Vuzix Corp
Form 10-K
March 15, 2019

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

þ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the fiscal year ended December 31, 2018

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

Commission file number: 001-35955

Vuzix Corporation

(*Exact name of registrant as specified in its charter*)

Delaware	**04-3392453**
(State of incorporation)	*(I.R.S. employer identification no.)*
25 Hendrix Road, Suite A	
West Henrietta, New York	
(Address of principal executive office)	

14586
(Zip code)

(585) 359-5900
(Registrant's telephone number including area code)

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

Title of each class: common stock, par value $0.001 per share

Name of each exchange on which registered: Nasdaq Capital 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 þ

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ¨ No þ

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes þ 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 into Part III of this Form 10-K or any amendment to this Form 10-K. þ

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company in Rule 12b-2 of the Exchange Act.

			Smaller reporting company þ
Large accelerated filer ¨	Accelerated filer þ	Non-accelerated filer ¨	
			Emerging growth company ¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ¨

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

The aggregate market value of the voting and non-voting common equity of the registrant held by non-affiliates as of June 30, 2018 was approximately $173,000,000 (based on the closing price of the common stock of $7.45 per share on that date, as reported on the NASDAQ Capital Market and, for purposes of this computation only, the assumption that all of the registrant's directors and executive officers are affiliates and that beneficial holders of 10% or more of the outstanding common stock are affiliates).

As of March 15, 2019, there were 27,597,917 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Form 10-K incorporates by reference portions of the registrant's proxy statement for its 2019 annual meeting of stockholders.

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FORWARD-LOOKING STATEMENTS

This annual report includes forward-looking statements within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements are based on our management's beliefs and assumptions and on information currently available to our management. The forward-looking statements are contained principally under the headings "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and "Business." Forward-looking statements contained in this Annual Report on Form 10-K include, but are not limited to, statements concerning:

- trends in our operating expenses, including personnel costs, research and development expense, sales and marketing expense, and general and administrative expense;
- the effect of competitors and competition in our markets;
- our wearable products and their market acceptance and future potential;
- our ability to develop, timely introduce and effectively manage the introduction of new products and services or improve our existing products and services;
- expected technological advances by us or by third parties and our ability to leverage them;
- our ability to attract and retain customers;
- our ability to accurately forecast consumer demand and adequately manage inventory;
- our ability to deliver an adequate supply of product to meet demand;
- our ability to maintain and promote our brand and expand brand awareness;
- our ability to detect, prevent, or fix defects in our products;
- our reliance on third-party suppliers, contract manufacturers and logistics providers and our limited control over such parties;
- trends in revenue, costs of revenue, and gross margin and our possible or assumed future results of operations;
- our ability to attract and retain highly skilled employees;
- the impact of foreign currency exchange rates;
- the effect of future regulations;
- the sufficiency of our existing cash and cash equivalent balances and cash flow from operations to meet our working capital and capital expenditure needs for at least the next 12 months; and
- general market, political, economic and business conditions.

All statements in this annual report that are not historical facts are forward-looking statements. We may, in some cases, use terms such as "anticipates," "believes," "could," "estimates," "expects," "intends," "may," "plans," "potential," "pre "projects," "should," "will," "would" or similar expressions that convey uncertainty of future events or outcomes to identify forward-looking statements.

Forward-looking statements are made based on management's beliefs, estimates and opinions on the date the statements are made and we undertake no obligation to update forward-looking statements if these beliefs, estimates and opinions or other circumstances should change, except as may be required by applicable law. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results,

levels of activity, performance or achievements.

PART I

Item 1. ***Business***

Company Overview

We are engaged in the design, manufacture, marketing and sale of augmented reality wearable display devices also referred to as head mounted displays (or HMDs, but also known as Video Eyewear or near-eye displays), in the form of Smart Glasses and Augmented Reality (AR) glasses. Our AR wearable display devices are worn like eyeglasses or attach to a head worn mount. These devices typically include cameras, sensors, and a computer that enable the user to view, record and interact with video and digital content, such as computer data, the Internet, social media or entertainment applications. Our wearable display products integrate micro-display technology with our advanced optics to produce compact high-resolution display engines, less than half an inch diagonally, which when viewed through our smart glasses products create virtual images that appear comparable in size to that of a computer monitor or a large-screen television.

In the past, see-through HMDs displayed the real world using semi-transparent mirrors placed in front of the user's eyes. These HMDs were large and bulky and as a result, they had little mass-market appeal. We have developed thin optics, called waveguides, that are fully see-through and enable miniature display engines to be mounted in the temples of the HMD which allows the form factor of the Smart Glasses to be comparable to conventional eyeglasses. Our Smart Glasses and AR Glasses are designed for all day use cases and are small enough to fit in a user's pocket or purse.

We believe that our waveguide optics and display engines offer a number of significant advantages over other wearable display solutions, including higher contrast, greater power efficiency, less weight, more compact size, and high brightness images for use outdoors. We also believe that our waveguide optics give us a substantial advantage over other competitors' optics, including other waveguides, because our solution allows us to produce optics that are fully transparent when off while also delivering the high brightness required for AR and enterprise Smart Glasses applications.

We believe that a key growth area for us is the consumer electronics, OEM and defense and homeland markets. Our potential channels to this market include supplying mass production of waveguide optics and display engines to select third parties to use in their products. We believe that our waveguides and compact display engine technologies are a key differentiator for enabling next generation AR and Smart Glasses hardware for the consumer and enterprise segments because they will ultimately allow us to make HMDs nearly indistinguishable from regular eyeglasses.

