AWARE

2018 Annual Report

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

Annual Report Pursuant to Section 13 or 15(d) of The Securities Exchange Act of 1934

For the fiscal year ended December 31, 2018

Commission file number 000-21129

AWARE, INC.
(Exact Name of Registrant as Specified in Its Charter)

Massachusetts	**04-2911026**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

40 Middlesex Turnpike, Bedford, Massachusetts 01730
(Address of Principal Executive Offices)
(Zip Code)

(781) 276-4000
(Registrant's Telephone Number, Including Area Code)

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, par value $.01 per share	**The Nasdaq Global Market**

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes [X] No [ ]

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an 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.:

Large Accelerated Filer___ Accelerated Filer_X_ Non-Accelerated Filer___ Smaller Reporting Company_X_ 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 [X]

As of June 30, 2018 the aggregate market value of the registrant's common stock held by non-affiliates of the registrant, based on the closing sale price as reported on the Nasdaq Global Market, was approximately $53,303,310.

The number of shares outstanding of the registrant's common stock as of February 11, 2019 was 21,571,150.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement to be delivered to shareholders in connection with the registrant's Annual Meeting of Shareholders to be held on May 22, 2019 are incorporated by reference into Part III of this Annual Report on Form 10-K.

AWARE, INC.
FORM 10-K
FOR THE YEAR ENDED DECEMBER 31, 2018

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ITEM 1. BUSINESS

Company Overview

Aware, Inc. ("Aware", "we", "us", "our", or the "Company") is a leading provider of software and services to the biometrics industry. We have been engaged in this business since 1993. Our software products are used in government and commercial biometrics systems to identify or authenticate people. Principal government applications of biometrics systems include border control, visa applicant screening, law enforcement, national defense, intelligence, secure credentialing, access control, and background checks. Principal commercial applications include: i) user authentication for login to mobile devices, computers, networks, and software programs; ii) user authentication for financial transactions and purchases (online and in-person); iii) physical access control to buildings; and iv) identity proofing of prospective employees and customers.

Our products provide interoperable, standards-compliant, field-proven biometric functionality and are used to capture, verify, format, compress and decompress biometric images as well as aggregate, analyze, process, match and transport those images within biometric systems. We sell a broad range of software products for fingerprint, facial, iris, and voice modalities. We also offer a variety of software engineering services, including: i) project planning and management; ii) system design; iii) software design, development, customization, configuration, and testing; and iv) software integration and installation. We sell our biometrics software products and services globally through systems integrators and OEMs, and directly to end user customers.

Aware was incorporated in Massachusetts in 1986. We are headquartered at 40 Middlesex Turnpike in Bedford, Massachusetts, and our telephone number at this address is (781) 276-4000. Our website address is *www.aware.com*. The information on our website is not part of this Form 10-K, unless expressly noted. Our stock is traded on the Nasdaq Global Market under the symbol AWRE.

Industry Background

Biometrics is the measurement of unique, individual physiological characteristics, such as fingerprints, faces, irises, and voices that can be used to determine or verify an individual's identity. The biometrics industry offers technology that digitally captures and encodes biometric characteristics and then compares those characteristics against previously encoded biometric data to determine or verify an individual's identity. Biometrics addresses the limitations inherent in traditional identification and authentication processes, such as biographic data, tokens, paper credentials, passwords, PIN codes, and magnetic access cards. Biometrics technology and products require algorithms for multiple distinct functions, such as feature finding, feature optimization, feature extraction, feature encoding, feature matching, and presentation attack detection ("PAD"), which is also referred to as liveness detection and spoof detection.

Application Areas: Identification and Authentication

Applications for biometrics typically fall into two primary areas: identification and authentication. Generally speaking, biometric identification attempts to answer the question "who are you?", while biometric authentication attempts to answer the question "are you the person we know?"

<u>Biometric Identification</u>

Biometric identification involves the "one-to-many" comparison of a "probe" sample to thousands or even millions of biometric samples in a database, comprising a search to determine which samples, if any, are associated with the individual that belongs to the probe. Biometric identification systems typically operate in a client/server architecture, with some systems migrating to web-based, thin-client architectures. Enrollment workstations with peripheral capture devices are used to enroll individuals into biometrics systems. Enrollment involves the capture, processing, and formatting of "biometric samples." A biometric sample consists of biometric data which may include: i) images of fingerprints, faces, or irises; ii) digital voice signals; or iii) some other electronic representation of a biometric characteristic. Examples of capture peripherals include: i) scanners for fingerprint images, ii) cameras for iris and facial images, iii) handheld devices for mobile capture of fingerprint, iris, and facial images, or iv) mobile phones and/or microphones for voice signals.

After biometric samples are captured, they are transported in digital form to centralized matching systems for identification. Equipment used to perform these functions includes: i) servers to process and transport biometric samples; and ii) mainframe computers and servers to store and match those samples. In addition, military applications may employ handheld devices that are capable of capturing samples and matching those samples against sample databases that reside on the devices.

"Identity proofing" is a term used to describe a process by which identity information provided by an individual, such as a prospective customer or job applicant, is corroborated between multiple identity sources. Biometric identification can be used as part of identity proofing.

Biometric Authentication

Biometric authentication involves a "one-to-one" biometric comparison that serves to verify that a live biometric sample belongs to the same individual associated with a trusted stored sample. In this way, biometrics can be used to authenticate identity. Computing devices such as PCs, smartphones and tablets, are capable of: i) capturing biometric samples (e.g., fingerprints, facial and iris images, and voices); ii) processing and storing those samples in a secure area on the device or server; and iii) matching new live samples against the trusted stored samples. Once a biometric match is achieved, the subsequent software functions are analogous to password-based authentication. Mobile authentication can be implemented in either a device- or server-centric architecture, with biometric data analysis, matching, and storage occurring either on the device or on a central server, respectively.

"Tokens" are often used as an alternative or enhancement to passwords. An authentication token may be a hardware device that the user must have possession of to authenticate. Examples are a USB dongle, smart phone, or smart card. In the case of multifactor authentication, a device such as a smart phone or PC may be considered as a token providing the primary authentication factor, with biometric authentication serving as a second authentication factor. Mobile authentication can be incorporated into a mobile app such as a banking application as a password-free security mechanism. It may also be employed in an "out-of-band" fashion to secure access on a PC through a browser.

As biometric authentication is most typically an unattended process, some form of presentation attack detection ("PAD") is an important feature of biometric authentication solutions. PAD features are designed to prevent "spoofing", whereby a fraudster attempts to defeat a biometric security feature by impersonating the rightful user.

The rapid advance and adoption of mobile devices has had a substantial impact on the adoption of biometrics for authentication. Many leading mobile devices incorporate native biometric security sensors and technology, in which case third-party mobile applications are granted access to authentication results but not the raw biometric samples used to authenticate.

In contrast, third party application providers can incorporate authentication functionality that makes use of multipurpose sensors such as the camera, microphone, and touchscreen. There are use cases where it is desirable to implement biometric security features that are independent of those provided natively by the device. Advantages include more control over the security level, security features, and user experience, as well as uniform functionality across different device models. Biometric authentication implemented on a mobile device may be used to gain access to online networks, systems, services, or accounts.

User authentication enabled by smartphones continues to evolve, and we expect to see further advances in smartphone security features and functionality. In the past few years, the FIDO® (Fast IDentity Online) Alliance, an industry consortium, has emerged to take a leading role in authoring and promoting technical standards for password-free multifactor authentication on mobile devices and desktops. The FIDO Alliance has developed specifications that define an open, scalable, interoperable set of mechanisms that supplant reliance on passwords to securely authenticate users of online services. The new standard for devices and browser plugins will allow any website or cloud application to interface with a broad variety of existing and future FIDO-enabled devices that the user has for online security. The FIDO Alliance has also established processes for accreditation of independent labs that will be able to analyze and identify products as "FIDO® Certified" in terms of interoperability, biometric matching performance, and security level.

Market Sectors: Government and Commercial

The market for biometrics may be segmented into government and commercial sectors. Principal government biometrics applications include border control, visa applicant screening, law enforcement, national defense, intelligence, secure credentialing, access control, and background checks. Principal commercial applications include: i) user authentication for login to mobile devices, computers, networks, and software programs; ii) user authentication for financial transactions and purchases (online and in-person); iii) physical access control to buildings; and iv) identity proofing of prospective employees and customers.

We believe that government and commercial entities will continue to adopt and expand the use of biometrics-enabled solutions to address the limitations and vulnerabilities of traditional identification and authentication processes. We believe the following factors, among others, will contribute to the growth of biometrics solutions: i) government-mandated implementation of identification for employees, citizens, and foreign nationals to enhance national security; ii) military implementations for the identification of terrorists and other hostile persons; iii) increasing threats to personal security encountered in areas such as transportation; iv) government and commercial efforts to detect and reduce fraud and cybercrime; v) adoption of biometrics on mobile devices; and vi) the emergence and adoption of international biometrics standards.

There is commonality between how biometric technologies are used across government and commercial sectors. The primary consumers of biometric identification systems are government agencies, while the primary users of biometric authentication technology are consumers owning mobile devices. We believe that these sector-based distinctions are important to an understanding of Aware's business as the vast majority of our revenue is currently derived from government customers.

Government Sector
Local, state, and national governments throughout the world were early adopters of biometrics technology and continue to be the largest consumers of the technology. At the local and state level, biometrics technology is used in the following applications:

- Law enforcement applications that enable officers in the field to correctly identify potential suspects more reliably and efficiently by submitting live (suspect is known) or latent (suspect is unknown) biometrics samples to state or federal biometric search services;
- Background checks for employment screening;
- Driver's licenses and identification cards; and
- Benefits issuance.

At the national level, biometrics technology is used in the following applications:

- Border control
  National governments throughout the world have mandated increased spending on security measures, implemented new regulations and placed greater emphasis on technology to address growing security concerns. Immigration and border control agencies have taken steps to improve security in response to heightened concerns over public safety from the threat of terrorism. They use biometrics to help establish the identity of visitors upon application for a visa or upon arrival at border checkpoints. For example, the U.S. Office of Biometric Identity Management currently requires foreign visitors entering the United States to have their ten fingers scanned and a facial photograph taken to determine if they are present on a watch list. The European Union now mandates that e-passports include fingerprint data in addition to a digital photograph.

- Defense
  Within military organizations, key applications of biometrics include: i) background checks of military personnel and contractors; ii) access control to physical and digital assets; and iii) identification of unknown and potentially hostile persons by a comparison of their biometric sample against a watch list.

- Law enforcement and background checks
  Law enforcement agencies perform background checks that use biometrics to help confirm the identity of individuals who might be present in a biometric database. Background checks might also be provided as a service to other agencies within the government.

- Access control
  Governments also use biometrics for physical access control by storing biometric data on a digital ID card or smart phone and performing a match to verify that the holder of the card is the same person who was issued the card. Biometrics are also used for securing access to digital assets, where a biometric match might be required in addition to or in place of a password to gain access to a computer system.

