

# UConn Student Managed Fund Analyst Report 2016

Azmath Rahiman and Vikram Kaimal



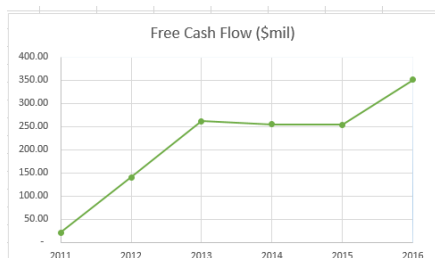
## History

GENTEX was founded in 1974 to manufacture the world's first dual sensor photoelectric smoke detector, which was invented by the current CEO, Fred Baur. However, currently the major product of GENTEX is auto dimming rear view and side view mirrors. The company has 92% market share of auto dimming rear-view mirrors, which are mainly used in light vehicles (Cars & SUVs). Gentex has also recently launched auto dimming windows for aircrafts. The company manufactures all of its auto dimming mirrors in a highly-automated factory in Zeeland, Michigan. The main customers of GENTEX are automobile OEMs and retail customers. Another major line of business is the SmartBeam technology, a camera based lighting system which optimizes the vehicles forward lighting environment. In September 2013, Gentex acquired HomeLink from Johnson's Control, thus diversifying further outside the mirror business. HomeLink is the world's most widely used vehicle-based wireless control system. Gentex is planning to launch an integrated toll paying capability into the rearview mirror this year. With an eye on mirrorless market, Gentex also developed a Full Display Mirror pipeline, which integrates rear view mirror with the rear-view camera. Gentex has more than 1,000 patents and is currently planning to expand its factory to cater the growing demand. The company has a consistent history of strong free cash flow and a low-debt balance sheet.

## Financial Snapshot

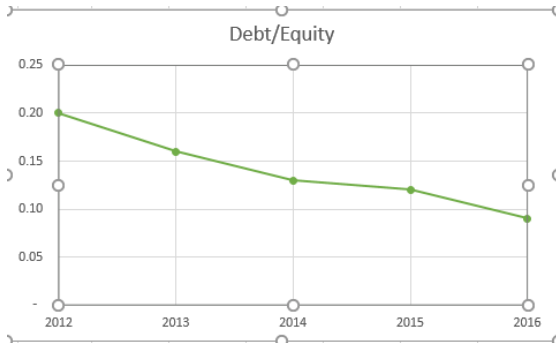
Gentex has a strong balance sheet with low debt and a healthy working capital trend. It is observed that for past 5 years the growth in account receivables, inventory, and account payables has been consistently fair to the growth in its earnings. The company has acquired a debt of \$266 million for the acquisition of Homelink in 2013<sup>1</sup>. The outstanding debt currently stands at \$178 million, with the debt to equity ratio a mere 9% and a negligible interest coverage ratio. The company has been consistently spending for capital expenditures, focusing on factory expansion in its Michigan and distribution centers in Europe and Asia.

The revenue has been growing at an average of 10% while the operating profit has been growing at an average of 17% for the past 5 years. Thus, the operating margin has been consistently grown from 21.32% to 30.49% between 2012-2016. This increase is largely due to higher automation in the production facility. During the stressful recessionary period of 2008-2009, Gentex maintained an operating margin of 10% (currently 20%) despite record low global auto sales growth. In effect, Gentex's free cash flow has been growing double digit for past five years. We believe that Gentex has been allocating its capital conservatively for its business.



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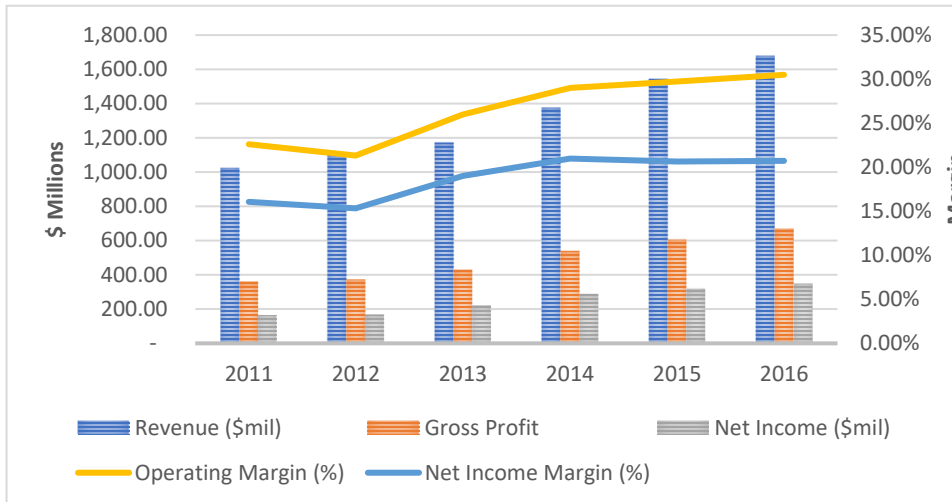
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Financial Snapshot						
2011-2016						
	2011	2012	2013	2014	2015	2016
Revenue (\$mil)	1,024.00	1,100.00	1,172.00	1,376.00	1,544.00	1,679.00
Gross Profit (\$mil)	362.00	373.00	431.00	539.00	604.00	668.00
Operating Profit (\$mil)	231.00	234.00	305.00	399.00	459.00	512.00
Net Income (\$mil)	165.00	169.00	223.00	289.00	318.00	348.00
EPS (Diluted) (\$)	0.57	0.58	0.78	0.98	1.08	1.19
FCF (\$mil)	21.00	140.00	262.00	255.00	254.00	351.00
Days Inventory (Days)	87.56	68.95	57.12	61.45	60.64	65.74
EPS Growth YoY (%)	16.33	2.63	32.48	26.45	10.20	10.18
Operating Margin (%)	22.60%	21.32%	26%	29%	29.72%	30.49%
Net Income Margin (%)	16.08%	15.33%	19.02%	20.98%	20.63%	20.72%
Debt/Equity		0.20	0.16	0.13	0.12	0.09
Number of Outstanding Shares (millions)	289.00	288.00	289.00	294.00	296.00	291.00
Current Ratio	7.47	8.47	5.01	6.42	7.51	7.71
ROE (%)	17.15	15.70	18.21	19.91	19.34	19.14
ROA (%)	15.12	13.81	14.72	15.24	15.27	15.59
Dividend Per share (\$)	0.24	0.26	0.28	0.31	0.34	0.35