We have developed our own intellectual property portfolio that includes patents, over 20 years of manufacturing know-how, proprietary processes, materials and equipment to create high performance waveguides, and near-eye display products. We believe our technology, intellectual property portfolio and position in the marketplace give us a leadership position in AR and Smart Glasses products and waveguide optics and display engine technology.

Our History

Historically, we have focused on three markets: the consumer markets for gaming, entertainment and mobile video, smart glasses products for enterprise, and rugged mobile displays for defense markets. We introduced our first HMD products over 22 years ago and we have offered numerous product models and versions with ever advancing features and capabilities that have served the three markets. In June 2012, we sold the assets that produced products and provided services to military organizations and defense organizations. Accordingly, in recent years our primary focus has been on the enterprise and "prosumer" consumer markets. Effective October 2018, we renegotiated the exclusivity agreement with the company we sold our defense division to and as a result we have started marketing and sale initiatives directly into some portions of the defense and homeland security markets.

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Overall Strategy

Our goal is to establish and maintain a leadership position as a worldwide supplier of wearable displays including AR glasses and Smart Glasses solutions. We offer our products across major markets, platforms and applications. We strive to be an innovator in designing wearable display devices that can enable enterprise productivity hands-free enhancements, mobile video viewing, general entertainment, social media, and most importantly, AR applications. We believe our revenue growth will be driven by the introduction of new AR Smart Glasses, accessories, and software applications.

To maintain and enhance our position as a leading provider of wearable display products for AR and hands-free computing, we seek to:

- develop products based on our unique technology for both specialized and large enterprise, consumer markets and defense and security;
- improve brand recognition;
- provide excellent products and service;
- broaden and develop strategic relationships and partnerships;
- sell our products or license our technology to third-party companies that would incorporate and sell them as a new product with their own brand name (OEM partners);
- promote and enhance development of third-party software that can take advantage of our products, including offering apps and software through our own “app store”;
- communicate the advantages of our proprietary waveguide optics and display engine technologies to the relevant customers in target market sectors and encourage their adoption through demonstrations and incorporation in the offerings of world-class companies;
- extend our innovative and proprietary technology leadership;
- enhance and protect our intellectual property portfolio;
- establish multiple revenue sources;
- attract and retain highly qualified personnel; and
- build and maintain strong product design capabilities.

Our strategy is also to create a leadership position as a worldwide supplier of waveguide optics and near-eye display technology solutions for applications in high growth segments of the consumer, enterprise and commercial electronics industry by capitalizing on our experience and expertise in wearable displays and the move to AR Smart Glasses for delivering AI, entertainment, work, social media and other applications. We aim to provide waveguides, display engines and complementary optics to enable OEM customers to serve a variety of markets with new enhanced display electronic products. Some key elements of our OEM strategy to achieve these objectives include the following:

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- Develop OEM and mass production partnerships in the consumer AR Smart Glasses market. As consumer mobile electronics markets transition to AR glasses, Vuzix technology is positioned well to address the requirements of this segment. Developing customer partners is key to establishing Vuzix as the market leader for next generation display technologies for the consumer AR Smart Glasses market.

- Strengthen our technology leadership. As one of the first to exploit waveguides with miniature display engines, we believe that we enjoy a significant advantage in bringing this technology to the OEM market. By continuing to invest in research and development and protecting our intellectual property, we expect to further develop performance improvements and provide a competitive edge for our customers who integrate our displays into their end products.

- Optimize waveguide manufacturing efficiencies while protecting proprietary processes. We intend to further improve our manufacturing yields and lower costs by way of increased automation as well as equipment upgrades. We intend to retain the waveguide design and final mold replication related processes in-house, where we have a core competency and manufacturing expertise. We also believe that by keeping these processes under tight control we can better protect our proprietary technology and process know-how. We believe that this strategy will also enhance our ability to continue to optimize and customize processes and devices to meet customer needs.

- Build and maintain strong design capabilities. We employ in-house design capabilities supplemented by outsourced design services. Building and maintaining this capability allows us to reduce engineering costs, accelerate the design process and enhance design accuracy to respond to our customers' needs as new markets develop. Given these capabilities, we continue to look for opportunities to add value to our displays to increase revenue.

- Leverage strategic relationships. External relationships serve an important role in our research and development efforts. Our relationships with suppliers, equipment vendors, contract research groups, external design companies, customer and corporate partners, all enhance our overall research and development effort and bring us new ideas and solutions.

The Market

The wireless, IT, and entertainment industries have evolved considerably and continue to do so. The mobile phone has evolved into a ubiquitous, location-aware, smart mobile computing device. Mobile technology is redefining the way people interact with their world, both at work and play, and it has become an essential lifestyle management and entertainment tool personalized to users’ unique needs. We believe that interactive AR content, AI, Edge Computing, and speech-based cloud services will significantly change the way mobile products are used and how content is delivered to the user. We believe head-worn displays that are hands free can connect the digital world to the real world and have the ability to change the future of the computing industry. We believe AR based wearable display and Smart Glasses can enable new experiences that cannot be experienced in any other way.

