 2015

Vision Systems demonstrated its Nuance Touchless at the 2015 Aircraft Interiors Expo in Hamburg, Germany. The new system allows passengers to use gestures, much like those used to operate a smart phone, to control the tint of their aircraft windows, but without ever having to touch the window or any other aircraft interior component.

Isoclima showcased its CromaLite brand of SPD-Smart Electronically Dimmable Windows at the Aircraft Interiors Expo in Hamburg, Germany.

March 2015:

Vision Systems unveiled its SPD-Smart Opti-Visor electronically dimmable sun visor for the aircraft market at the Helicopter Association International Heli-Expo in Orlando, Florida.

October 2014:

Epic Aircraft featured SPD-Smart windows in the mock-up of their E1000. The mock-up was unveiled at 2014 NBAA in Orlando, Florida.

October 2013:

Dassault announced their Falcon 5X at the 2013 NBAA show in Las Vegas. In an aviation industry first, an SPD-Smart skylight was featured on the mock-up. The Falcon 5X will use SPD technology as standard equipment, and use of a skylight on an aircraft is an industry first

May 2013:

Eurocopter featured SPD-Smart windows, and SPD-Smart cabin partitions, in the mock-up of their EC175 helicopter. The mock-up was unveiled at EBACE 2013 in Geneva, Switzerland.

October 2012:

Honda Aircraft Company featured HondaJet SPD-Smart cabin windows at the 2012 National Business Aviation Association (NBAA) Annual Meeting & Convention. The HondaJet s passenger windows will use SPD technology as standard equipment. SPD-Smart Nuance windows for the HondaJet went into production at Vision Systems new Melbourne, Florida factory and the HondaJet is currently expected to get FAA certification in the first half of 2015 and be delivered to customers shortly after that.

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.

Tier 1 suppliers of cabin systems have featured SPD-Smart electronically dimmable windows in mockups, with some of these mockups being exhibited at major aviation shows:

April 2014:

BAE Systems featured SPD-Smart electronically dimmable windows in their cabin management system mock-up at the 2014 Hamburg Airshow. The windows can be controlled by the BAE system.

April 2014:

Vaupell featured SPD-Smart an electronically dimmable window in their commercial airliner window assembly at the 2014 Hamburg Airshow.

The latest generation of SPD-Smart electronically dimmable windows 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, 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

Aircraft Window Licensee - InspecTech Aero Service Inc.

Research Frontiers' licensee InspecTech Aero Service Inc. markets its iShade and eShade brands 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 33 models of helicopters and commercial, corporate, and military aircraft.

InspecTech s SPD-Smart aircraft windows 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 2015, InspecTech marked the 14-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:

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.

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.

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.
InspecTech has strategic partners that manufacture traditional pleated shades, combining InspecTech s SPD-Smart iShade dimmable window with a pleated shade. The integration of InspecTech s iShade greatly enhances the flexibility and light-control capability now available to these partners customers. 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. Aircraft owners and operators can maintain the soft fabrics and warm colors of traditional pleated or roller shades, and benefit from the SPD-Smart film technology used in InspecTech s iShades. This integration highlights the creative potential and adaptability of SPD technology.

At the end of 2015, InspecTech s sales of its iShade and eShade brands of SPD-Smart dimmable windows had extended to installation on 33 different aircraft models.

Aircraft Window Licensee - Vision Systems

In December 2014, at the 2014 MEBA show in Dubai, U.A.E., Vision Systems unveiled a new generation of its Energia photovoltaic autonomous SPD-Smart dimmable window the new product is capable of producing more energy than the prior generation.

In May 2014, at the 2014 EBACE show in Geneva, Switzerland, Vision Systems unveiled a new SPD-Smart dimmable window product that offers passengers the ability to independently control the tint of different zones within the same window. At the same show, Vision Systems announced an improvement in the optical performance of its Nuance SPD-Smart dimmable windows a product offering wider amplitude between clear and dark.

In October 2013, at the 2013 AIX Americas show, Vision System s strategic partner Vaupell announced they are offering the industry a complete SPD-Smart light-control window system Vision Systems SPD-Smart Noctis window and control system, integrated with Vaupell s window assembly. This product offering was showcased at Vaupell s AIX Americas booth. Vision Systems and Vaupell entered into a strategic partnership to develop and offer SPD-Smart Noctis and Nuance windows to OEMs, including Vaupell s longstanding customer Boeing.

In October 2013, at the 2013 NBAA, Vision Systems unveiled Energia the world s first self-powered dimmable window for aircraft cabins. Energia adds the many practical, technical, and financial benefits of solar power to the instant switching speed, wide range of light transmission, and relief from light, glare and heat that SPD-Smart aircraft windows already provide. Energia operates without using the aircraft s electrical system because it integrates a transparent photovoltaic layer that is capable of producing its own energy from the sun, or from artificial light sources. Energia facilitates the installation of dimmable windows on new production and aftermarket aircraft. It is completely independent of the cabin s wiring, and no modifications to the aircraft s existing electrical system are required. Energia was developed in collaboration with Sunpartner Technologies, Vision Systems partner and the inventor and manufacturer of the transparent photovoltaic panel. In March 2014, Vision Systems announced that Energia had been selected as a finalist in the prestigious 2014 Crystal Cabin Award.