Source: Gentex website



## Product Mix

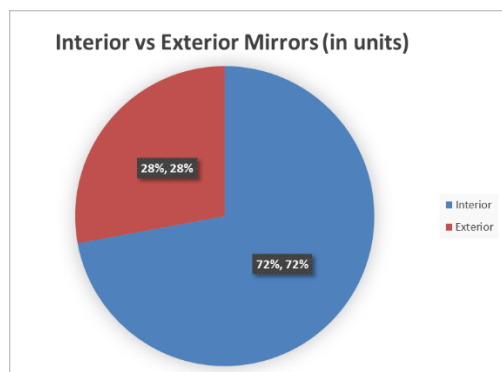
### 1. Auto Dimming Rear View Mirrors (Interior and Exterior Mirrors)

The interior and exterior auto dimming rear view mirror accounts for 86% of the company's revenue. The auto-chromatic technology increases the driver's safety by detecting the headlight and reducing the glare from vehicles traveling behind. Gentex has a near monopoly in this market. Recently the Gentex introduced full display rear view mirror which integrates rear view camera with its auto-chromatic technology. Currently, the company sells the auto dimming mirrors to Audi, BMW, Chrysler, Citroen, Fiat, Ford, General Motors, Honda, Hyundai/Kia, Infiniti, Jaguar/Land Rover, Lexus, Mazda, Mercedes-Benz, Mitsubishi, Nissan, Opel, Peugeot, Renault, Rolls Royce, SAIC, Samsung, SEAT, Skoda, Toyota, Volkswagen and Volvo. In 2016 alone 21 new nameplates were launched including GM's Cadillac introducing the full display mirror<sup>1</sup>.

<sup>1</sup> According to 2016 Q3 conference call

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**Growth Prospects:** Interior rearview mirror accounted for 72% of the unit mirror shipments in 2016. In 2016 alone, a total of 26 million interior mirrors were shipped worldwide. Growth in international shipment (outside North America) has been around 14% while the sales growth in North America tend to be stagnant at 5%. However, exterior mirror has shown a considerable increase in penetration in North America than abroad. We believe this contrasting trend in product line between international and domestic shipment is largely due to the higher penetration of interior mirror in North America, which is around 50% by our estimate. Auto dimmable exterior mirror comes in demand only after the demand for interior mirrors are satisfied. In North America room for growth in interior mirror is considerably less than abroad. In 2015, an estimated 26% of all light vehicles worldwide had an interior auto-dimming mirror and 8.5% had at least one exterior auto-dimming mirror<sup>2</sup>. Gentex's market share was 92% in 2016 and thus almost a monopoly in the auto dimmable mirror market worldwide.

Year	Global car production
2016	93,107.71
2017	94,809.10
2018	95,961.40
2019	98,289.34
2020	101,597.58
2021	103,480.56
2022	105,232.41
2023	106,580.00
2024	108,254.46

Source: HIS Global

**Market Saturation:** Light weight vehicle sales is expected to grow just on average 1-2% (in units)<sup>3</sup> in the North America, Japan and Europe (where Gentex has significant exposure). However, having a market share of around 92% in auto dimming mirror market, Gentex seems to have a lot of scope to penetrate further into the remaining 74% of the total light weight vehicle market. On the other hand, there is considerable room of growth in emerging market where the light vehicle sales are expected to grow in double digits. Thus, there seems to be no immediate threat from market saturation.

**Competition:** Magna, a \$36 billion company (in revenue) acquired Donnelly on 2002. Donnelly, which was also based in Michigan, was once an arch rival of Gentex following several patent suits. There were a lot of speculation, that the acquisition will pose significant threat to Gentex. However, market share of Gentex has in fact increased since 2002 from 78% to 92% in 2016. Such a steady growth in the segment, could be attributed to Gentex's existing patents, operational efficiency, management focus on a narrow range of products among others. Thus, we wouldn't expect a significant threat from competition in near term in the mirror category.