Current mobile display technology is almost universally based on direct view screens. These displays are designed to be small and make portability easy. At the same time, these displays must be held by the user and, depending upon their size, can have difficulty in producing human readable high-resolution content without magnification zooming, which reduces screen resolution. Our products are aimed at solving these problems by creating hands-free virtual large screens that are interactive and fit into eyeglasses form factors. VR-based head-worn displays block out surroundings for a fully immersive experience. AR-based displays are designed to be "see-through" or "see-around" and allow the user to still see and interact with their surroundings. They may contain one (monocular) or two (binocular) displays. We have leveraged our experience in developing wearable display products over the last 20 years and believe AR experiences, relative to our competitors, allows us to more rapidly introduce wearable displays suitable for specialized and mass market consumer AR and Smart Glasses.

Our business for the last five years has focused on enterprise and industrial markets and high-end (prosumer) mobile consumer markets. We believe the demand for head-worn displays in these markets is being driven by such factors and expectations as:

- Increasing demand for Internet, social media, and cloud services' access "anywhere, anytime";
- An increasing number of hands-free enterprise, commercial and medical applications for which our products are well-suited;
- We believe the growing use of AR applications will drive the need for head-worn display solutions to replace the need to hold up handheld devices to use the applications; we believe that AR Smart Glasses, rather than a smart phone, are needed to deliver this experience correctly; and
- More users are migrating a greater portion of their entertainments and information gathering time to mobile devices. We believe that our near-eye display technologies can significantly increase user satisfaction and allow for wide spread AR adoption and applications.

Target Markets

We offer smart wearable display products that enable development and deployment of AR applications. AR Smart Glasses enable the wearer to see computer-generated information, graphics or images projected into the real-world environment or upon an object that the user is observing. Thus, whether in the warehouse, on the factory floor, or in-the-field, users while wearing the AR Smart Glasses may access a manual, tutorial, or image that is connected to the task at hand which will assist them in completing that task, while also viewing their current surroundings and nearby objects. Additional possible applications of AR-enabled Smart Glasses for consumer use include hands-free alerts, messaging, location and context aware information and social interaction.

Our target markets and applications by major sector are:

Enterprise

Our Smart Glasses products are currently focused on enterprise, industrial and medical markets. These Smart Glasses products run native Android applications within the glasses that, for example, allow them to stream video in real-time, which is very useful for many enterprise applications. We believe that a wide variety of commercial and industrial markets offer significant opportunities for our products due to increasing demand for instant data accessibility in mobile workplace environments and due to the benefit of hands-free mobile displays to enhance visual performance and worker productivity. Our Smart Glasses are being used for numerous applications including: remote service video support, wearable computer displays, viewing of wireless sensor data, quality assurance, hands-free access to work instructions such as assembly check lists and manuals, in-the-field maintenance, warehouse pick and place, real-time viewing of remote images, and training and education. Further, Smart Glasses can be used to enhance vision for many people with visual impairments. We have built an eco-system of Value-Added Resellers (VARs or VIPs – Vuzix Integration Partners), established relationships with a growing number of system integrators, and have garnered infrastructure support from leading mobile device management companies.

Prosumer

We believe that the most significant driver of the longer-term wearable display market adoption is the growing consumer demand for mobile access to ever larger volumes of information and entertainment in smaller and wearable packages.

We also believe that there is a growing need for active smart phone users to be able to keep their phones in their pocket and at the same time still receive location-aware content from the web overlaid with their real-world view. For example, while a user walks down the street, they could get directions and a Yelp score for the restaurant they are looking at; all within the view of their smart glasses while leaving the phone in their pocket.

As we manufacture our waveguides and display engines in higher volumes at reduced costs and capitalize on our waveguide manufacturing expertise, we believe that our products will be increasingly well-positioned to compete with other see-through optics and displays and cell phone size displays in the rapidly growing consumer market, particularly as demand expands for sophisticated mobile personal viewers offering higher resolution and better image quality for AR and Smart Glasses applications. We believe our waveguide and display engine technology addresses the critical performance parameters for next generation AR products, including higher brightness, sharper resolution, true see-through capabilities, compact size, lower power consumption and longer life.

Products

We now produce and sell AR Smart Glasses for a variety of enterprise, commercial, and prosumer uses and applications. Our products are available with varying features and are currently offered as monocular display systems. Our AR Smart Glasses have many of the capabilities of a smartphone such as cameras and computer processors that can allow applications to be run directly in the AR Smart Glasses, enabling cloud connected applications through a wireless link directly with the glasses.

Our AR Smart Glasses are an intelligent wearable computing system specifically designed to enable computing and connecting AR cloud/internet of things information and AI to the real world. The embedded cameras in our Smart Glasses are used for recording and/or seeing the real world. Input and control of our smart glasses consist of using the wirelessly connected smartphone, speech recognition voice control, a series of built in sensors for head motion and in some cases gesture sensors. We are building an eco-system of developers around these smart glasses and anticipate that most of the software being developed will be usable on future generations of our smart glasses. Cloud or internet-connected Smart Glasses applications are being created for manufacturing, medical, field maintenance and repair, training, gaming and social media uses for both our Smart Glasses product lines.