Due to the nature of government applications, particularly those involving security and defense, government biometrics systems must be capable of accurately and rapidly searching large databases of stored samples. The ability to accurately and rapidly match samples against databases of millions of samples is critical because incorrect or delayed results could have severe adverse consequences. These requirements are an important distinguishing characteristic of the government market as compared to the commercial market.

Commercial Sector

The principal application of biometrics in commercial markets is user authentication, with identity proofing also emerging as an application. The types of users that may need to be authenticated or identified in commercial applications include customers, employees, contractors, visitors, healthcare patients, or other parties wishing to establish their identity towards gaining access to information, systems, bank accounts, credit card accounts, events, devices, or buildings.

In commercial markets, biometrics-based solutions compete with more traditional security methods including keys, cards, tokens, passwords, personal identification numbers ("PINs") and security personnel. The adoption of biometrics by leading vendors of smartphones and other popular consumer products has increased users' confidence and comfort with biometrics as a convenient and secure means of authentication in place of or in addition to passwords. Biometrics solutions are also being considered in commercial markets as a means to enhance identity proofing, sometimes referred to "know-your-customer" ("KYC") and "know-your-employee" ("KYE") efforts. KYC and KYE processes are designed to corroborate the identity data claimed by prospective customers and employees with multiple independent sources.

The commercial market for biometrics technology remains nascent. The rate of adoption of biometrics in commercial markets depends upon a number of factors, including: i) the performance and reliability of biometric solutions; ii) costs involved in adopting and integrating biometric solutions; iii) public concerns regarding privacy, including potential privacy legislation; and iv) standardization efforts by various industry consortia and standards bodies.

Examples of commercial market applications include:

- User authentication for login and access to mobile devices, mobile apps, desktop computers, networks, and web-based software programs.
- User authentication for financial transactions in the financial services industry.
- User authentication for in-person or online purchases in the retail industry.
- User authentication for physical access to secured buildings and perimeters.
- User authentication of employees to access private patient information in the healthcare industry.
- Identity verification of patients in hospital and surgical settings.
- Identity verification of test takers in the educational testing industry.
- Identity proofing of prospective customers in the financial services industry.
- Identity proofing of candidates for pre-employment screening and background checks.
- Identification of undesirable customers in the gaming industry.

Market Segments: Consumer-Facing and Employee-Facing

The biometrics market may be further segmented into: i) a consumer-facing segment; and ii) an employee-facing segment.

Consumer-Facing segment – The primary applications in the consumer-facing segment are biometric identity proofing and authentication for the purpose of onboarding and authentication of customers of commercial organizations, and also for citizens by governments. Adoption of biometrics is stronger where the convenience of a password-free user experience is valued but there is also risk of fraud. Industries that fall into this category include financial services, retail, and healthcare. Government agencies similarly employ citizen-facing biometric identity proofing and authentication solutions in situations where there is potential risk of fraud, such as benefits disbursement and voting. Healthcare organizations use biometrics in a safety context to prevent patient misidentification and care delivery errors.

Employee-Facing segment – The primary applications in the employee-facing segment are identity proofing and authentication of employees as a means for screening of new employees, and for user authentication towards securing access for employees and contractors to digital assets against a breach. Applications for employee-facing biometrics are found in both the government and commercial sectors.

Delivery Models: Tools and Services, Solutions, Software as a Service

As with other technology products and services, there are different models for product and service delivery in the biometrics arena, including tools and services, solutions, and Software as a Service.

1. Tools and Services – Customers can choose to build their own biometric system using off-the-shelf subcomponents purchased a la carte and used to design, develop, and operate their own bespoke system. In doing so, a customer may or may not decide to also receive services to help with that process. Those services might come from a software provider or a third-party system integrator. These customers tend to have highly specific requirements and the scale to justify the cost of acquiring a custom-configured biometric system. Government agencies tend to be an example of this class of customer.

2. Solutions – Some organizations prefer a more complete and comprehensive solution that sources most or all system capability and services from a single supplier and requires less customization. Companies that offer identification/access solutions or biometric smart cards tend to be an example of this class of customer.

3. Software as a Service – Advances in cloud computing and browser technology have made Software as a Service, or "SaaS" an increasingly common delivery model of enterprise software. Benefits derived include lower up-front costs as well as lower maintenance and support risk. Biometric solutions can be provided as SaaS. Small and midsize commercial enterprises tend to be an example of this class of customer.

Biometrics Industry Participants

There are a large number of vendors that serve government and commercial biometrics markets. In order to provide an understanding of the biometrics industry and our role in it, we have categorized industry participants into categories that have been defined by us. While we believe our categorization is a reasonable representation of the industry, we acknowledge that: i) knowledgeable industry participants may define categories differently or classify vendors differently; and ii) not all companies involved in the industry were included. Accordingly, the classification that follows represents our perspective on the industry.

We believe that biometrics industry participants may be classified into the following categories:

1) Core technology suppliers
2) System integrators
3) Fully integrated solution suppliers
4) Biometrics-as-a-service providers
5) Vendors of biometrically-enabled solutions

Category descriptions and companies that offer products and services in each category are provided below. It should be noted that some companies appear in multiple categories.

1) Core technology suppliers

Core biometrics technology includes hardware and software products that enable: i) traditional biometrics systems used by government and commercial customers; ii) new biometric service offerings; and iii) biometrically-enabled functionality embedded in other products and solutions. Core biometrics technology includes three types of products: i) sensor products, ii) biometric capture devices, and iii) software products.

Sensor products

Biometrics sensors are primarily silicon-based devices that capture biometrics samples, such as fingerprints. Sensors are typically embedded in other devices, such as smartphones or biometric capture devices.

Examples of companies that offer biometric sensor products include: 1) Qualcomm Technologies, Inc.; 2) Sonavation, Inc.; 3) Synaptics, Inc.; 4) Fingerprint Cards AB; 5) Integrated Biometrics, LLC; and 6) Next Biometrics AS.

Biometric capture devices

Biometric capture devices are designed to capture and process biometric samples as their primary function. These products may be strictly hardware products or hardware products that also incorporate biometrics software.

Examples of companies that offer biometric capture devices include: 1) Cross Match Technologies, Inc. which was acquired by HID Global Corporation in 2018; 2) Suprema, Inc.; 3) HID Global Corporation ("HID"); 4) Iris ID Systems, Inc ("Iris ID"); 5) Precise Biometrics AB ("Precise Biometrics"); 6) Credence ID, LLC; 7) SecuGen Corporation; 8) IrisGuard, Inc. ("IrisGuard"); 9) Aurora Biometrics, Inc. ("Aurora Biometrics"); 10) EyeLock LLC ("EyeLock"); and 11) Tascent, Inc.

Software products

Biometrics software products provide functionality that captures, formats, stores, processes, or matches samples of fingerprints, faces, iris, voices and other modalities. Biometrics software is capable of operating on a variety of equipment platforms, including personal computers, smartphones, biometric capture devices, hand-held devices, servers, and mainframe computers.

Examples of companies that offer biometrics software products include: 1) Aware, Inc.; 2) Idemia; 3) Gemalto NV ("Gemalto"); 4) NEC Corporation ("NEC"); 5) Cognitec Systems GmbH ("Cognitec"); 6) Neurotechnology; 7) Iritech, Inc. ("Iritech"); 8) Innovatrics s.r.o. ("Innovatrics"); 9) Nuance Communications, Inc.; 10) Precise Biometrics; 11) VoiceTrust GmbH.; 12) Eyelock; 13) BIO-key International, Inc.; 14) Zoloz (formerly known as EyeVerify, Inc.); 15) Iris ID; 16) Dermalog Identification Systems GmbH ("Dermalog"); 17) FacePhi Biometria; and 18) Sensory, Inc.

2) System integrators

System integrators purchase hardware and software technology from core biometrics technology vendors and incorporate those components into customized biometrics systems that they deliver to end-user customers. Historically those end-user customers have been governments, but in recent years system integrators have begun to serve commercial enterprise customers as well. System integrators include large multinationals with a broad range of expertise and the capacity to execute very large projects, as well as smaller system integrators that have more focused expertise on a particular market sector, technology, or geography. Some system integrators have developed their own biometric technologies that they deliver as part of their solutions.

Examples of companies that offer systems integration services include: 1) Northrop Grumman Corporation; 2) Science Applications International Corporation; 3) Hewlett-Packard Enterprise Services; 4) International Business Machines Corporation; 5) Fujitsu Limited; 6) Accenture plc; 7) Unisys Corporation; 8) Leidos, Inc.; and 9) ManTech International Corporation.

3) Fully integrated solutions suppliers

Fully integrated solutions suppliers are similar to systems integrators in that they deliver customized biometrics systems to government and commercial enterprise end-user customers. They differ from system integrators in that they use core hardware and software technologies that they developed in-house or acquired from others. Vendors in this category may purchase some third party software, but we believe such purchases represent a minor component of the overall systems they deliver.

There are three large global suppliers of fully integrated solutions, including: 1) Idemia; 2) Gemalto; and 3) NEC. We believe these companies supply a large percentage of the biometric systems that are delivered to government customers around the world.

In addition to these three large suppliers, we would categorize Dermalog as a fully integrated solution provider, but one that operates on a smaller scale. Aware also has a product portfolio and services capability that enables us to deliver fully integrated solutions. We have acted in this capacity on a limited basis in the past and an element of our strategy is to grow this part of our business in the future.

4) Biometrics-as-a-service providers

Biometrics service providers have begun to offer a pay-per-transaction biometrics service offering. This service allows organizations to biometrically identify or verify employees, customers, or other individuals relevant to their business. A pay-per-transaction model may be potentially more financially attractive for some organizations as compared to the cost of purchasing, installing and maintaining internal biometrics systems.

Examples of companies offering biometrics services include: 1) Certibio Identidade Biometrica, a wholly-owned subsidiary of Certisign Certificadora Digital S.A. ("Certisign"); 2) Idemia; 3) RightPatient, Inc.; 4) Microsoft Corporation; 5) SkyBiometry (a spin-off from Neurotechnology); 6) BioID GmbH; and 7) VoiceIt Technologies, LLC.

5) Vendors of biometrically-enabled solutions

Vendors of biometrically-enabled solutions provide products that are not principally marketed as biometrics products, but include biometric functionality. Biometrics capability is a feature, but not the chief function of these products. Such vendors represent a potential opportunity for core biometrics technology providers as some of them do not own core biometrics technology.

Examples of companies that offer biometrically-enabled smartphone products include: 1) Apple, Inc.; 2) Samsung Electronics Co., Ltd.; and 3) Google, Inc.

Examples of companies that offer secure identification/access solutions that incorporate biometrically-enabled components include: 1) Gemalto; 2) HID; 3) Entrust Datacard Corporation; and 4) Idemia.