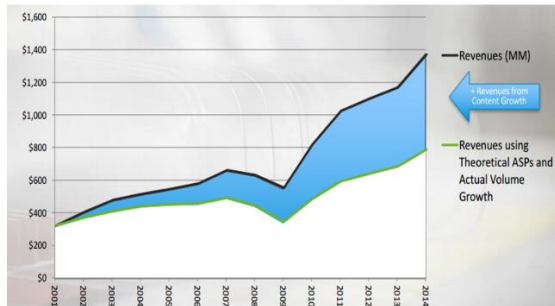
**Pricing Pressure:** Gentex's revenue from its top three clients (Volkswagen, Ford and Toyota) accounts for 36% of its total revenue and it has been consistent for years. With Gentex's nameplate expansion, there has been a continuous increase in number of contracts with new OEMs (5 new OEMs

<sup>2</sup> According to IR slide 2015

<sup>3</sup> [https://www.ihs.com/pdf/IHS-Automotive-Global-Summary-Production-LVP-03-17\\_222719110913052132.pdf](https://www.ihs.com/pdf/IHS-Automotive-Global-Summary-Production-LVP-03-17_222719110913052132.pdf)

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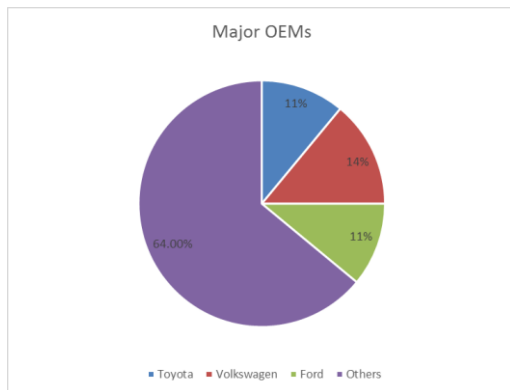
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Source: Gentex IR presentation

expected in 2017<sup>4</sup>) and increase in aftermarket exposure with a new contract with VOXX electronics. Thus, we do not see a considerable threat from price pressure due to lack of diversification. Our analysis shows that the revenue per unit mirror (Average Selling Price) has been stable at \$40/unit for past three years. Although, Gentex seems to not have succeeded in increasing the sales tag, its increasing operational efficiency along with content growth and volume growth has given it a moat to sustain the price pressure.

**Disintermediation of products:** Disintermediation of exterior mirrors is not seen to be a considerable threat in near future. Although, there has been reports on disintermediation of exterior mirrors to increase the fuel efficiency, we do not believe this would be a reason for concern. Also, driverless cars is not expected to cause a considerable impact for the near term. We believe that the regulation will not allow to disintermediate interior and exterior mirror even in autonomous cars. In addition, the road infrastructure in emerging market is fragile for driverless cars. Thus, we do not see a formidable threat from disintermediation of products in near term.



**Government Regulations:** Our major concern is regarding government regulation, and we have given a considerable weightage to this factor in our valuation. The Kids Transportation Safety Act of 2007 was signed into law in February 2008, which revises federal standards to expand the field of view so that drivers can detect objects directly behind vehicles. In December 2010, the U.S. Department of Transportation proposed rules regarding the required field of view to detect objects directly behind vehicles. The law might further expand the market of camera based rear view screen giving a significant market share for Gentex's Full HD mirror – a dual rear view HD screen and rearview mirror. However, implementation of the law may *significantly* decrease the demand of rear view mirrors. It is doubtful if rear view mirror will be completely replaced by camera based screens as dirt and blockage to rear view cameras may impede the visibility. Although Gentex's Full HD mirror is top end in camera based system, we are concerned of the competition in this space. Unlike the auto-chromatic mirror system is well protected by Gentex's patents and process systems, Full HD mirror is not immune from low end competitions.

**Projection Basis:** Our valuation on this line of business is restricted on a 5-year basis. Although the business is generating abnormal cash flows now, we are not certain about whether Gentex would continue to do so to perpetuity. However, we are confident about continuing performance for at least 5 years. For our valuation, we have assumed that the market share of auto dimmable mirror to increase from the current 51% to 60%, 53% to

<sup>4</sup> According to 2016 Q3 investor call

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63% and 45% to 56% by 2021. We have priced the mirror on per unit basis to \$40/unit based on our estimation. Our revenue projection on the automotive segment is largely from our light vehicle sales projection according to IHS on various geographic areas and estimated market penetration for next 5 years.

## 2. Gentex-PPG Aerospace tie-up for Alteos® Aircraft Windows

“The world’s first electrochromic window shades for commercial aircraft passenger cabins, these advanced systems switch from a bright clear state to a totally dark state or a comfortable intermediate level all at the touch of a button”, claims the brochure from PPG Aerospace for their revolutionary product. Gentex supplies this technology to aircraft window manufacturer PPG Aerospace. The current end customers are Boeing and Bombardier (not confirmed but highly speculated). Although, aircraft airframe manufacturers can be a target market, the companies most likely to purchase high-end airplane windows are Boeing, Bombardier, and Airbus. Business Jet manufacturers are also possible future customers provided the ‘luxury’ element in this product.