Our current products include:

M300, M300XL and M400 Smart Glasses **(M series)**

The M300 and M300XL (the “M series”) products are our monocular smart glasses designed for enterprise, industrial, commercial and medical markets. These products include an Android-based wearable computer, enhanced with a wearable monocular display and wireless connectivity capabilities. These Smart Glasses serve up the digital world “hands-free”, offering access to information, data collection and more. Monocular products, due to their single eye display, are best used for push notifications and “information snacking”. An integrated head tracking, camera, touchpad, buttons and speech recognition gives versatility to navigate and use these M-series Smart Glasses in almost any working environment. These products include pre-installed apps that can be used to record and playback still pictures and video, track timed events, manage a user’s calendar, link to a phone, scan barcodes and much more. These products can provide enhancements to existing workflows and open new opportunities in industrial, medical, retail, supply chain, remote help desk, and many more aspects of our customers’ businesses.

In February 2019, the Company announced at the Mobile World Congress tradeshow a prototype of our M400 Smart Glasses based on the new Qualcomm XR1 platform and runs on the latest Android OS. This model will have a host of new and more powerful features and it will enter mass production by mid-summer of 2019, selling at a premium to the

existing M-series models.

Blade Smart Glasses

We introduced the Blade Smart Sunglasses as a monocular system at CES 2018. We believe the Vuzix Blade™ is the natural evolution of AR glasses providing the user with the wide range of features and capabilities in a natural glasses form factor that we believe people will want to wear. Delivered visually right in front of the user, current applications range from basic text messaging and answering the phone to overlaying mapping directions, menus, weather, events, stock quotes, video conferencing, sports updates, social feeds, bio-metrics and much more. The intuitive and feature packed Vuzix Blade OS allows the user to simply and intuitively navigate via simple swipes and taps, or leverage voice controls and external AI systems. This allows users to leave their phones in their pockets for most functions and adds the ability to connect the information being presented to the real world, including that from cloud-based speech AI platforms such as Amazon Alexa. We believe the Blade Smart Glasses is the first natural step to replacing the smart phone with a ubiquitous wearable device for all.

The Vuzix Blade with its fashionable form factor and all-day wear-ability fills the gap between wearer expectations and actual form factors. For the enterprise user, the Vuzix Blade pairs with the user’s smart phone or connect directly to a Wi-Fi network, allowing for custom, secure industrial applications.

Other AR Products

We are currently also developing a binocular AR Smart Glasses product with 3D, stereo cameras, and 3D camera vision capabilities that we expect to introduce sometime in late 2020. Future AR Smart Glasses versions will include increased resolutions and fields of view, more powerful computers and our thin waveguide see-through optics. AR wearable displays provide the user a live, direct or indirect, view of a physical, real-world environment whose elements are "augmented" by computer generated sensory input such as sound, video, graphics or GPS data. Such systems also contain head tracking technology, which enables the user to look around the environment being viewed by moving his or her head which in turn sends that information back to the computer, which then adjusts the computer-generated AR image accordingly.

Applications for Smart Glasses

Our Vuzix Basics product line consists of out-of-the-box applications optimized for use with the growing lineup of Vuzix AR Smart Glasses, including the Vuzix M300 and M300XL Smart Glasses and the Vuzix Blade. VUZIX Basics™ are standard applications, designed to be simple to get started, simple to use, and apps we believe can immediately provide the fundamental benefits of Smart Glasses to novice and expert users alike.

The first application in the platform, VUZIX Basics Video, provides remote telepresence capabilities, otherwise known as see-what-I-see video collaboration, enabling an operator, mechanic, field technician or consultant to communicate in a hands-free manner with a remote expert to drive "just in time" video support of a process or repair. VUZIX Basics Video enables clients to multiply their expert workforce, eliminate the high costs of travel, improve customer service levels and equipment operation and accelerate knowledge transfer and training. We are offering VUZIX Basics apps on a monthly or one-year subscription basis.

App Store for Smart Glasses

We also have an App Store on our website where users can download and purchase Smart Glasses applications, including third-party apps. We are fostering the development of an ecosystem of third-party developers to offer applications and trials for their smart glasses apps and many will be sold on an industry common revenue share model, with the publisher receiving approximately 70% of the subscriptions collected. The Vuzix third-party developer community will be able leverage the open Android platform of the Vuzix M-Series and the Vuzix Blade to bring new and creative ideas to life. Supported by Vuzix' new App Store, developers can offer or sell their applications to all Vuzix Smart Glasses users, expanding into an ecosystem of AR applications for real world use today. The App store supports free, onetime fee, and paid subscription monetization models.

Waveguide Optics and Design Reference Kits

We selectively offer waveguide optics and related coupling optics combined with our compact Cobra II display engine to form a see-through display module. We sell our waveguide optic design reference kits to select qualified potential OEMs/ODMs, which include a Cobra II projector, waveguide optics and associated electronics, to help these customers evaluate our technologies and to assist their efforts to build and test new products incorporating our proprietary solutions.

We have shipped these customized modules to numerous customers, some of whom may soon incorporate our products into their own commercial products. Our strategy for addressing the consumer mass market includes developing partnerships with both select consumer companies, including wireless communications carriers and select high volume production manufacturing companies.

Custom Solutions and Engineering Solutions

We have in the past provided fully integrated wearable display systems, including head mounted displays, human computer interface devices, near-eye display related engineering services and wearable computers to commercial, industrial and defense customers. As a result of the sale our defense division in June 2012, we were precluded from pursuing general engineering services work with defense or security organizations. However, in October 2018 we signed an amendment to our agreement with the purchaser of our defense division that now allows us to sell our products to defense and security organizations, including business customers and governmental entity customers that primarily provide security and defense services. Such potential customers include police, fire fighters, EMTs, other first responders, and homeland and border security.