Examples of companies that offer physical access control solutions that may incorporate biometrics include: 1) Honeywell International, Inc.; 2) Tyco International Ltd.; 3) LenelS2 (formed by combination of Lenel and S2 Security both of which were acquired by United Technologies Corp.); and 4) Stanley Security Limited.

Products and Services

Software products

We sell a broad range of biometrics software products that enable important functions in biometrics systems, including:

1. Enrollment, analysis, and processing of biometric images and data on workstations or mobile devices.
2. Integration of peripheral biometric capture devices.
3. Centralized workflow, transaction processing, and subsystem integration.
4. Matching of biometric samples against biometric databases to authenticate or verify identities;
5. Analysis and processing of text-based identity data.

Our biometrics software products range from discrete "building blocks", such as software development kits ("SDKs"), application program interfaces ("APIs") and applications that customers can use to develop their own systems to more complete solutions that customers can use to reduce or eliminate their development times and exposure to software support and maintenance risks. Our products are described below.

1) Building Blocks: SDKs, APIs, Applications, and Subsystems

1a. Biometric Search & Matching SDKs

Our SDKs consist of: i) multiple software libraries; ii) sample applications that show customers how to use the libraries; and iii) documentation. Customers use our SDKs to design and develop biometrics applications. Our line of biometric search and match SDKs is called Nexa™ and it includes Nexa|Fingerprint™, Nexa|Face™, Nexa|Iris™ and Nexa|Voice™. These products provide high-performance biometric algorithms for fingerprint, facial, iris and voice identification or authentication. The algorithms in these products convert images into biometric templates, which can then be compared to templates stored in databases to find matches.

Each Nexa SDK can be deployed on a workstation or a server, either as a standalone biometric search/match API, or in combination with our other SDKs, applications, BioSP, or Astra products. Our SequenceCheck, PreFace, and IrisCheck SDKs may be used in concert with Nexa libraries to perform optional quality assurance and preprocessing for enhanced fingerprint, face, and iris search and match functionality.

In addition to the Nexa line of biometric search and match SDKs, we also offer AwareXM™, an interoperable fingerprint matching SDK. Aware XM is an SDK that provides MINEX-certified, INCITS 378-compliant fingerprint minutiae extraction, template generation, and fingerprint authentication.

1b. Biometric Enrollment SDKs and APIs

Our suite of enrollment SDKs and APIs performs a variety of functions that are critical to biometric enrollment, including image capture, image quality assurance, image formatting, and image compression. Our enrollment SDK and API products include:

- *Image Capture and Hardware Abstraction* – This group of products includes: i) LiveScan API; ii) PreFace™; iii) IrisCheck™; and iv) SequenceCheck™.
- *Data Formatting and Validation* – This group of products includes: i) NISTPack; ii) ICAOPack; and iii) PIVPack™.
- *Fingerprint Cards* – This group of products includes: i) AccuScan™; and ii) AccuPrint™, used for scanning and printing of fingerprint cards in accordance with FBI fingerprint image quality standards.
- *Image Compression* – This group of products includes: i) Aware WSQ1000; and ii) Aware JPEG2000 for standards-compliant compression and decompression of biometric images.
- *Mobile Enrollment and Matching –* Aware offers versions of several of our Windows-based products designed to operate on Android and iOS platforms. Our family of mobile SDKs includes: i) Nexa|Face™ Mobile; ii) Nexa|Fingerprint™ Mobile; iii) PreFace™ Mobile; iv) LiveScan API Mobile; v) NISTPack Mobile; vi) WSQ1000 Mobile; vii) AwareXM™ Mobile; and FIDO® Suite._FIDO® Suite is a family of products that are certified by the FIDO Alliance and are interoperable with other FIDO-certified products. Our FIDO Suite includes: i) Aware FIDO® Face Authenticator; Aware FIDO® Face+Voice Authenticator; iii) Aware FIDO® Client; and iv) Aware FIDO® Server. These products are available for Android and iOS devices.

1c. Identity Text Analytics SDK - Inquire™

Inquire is a SDK that performs fuzzy text-based filtering, searching, matching, and linking functions towards discovery of useful information in identity data. Analysis of text-based identity data is naturally complementary to biometric verification and identification, and Inquire is optimized for processing and analysis of data that includes biometrics.

1d. Biometric Applications

Our products in this category combine user interfaces with multiple Aware software products to create more complete applications that operate on client workstations or mobile devices.

Enrollment Applications

Our enrollment application products include Universal Registration Client ("URC™"). URC is a configurable Windows-based enrollment application that performs a variety of biometric data capture, analysis, matching, formatting, and hardware abstraction functions.

URC|Mobile™ is a software application for capturing fingerprint and facial images on an Android smart phone or tablet using its onboard camera and a tethered fingerprint capture device. It is designed to be used by an enrollment attendant for rapid capture and quality assurance of biometric data and submission to a centralized biometric database for enrollment, search, or authentication.

Our fingerprint card products include FormScannerSE™ and FormScannerMB™. The two products are independent applications that may be used for scanning and processing of inked fingerprint cards.

- FormScannerSE is designed for one-at-a-time, assisted "scan and entry" processing of fingerprint cards, such as for manual data entry of previously scanned card batches. It can also be used for manual "rework" such as crop region adjustments.
- FormScannerMB is designed for "multi-batch" scanning of large volumes of cards in an automated fashion, and provides features useful for high-volume processing such as support for automatic document feeding and real-time image quality feedback.

Forensic Workstations

Our forensic analysis and quality assurance products include WorkbenchSuite™. WorkbenchSuite is a family of .NET workstation applications that are designed to be used by an operator to analyze and repair or otherwise process digital records containing biometric images and data. Each targets a particular use case and implements workflow carefully designed to best assist analysts in their task. The suite comprises:

- FingerprintWorkbench, which is used for forensic analysis, processing, and reporting of biometric fingerprint evidence comparison and search results.
- ForensicWorkbench, which is used for the categorization, processing, and standards-compliant formatting of biometric images and demographic data.
- SequenceWorkbench, which is used for the detection and assisted repair of fingerprint records containing sequence errors.
- CrosslinkWorkbench, which is used for assisting with identifying and repairing of crosslink errors in ANSI/NIST ITL transactions. Crosslinks are biometric records that erroneously contain data from different individuals.
- FaceWorkbench, which enables an analyst to analyze and process candidates returned from a biometric face search.

Application Components

This group of products consists of our BioComponents™ line of products. Our BioComponents products allow customers to develop biometric enrollment applications more quickly than if they purchased our SDKs. Each product in the group includes a user interface and one or more software libraries that perform a discrete set of functions, such as automated image capture, quality assurance, and capture hardware integration. BioComponents comprise modular, independent, self-contained software components that can operate either independently or in concert with one another. Specific BioComponents products and the functions they perform are:

- FingerprintComponent, which is used to capture, verify image quality, and compress fingerprint images.
- PhotoComponent, which is used to capture, verify image quality, and manipulate facial images.
- ScanningComponent, which is used to scan forms such as inked fingerprint cards.
- PrintingComponent, which is used for printing FBI-quality fingerprint images on cards and forms.
- NISTComponent, which is used for biographic and textual data entry and formatting, NIST compliance checking, and submission.

1e. Biometric Subsystems

Biometric Services Platform - BioSP™

Our Biometric Services Platform product is called BioSP. BioSP is a service-oriented platform used to enable a biometric system with advanced biometric data processing and management functionality in a web services architecture. It provides workflow, data management and formatting, and other important utilities for large-scale fingerprint recognition, face recognition, and iris recognition systems. BioSP is well suited for applications that require the collection of biometrics throughout a distributed network, and subsequent aggregation, analysis, processing, distribution, matching, and sharing of data with other system components. BioSP is modular, programmable, scalable, and secure, capable of managing all aspects of transaction workflow including messaging, submissions, responses, and logging. BioSP makes extensive use of open-source components and is J2EE-compliant.

Cluster-Based Matching Platform - Astra™

Our cluster-based matching platform product offering is called Astra. Astra is used for large-scale fingerprint recognition, face recognition, iris recognition, and text-based name matching and identity resolution. It is a highly scalable biometric identification and authentication platform that performs one-to-many search or one-to-one match against large stores of biometrics and other identity data. It does so by deploying biometric and text data and matching algorithms across a cluster of multiple computing nodes.

2) Integrated Solutions

2a. Knomi™

In 2017, we introduced Knomi, a mobile biometric authentication framework offering face, voice and keystroke dynamics. The Knomi mobile biometric authentication framework is a collection of biometric SDKs running on mobile devices and a server that together enable strong, multi-factor, password-free authentication from a mobile device using biometrics. Knomi offers multiple biometric modality options, including facial recognition, keystroke dynamics, and voice authentication as means to authenticate. Banks or any other commercial enterprise can deploy Knomi to enhance their password-based authentication mechanisms, making login to their mobile applications more secure and convenient for their customers and employees. Knomi software components can be used in different combinations and configurations to enable either a server-centric architecture or a device-centric, FIDO® Certified implementation.

2b. AwareABIS™

AwareABIS is an Automated Biometric Identification System ("ABIS") used for large-scale biometric identification and deduplication using fingerprint, face, and iris recognition. It is a highly scalable platform that performs one-to-many search or one-to-one match against large stores of biometrics and other identity data. It does so by deploying biometric data and matching algorithms across a cluster of multiple computing nodes. Extremely large biometric databases (tens of millions of records) cannot be stored or efficiently searched on a single computer. Distributing the data and biometric comparison tasks across multiple machines enables even extremely large databases to be searched in only seconds. AwareABIS enables not only massive biometric search tasks but complex filter, search, match, and link operations critical to data preparation and quality assurance functions such as identity resolution and data deduplication. AwareABIS is built upon several mature, high-performance, field-proven applications, platforms, and algorithms from Aware. Components are available a la carte depending on the application and system requirements.

2c. WebEnroll

WebEnroll is a browser-based biometric enrollment and data management solution available as an enhanced version of BioSP™ (Biometric Services Platform) that utilizes BioComponents for capture of biographic data, fingerprints and facial images in a browser. Each BioComponent performs advanced biometric image autocapture as well as capture device hardware abstraction. Once images are captured, they are submitted to BioSP, where configurable workflows and modular software applications are used for processing, routing, and storage of each transaction. Biometric verification or identification can be added with Nexa or one of several third-party matchers integrated with BioSP, or an external matching service.

2d. Indigo

Indigo™ is Aware's family of turnkey biometric solutions, available as traditional software licenses or as cloud-based software-as-a-service. Indigo solutions are designed to deliver useful functionality and powerful biometric matching performance out-of-the-box, without requiring integration and configuration. They are built upon Aware's time-tested, market-leading software components for biometric enrollment, analysis, and matching.

3) Imaging products

In addition to our biometrics software products, we also sell products used in applications involving medical and advanced imaging. Our principal imaging product is Aware JPEG 2000, which is based on the JPEG2000 standard. The JPEG2000 standard is an image compression standard and coding system that was created by the Joint Photographic Experts Group committee in 2000. Our JPEG2000 product is used to compress, store, and display images. Those images are typically medical images.