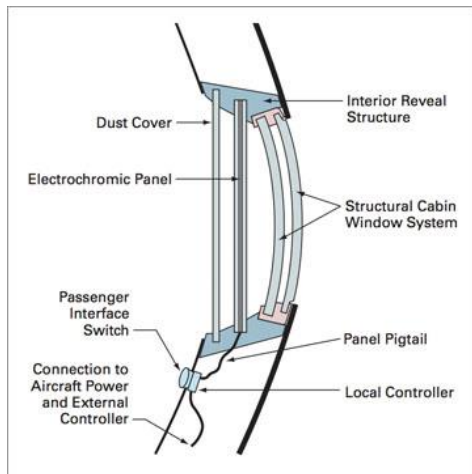


Source: Gentex website

**Tie-up with PPG Aerospace:** This company claims that it supplies electrically dimmable aircraft windows named Alteos® for the Boeing 787 Dreamliner aircraft. Alteos® is manufactured by PPG but the electrochromic technology is supplied by Gentex. Therefore, Gentex’s immediate customer is PPG Aerospace which ultimately manufactures the interactive window system. PPG has published a product catalogue which talks about the PPG-Gentex Advantage. The catalogue says; “The unique PPG-Gentex relationship affords aircraft manufacturers and operators with the most advanced technology and product support”.

**A short note on the technology:** Electrochromic technology uses electricity to change the color of and light transmission through a transparent medium (very thin films, gels, etc.) that is typically sandwiched between two thin glass plies. The electric current passes across transparent conductive coatings on the inner-facing surfaces of the glass, causing a chemical reaction to occur in the electrochromic medium. This chemical reaction causes the electrochromic medium to change opacity. (*Directly sourced from Technical Brochure PPG Aero*)

The Gentex electrochromic technology utilizes gel as the electrochromic medium. Applying a small electrical voltage across the gel causes it to darken, while removing the voltage allows the gel to return to its natural transparent state. The voltage can be precisely controlled and adjusted in small increments to allow intermediate states of light transmittance to be selected. (*Directly sourced from: Alteos® product catalogue*).



Source: Gentex website



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Airliners orders and deliveries as on 2016				
Manufacturer	Deliveries	Values (\$bn)	Net orders	Backlog
Boeing	726	57.8	563	5,660
Airbus	685	45.5	711	6,845
Embraer	108	2.9	39	444
Bombardier	81	1.9	162	437
ATR	73	1.5	36	236
Other	31	0.5	72	1,080
Total	1,704	110.1	1,583	14,702

Source: Wikipedia

Boeing 787 orders and deliveries by type		
Type	Total orders	Total deliveries
787-8	423	332
787-9	639	200
787-10	149	–
<b>Total</b>	<b>1,211</b>	<b>532</b>

Other companies that manufacture Electrochromic dimmable aircraft windows: The only competitor is Vision Systems, a French company that uses Suspended Particle device technology to produce dimmable windows.

**Companies that manufacture regular aircraft windows:** PPG Industries, TBM Glass, Kopp Glass, GKN Aerospace, Techstar LLC, Triumph Group Inc., American Polarizers Inc., Great Lakes Aero products, LP Aeroplastics, Perkins Aircraft services.

**Industry demand:** If we look at the total aircraft manufacturing orders, it stands at around 14,700 aircraft. Gentex currently has orders from Boeing for its 787 Dreamliner aircraft windows.

**Production rate:** In early 2014, Boeing raised its 787-production rate to 10 aircraft per month from 7 aircraft per month in 2013. The production rate for the 787 is at 12 jets per month as of June 30, 2016, and it is expected to increase to 14 jets per month by the end of the decade. Annual aircraft production is around 144.

**Projected sales figures:** If we look at the current order book for the 787, it stands at 1211, of which 532 have been delivered. The Gen-2 dimmable window is available on all 787-9 versions (639 already delivered, 200 orders pending). Going forward, dimmable windows will be a standard feature on all new generation 787s.

**Market Analysis for dimmable windows:** Industry analysts predict that dimmable windows could be a standard feature in all commercial and business aircraft in a few years. To study this market opportunity, we will take both the optimistic and conservative projections.

**Conservative outlook:** In case Boeing 787 (9 and 10) are the only customers, we feel that the company will manage to sell an additional 42336 windows going by the current order book.

	Conservative Outlook	
	Current fleet	Order book size
Boeing 787-9	200 delivered	588 (pending)
No of windows per plane	72	
Total windows	14,400 delivered	42,336 pending

**Optimistic outlook:** In case the company manages to sell this product to a wider market, including Airbus, Bombardier, Embraer in the commercial

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aviation segment, and Gulfstream, Dassault, Boeing, and Airbus in the business jet segment, we have a much more optimistic outlook.

<b>Optimistic Outlook</b>	
Total aircraft orders (2016)	14,700
Assuming 20% market	2,940
Total windows (average 30 per aircraft)	88,200

**Revenue:** It is difficult to assess total revenue (or per unit revenue) because the company does not divulge the revenue split between Fire protection devices and Aircraft windows. The combined revenue for both was \$39.2 million in 2016. We can deduce an approximate revenue by studying all 10K documents from 2007 when the aircraft window business was nonexistent. The approximate revenue for the year 2010 was \$2 million (approx.). This revenue has grown hence to approximately \$15 million. Calculating the number of windows sold so far (based on number of 787 aircraft delivered), we see that even with a conservative outlook, the business can see a 300% growth to approximately \$40 million. In case the company is able to garner bigger deals, it is possible to get a huge first mover advantage.