In February 2017, we entered into a development agreement with Toshiba to create a customized Window-based USB-C Type C AR Smart Glasses offering for Toshiba, which is a derivative product of the Vuzix M300 Smart Glasses. Throughout 2017, our design teams created an entirely new Vuzix product for Toshiba. We have delivered hundreds of engineering and development units and have begun volume manufacturing for Toshiba to fulfill their initial orders under our 3-year supply agreement, which was previously announced by Vuzix in December 2017. The near-term realization of commercial orders were initially slowed during the purchase of Toshiba by Sharp (Foxconn), but have now begun again as a part of the Toshiba integration into Sharp (Foxconn).

Defense and Security Products

In early October 2018, we amended the 10-year non-compete restrictions with the buyer of our former defense division, TDG Acquisition LLC (DBA – Six15 Technologies ("Six15")). This amendment allows us to pursue opportunities related to the Company's smart glasses and waveguide optics technologies into these expanded market opportunities related to first responders, US Department of Defense, Security Organizations and the Military. Additionally, Vuzix is now permitted to perform contract work with and sell its waveguide optics and display engines to the largest third-party defense suppliers around the world that seek to incorporate Vuzix near-eye display or HMD technologies into the products and systems that they sell into Military Organizations. And while direct sales of products and services by us directly to Military Organizations are still precluded pursuant to the original non-compete, these new markets for Vuzix products should be significant in both the United States and globally.

Product Development

We believe that continued introduction of new products in our target markets is essential to our growth. Our products tend to have two to three-year life cycles. We have assembled a group of highly skilled engineers who work internally as well as with external consultants to continue our product development efforts. Our primary development efforts are focused on waveguide optics (and their manufacture), projection engines, displays, low-power electronic designs, firmware and wearable software, and the design and ergonomics of wearable displays. Our display product development efforts are focused towards continually enhancing the resolution, performance and manufacturability of our display products. During 2018, 2017 and 2016, we invested $10,378,728, $6,706,690, and $6,947,878, respectively, on research and development activities. We expect to increase our research and development expenditures in the future and as our revenues grow. We have also acquired and licensed technologies developed by third parties and we may continue to do so in the future.

Technology

We believe that it is important to make substantial investments in research and development to maintain our competitive advantage. The development and procurement of intellectual property rights relating to our technologies is a key aspect of our business strategy. We believe that it is now technologically feasible to improve upon the weight, ergonomics, optical performance, see-through capabilities, luminance, power efficiency, compactness, field-of-view and resolution of the current generation of virtual displays and display components. "Early technology adopters" and "prosumer" consumers have been the majority of the purchasers of our consumer wearable display products to date and similarly within the enterprise customer base for our Smart Glasses. However, our near-eye virtual display technology has been gradually improving in performance and we believe is starting to meet the high expectations of both the enterprise and the consumer mass markets with respect to screen resolution, computer power, image size and ergonomics. We expect to continue to improve our products through our ongoing research and development and

advancements made by our third-party suppliers of key components.

We believe that the range of our proprietary technologies gives us a significant competitive advantage. Our technologies relate to advanced optics systems including passive and active see-through imaging waveguides, micro-projection display engines, high resolution scanning displays, motion tracking systems, and specialized software drivers and applications for video eyewear displays. We also have a portfolio of trade secrets and expertise in nano-imprinting using quartz mold substrates, nano structure embossing, and engineering tool-sets for the design and manufacturing of diffractive waveguide optics.

We believe that display engines are also important for commercializing wearable displays. We have developed a proprietary micro digital light processing (DLP) based engine called the Cobra II and are working on laser modulated and LED engines designed specifically for our waveguide optics solutions. These next generation waveguides and display engines have allowed us to shrink the entire assembly to fit in the space available in a typical off-the-shelf pair of sports sunglasses.

We entered into a technology license agreement with Nokia Corporation in August 2011 for their Exit Pupil Expanding (EPE) optics technology. This agreement was amended in October 2017 to allow us greater flexibility with sub-licensing and preferable royalty terms. Under these agreements, we perform on-going research and development on EPE optics and are expected to manufacture and bring to market components and products containing the licensed technology. In addition, we will provide Nokia with the ability to purchase products and components which incorporate the licensed technology. EPE technology is an important foundation of our diffraction-based waveguide optics technology.

In October 2017, we acquired certain IP and patent applications from the inventor/seller related to holographic optics and display engines for “image and wave field projection through a diffusive media”. This technology is still in active development with a goal of creating a functional demonstrator model by the end of 2019.

Major technologies that we employ in our products include:

Micro-display optics represent a significant cost of goods for both us and our competitors. This cost is a function of the physical size of the micro-display and the cost of the supporting optics. Smaller micro-displays are less expensive to produce but they require larger and more sophisticated optics to make solutions that have no user adjustments, large fields-of-view, and very low distortion specifications. Larger displays require less magnification and less complex optics, but these optics become very bulky and the displays are significantly more expensive to manufacture. We have developed thin and lightweight optics that can be integrated with very small micro-displays that we expect will closely match conventional eyewear frames in size and weight. These new optics and displays provide what we believe are significantly improved ergonomics compared to competing wearable display solutions.