Software maintenance

We also sell software maintenance contracts to many of our customers who purchase software licenses. These contracts typically have a one year term during which customers have the right to receive technical support and software updates, if and when they become available. Customers tend to renew maintenance contracts during the period of time that our software is being used in their biometrics systems.

Services

We offer a variety of software engineering services, including: i) project planning and management; ii) system design; iii) software design, development, customization, configuration, and testing; and iv) software integration and installation. Services are typically, but not always, sold in conjunction with software licenses.

Service engagement deliverables may include: i) custom-designed software products; ii) custom-configured versions of existing software products; iii) one or more subsystems comprised of software products that are integrated within a larger system; or iv) complete software solutions. In some cases, the software resulting from service engagements may form the basis for new or improved Aware software products.

Our customers for services include: i) government agencies; ii) large multinational systems integrators; iii) smaller systems integrators with a particular market, technology or geographic focus; and iv) commercial providers of products, solutions, and services. We provide services directly to end-users or indirectly to end-users through systems integrators. When we provide services to systems integrators, they are often engaged with the end-user as a prime contractor and are responsible for delivery of a complete solution, in which case we typically serve as a subcontractor assigned a subset of the total scope of work.

The scope of our services projects varies. A small project might involve configuration and testing of a single software product, taking a small team one month or less. A large project might involve delivery of a more complex solution comprised of multiple products and subsystems, requiring a larger team to conduct project management, system design, software customization and integration, and taking up to one year or more. Some projects are followed by subsequent projects that serve to change or extend the features and functionality of the initial system.

Sales and Marketing

As of December 31, 2018, we had a total of 10 employees in our sales and marketing organization. In addition to our employee sales staff, we also engage third party sales agents to sell our products and services in foreign countries.

We sell our products and services through three principal channels of distribution:

i) Systems integrator channel – we sell to systems integrators that incorporate our software products into biometrics systems that are delivered primarily to government end users.

ii) OEM channel – we sell to hardware and software solution providers that incorporate our software products into their products.

iii) Direct channel – we also sell directly to government, and, to a lesser degree, to commercial customers.

All of our revenue in 2018, 2017, and 2016 was derived from unaffiliated customers. In 2018, two customers represented 20% and 13% of total revenue. In 2017, one customer represented 17% of total revenue. In 2016, two customers represented 21% and 13% of total revenue. No other customer represented 10% or more of total revenue in any of those years.

Competition

The markets for our products and services are competitive and uncertain. We compete against: i) other companies that provide biometric software solutions; and ii) fully diversified companies that provide biometric software solutions and also act as systems integrators. We can give no assurance that: i) our products and services will succeed in the market; ii) that we will be able to compete effectively; or iii) that competitive pressures will not seriously harm our business.

Many of our competitors are larger than us and have significantly greater financial, technological, marketing and personnel resources than we do. At the other end of the competitive spectrum, we have seen increasing competition from smaller biometrics companies in foreign countries. These smaller foreign competitors have demonstrated a willingness to sell their biometrics software products at low prices.

We can give no assurance that our customers will continue to purchase products from us or that we will be able to compete effectively in obtaining new customers to maintain or grow our business.

Aware's Strategy

Our strategy is to capitalize on our strong brand and reputation to sell biometrics software products and services into government and commercial markets. We intend to continue to offer a broad portfolio of high quality products that are coupled with expert technical support and services. We expect to continue to employ a three-pronged distribution strategy using systems integrators, OEMs, and direct sales.

Our strategy for growing our biometrics business may include one or more of the following elements:

i) *Product strategy* – Our product strategy is to offer more complete biometrics solutions. We believe this strategy will allow us to us to sell more software and services into biometrics projects. We recognized the need to make this transition several years ago and developed new products to enable this strategy.

Our strategy to offer complete solutions involves:

- Product line expansion - Our aim is to expand our product portfolio by adding new products and increasing the functionality of existing products using our internal engineering teams. This means we may add resources to our engineering staff. To the extent we are unable to develop critical new technologies internally, we may purchase or license such technologies from third parties. Alternatively, we may also acquire biometrics companies provided we believe the acquisition cost is reasonable relative to the estimated future revenue and profits the acquired company may produce.

- Engineering services – We believe that services are an important element of our strategy to sell complete solutions. We intend to have adequate engineering resources on hand to ensure that we can staff projects with the technical expertise we need to win new projects.

ii) *Market strategy* – Our market strategy is to continue to focus on our legacy government biometrics market and expand into new commercial biometrics markets. Historically our revenue has been primarily derived from the government biometrics market.

We believe the evolution of commercial markets over the past few years may present mobile authentication and enterprise opportunities. To that end, we have modified some of our products to enable us to participate in these markets.

iii) Sales strategy – While the United States remains a large market, we believe there are attractive growth opportunities in international markets. We intend to continue our focus on international markets and pursue opportunities in those markets through our sales staff and third party sales agents.

As we attempt to grow our biometrics business, we may make investments in growth initiatives, such as those described above, that may cause our profitability to decline in the near term.

Backlog

We had $4.7 million of backlog on December 31, 2018. We define backlog as revenue items in deferred revenue and undelivered orders in our backlog report. Total backlog of $4.7 million included: i) $3.2 million of software maintenance revenue of which approximately $3.1 million will be recognized during 2019; ii) $0.8 million of software license revenue that we anticipate will be recognized during 2019 and iii) $0.7 million of services revenue that we anticipate will be recognized during 2019.

Research and Development

Our research and development activities are focused on enhancing our existing products and developing new products. Our engineering organization is based in Bedford, Massachusetts. As of December 31, 2018, we had an engineering staff of 47 employees, representing 70% of our total employee staff.

Patents and Intellectual Property

We rely on a combination of nondisclosure agreements and other contractual provisions, as well as patent, trademark, trade secret and copyright law to protect our proprietary rights. We have an active program to protect our proprietary technology through the filing of patents. As of December 31, 2018, we had approximately 81 U.S. and foreign patents and approximately 40 pending patent applications. Our patents and patent applications pertain primarily to biometrics and imaging compression.

Although we have patented certain aspects of our technology, we rely primarily on trade secrets to protect our intellectual property. We attempt to protect our trade secrets and other proprietary information through agreements with our customers, suppliers, employees and consultants, and through security measures. Each of our employees is required to sign a non-disclosure and non-competition agreement. Although we intend to protect our rights vigorously, we cannot assure you that these measures will be successful. In addition, effective intellectual property protection may be unavailable or limited in certain foreign countries.

Third parties may assert exclusive patent, copyright and other intellectual property rights to technologies that are important to us. From time to time, we receive claims from third parties suggesting that we may be obligated to license such intellectual property rights. If we were found to have infringed any third party's patents, we could be subject to substantial damages or an injunction preventing us from conducting our business.

Manufacturing & Systems Integration

We do not design or manufacture hardware products, however we have provided systems integration services for one U.S. government customer. Our systems integration activities include: i) procuring hardware and software components from third party suppliers; ii) installing Aware and third party software on the purchased hardware; and iii) testing products for quality assurance prior to shipment.

To the extent we receive any more orders for hardware revenue in the future, we rely on single source suppliers for certain critical hardware and software components. Our dependence on single source suppliers involves several risks, including limited control over availability, quality, and delivery schedules. Any delays in delivery or shortages of such components could cause delays in the shipment of our products, which could harm our business.

Employees

At December 31, 2018, we employed 67 people, including 47 in engineering, 10 in sales and marketing, and 10 in finance and administration. Of these employees, 64 were based in Massachusetts. None of our employees are represented by a labor union. We consider our employee relations to be good.

We believe that our future success will depend in large part on the service of our technical, sales, marketing and senior management personnel and upon our ability to retain highly qualified technical, sales and marketing and managerial personnel. We cannot assure you that we will be able to retain our key managers and employees or that we will be able to attract and retain additional highly qualified personnel in the future.

Available Information

Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, proxy statements, and amendments to reports filed pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, are made available free of charge on or through our website at *www.aware.com* as soon as reasonably practicable after such reports are filed with, or furnished to, the Securities and Exchange Commission (the SEC). The SEC also maintains a website, *www.sec.gov*, that contains reports and other information regarding issuers that file electronically with the SEC.

Copies of our (i) Corporate Governance Principles, (ii) charters for the Audit Committee, Compensation Committee, and Nominating Committee, and (iii) Code of Ethics are available in the Investor Relations section of our website at *www.aware.com*.

ITEM 1A. RISK FACTORS

Our operating results may fluctuate significantly from period-to-period and are difficult to predict.

Individual orders can represent a meaningful percentage of our revenues and operating results in any single quarter and the timing of the receipt of those orders is difficult to predict. The failure to close an order or the deferral or cancellation of an order can result in revenue and net income shortfalls for that quarter. We base our current and future expense levels on our internal operating plans and sales forecasts, and our operating costs are to a large extent fixed. As a result, we may not be able to sufficiently reduce our costs in any quarter to adequately compensate for an unexpected near-term shortfall in revenues, and even a small shortfall could disproportionately and adversely affect financial results for that quarter.

Our financial results may be negatively affected by a number of factors, including the following:

- the lack or reduction of government funding and the political, budgetary and purchasing constraints of government customers who purchase products and services directly or indirectly from us;
- the terms of customer contracts that affect the timing of revenue recognition;
- the size and timing of our receipt of customer orders;
- significant fluctuations in demand for our products and services;
- the loss of a key customer or one of its key customers;
- new competitors, or the introduction of enhanced solutions from new or existing competitors;
- competitive pressures on selling prices;
- cancellations, delays or contract amendments by government customers;
- higher than expected costs, asset write-offs, and other one-time financial charges; and
- general economic trends and other factors

As a result of these factors, we believe that period-to-period comparisons of our revenue levels and operating results are not necessarily meaningful. You should not rely on our quarterly revenue and operating results to predict our future performance.

We derive a significant portion of our revenue directly or indirectly from government customers, and our business may be adversely affected by changes in the contracting or fiscal policies of those governmental entities.

We derive a significant portion of our revenue directly or indirectly from federal, international, state and local governments. We believe that the success and growth of our business will continue to depend on government customers purchasing our products and services either directly through us or indirectly through our channel partners. Changes in government contracting policies or government budgetary constraints may adversely affect our financial performance. Among the factors that could adversely affect our business are:

- changes in fiscal policies or decreases in available government funding,
- changes in government funding priorities;
- changes in government programs or applicable requirements;
- the adoption of new laws or regulations or changes to existing laws or regulations;
- changes in political or social attitudes with respect to security and defense issues;
- changes in audit policies and procedures of government entities;
- potential delays or changes in the government appropriations process; and
- delays in the payment of our invoices by government payment offices.

These and other factors could cause government customers or our channel partners to reduce purchases of products and services from us which would have a material adverse effect on our business, financial condition and operating results.