We feel that this business is at a tipping point right now. Airlines are advancing from in-flight entertainment as their main-focus to enhancing passenger comfort by reducing jet-lag and fatigue. Dimmable windows offer a better customer experience by allowing the body to gradually acclimate, as passengers move across time zones. In the future, this niche technology has the possibility of becoming the mainstay for all aircraft.

### **3. Homelink Acquisition:**

In 2013 Gentex acquired Homelink. HomeLink is a three-button radio frequency transmitter that can be programmed to control garage door openers, security gates, RF doors/locks, interior/exterior lighting, security systems and more. Gentex acquired HomeLink with a fair value consideration for \$360 million for HomeLink's assets and \$337 million for the goodwill. In 2016 the revenue from HomeLink was \$182 million, which does not include Homelink technology integrated with the mirror. Overall, we believe that Homelink was a successful acquisition creating strategic synergy. The gross margin from HomeLink is estimated to be as high as 60%<sup>5</sup>. We estimate that Gentex would have gained and continue to yield around 10% since the acquisition.



Source: Gentex website

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<sup>5</sup> 2013 Dec 8K

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The logo for TransCore, featuring the word "TRANSCORE" in a blue, sans-serif font with a stylized blue arc above the letters "A", "N", and "O".

## 4. The Gentex Integrated Toll Module-2019 - The “connected car”

**Product Description:** According to the Gentex’s published annual report: “The Gentex Integrated Toll Module™ (ITM™) is a nationwide toll collection technology for factory integration into new vehicles. The system uses a mirror-integrated multi-protocol toll tag that provides motorists with access to toll roads throughout the U.S.” (*directly sourced from report*)

The company claims that this will offer seamless driver and passenger experience. The advantages of this system are:

- 1) Drivers do not need to maintain multiple accounts for different toll systems.
- 2) Reduced windshield clutter, as it eliminates the need for toll tag devices.
- 3) Access to all toll-roads across the country.

**Tolling in the United States:** 35 states have toll roads and toll revenues collected in 2015 topped 14 billion dollars. The country has 5,932 miles of toll roads.

Let us take a look at some other statistics with respect to tolls:

Total number of trips across a toll booth: 5.7 billion

Total number of toll transponders in cars: 37 million.

**Business Case for Gentex:** This is a new technology expected to roll out in 2019 and follows the efforts to build the backend infrastructure for nationwide interoperability for toll payments. Gentex is at the forefront of this technology.

**Business Model:** It is not very clear whether Gentex wants to be just an OEM supplier for the integrated toll module to car manufacturers. This would be a good business model, especially as a premium offering. The business model can be even more lucrative if Gentex builds a **subscription based model** where the car owner needs to transact through Gentex to gain access to the hundreds of toll roads in the USA.

**Future growth potential:** The company claims that its integrated toll module is a first step towards a more “connected car”, “enabling in-vehicle payment for everything from gasoline and coffee, to parking meters and parking garages”.<sup>6</sup>

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<sup>6</sup> 2016 Annual Report



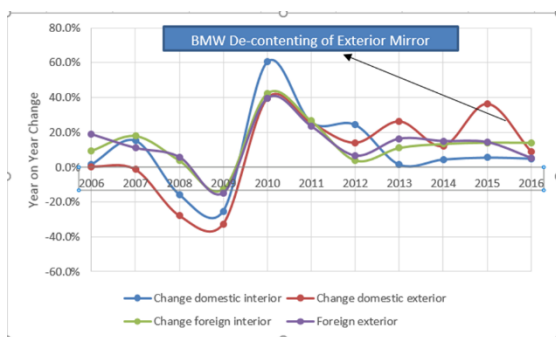
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## 5. Smart Beam<sup>®</sup>

**Product Details:** There are two versions of this product.

- a. **Lighting Assist-Smart Beam**<sup>®</sup>: It is a driver-assist feature that controls the headlamp beam control. According to the company brochure, "SmartBeam uses a miniature camera-on-a-chip integrated into a Gentex auto-dimming mirror combined with algorithmic decision-making to automatically operate a vehicle's high beams to optimize their usage according to surrounding traffic conditions."
- b. **Dynamic Forward Lighting-Smart Beam**<sup>®</sup>: According to the company brochure, "SmartBeam<sup>®</sup> DFL (Dynamic Forward Lighting), consists of a custom CMOS (complementary metal oxide semiconductor) image sensor combined with algorithmic decision-making to offer constant "on" glare-free high beams. Specifically, the system detects the presence of other headlamps and taillamps and generates dynamic "block-out" zones around vehicles that it is either trailing or moving toward."



**Market Analysis:** The company started selling this product in 2004. The Cadillac STS, Jeep Grand Cherokee, Cadillac DTS, the Jeep Commander, BMW 5, 6 and 7 Series models in Europe were the first customers. As on today SmartBeam<sup>®</sup> is used in 66 models with 12 automakers and the company shipped a total of 1.04 million units.