In June 2013 at the Paris Air Show, Vision Systems announced it will open its first-ever U.S. SPD-SmartGlass factory, investing nearly $1.2 million in capital expenditures to serve customers with strong U.S. operations. The new factory was highlighted by Florida Governor Rick Scott and Vision Systems President and CEO Carl Putman, with Research Frontiers President and CEO Joseph M. Harary and others in attendance for this special announcement. This announcement of a further expansion to the United States indicates an acceleration of existing and projected business in North and South America where major aircraft OEMs and customers of Vision Systems are located, including HondaJet and Gulfstream.

In April 2013, Vision Systems debuted its new SPD-Smart window with integrated electronics and controls directly on the window at the 2013 Hamburg Air Show. Developed with strategic partner Vaupell, a world leader in the production of aircraft interior subassemblies for commercial aerospace applications, it became the first dimmable window with integrated electronics and control panel directly on the aesthetically attractive window reveal.

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.

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. Also 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.

Aircraft Window Licensee - GKN Aerospace Transparency Systems

In October 2013, in a press release at the 2013 NBAA in Las Vegas, GKN stated: In addition to the Global 7000/8000, the aircraft transparencies operation equips the Beechcraft KingAir, the Lear 35/45 and 60 and the complete Embraer aircraft family. The company s latest passenger windows are the largest and most effective on the market and GKN Aerospace is developing new dimmable cabin management technology that will include full cabin blackout providing passengers with new levels of comfort and environmental control during their journey.

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.

Aircraft Window Licensee - 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.

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. (i-Glass), Innovative Glass, LTI SmartGlass, Prelco, Isoclima, Traco (a business unit of Alcoa), Mecanica de Vidros Industria E Comercio (MDV), and Tint-It JSC.

At its annual stockholders meeting in June 2015, Research Frontiers announced its strategic investment in Zuli Inc. a manufacturer of smartplugs. At this meeting, Joseph Harary demonstrated how the Zuli Smartplug integrates with SPD SmartGlass products. Mr. Harary indicated that Using a Zuli Smartplug, you can walk into a room with your smartphone, and have the lights automatically turn on, temperature adjust, and the glass in your windows instantly go from an energy-saving dark tint, to clear so you can see the magnificent views outside your home. Now, walk into another room and have those lights and windows adjust too, while the Zuli Smartplug automatically shuts off your devices in the room you left to save energy.

In March 2015, it was announced that Research Frontiers patented SPD-SmartGlass technology has been selected as the exclusive smart glass for the USA Pavilion at this year s World s Fair, Expo Milano 2015 from May through October, 2015. The USA Pavilion 312 large panels of SPD-SmartGlass manufactured under license from Research Frontiers by Isoclima S.p.A. Each panel measures approximately 1 meter by 3 meters, making the total surface area in the roof more than 10,000 square feet. This is the largest known installation of smart glass in the world for a roof application, and was seen by over six million people.

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 a 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.

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. Innovative Glass also periodically exhibits 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.

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.

Research Frontiers has added a number of new architectural licensees over the last several years. In 2014, Research Frontiers added Teknoglass Solutions LLP and Diamond Glass. Teknoglass Solutions LLP acquired a license from Research Frontiers Inc. to make and sell SPD-SmartGlass architectural smart window products in the United Kingdom and Republic of Ireland. Diamond Glass acquired a license from Research Frontiers Inc. to make and sell SPD-SmartGlass architectural smart window products throughout Europe. In November of 2013 Research Frontiers announced that it had a new licensee, MDV, who is targeting the architectural market in Brazil. In March of 2013 Research Frontiers announced that it had added two new licensees, Tint-It JSC and Advnanotech, both of whom are targeting the architectural market (in addition to the automotive aftermarket discussed previously) in Russia.

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. 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, but is believed to currently be inactive and seeking to terminate its license for SPD-SmartGlass technology for the marine market.

In November 2015, Silver Arrows Marine in conjunction with Mercedes-Benz Style (a design arm of Mercedes-Benz) unveiled a new yacht called the ARROW460 Granturismo featuring an SPD-SmartGlass electronically dimmable roof. The roof, which is supplied by licensee Vision Systems, will be able to be electrically risen, creating a glass pergola effect on the yacht. First customer deliveries of this production yacht are planned to start in early 2016. Vision Systems presented its products at the 2015 Marine Equipment Trade Show in Amsterdam in November 2015 and at the Monaco Yacht Show in September 2015.

In November 2013, Hatteras Yachts unveiled their new flagship motor yacht, the 100 Raised Pilothouse with dual SPD-SmartGlass skylights in the galley as standard equipment at the 2013 Fort Lauderdale Boat Show.

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.

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 a major innovation that will benefit designers and owners greatly - with comparatively little increase in cost.

In October 2011, Cheoy Lee Shipyards unveiled the Alpha 76 Express, 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 with SPD-SmartGlass.