A significant commercial market for biometrics technology may not develop, and, even if it does, there can be no assurance our biometrics technology will be successful.

A component of our strategy to grow revenue includes expansion into commercial markets. To date, biometrics technology has received only limited acceptance in such markets. Although the recent appearance of biometric readers on popular consumer products, such as smartphones, has increased interest in biometrics as a means of authenticating and/or identifying individuals, commercial markets for biometrics technology are in the process of developing and evolving. Biometrics-based solutions compete with more traditional security methods including keys, cards, personal identification numbers and security personnel. Acceptance of biometrics as an alternative to such traditional methods depends upon a number of factors including: i) the performance and reliability of biometric solutions; ii) costs involved in adopting and integrating biometric solutions; iii) public concerns regarding privacy; and iv) potential privacy legislation.

For these reasons, we are uncertain whether there will be significant demand for biometrics technology from commercial markets. Moreover, even if there is significant demand, there can be no assurance that our biometrics products will achieve market acceptance.

We derive a significant portion of our revenue from third party channel partners.

Our future results depend upon the continued successful distribution of our products through a channel of systems integrators and OEM partners. Systems integrators, including value added resellers, use our software products as a component of the biometrics systems they deliver to their customers. OEMs embed our software products in their technology devices or software products. These channel partners typically sell their products and services to government customers.

Our failure to effectively manage our relationships with these third parties could impair the success of our sales, marketing and support activities. Moreover, the activities of these third parties are not within our direct control. The occurrence of any of the following events could have a material adverse effect on our business, financial condition and operating results:

- a reduction in sales efforts by our partners;
- the failure of our partners to win government awards in which our products are used;
- a reduction in technical capabilities or financial viability of our partners;
- a misalignment of interest between us and them;
- the termination of our relationship with a major systems integrator or OEM; or
- any adverse effect on a partner's business related to competition, pricing and other factors.

If the biometrics market does not experience significant growth or if our products do not achieve broad acceptance both domestically and internationally, we may not be able to grow our business.

Our revenues are derived primarily from sales of biometrics products and services. We cannot accurately predict the future growth rate or the size of the biometrics market. The expansion of the biometrics market and the market for our biometrics products and services depend on a number of factors, such as:

- the cost, performance and reliability of our products and services and the products and services offered by our competitors;
- the continued growth in demand for biometrics solutions within the government and law enforcement markets as well as the development and growth of demand for biometric solutions in markets outside of government and law enforcement;
- customers' perceptions regarding the benefits of biometrics solutions;
- public perceptions regarding the intrusiveness of these solutions and the manner in which organizations use the biometric information collected;
- public perceptions regarding the confidentiality of private information;
- proposed or enacted legislation related to privacy of information;
- customers' satisfaction with biometrics solutions; and
- marketing efforts and publicity regarding biometrics solutions.

Even if biometrics solutions gain wide market acceptance, our solutions may not adequately address market requirements and may not continue to gain market acceptance. If biometrics solutions generally or our solutions specifically do not gain wide market acceptance, we may not be able to achieve our anticipated level of growth and our revenues and results of operations would be adversely affected.

We face intense competition from other biometrics solutions providers.

A significant number of established companies have developed or are developing and marketing software and hardware for biometrics products and applications that currently compete with or will compete directly with our offerings. We believe that additional competitors will enter the biometrics market and become significant long-term competitors, and that, as a result, competition will increase. Companies competing with us may introduce solutions that are competitively priced, have increased performance or functionality or incorporate technological advances we have not yet developed or implemented. Our current principal competitors include:

- Diversified technology providers that offer integrated biometrics solutions to governments, law enforcement agencies and other organizations. This group of competitors includes companies such as Idemia, Gemalto, and NEC.

- Component providers that offer biometrics software and hardware components for fingerprint, facial, iris and voice biometric identification. This group of competitors includes companies such as Cognitec, Neurotechnology, Iritech, Nuance Communications, Inc. and Innovatrics.

We expect competition to intensify in the near term in the biometrics market. Many current and potential competitors have substantially greater financial, marketing, and research resources than we have. Moreover, low cost foreign competitors from third world and other countries have demonstrated a willingness to sell their products at significantly reduced prices. To compete effectively in this environment, we must continually develop and market new and enhanced solutions and technologies at competitive prices and must have the resources available to invest in significant research and development activities. Our failure to compete successfully could cause our revenues and market share to decline.

The biometrics industry is characterized by rapid technological change and evolving industry standards, which could render our existing products obsolete.

Our future success will depend upon our ability to develop and introduce a variety of new capabilities and enhancements to our existing products in order to address the changing and sophisticated needs of the marketplace. Frequently, technical development programs in the biometrics industry require assessments to be made of the future direction of technology, which is inherently difficult to predict. Delays in introducing new products and enhancements, the failure to choose correctly among technical alternatives or the failure to offer innovative products or enhancements at competitive prices may cause customers to forego purchases of our products and purchase our competitors' products. We may not have adequate resources available to us or may not adequately keep pace with appropriate requirements in order to effectively compete in the marketplace.

Our software products may have errors, defects or bugs, which could result in delayed or lost revenue, expensive correction, liability to our customers, and claims against us.

Complex software products such as ours may contain errors, defects or bugs. Defects in the products that we develop and sell to our customers could require expensive corrections and result in delayed or lost revenue, adverse customer reaction and negative publicity about us or our products and services. Customers who are not satisfied with any of our products may also bring claims against us for damages, which, even if unsuccessful, would likely be time-consuming to defend, and could result in costly litigation and payment of damages. Such claims could harm our reputation, financial results and competitive position.

Our business may be adversely affected by our use of open source software.

The software industry is making increasing use of open source software in the development of products. We also license and integrate certain open source software components from third parties into our software. Open source software license agreements may require that the software code in these components or the software into which they are integrated be freely accessible under open source terms. Many features we may wish to add to our products in the future may be available as open source software and our development team may wish to make use of this software to reduce development costs and speed up the development process. While we carefully monitor the use of all open source software and try to ensure that no open source software is used in such a way as to require us to disclose the source code to the related product, such use could inadvertently occur. If we were required to make our software freely available, our business could be seriously harmed.

We rely on third-party software to develop and provide our solutions and significant defects in third-party software could harm our business.

We rely on software licensed from third parties to develop and offer some of our solutions. In addition, we may need to obtain future licenses from third parties to use software or other intellectual property associated with our solutions. We cannot assure you that these licenses will be available to us on acceptable terms, without significant price increases or at all. Any loss of the right to use any such software or other intellectual property required for the development and maintenance of our solutions could result in delays in the provision of our solutions until equivalent technology is either developed by us, or, if available from others, is identified, obtained, and integrated, which could harm our business. Any errors or defects in third-party software could result in errors or a failure of our solutions, which could harm our business.

Our operational systems and networks and products may be subject to an increasing risk of continually evolving cybersecurity or other technological risks, which could result in the disclosure of company or customer confidential information, damage to Aware's reputation, additional costs to Aware, regulatory penalties and financial losses.

The company's products, services and systems may be used in critical company, customer or third-party operations, or involve the storage, processing and transmission of sensitive data, including valuable intellectual property, other proprietary or confidential data, regulated data, and personal information of employees, customers and others. Successful breaches, employee malfeasance, or human or technological error could result in, for example, unauthorized access to, disclosure, modification, misuse, loss, or destruction of company, customer, or other third party data or systems; theft of sensitive, regulated, or confidential data including personal information and intellectual property; the loss of access to critical data or systems through ransomware, destructive attacks or other means; and business delays, service or system disruptions or denials of service.

If we or third parties with which we do business were to fall victim to successful cyber-attacks or experience other cybersecurity incidents, including the loss of individually identifiable customer or other sensitive data, we may incur substantial costs and suffer other negative consequences, which may include remediation costs, such as liability for stolen assets or information, repairs of system damage, and incentives to customers or business partners in an effort to maintain relationships after an attack as well as litigation and legal risks, including regulatory actions by state and federal regulators.

Our intellectual property is subject to limited protection.

Because we are a technology provider, our ability to protect our intellectual property and to operate without infringing the intellectual property rights of others is critical to our success. We regard our technology as proprietary. We rely on a combination of patent, trade secret, copyright, and trademark law as well as confidentiality agreements to protect our proprietary technology, and cannot assure you that we will be able to enforce the patents we own against third parties. Despite our efforts, these measures can only provide limited protection. Unauthorized third parties may try to copy or reverse engineer portions of our products or otherwise obtain and use our intellectual property. If we fail to protect our intellectual property rights adequately, our competitors may gain access to our technology, and our business would thus be harmed.

In the future, we may be involved in legal action to enforce our intellectual property rights relating to our patents, copyrights or trade secrets. Any such litigation could be costly and time-consuming for us, even if we were to prevail. Moreover, even if we are successful in protecting our proprietary information, our competitors may independently develop technologies substantially equivalent or superior to our technology. Accordingly, despite our efforts, we may be unable to prevent third parties from infringing upon or misappropriating our intellectual property or otherwise gaining access to our technology. The misappropriation of our technology or the development of competitive technology could seriously harm our business.

We may be sued by third parties for alleged infringement of their proprietary rights.

Our technology and products may infringe the intellectual property rights of others. A large and increasing number of participants in the technology industry, including companies known as non-practicing entities, have applied for or obtained patents. Some of these patent holders have demonstrated a readiness to commence litigation based on allegations of patent infringement. Third parties have asserted against us in the past and may assert against us in the future patent, copyright and other intellectual property rights to technologies that are important to our business.

Intellectual property rights can be uncertain and involve complex legal and factual questions. Moreover, intellectual property claims, with or without merit, can be time-consuming and expensive to litigate or settle, and could divert management attention away from the execution of our business plan. If we were found to have infringed the proprietary rights of others, we could be subject to substantial damages or an injunction preventing us from conducting our business.

If we are unable to attract and retain key personnel, our business could be harmed.

If any of our key employees were to leave, we could face substantial difficulty in hiring qualified successors and could experience a loss in productivity while any successor obtains the necessary training and experience. Our employment relationships are at-will and we have had key employees leave in the past. We cannot assure you that one or more key employees will not leave in the future. We intend to continue to hire additional highly qualified personnel, including software engineers and sales personnel, but may not be able to attract, assimilate or retain qualified personnel in the future. Any failure to attract, integrate, motivate and retain these employees could harm our business.

Our business may be affected by government regulations.

Extensive regulation by federal, state, and foreign regulatory agencies could adversely affect us in ways that are difficult for us to predict. More specifically, we are subject to regulatory environment changes regarding privacy and data protection that could have a material impact on our results of operations. These regulatory changes may potentially involve new regulatory issues/requirements such as the EU General Data Protection Regulation (GDPR). The potential costs of compliance with or imposed by new/existing regulations and policies that are applicable to us may affect the use of our products and services and could have a material adverse impact on our results of operations.