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See-Through Waveguides: We have developed a range of patents and patents pending around our see-through waveguides. We are developing passive, dynamic and diffractive optics-based waveguides that are the basis for some of our future slim wearable display AR and smart glasses products. We are striving to develop ultra-compact micro-display engines to magnify and focus the light from a display into a user's eye. Our development goal with these waveguides is to create AR-based wearable displays that will appear to others as practically indistinguishable from today's conventional sunglasses by most every measure, including comfort, size, weight and ergonomics.

Custom Display Engines: We have patents and patents pending on modulated laser-based display engines and IP around micro DLP display engines. Our Cobra II micro DLP engine is one of the smallest volume engines built around DLPs. We are also performing research and development work on laser engines to drive scanned images into holograms, with the goal of such systems to offer next generation waveguides capable of 100 plus degree fields-of-view.

Nanoimprinting: We continue to develop a portfolio of trade secrets and expertise in nanoimprinting for use in our waveguide optics. We believe these technologies are essential to the production of our approximately 1.2 mm thick see-through lenses which we believe are the cornerstone to making fashionable eyeglass-styled Smart Glasses. We have developed technology for waveguide design and production including: tool design and creation, custom designed software for grating structures and layout, lithography processes, high index low shrinkage polymers and other materials, mold treatments, automation equipment and test/QA processes and procedures, to name a few.

Patents and other Intellectual Property

We have an intellectual property policy which has as its objectives: (i) the development of new intellectual property to further our intellectual property position in relation to personal display technology; and (ii) the maintenance and protection of our valuable trade secrets and know-how. We seek to achieve these objectives through the education and training of our engineering staff and the adoption of appropriate systems, policies and procedures for the creation, identification and protection of intellectual property.

Our general practice is to file patent applications for our technology in the United States, Europe, Japan, and in additional countries, including Canada and China for inventions which we believe have the greatest potential. We file and prosecute our patent applications in pursuit of the most extensive fields of protection possible including, where appropriate, the application of the relevant technology to the broader display industry.

We believe that our intellectual property portfolio, coupled with our key supplier relationships and accumulated experience in the personal display field, gives us an advantage over potential competitors. We also believe our

copyrights, trademarks, and patents are critical to our success and we intend to maintain and protect these. We also rely on proprietary technology, trade secrets, and know-how, including manufacturing processes and procedures, which are not patented. To protect our rights in these areas, we require all employees and, where appropriate, contractors, consultants, advisors and collaborators, to enter into confidentiality, invention assignment and non-competition agreements.

Our technologies enable us to provide low-cost, small form factor, high-resolution wearable display products. To protect our technologies, we have developed a patent portfolio which currently consists of 74 issued U.S. and foreign patents and 70 pending U.S. and foreign patent applications. We are also currently preparing several invention disclosures for the purposes of submitting design and utility patent applications. Our U.S. and foreign patents expire on various dates to July 6, 2041. In addition, in connection with the sale of our defense division in 2012, we received a worldwide, royalty-free, assignable grant-back license to all the patents and other intellectual property sold for use in the manufacture and sale of products in the consumer markets.

In addition to our various patents, we have 5 registered U.S. trademarks and 51 trademark registrations worldwide.

Competitors

The near-eye or personal display and mobile device industry in which we operate is highly competitive and evolving rapidly. We compete against both direct view display technology in smart phones and tablets and wearable display technology. We believe that the principal competitive factors in the personal display industry include image size, image quality, image resolution, power efficiency, manufacturing cost, weight and dimension, feature implementation, AR capabilities, ergonomics, style, hands free capabilities and, finally, the interactive capabilities of the overall display system.

Aside from direct view displays, we also have competitors who produce near-eye personal displays or wearable displays. For the past decade most of these products were mainly low-resolution, bulky in size, poor ergonomically, costly, and heavy in their power requirements.

Competition - Binocular Wearable Display Products

Vuzix AR Smart Glasses competitors include binocular wearable displays and virtual reality systems, using micro-displays. Examples of such companies include or have included Carl Zeiss, Seiko Epson (Epson), Sony Corporation, Avegant, Osterhout Design Group (ODG), Oculus/Facebook, HTC, Razer and many others. Many of these firms have discontinued their efforts while others have introduced VR viewers themselves. We believe these competitive products have received limited customer acceptance due to their bulky and non-user-friendly designs. Other companies that have stated their intention to enter this market when their product development is complete with either finished products or components with optics and display engines are Lumus, Waveoptics, Digilence, and Microvision Corporation.

As an alternative to micro-display based head worn display systems, most manufacturers have moved to using larger display panels that are typically found in smart phones. A Facebook unit, Oculus, has been shipping its large field-of-view VR goggle HMD called the Oculus Rift since 2016. HTC that same year introduced it higher-end VR system called the HTC Vive. Sony, after dropping their HMZ video viewer product, released in October 2016 its PlayStation VR goggle system specifically for its PlayStation 4 game console. Enhanced versions of these VR goggles systems with improved performance and reduced pricing has been introduced by HTC and Oculus has offered new models which don’t have to be connected with a PC to operate.

Additionally, numerous manufacturers now offer head worn goggle attachments for smart phones that are designed to be used for VR applications. These devices contain simple optics that allow the user to insert their smart phone into the device and view their phone screen very close to their eyes and can offer an inexpensive way for owners of compatible smart phones to experience virtual reality. These products are generally priced under $100 and include a wireless controller to allow the wearer to navigate and play VR games. We believe all these units are very bulky relative to the wearer’s head, offer limited, but improving resolution to each eye, and often have less than clear optical performance across their viewing area. While acceptable for VR games and 360 videos, they are less than satisfactory as a big-screen video viewer or computer display due to ‘screen-door’ and other optical distortions. We expect that, as the market grows and matures and as the technology becomes more refined, more companies may compete with us.