**Industry size:** It may be noted that Gentex has captured a 1.07% market share if we consider the total number of cars manufactured globally. There are not many players in this market though the company sees competition from multi-function drive assist technologies. Since SmartBeam<sup>®</sup> is offered in so many models, Gentex feels that there is scope for expanding this in the next five years.

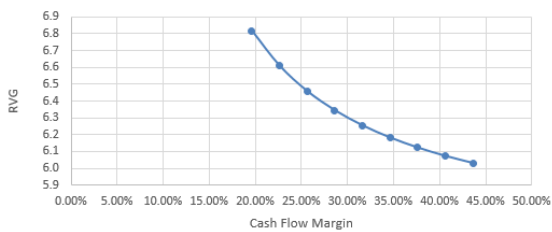
**Threat to SmartBeam**<sup>®</sup>: The company has assessed two kinds of threats for this product. The first is from a similar but more comprehensive driver assist technology that threatens to make Gentex smart beam systems redundant. A more advanced drive assist system may have far superior capabilities than Gentex's product. The second threat is in the form of regulatory guidelines in Europe.<sup>7</sup>

<sup>7</sup> "The European New Car Assessment Program ("Euro NCAP") provides an incentive for automobiles sold in Europe to apply safety technologies that include driver assist features such as lane detection, vehicle detection, and pedestrian detection as standard equipment. Euro NCAP compliant driver assist systems are also capable of including high beam assist as a function. The increased application of Euro NCAP on European vehicles could potentially replace the Company's SmartBeam<sup>®</sup> application on these vehicles." (Sourced directly from 2016 annual report).

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RVG change with Cash Flow Margin



## Risks:

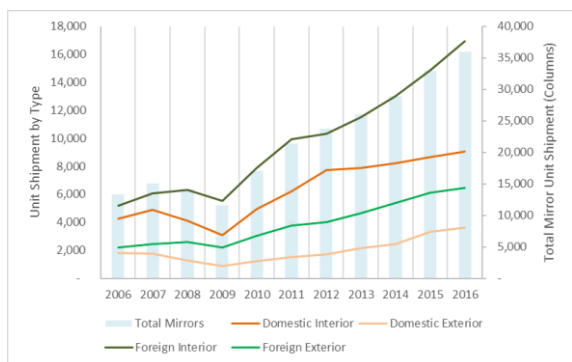
**Raw material shortage (low-risk):** The Dodd-Frank Wall street reform and the Consumer Protection Act creates supply chain bottleneck as it requires accountability of conflicting raw materials. We have seen constrains in production utilization due to raw material unavailability in the recent quarter. In the fourth quarter of 2016, there was a significant raw material (plastic) shortage which resulted in not satisfying the customer demand, effecting the top line. Although the effect on revenue due to raw material shortage was not considerable (around \$5 million), we are worried about the reaction from the OEMs due to procurement delays. To avoid the regulatory requirement, it is not certain if the company will start manufacturing outside US, which may affect the possible benefits from Trump tax cuts. In either case, we do not consider it to be a major threat.

**De-contenting of exterior mirrors (low-risk):** We do not see disintermediation of exterior mirror to be a significant threat for Gentex. There has been occasion when a major OEM (example: BMW) has de-contented its exterior mirror, effecting the sales of Gentex's exterior mirrors. However, these incidents are occasional and we do not see it a significant threat to the overall company.

**Regulation (High-Risk):** We are concerned about the impact of some regulatory changes. By far the greatest concern we have is on the implementation of The Kids Transportation Safety Act (as discussed earlier), which may force Gentex out of the niche auto-dimmable category to a camera based rear view mirror auto-supplier. We acknowledge that Gentex has positioned itself better since its launch of Full HD togglable mirrors, which is a combination of its patented auto-chromatic mirror and LCD displays.

**Loss of CEO/Key person risk (High Risk):** 73 year old Fred Bauer has been an integral part of Gentex's innovative culture since its inception. It is well possible that the innovative culture will stay after Mr. Bauer steps down, but we perceive the loss of CEO to be risky for the investors at this transitional stage of the company from a mirror manufacturer to a more strategically oriented company with a broad spectrum of synergetic products.

**Investor overreaction in short-term (Short-term risk):** This report values the company from a 10-year stand-point and we are not concerned about the volatility impact on the stock price in a short-term. However, it is worthy to note that the relative value of growth (RVG)<sup>8</sup> of 6.8. In other words, the investors currently value a 1% increases in growth 6.8 times than they would



<sup>8</sup> We calculated the RVG with a WACC of 10.55%, with the cost of equity derived through CAPM

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value a 1% increase in operating margin. Thus, we expect an investor overreaction on a lower revenue growth than from an increase in profitability. We have observed that the company has continued to focus on profitably, despite it manufactures 100% in the US. We believe that from the investment horizon this report is based on, the company is in right track in its conservative capital expenditures and profitability oriented business models.