In addition, our business may also be adversely affected by: i) the imposition of tariffs, duties and other import restrictions on goods and services we purchase from non-domestic suppliers; or ii) by the imposition of export restrictions on products we sell internationally. Changes in current or future laws or regulations, in the United States or elsewhere, could seriously harm our business.

Adverse economic conditions could harm our business.

Unfavorable changes in economic conditions, including recessions, inflation, turmoil in financial markets, or other changes in economic conditions, could harm our business, results of operations, and financial conditions as a result of:

- reduced demand for our products;
- increased risk of order cancellations or delays;
- increased pressure on the prices for our products;
- greater difficulty in collecting accounts receivable; and
- risks to our liquidity, including the possibility that we might not have access to our cash when needed.

We are unable to predict the timing, duration, and severity of any such adverse economic conditions in the U.S. and other countries, but the longer the duration, the greater the risks we face in operating our business.

We may make acquisitions of companies.

We may make acquisitions of companies that offer complementary products, services and technologies. Any acquisitions we complete may involve a number of risks, including the risks of assimilating the operations and personnel of acquired companies, realizing the value of the acquired assets relative to the price paid, distraction of management from our ongoing businesses and potential product disruptions associated with the sale of the acquired company's products. These factors could have a material adverse effect on our business, financial condition, operating results and cash flows. The consideration we pay for any future acquisitions could include our stock. As a result, future acquisitions could cause dilution to existing shareholders and to earnings per share.

We may have additional tax liabilities.

We are subject to income taxes in the United States. Significant judgments are required in determining our provisions for income taxes. In the course of preparing our tax provisions and returns, we must make calculations where the ultimate tax determination may be uncertain. Our tax returns are subject to examination by the Internal Revenue Service ("IRS") and state tax authorities. There can be no assurance as to the outcome of these examinations. If the ultimate determination of taxes owed is for an amount in excess of amounts previously accrued, our operating results, cash flows, and financial condition could be adversely affected.

The market price of our common stock has been and may continue to be subject to wide fluctuations, and this may make it difficult for shareholders to resell the common stock when they want or at prices they find attractive.

The market price of our common stock, like that of other technology companies, is volatile and is subject to wide fluctuations in response to a variety of factors, including:

- quarterly variations in operating results;
- announcements of technological innovations or new products by us or our competitors,
- changes in customer relationships, such as the loss of a key customer;
- recruitment or departure of key personnel;
- corporate actions we may initiate, such as acquisitions, stock sales or repurchases, dividend declarations, or corporate reorganizations; and
- other events or factors.

Our stock price may also be affected by broader market trends unrelated to our performance. As a result, purchasers of our common stock may be unable at any given time to sell their shares at or above the price they paid for them. Moreover, companies that have experienced volatility in the market price of their stock often are subject to securities class action litigation. If we were the subject of such litigation, it could result in substantial costs and divert management's attention and resources.

If we are unable to maintain effective internal controls over financial reporting, investors could lose confidence in the reliability of our financial statements, which could result in a decline in the price of our common stock.

As a public company, we are required to enhance and test our financial, internal and management control systems to meet obligations imposed by the Sarbanes-Oxley Act of 2002. Consistent with the Sarbanes-Oxley Act and the rules and regulations of the SEC, management's assessment of our internal controls over financial reporting and the audit opinion of our independent registered accounting firm as to the effectiveness of our controls is required in connection with our filing of our Annual Report on Form 10-K. If we are unable to identify, implement and conclude that we have effective internal controls over financial reporting or if our independent auditors are unable to conclude that our internal controls over financial reporting are effective, investors could lose confidence in the reliability of our financial statements, which could result in a decrease in the value of our common stock. Our assessment of our internal controls over financial reporting may also uncover weaknesses or other issues with these controls that could also result in adverse investor reaction.

We must make judgments in the process of preparing our financial statements.

We prepare our financial statements in accordance with generally accepted accounting principles and certain critical accounting policies that are relevant to our business. The application of these principles and policies requires us to make significant judgments and estimates. In the event that our judgments and estimates differ from actual results, we may have to change them, which could materially affect our financial position and results of operations.

Moreover, accounting standards have been subject to rapid change and evolving interpretations by accounting standards setting organizations over the past few years. The implementation of new accounting standards requires us to interpret and apply them appropriately. If our current interpretations or applications are later found to be incorrect, we may have to restate our financial statements and the price of our stock could decline.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

We believe that our existing facilities are adequate for our current needs and that additional space sufficient to meet our needs for the foreseeable future will be available on reasonable terms. We currently occupy approximately 72,000 square feet of office space in Bedford, Massachusetts, which serves as our headquarters. This site is used for our research and development, sales and marketing, and administrative activities. We own this facility.

ITEM 3. LEGAL PROCEEDINGS

From time to time we are involved in litigation incidental to the conduct of our business. We are not party to any lawsuit or proceeding that, in our opinion, is likely to seriously harm our business.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock is the only class of stock we have outstanding, and it trades on the Nasdaq Global Market under the symbol AWRE.

As of February 12, 2019, we had approximately 79 shareholders of record. This number does not include shareholders from whom shares were held in a "nominee" or "street" name. We paid no dividends in 2018, and 2017. We anticipate that we will continue to reinvest any earnings to finance future operations although we may also pay special cash dividends if our board of directors deems it appropriate.

We did not sell any equity securities that were not registered under the Securities Act of 1933 during the three months ended December 31, 2018.

Issuer Purchases of Equity Securities

Period	(a) Total Number of Shares Purchased	(b) Average Price Paid per Share	(c) Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	(d) Maximum Number (or Approximate Dollar Value) of Shares That May Yet Be Purchased Under the Plans or Programs
October 2018	2,700	$3.87	2,700	-
November 2018	18,106	$3.70	18,106	-
December 2018	15,032	$3.61	15,032	$9,608,378

(1) On April 24, 2018, we issued a press release announcing that our board of directors had approved the repurchase of up to $10,000,000 of our common stock from time to time through December 31, 2019. During the three months ended December 31, 2018, we purchased 35,838 shares under this plan at an aggregate purchase price of $131,728.

ITEM 6. SELECTED FINANCIAL DATA

Not applicable.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

RESULTS OF OPERATIONS

The following table sets forth, for the years indicated, certain line items from our consolidated statements of income and comprehensive income stated as a percentage of total revenue:

	Year ended December 31,	
Revenue:	2018	2017
Software licenses	50%	59%
Software maintenance	33	32
Services	17	8
Royalties	-	1
Total revenue	100	100
Costs and expenses:		
Cost of software licenses	-	2
Cost of services	8	4
Research and development	44	50
Selling and marketing	26	25
General and administrative	20	22
Total costs and expenses	98	103
Patent related income	1	10
Operating income	3	7
Other income	-	-
Interest income	5	3
Income before provision for (benefit from) income taxes	8	10
Provision for (benefit from) income taxes	-	4
Net income	8%	6%

Summary of Operations

We are primarily engaged in the development and sale of biometrics products and services. Our software products are used in government and commercial biometrics systems to identify or authenticate people. Principal government applications of biometrics systems include border control, visitor screening, law enforcement, national defense, intelligence, secure credentialing, access control, and background checks. Principal commercial applications include: i) user authentication for login and access to mobile devices, computers, networks, and software programs; ii) user authentication for financial transactions and purchases (online and in-person); iii) physical access control to buildings, and iv) screening and background checks of prospective employees and customers. We sell our software and services globally through systems integrators and OEMs, and directly to end user customers. We also derive a portion of our revenue from the sale of imaging software licenses to OEMs and systems integrators that incorporate our software into medical imaging products and medical systems.

Effective January 1, 2018, we adopted Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC"), Topic 606, Revenue from Contracts with Customers ("ASC 606"), using the full retrospective transition method. Adoption of the standard using the full retrospective method required us to restate certain previously reported results. Refer to Note 2 – Recently Adopted Accounting Pronouncements for further information on the impacts of adopting ASC 606.

Summary of Financial Results

We used revenue and operating income to summarize financial results over the past two years as we believe these measurements are the most meaningful way to understand our operating performance.

2018 compared to 2017

Revenue and operating income in 2018 were $16.1 million and $0.4 million, respectively, which compared to revenue and operating income in 2017 of $15.5 million and $1.1 million, respectively.

Higher revenue in 2018 as compared to 2017 was primarily due to higher biometrics license, maintenance and services revenue. This was partially offset by lower imaging license revenue. Lower operating income in 2018 as compared to 2017 was primarily due to lower income from a patent arrangement that was partially offset by: i) higher revenue in 2018; and ii) lower total costs and expenses in 2018.

Software Licenses

Software licenses consist of revenue from the sale of biometrics and imaging software products. Sales of software products depend on our ability to win proposals to supply software for biometrics systems projects either directly to end user customers or indirectly through channel partners.

Software license revenue decreased 12% from $9.1 million in 2017 to $8.0 million in 2018. As a percentage of total revenue, software license revenue decreased from 59% in 2017 to 50% in 2018. The $1.1 million decrease in software license revenue was primarily due to a $2.3 million decrease in imaging software license sales that was partially offset by $1.2 million increase in biometrics software license sales. The reasons for the changes in biometrics and imaging software licenses were:

i) Biometrics software licenses – Biometrics software license sales were $7.1 million in 2018 versus $6.0 million in 2017. The dollar increase was primarily due to: i) a software license agreement we entered into with a large commercial customer during the third quarter of 2018; and ii) revenue from the software license agreement we entered into with a systems integrator in the second quarter of 2018. We recognized $1.8 million of software license revenue from this agreement in 2018. We also provide engineering services to this systems integrator pursuant to this arrangement. We expect our development effort on this project to continue for approximately the next two to three quarters. The dollar increase was partially offset by lower revenue from our government customers and our other biometric license customers.

ii) Imaging software licenses – Imaging software license sales were $0.9 million in 2018 versus $3.2 million in 2017. The dollar decrease was primarily due to the impact of a software license agreement we entered into with a medical imaging customer in the third quarter of 2017 whereas there was no such imaging software sale in 2018.

Software Maintenance

Software maintenance consists of revenue from the sale of software maintenance contracts. Software maintenance contracts entitle customers to receive software support and software updates, if and when they become available, during the term of the contract.

Software maintenance revenue increased 10% from $4.9 million in 2017 to $5.4 million in 2018. As a percentage of total revenue, software maintenance revenue increased from 32% in 2017 to 33% in 2018. The dollar increase in software maintenance was primarily due to the higher retention of maintenance renewals in 2018.

A majority of our customers purchase software maintenance contracts when they initially purchase software licenses. Since our software is used in active biometrics systems, many of our customers continue to renew their maintenance contracts in subsequent years while systems remain operational.

Services

Services consist of fees we charge to perform software development, integration, installation, and customization services. Similar to software license revenue, services revenue depends on our ability to win biometrics systems projects either directly with end user customers or in conjunction with channel partners. Services revenue will fluctuate when we commence new projects and/or when we complete projects that were started in previous periods.