Competition – AR Glasses

In the AR markets, there are few competitors with most of this market currently aimed at the high-end and research markets. Companies either offering products or intending to do so in this area include the Microsoft Hololens, Meta, Sony, Epson, Atheer, DAQRI, Magic Leap, ODG, Nreal and CastAR. Today many of these products are fairly bulky and tethered to an external controller. Many are being sold as AR Smart Glasses and are currently targeted at enterprise and academic researchers. The most complete and functional systems today are the Hololens and the Magic Leap One, both of which cost $2,500 - $3,500 per unit. Microsoft unveiled their second generation of Hololens in late February 2019.

Magic Leap, a well-funded startup, released its Magic Leap One creator edition system for AR applications in late 2018 at a price of $2,295. Further, industry bloggers have speculated that companies such as Apple, Google, and Oculus/Facebook may offer or support AR wearable display products in the future, but, to date, no specific product launch details have been officially announced.

Competition - Monocular Smart Glasses and Wearable Display Products

Although several companies produce monocular wearable displays, we believe that sales of their products to date have been limited. To date, the market opportunity for monocular products other than night vision products has been limited primarily to trial tests and smaller rollouts in enterprise markets rather than broad commercial volume purchases. Competitors in these markets include or have included: Liteye Systems, Inc., Lumus, Shimadzu Corporation, Sony, Kopin, Zebra Technologies (inclusive of business unit formerly part of Motorola), Creative Display Systems, Brother, Google, Garmin, BAE Systems, Six-15 Technologies, LLC (the purchaser of our defense division), Lenovo, Optinvent, RealWear, Focals by North, and Rockwell Collins.

Google’s wearable display device, named Google Glass, was a headset product with similar form and function to our M100 Smart Glasses. In 2015, Google stopped selling its first version of Glass and then launched a refreshed version called Glass Enterprise. Recent industry rumors indicate that Google may introduce the Google Glass 2 for Enterprise in 2019.

Several Japanese electronics companies including Hitachi, Murata, Sony, Westunitis, and Olympus have or had announced monocular smart glass systems for industry. There are also several Chinese based companies that have been showing monocular smart glasses products, including Lenovo but their sales activities thus far have been somewhat limited and focused on Asia. We expect that we will encounter competition in the future from major consumer electronics companies and suppliers of imaging and information products for defense applications.

There is competition in all classes of products we manufacture, from both large and small companies. Our sales do not represent a significant share of the market for any class of products. The principal points of competition for these products include, among other factors: price, product performance, the availability of supporting applications, and the experience and brand name of the particular company and history of its dealings in such products. We believe that our monocular products match or exceed the display products currently offered by our competitors.

Competition – Waveguides and Display Engines

There are a limited number of manufacturers of waveguide optics, all targeted at OEM producers of AR and smart glasses. Competitors to our waveguide products include Lumus, Waveoptics, Digilens, Optivent, WaveOptics, and others. New waveguide manufacturers from China have recently begun demonstrating their solutions at 2019 trade shows.

Sales and Marketing

Sales

Our strategy is to sell our products and components both directly and through distributors and value-added resellers (VARs – also referred to Vuzix Integration Partners or VIPs), and on a select basis to OEMs. As a result, we have distinct strategies for the sales of our products.

In the Smart Glasses and AR markets, we are currently focused on the enterprise space and as such are building strategic marketing relationships with software firms to address and support enterprise customers. We are, in parallel, developing a VAR network with leading companies in various vertical markets from warehousing to field service to medical. As these VARs finish their value-added software and services offerings, we expect them to roll-out their finished solutions to their respective customer bases. Some VARs, after qualification, are being designated as a Vuzix Integration Partner or VIP. Such VIP partners gain early access to our new Smart Glasses hardware, receive first access to the initial commercial shipments, and get access to co-marketing support, discounts and more. We are also supporting select larger key accounts with our in-house direct sales team. For our Smart Glasses, we are also developing an ecosystem with application developers from around the world. We have introduced our own hosted application store where our Smart Glasses customers can download and purchase applications and software developer kits.

We currently sell our products internationally through resellers, online stores and various Vuzix operated web stores in Europe and Japan. Our international focus is currently on Japan and the European Union (the “EU”). In Japan, we have a branch sales and service office in Tokyo and a small warehouse outside of Tokyo. We employ two full-time staff in Japan. We have a wholly-owned subsidiary, Vuzix (Europe) Limited, through which we conduct our business in the EU and Middle Eastern markets. Resellers in 50 countries placed orders with us during the last two years. We maintain small European sales offices in Oxford, England and Barcelona, Spain, both are staffed by full time sales consultants. For customer support and warehousing, we have contracted with a third-party end user technical support firm and fulfillment center to service our customers in the EU.

We intend to primarily provide our waveguide and miniature display engine modules and optics components to select OEMs to incorporate into their branded products and sell through their own well-established distribution channels. An OEM/ODM design cycle typically requires between 6 and 24 months, depending on the uniqueness of the market, and the complexity of the end product. Because our waveguides and display engines are the main functional component that defines the imaging as well as look and feel of many of our potential OEM customers' end products, we intend to

work closely with these customers to provide technical assistance throughout their product evaluation and any eventual integration process.