## Valuation:

### 1. Undervalued Business Strategy

**Mirror as real estate:** With 35 years of business, Gentex has become the market leader in auto dimmable rear-view mirror. With a 92% market share of auto-dimmable mirrors, we estimate Gentex has a penetration of around 50% of light vehicle sales in North America, 50% in Europe and around 40% in Asia-Pacific<sup>9</sup>. This is an enormous real estate of mirrors, a 72 in<sup>2</sup> mirror spread in 26 million interior mirror producing annually. This mirror, could be effectively used for various purposes. Gentex has been integrating value added utilities like HomeLink and integrated full HD LCD displays in the mirror. However, by integrating nationwide integrated toll module, Gentex will provide OEMs a unique opportunity to expand a value-added proposition to the end customers. There are around 250 million vehicles in US, which makes 5.7 billion trips through toll booths annually. That is on average, a vehicle passes 22 times through toll booths annually. If we conservatively estimate 10 passes per vehicle, **Gentex's will have an earning potential from 260 million toll passes annually.** We do not know how Gentex would leverage this real estate, but the potential for earning either through subscription based business model or one-time fee would be considerable for the company. A subscription based model will generate continuous income until the life span of the vehicle, with relatively minimum cost. We do not see any premium given by the market for the prospect of this business model in Gentex's current valuation.

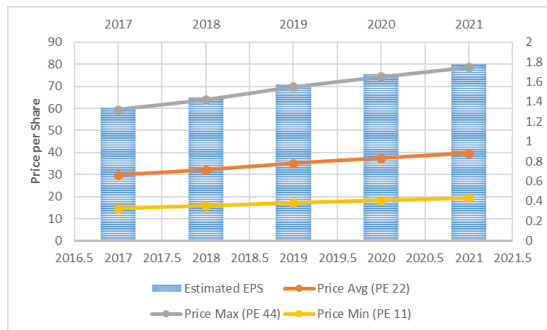
**Aerospace industry penetration:** As we have analyzed earlier aerospace windshield is a new Market Gentex is entering with a partnership with PPG industries. Unlike Auto industry, there is a high barrier for entry for aerospace suppliers and Gentex has managed to enter this high margin space. Although the inventory turnover would be considerably lower for aerospace windshield supply than rear-view mirror supply, we expect a higher gross margin in this field. Although we expect 14,400 annual windows supply to Boeing 787-9 alone, we have difficulty in estimating the ASP per windshield. There is high probability of using the same technology in high-end cars. We do not expect the revenue from this business to boost the top-line significantly in next five years, but we value the strategic impact of entering the new industry in the

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<sup>9</sup> Calculation with the combination of percentage of interior mirror sales by geography form 2006 10-K and IHS vehicle production statistics.

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light of future partnerships with Boeing. Also, if Gentex is successful in implementing this technology in high-end car windshields, it will give a significant brand exposure to the company.

**Trickling-down effect:** When the auto dimmable mirror was launched, the main OEM partnership were with high-end cars. We have seen increasing penetration in the market and we continue it to happen in low-end cars. Anti-glare mirrors, and camera based rear view system has become a safety consideration by regulators.

**Growth opportunities in emerging market:** Auto-dimmable mirror penetration globally is just around 28% for interior mirrors and 8% for exterior mirrors. With China producing almost 24 million and India producing 3.6 million light vehicles annually, there is a considerable room of opportunity from the growth in emerging markets. We have seen an increasing trend of global revenue share for Gentex and we expect this to continue for the next 5 years.

## 2. The Right Price

We valued Gentex with following assumption:

- The projected light vehicle sales for next five years in North America, Europe and Japan/Korea were taken as such from HIS forecast.
- We estimated the current penetration of Gentex mirrors in all the above locations with an assumption of 92% penetration of Gentex mirror worldwide.
- The exterior and interior mirror revenue were taken separately based on the current unit distribution of the mirrors (72:22)
- We added \$50 million in revenue in year 2019 from the ITM product launch
- A 15% growth for other revenue including aerospace, HomeLink and fire safety system were included in our revenue projection
- A constant growth rate of 3% was assumed after year 2021.

With the above bottom-up approach valuation, our discounted cash flow method yielded the following intrinsic value for various discount rate.

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Discount Rate	Intrinsic Value
5%	63.32
6%	42.08
7%	31.47
8%	25.1
9%	20.86
10%	17.83
11%	15.56

We also valued Gentex considering historic PE ratios. We found that since 2006, the highest PE recorded was 44 in 2008, lowest was 11 in 2016 and an average PE of 22. Based on the calculated EPS through our revenue projection, we estimated various possible price and the implied yield for next five years. If the PE stands at 22 by year 2021, we may expect a compounded yield of 14%. Or in other words, if the PE happens to hit the historic average of 22 in the next five years and our estimated EPS holds true, then we may get a yield of anywhere between 14% to 47%, depending upon the year which the average PE is realized.

Based on the above valuations, if the investor is looking for a five-year yield of 8% or less, we recommend a **BUY** for this company at the price below \$25/share.