Services increased 114% from $1.3 million in 2017 to $2.7 million in 2018. As a percentage of total revenue, services increased from 8% in 2017 to 17% in 2018. The dollar increase in services revenue was primarily due to higher services revenue related to the software license agreement we entered into with a systems integrator in the second quarter of 2018 for a large project, which was slightly offset by lower service revenue from our other service customers. We expect our development effort on this large project to continue for approximately the next two to three quarters.

Services backlog was $0.7 million as of December 31, 2018.

Royalties

Royalties consist primarily of royalty payments we receive under DSL silicon contracts with two customers that incorporate our silicon intellectual property ("IP") in their DSL chipsets. We sold the assets of our DSL IP business in 2009, but we continued to receive royalty payments from these customers. Royalties are reported in continuing operations in accordance with ASC 205-20, Reporting Discontinued Operations, because we have continuing ongoing cash flows from this business.

Royalties decreased 100% from $0.1 million in 2017 to zero in 2018. As a percentage of total revenue, royalties decreased from 1% in 2017 to zero in 2018.

The royalty dollar decrease in 2018 was primarily due to no DSL royalties from both of our licensees. One of our royalty customers reported no royalties in 2018 and the other customer completed its royalty obligation in 2017. We do not consider DSL royalties to be a key element of our business and we believe that it is unlikely we will receive DSL royalties in future periods.

Cost of Software Licenses

Cost of software licenses consists primarily of the cost of third party software included in certain software products delivered to the U.S. Marine Corps ("USMC") and U.S. Navy (the "Navy").

Cost of software licenses decreased 93% from $274,000 in 2017 to $20,000 in 2018. Cost of software licenses as a percentage of software license sales decreased from 3% in 2017 to less than 1% in 2018. The dollar decrease in cost of software licenses was primarily due to no sales of software to the USMC and to lower sales of software to the Navy that included third party software.

Cost of Services

Cost of services consists of engineering costs to perform customer services projects. Such costs primarily include: i) engineering salaries, stock-based compensation, fringe benefits, and facilities; and ii) engineering consultants and contractors.

Cost of services increased 103% from $601,000 in 2017 to $1.2 million in 2018. Cost of services as a percentage of services revenue decreased from 48% in 2017 to 45% in 2018, which means that gross margins increased from 52% to 55%. The dollar increase in cost of services was primarily due to a large project with a systems integrator that we signed in the second quarter of 2018. The increase was partially offset by lower services revenue from our other customers. We anticipate further cost of services from this project over the next two to three quarters.

Gross margins on services of 55%, and 52%, in 2018, and 2017, respectively, were a function of: i) the nature of the projects; ii) the level of engineering difficulty and labor hours required to complete project tasks; and iii) how much we were able to charge. Gross margins in these years reflect the profitability mix of customer projects. We expect that gross margins on services will continue to fluctuate in future periods based on the nature, complexity, and pricing of future projects.

Research and Development Expense

Research and development expense consists of costs for: i) engineering personnel, including salaries, stock-based compensation, fringe benefits, and facilities; ii) engineering consultants and contractors, and iii) other engineering expenses such as supplies, equipment depreciation, dues and memberships and travel. Engineering costs incurred to develop our technology and products are classified as research and development expense. As described in the cost of services section, engineering costs incurred to provide engineering services for customer projects are classified as cost of services, and are not included in research and development expense.

The classification of total engineering costs to research and development expense and cost of services was (in thousands):

	Years ended December 31,	
	2018	2017
Research and development expense	$7,105	$7,769
Cost of services	1,220	601
Total engineering costs	$8,325	$8,370

Research and development expense decreased 9% from $7.8 million in 2017 to $7.1 million in 2018. As a percentage of total revenue, research and development expense decreased from 50% in 2017 to 44% in 2018. The decrease in research and development expense was primarily due to the reallocation of engineers from internal development projects to customer services projects.

As the table above indicates, total engineering costs decreased by $45,000 in 2018 as compared to 2017. The spending decrease was primarily due to lower spending on third-party development costs, which were partially offset by higher employee costs. Our engineering headcount increased by two in 2018. We believe our engineering organization was adequately staffed as of December 31, 2018.

As we described in the strategy section in Part 1 of this Form 10-K, we intend to introduce new products that will allow us to offer more complete biometrics solutions. We believe this strategy will allow us to sell more software into biometrics systems projects in order to grow our revenue. Our preference is to develop such products internally, however to the extent we are unable to do that, we may purchase or license technologies from third parties. We anticipate that we will continue to focus our future research and development activities on enhancing existing products and developing new products.

Selling and Marketing Expense

Selling and marketing expense primarily consists of costs for: i) sales and marketing personnel, including salaries, sales commissions, stock-based compensation, fringe benefits, travel, and facilities; and ii) advertising and promotion expenses.

Sales and marketing expense increased 7% from $4.0 million in 2017 to $4.2 million in 2018. As a percentage of total revenue, sales and marketing expense increased from 25% in 2017 to 26% in 2018. The dollar increase in selling and marketing expense was primarily due to higher spending on sales commissions, which were partially offset by lower spending on sales agents.

General and Administrative Expense

General and administrative expense consists primarily of costs for: i) officers, directors and administrative personnel, including salaries, bonuses, director compensation, stock-based compensation, fringe benefits, and facilities; ii) professional fees, including legal and audit fees; iii) public company expenses; and iv) other administrative expenses, such as insurance costs and bad debt provisions.

General and administrative expense decreased 3% from $3.4 million in 2017 to $3.3 million in 2018. As a percentage of total revenue, general and administrative expense decreased from 22% in 2017 to 20% in 2018. The decrease in general and administrative expense in 2018 was primarily due to: i) lower stock based compensation expense; and ii) lower audit and professional service fees. Higher audit and professional service fees in 2017 were primarily due to services related to the implementation of the new revenue standard. These decreases were partially offset by higher legal fees.

Patent Related Income

The composition of patent related income in 2018 and 2017 was as follows:

We had $69,000 and $1.6 million of income from a patent arrangement in the years ended December 31, 2018 and 2017, respectively. We entered into an arrangement with an unaffiliated third party in 2010 under which we assigned certain patents in return for royalties on proceeds from patent monetization efforts by the third party. Such third party has engaged in various patent monetization activities, including enforcement, litigation and licensing. The party reported and we recorded $69,000 and $1.6 million of income from this arrangement in the years ended December 31, 2018 and 2017, respectively.

We continue to have a contractual relationship with this third party. However, we are unable to predict how much more income we might receive from this arrangement, if any, because we do not know whether any patent monetization efforts by the third party will be successful.

Future patent sales are likely to be minimal as our remaining patents and patent applications pertain primarily to biometrics and imaging compression. Our current intent is to retain these patents for use in the business.

Other Income

We recorded other income of $36,000 in the year ended December 31, 2017 which consisted of a realized gain of $37,000 offset by a $1,000 realized loss on sale of two high yield bond investments. We did not record any other income or expense in the year ended December 31, 2018.

Interest Income

Interest income increased 110% from $401,000 in 2017 to $844,000 in 2018. The dollar increase was primarily due to higher interest rates within our money market accounts.

Income Taxes

We are subject to income taxes in the United States and we use estimates in determining our provisions for income taxes. We account for income taxes using the asset and liability method for accounting and reporting income taxes. Deferred tax assets and liabilities are recognized based on temporary differences between the financial reporting and income tax bases of assets and liabilities using statutory rates.

A discussion of income taxes for the years ended December 31, 2018, and 2017 follows:

Year ended December 31, 2018. Total income tax benefit for the year ended December 31, 2018 was $8,000. Income tax benefit for 2018 was based on: i) the U.S. statutory rate of 21%, ii) increased by state income taxes; and iii) reduced by permanent adjustments and research tax credits.

As of December 31, 2018, we had a total of $5.2 million of deferred tax assets for which we had recorded no valuation allowance. We have assessed the need for a valuation allowance on our deferred tax assets. Based on our assessment of future sources of income, including reversing deferred tax liabilities, and future earnings, we have determined that it is more likely than not that the deferred tax assets will be realized, and therefore there is no valuation allowance required for the deferred tax assets. We will continue to assess the level of valuation allowance in future periods.

Should evidence regarding the realizability of tax assets change at a future point in time, a valuation allowance will be required.

In 2017, the Internal Revenue Service commenced an examination of our tax return for the year ended December 31, 2015. In February 2018, the Internal Revenue Service notified us that it had completed its examination and that it had no changes to our reported tax.

Year ended December 31, 2017. Total income tax expense for the year ended December 31, 2017 was $0.5 million. Income tax expense for 2017 was based on: i) the U.S. statutory rate of 34%, ii) increased by the impact of the federal rate change on deferred tax assets due to enactment of the Tax Cuts and Jobs Act, iii) increased by state income taxes; and iv) reduced by permanent adjustments and research tax credits.

In the year ended December 31, 2017, as a result of the adoption of ASU 2016-09, that was effective on January 1, 2017, we recognized all excess tax benefits and tax deficiencies as income tax expense or benefit.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act. This legislation makes significant change in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss carryforwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S. corporate tax rate from the current rate of 34% to 21%. As a result of the enacted law, we were required to revalue deferred tax assets and liabilities at the enacted rate. This revaluation resulted in a provision of $0.4 million to income tax expense and a corresponding reduction in the deferred tax assets.

LIQUIDITY AND CAPITAL RESOURCES

In recent years, we have financed the company with our cash balances, cash generated from operations, and cash received from the sale of patent assets. Equity financing has not been a meaningful source of financing for us in recent years. Cash flows from operating, investing and financing activities are described below.

<u>Cash flow from operating activities</u>
In the years ended December 31, 2018, and 2017, our operating activities provided net cash of $0.7 million, and $3.7 million, respectively. A discussion of cash flow from operating activities for each of the last two years follows:

> *Year ended December 31, 2018.* Cash provided by operating activities was $0.7 million in 2018. Cash provided by operations was primarily the result of $1.2 million of net income and the add back of $1.0 million of non-cash items for depreciation, amortization and stock-based compensation. Cash from these sources was partially offset by $1.5 million of changes in assets and liabilities.
>
> *Year ended December 31, 2017.* Cash provided by operating activities was $3.7 million in 2017. Cash provided by operations was primarily the result of $1.0 million of net income and the add back of $1.2 million of non-cash items for depreciation, amortization and stock-based compensation. Cash provided by operating activities also included $1.5 million of cash from changes in assets and liabilities.

<u>Cash flow from investing activities</u>
In the year ended December 31, 2018, our investing activities used net cash of $0.2 million. In the year ended December 31, 2017, our investing activities provided net cash of $0.9 million. A discussion of cash flow from investing activities for each of the last two years follows:

> *Year ended December 31, 2018.* Cash used by investing activities of $0.2 million in 2018 consisted of purchases of property and equipment.
>
> *Year ended December 31, 2017.* Cash provided by investing activities of $0.9 million in 2017 was primarily the result of $1.0 million of proceeds from the sale of investments, which was partially offset by $0.1 million of purchases of property and equipment.