VariGuard Business Unit:

In May of 2013 Research Frontiers announced the formation of its VariGuard business unit. This business unit allows the Company to directly address market opportunities for SPD technology outside the scope of its current license agreements or the focus of its licensees. VariGuard is a developmental activity for the Company and its revenues are currently immaterial relative to the Company s licensing activities.

The VariGuard business unit markets and sells SPD-Smart products directly to customers for specialty uses such as the protection of artwork and light-sensitive documents in museums and private collections. The business uses an optimized fabrication designed specifically for its exhibition panels. The production of these panels is outsourced to current licensees that have experience producing SPD laminates.

Excessive light-exposure is a leading cause of irreversible damage to many precious objects, particularly works on paper, textiles and watercolor. Presently, no display system is able to provide these artifacts with any protection against visible light damage. VariGuard provides the world's first and only display panels that limit an artifact's light-exposure only to when the artifact is being viewed. This provides unequalled protection for light-sensitive artifacts by substantially reducing an artifact's overall lux-hour exposure when compared to conventional display panels.

VariGuard marketing and exhibition activities include:

In September 2015, the Church History Museum, operated by The Church of Jesus Christ of Latter-day Saints, installed 22 exhibit cases containing VariGuard SmartGlass panels to protect light sensitive documents and artifacts. VariGuard panels provide a better viewing experience (by allowing substantially higher gallery illumination levels), while simultaneously reducing damaging visible light-exposure to artifacts.

In August 2015, the Smithsonian s National Postal Museum selected VariGuard panels to protect the 1856 British Guiana One Cent Magenta, the world s most famous rare postage stamp.

In May 2015, VariGuard exhibited its products at the American Institute for Conservation of Historic and Artistic Works (AIC) 43rd annual meeting in Miami, FL. Seth Van Voorhees, President of the VariGuard business unit commented: Our display panels offer the highest level of protection against UV and visible light damage in the industry and they are being used in cases, frames and wall cases to protect various light sensitive artifacts in museums internationally. Reinforcing the benefits of VariGuard panels and how they limit light exposure, the Smithsonian National Postal Museum presented a paper at this meeting entitled (Year of Light) Lighten Up: Enhancing Visitor Experiences, which will discuss the positive impact that VariGuard panels have in protecting valuable artifacts and enhancing the visitor experience.

In January 2015, VariGuard exhibited its display panels at a Washington Conservation Guild meeting focused on innovative new conservation technologies at the Smithsonian Institution s S. Dillon Ripley Center in Washington, DC.

In November 2014, VariGuard was invited to present at a meeting of the Washington Conservation Guild which was entitled: Outsmarting Light: SmartGlass Technology in Exhibitions . At this meeting, results of the light conservation benefits of its light control panels at the National Postal Museum were reported. This study quantified the dramatic reduction (>86%) in light exposure that artifacts experienced in cases using VariGuard display panels versus traditional glass display panels.

In June 2014, VariGuard business unit announced that the Smithsonian s National Postal Museum will use VariGuard s panels based on SPD-SmartGlass technology at the Behind the Badge exhibition in Washington, DC. This exhibit showcases the work of one of the nation s oldest federal law enforcement agencies and VariGuard panels are featured in display cases that showcase historic light-sensitive artifacts.

In January 2014, the VariGuard business unit announced that Omega Moulding will distribute its patented light control SmartGlass products for frames and display cases in the United States and Canada. That month Omega Moulding showcased the benefits of VariGuard SmartGlass products at the 15th Annual West Coast Art and Frame Expo and National Conference in Las Vegas, NV.

In May 2013, VariGuard featured its panels in several framing applications at Museum Expo 2013 at the Baltimore Convention Center in Baltimore, MD.
More information about VariGuard can be found on its independent website at www.VariGuard.com.

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. In 2014, 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. During 2014 the Company gave: (i) keynote presentations at: (i) the Smart Glass at the sixth annual 2014 IDTechEx Energy Harvesting and Storage USA Conference in Santa Clara, California and (ii) the 2014 IDTechEx Energy Harvesting and Storage Europe Conference in Berlin, Germany. In addition, the Company presented the benefits and recent developments relating to patented SPD-SmartGlass at the glass industry s largest trade show, Glasstec 2014 in Dusseldorf, Germany.

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, Research Frontiers completed the construction of the SPD-SmartGlass Design Center. 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:

The Company s licensees are currently 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, Diamond Sea Glaze and Film Technologies International are pursuing business activities with respect to SPD technology. The Company and licensee N.V. Bekaert, S.A mutually agreed to terminate their license agreement during 2008 for reasons unrelated to SPD technology. Similarly, the Company and SPD Control Systems agreed to terminate their license agreement in December 2014. The loss of SPD Control Systems as a licensee: (i) is not expected to have a material effect on the financial performance of the Company in the future, and (ii) resulted in a grant back to Research Frontiers of certain rights in SPD Control Systems intellectual property. 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 SPD light-control technology, in which particles move under the influence of an electric field, has certain performance advantages over other smart glass technologies.

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 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 that manufacture LCD and