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We believe that the technical nature of our potential OEM products such as waveguides and display projectors with micro-displays, demands close relationships with such customers. Our sales and marketing staff, assisted by our technical staff and senior management, visit prospective and existing customers worldwide on a regular basis. We believe these contacts are vital to the development of a close, long-term working relationship with our OEM customers, and in obtaining regular forecasts, market updates and information regarding technical and market trends. We also participate in industry specific trade shows and conferences.

Marketing

Our marketing and sales group in conjunction with external firms is responsible for product management, planning, advertising, marketing communications, and public relations. We have both internal and external public relations efforts in the U.S. and UK. We also employ marketing firms to help prepare brochures, packaging, tradeshow messaging and advertising campaigns, again focused on either the consumer or enterprise markets. Most of our products are currently sold under the Vuzix brand name. Toshiba's AR100, based on our M300 Smart Glasses is our first co-branded product. We seek to have Vuzix become known as one of the premier suppliers of wearable display products for video viewing, smart and AR glasses. We currently undertake specific marketing activities as needed, including, but not limited to:

- product reviews, case studies and promotions in trade publications;
- case studies on successful enterprise uses of Smart Glasses and AR;
- product and technology views for our website and social media;
- internet and search engine advertising and targeted emails;
- public relations; and
- trade shows and event sponsorships.

Prosumer Marketing

We engage in select marketing efforts that are intended to drive customers to our products and to grow awareness of our AR Smart Glasses and wearable displays in general. Public relations and product videos are an important aspect of our marketing and we intend to continue to distribute samples of our products to key industry participants. We intend to focus our marketing efforts for the next 12 months on:

- distinguishing our AR Smart Glasses products from current competitors and by offering products with superior performance and advanced optics relative to those of our competitors;

- working with third-party software developers to support the unique capabilities of our new products; and

- creating brand awareness with the press and general public of Vuzix and our products, with particular emphasis on our new forthcoming waveguide-based products.

Our wearable display products are currently primarily sold directly to prosumers and at times through select specialty retailers and online retailers such as Amazon. Our monocular Smart Glasses are sold through valued-added resellers, direct to end customers, and through our webstore. Our website, www.vuzix.com, is an important part of our direct sales efforts.

Engineering Services and OEM Products

We primarily respond to sales inquiries for our engineering services programs and OEM component requests directly and usually in response to inbound inquiries. We do not typically offer “works for hire” services at Vuzix but rather offer our services to opportunities that could result in advancing our technology or end up in a long-term supply or OEM relationship. We believe we have established a solid reputation for quality, performance, and innovation for wearable virtual display systems that will be attractive to many types of commercial users that want to leverage our services and products within their businesses. Our design and engineering staff are actively involved with customers during all phases of prototype design through production by providing engineering data, up-to-date product application notes, regular follow-up and technical assistance.

We continue to receive an influx of inbound requests for engagement related to our proprietary waveguide optics and miniature display engines from some of the world’s largest consumer and mobile electronics firms. We are now engaged with several major consumer electronics companies that have started building and/or are currently evaluating hardware designs and product roadmaps which incorporate our waveguide optics technology. Our business strategy is to commercialize our waveguide and display engine technologies and products to permit select ODMs and OEMs to integrate and embed our technologies and products in a way that best matches their unique capabilities and timeline for bringing their products to market.

Manufacturing

We purchase product components from our suppliers, engage third-party contract manufacturing firms to perform electronic circuit board and cable assemblies, and have the final assembly of our products done primarily in China at our contract manufacturer there. In the past, we have built products ourselves in our West Henrietta, New York based facility. We are experienced in the successful production of our products in moderate volumes. We expect, at most, to perform the final assembly of our new AR Smart Glasses products ourselves, in West Henrietta, NY, on a test or start-up basis before considering a move offshore; however, we also expect to manufacture all our waveguide optics at our West Henrietta, New York facility. We believe that using outsourced manufacturing enables greater scale and flexibility at lower costs than establishing our own manufacturing facilities. We evaluate our current contract manufacturers and component suppliers on an ongoing basis, including whether or not to utilize new or alternative contract manufacturers or component suppliers.

We currently purchase almost all of the micro-displays used in our products from Kopin Corporation and Texas Instruments. Our relationship with these micro-display suppliers is generally on a purchase order basis and none have a contractual obligation to provide adequate supply or acceptable pricing to us on a long-term basis, nor do we have any contractual obligation to purchase micro-displays from them. We have operated this way for over a decade with these suppliers. Our Cobra II display engine is based on our proprietary design and is exclusively manufactured for us by a firm in Asia and it incorporates a DLP engine from Texas Instruments. We generally procure our other nonmicro-display components and products from our vendors on a purchase order basis without any long-term commitments. Many of the raw materials used in our components are standard to the consumer electronics industry. We provide forecasts that allow our contract manufacturers to stock component parts and other materials and plan capacity. Our contract manufacturers procure raw materials in volumes consistent with our forecasts, manufacture and/or assemble the products and perform tests according to our specifications. In some cases, we procure specific components and either sell them or consign them to our contract manufacturers. Products are either shipped to our customers or shipped to our West Henrietta, New York headquarters to be inventoried as finished goods. We currently use several manufacturing s