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## APPENDIX 1 – PE INDEX

Price Avg (PE 22)	Price Max (PE 44)	Price Min (PE 11)	Avg Gain/Loss	Max Gain/Loss	Min Gain/Loss
29.89805158	59.42232434	14.66255825	47%	192%	-28%
32.17996862	63.95763041	15.78165263	26%	77%	-12%
35.07900102	69.71945214	17.20339181	20%	51%	-5%
37.4067874	74.34592342	18.34498136	16%	38%	-3%
39.61580101	78.73633406	19.42832255	14%	31%	-1%

## APPENDIX 2 – REVENUE/FREE CASH FLOW PROJECTIONS

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Light Vehicle Sales (units in million)													
						North America	17.5	17.825	17.549	17.799	18.06	18.657	18.655
						Europe	20.9	21.54	21.892	22.11	22.43	22.66	23.05
						Japan & Korea	13.2	12.914	13.31	12.87	12.64	12.66	12.45
						Other	35.3	41	42	43	45	48	49
						Worldwide	87	93	95	96	98	102	103
Auto dim mirror													
NA auto dim penetration						49%	51%	53.00%	55.00%	57.00%	59.00%	61.00%	61.00%
Europe auto dim penetration						51%	53%	55.00%	57.00%	59.00%	61.00%	63.00%	63.00%
Asia Pacific auto dim penetration						32%	40%	45.00%	50.00%	52.00%	54.00%	56.00%	56.00%
Gentex market share (average)						91%	92%	92%	93%	93%	93%	93%	93%
Average selling price						40	40	41	41	42	42	42	42
Revenue from interior mirror NA						315	338	351	373	402	430	444	444
Revenue from exterior mirror NA						122	131	136	145	156	166	172	172
<b>Total revenue from mirror NA</b>						437	469	487	518	558	596	617	617
Revenue from interior mirror Europe						392	424	454	481	517	540	567	567
Revenue from exterior mirror Europe						152	165	177	187	201	210	221	221
<b>Total revenue from mirror Europe</b>						544	590	631	667	718	750	788	788
Revenue from interior mirror Japan/Korea						155	192	226	245	257	267	272	272
Revenue from exterior mirror Japan/Korea						56	69	81	88	92	96	98	98
<b>Total revenue from mirror Japan/Korea</b>						211	261	307	333	349	363	370	370
<b>Total revenue NA, Europe and Japan/Korea</b>						1193	1319	1424	1519	1625	1709	1774	1774
<b>Total revenue other countries</b>						139	138	142	152	162	171	177	177
Actual total revenue from mirror						1169	1332	1457					
Estimated total revenue from mirror									1567	1671	1787	1880	1952
<b>Total revenue (actual)</b>	<b>816.263</b>	<b>1023.762</b>	<b>1099.56</b>	<b>1172</b>	<b>1375.501</b>	<b>1543.618</b>	<b>1678.925</b>						
Revenue growth		25%	7%	7%	17%	12%	9%						
Other revenue						212	222	255	293	358	412	474	474
<b>Total revenue (estimated)</b>								<b>1822</b>	<b>1964</b>	<b>2145</b>	<b>2292</b>	<b>2426</b>	2426
Revenue growth								9%	7.8%	9.2%	6.8%	5.8%	5.8%
Cost of Revenue	521	662	727	741	837	940	1010	1093	1178	1287	1375	1455	1455
COGS/Revenue %	64%	65%	66%	63%	61%	61%	60%	60%	60%	60%	60%	60%	60%
<b>Gross Profit</b>	296	362	373	431	539	604	668	729	786	858	917	970	970
Operating Expenses	105	130	139	126	140	145	157	164	177	193	206	218	218
Operating Expense/revenue %	13%	13%	13%	11%	10%	9%	9%	9%	9%	9%	9%	9%	9%
Interest Expense				0.94	3.50	4.44	5.68	4	4	4	4	4	4
Other income (expense)	12.47	13.06	15.17	22.39	12.99	9.26	4.50	12	12	12	12	12	12
Income before taxes	203.16	244.43	249.36	326.33	408.33	463.59	510.56	574	617	674	719	761	761
Taxes	65.71	79.76	81.04	105.13	126.72	145.12	162.97	182	195	212	228	241	241
Taxes/EBT %	32%	33%	32%	32%	31%	31%	32%	32%	32%	32%	32%	32%	32%
Net Income	137.45	164.67	168.32	221.19	281.60	318.47	347.59	391.17	422.03	461.18	491.61	519.40	519.40
No. of Outstanding shares	281.47	288.55	287.94	288.55	293.40	296.24	291.07	291.44	292.14	292.86	292.75	292.05	292.05
EPS	0.49	0.57	0.58	0.77	0.96	1.08	1.19	1.34	1.44	1.57	1.68	1.78	1.78
<b>Free Cash Flow to Equity (\$ million)</b>													
Plus: Depreciation	39	43	50	63	77	81	89	92	102	112	119	126	126
Depreciation/COGS %	7%	6%	7%	8%	9%	9%	9%	8%	9%	9%	9%	9%	9%
Less: Capital Expenditures	-47	-120	-117	-55	-73	-98	-120.956	-109.3295	-117.842	-128.714	-137.521	-145.536	-145.536
CAPEX/Revenue %	-6%	-12%	-11%	-5%	-5%	-6%	-6%	-6%	-6%	-6%	-6%	-6%	-6%
Less: Increases in NWC	-60	-83	30	42	-54	-73	-97.942	-61.267416	-66.0377	-72.1305	-77.0658	-81.5571	-81.5571
Change in NWC/Revenue %	-7%	-8%	3%	4%	-4%	-5%	-6%	-3%	-3%	-3%	-3%	-3%	-3%
<b>Free Cash Flow to Equity</b>	69	4	131	271	232	228	217	312	341	373	396	418	418