We have no material commitments for capital expenditures.

<u>Cash flow from financing activities</u>
In the years ended December 31, 2018 and 2017, our financing activities used net cash of $0.5 million and $4.9 million, respectively. A discussion of cash flow from financing activities for each of the last three years follows:

Year ended December 31, 2018. Cash used in financing activities was $0.5 million in 2018. Financing activity cash usage was primarily the result of $392,000 used to buy back stock under our stock repurchase program and $107,000 used to pay income taxes for employees who surrendered shares in connection with stock grants. Cash used for these purposes was partially offset by $50,000 of cash received from the issuance of stock under our ESPP program.

Year ended December 31, 2017. Cash used in financing activities was $4.9 million in 2017. Financing activity cash usage was primarily the result of $4.8 million used to buy back stock under our stock repurchase program and $186,000 used to pay income taxes for employees who surrendered shares in connection with stock grants. Cash used for these purposes was partially offset by $74,000 of cash received from the issuance of stock under our ESPP program and stock option exercises.

At December 31, 2018, we had cash and cash equivalents of $51.6 million. While we cannot assure you that we will not require additional financing, or that such financing will be available to us, we believe that our cash and cash equivalents will be sufficient to fund our operations for at least the next twelve months from the filing date.

To date, inflation has not had a material impact on our financial results. There can be no assurance, however, that inflation will not adversely affect our financial results in the future.

OFF-BALANCE SHEET ARRANGEMENTS

We do not currently have any arrangements with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities, or variable interest entities which are often established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Accordingly, we are not exposed to any financing, liquidity, market or credit risk if we had such relationships.

CRITICAL ACCOUNTING POLICIES

We consider certain accounting policies related to revenue recognition, stock-based compensation, income taxes, and the allowance for doubtful accounts to be critical policies.

Revenue recognition. Effective January 1, 2018, we adopted Accounting Standards Codification (“ASC”), Topic 606, Revenue from Contracts with Customers (“ASC 606”), using the full retrospective transition method. Adoption of the standard using the full retrospective method required us to restate certain previously reported results.

In accordance with ASC 606, revenue is recognized when a customer obtains control of promised goods and services. The amount of revenue recognized reflects the consideration to which we expect to be entitled to receive in exchange for these goods and services. In addition, ASC 606 requires disclosures of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers.

The core principle of the standard is that we should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. To achieve that core principle, we should apply the following five step model:

1. Identify the contract with the customer;
2. Identify the performance obligations in the contract;
3. Determine the transaction price;
4. Allocate the transaction price to the performance obligations in the contract; and
5. Recognize revenue when (or as) each performance obligation is satisfied.

1) Identify the contract with the customer

A contract with a customer exists when (i) we enter into an enforceable contract with a customer that defines each party’s rights regarding the goods or services to be transferred and identifies the related payment terms, (ii) the contract has commercial substance, and (iii) we determine that collection of substantially all consideration for goods and services that are transferred is probable based on the customer’s intent and ability to pay the promised consideration. We apply judgment in determining the customer's intent and ability to pay, which is based on a variety of factors including the customer's historical payment experience, or in the case of a new customer, published credit and financial information pertaining to the customer.

We evaluate contract modifications for the impact on revenue recognition if they have been approved by both parties such that the enforceable rights and obligations under the contract have changed. Contract modifications are either accounted for using a cumulative effect adjustment or prospectively over the remaining term of the arrangement. The determination of which method is more appropriate depends on the nature of the modification, which we evaluate on a case-by-case basis.

We combine two or more contracts entered into at or near the same time with the same customer and account for them as a single contract if (i) the contracts are negotiated as a package with a common commercial objective, (ii) the amount of consideration to be paid in one contract depends on the price or performance of the other contract, or (iii) some or all of the goods or services in one contract would be combined with some or all of the goods and services in the other contract into a single performance obligation. If two or more contracts are combined, the consideration to be paid is aggregated and allocated to the individual performance obligations without regard to the consideration specified in the individual contracts.

2) Identify the performance obligations in the contract

Performance obligations promised in a contract are identified based on the goods and services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the good or service either on its own or together with other available resources, and are distinct in the context of the contract, whereby the transfer of the good or service is separately identifiable from other promises in the contract. To the extent a contract includes multiple promised goods and services, we apply judgment to determine whether promised goods and services are capable of being distinct and distinct in the context of the contract. If these criteria are not met, the promised goods and services are accounted for as a combined performance obligation. To identify performance obligations, we consider all of the goods or services promised in a contract regardless of whether they are explicitly stated or are implied by customary business practices.

3) Determine the transaction price

The transaction price is determined based on the consideration we expect to be entitled in exchange for transferring promised goods and services to the customer. Determining the transaction price requires significant judgment. To the extent the transaction price includes variable consideration, we estimate the amount of variable consideration that should be included in the transaction price utilizing either the expected value method or the most likely amount method depending on the nature of the variable consideration. Variable consideration is included in the transaction price if, in our judgment, it is probable that a significant future reversal of cumulative revenue recognized under the contract will not occur. Any estimates, including the effect of the constraint on variable consideration, are evaluated at each reporting period. The amount of consideration is not adjusted for a significant financing component if the time between payment and the transfer of the related good or service is expected to be one year or less under the practical expedient in ASC 606-10-32-18. Our revenue arrangements are typically accounted for under such expedient, as payment is typically due within 30 to 60 days. As of December 31, 2018, none of our contracts contained a significant financing component.

4) Allocate the transaction price to performance obligations in the contract

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation based on a relative standalone selling price ("SSP") basis unless the transaction price is variable and meets the criteria to be allocated entirely to a performance obligation or to a distinct service that forms part of a single performance obligation. The consideration to be received is allocated among the separate performance obligations based on relative SSPs. The SSP is the price at which we would sell a promised good or service separately to a customer. The best estimate of SSP is the observable price of a good or service when we sell that good or service separately. A contractually stated price or a list price for a good or service may be the SSP of that good or service. We use a range of amounts to estimate SSP when we sell each of the goods and services separately and need to determine whether there is a discount that needs to be allocated based on the relative SSP of the various goods and services. In instances where SSP is not directly observable, such as when we do not sell the product or service separately, we typically determine the SSP using an adjusted market assessment approach using information that may include market conditions and other observable inputs.

We typically have more than one SSP for individual goods and services due to the stratification of those goods and services by customers and circumstances. In these instances, we may use information such as the nature of the customer and distribution channel in determining the SSP.

5) Recognize revenue when or as we satisfy a performance obligation

We satisfy performance obligations either over time or at a point in time as discussed in further detail below. Revenue is recognized over time if 1) the customer simultaneously receives and consumes the benefits provided by our performance, 2) our performance creates or enhances an asset that the customer controls as the asset is created or enhanced, or 3) our performance does not create an asset with an alternative use to us and we have an enforceable right to payment for performance completed to date. If we do not satisfy a performance obligation over time, the related performance obligation is satisfied at a point in time by transferring the control of a promised good or service to a customer.

We categorize revenue as software licenses, software maintenance, services, or royalties. In addition to the general revenue recognition policies described above, specific revenue recognition policies apply to each category of revenue.

Software licenses

Software licenses consist of revenue from the sale of software licenses for biometrics and imaging applications. Our software licenses are functional intellectual property and typically provide customers with the right to use our software in perpetuity as it exists when made available to the customer. We recognize revenue from software licenses at a point in time upon delivery, provided all other revenue recognition criteria are met.

Software maintenance

Software maintenance consists of revenue from the sale of software maintenance contracts for biometrics and imaging software. Software maintenance contracts entitle customers to receive software support and software updates, if and when they become available, during the term of the maintenance contract. Software support and software updates are considered distinct services. However, these distinct services are considered a single performance obligation consisting of a series of distinct services that are substantially the same and have the same pattern of transfer to the customer. We recognize software maintenance revenue over time on a straight-line basis over the contract period.

Services

Service revenue consists of fees from biometrics customers for software engineering services we provide to them. We recognize services revenue over time as the services are delivered using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted), provided all other revenue recognition criteria are met.

Royalties

Royalties consist primarily of royalty payments we receive under DSL silicon contracts with two customers that incorporate our silicon intellectual property (“IP”) in their DSL chipsets. We sold the assets of our DSL IP business in 2009, but we continued to receive royalty payments from these customers.

We recognize revenue from sales-based royalties at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Refer to Note 8 – Business Segments and Major Customers for further information on the disaggregation of revenue, including revenue by geography and category.

Arrangements with multiple performance obligations

In addition to selling software licenses, software maintenance and software services on a standalone basis, a significant portion of our contracts include multiple performance obligations. The various combinations of multiple performance obligations and our revenue recognition for each are described as follows:

- Software licenses and software maintenance. When software licenses and software maintenance contracts are sold together, the software licenses and software maintenance are generally considered distinct performance obligations. The transaction price is allocated to the software licenses and the software maintenance based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery, provided all other revenue recognition criteria are met. Revenue allocated to the software maintenance is recognized over time on a straight-line basis over the contract period.

- Software licenses and services. When software licenses and significant customization engineering services are sold together, they are accounted for as a combined performance obligation, as the software licenses are generally highly dependent on, and interrelated with, the associated services and therefore are not distinct performance obligations. Revenue for the combined performance obligation is recognized over time as the services are delivered using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). When software licenses and standard implementation or consulting-type services are sold together, they are generally considered distinct performance obligations, as the software licenses are not dependent on or interrelated with the associated services. The transaction price in these arrangements is allocated to the software licenses and services based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery, provided all other revenue recognition criteria are met. Revenue allocated to the services is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). In arrangements with both software licenses and services, the software license portion of the arrangement is classified as software license revenue and the services portion is classified as services revenue in our consolidated statements of income and comprehensive income.

- Software licenses, software maintenance and services. When we sell software licenses, software maintenance and software services together, we account for the individual performance obligations separately if they are distinct. The transaction price is allocated to the separate performance obligations based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery. Revenue allocated to the services is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). Revenue for the software maintenance is recognized over time on a straight-line basis over the contract period. However, if the software services are significant customization engineering services, they are accounted for with the software licenses as a combined performance obligation, as stated above. Revenue for the combined performance obligation is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted).

Returns

We do not offer rights of return for our products and services in the normal course of business.

Customer Acceptance

Our contracts with customers generally do not include customer acceptance clauses.

Contract Balances

When the timing of our delivery of goods or services is different from the timing of payments made by customers, we recognize either a contract asset (performance precedes contractual due date) or a contract liability (customer payment precedes performance). Customers that prepay are represented by the deferred revenue below until the performance obligation is satisfied. Contract assets represent arrangements in which the good or service has been delivered but payment is not yet due. Our contract assets consist of unbilled receivables. Our contract liabilities consisted of deferred (unearned) revenue, which is generally related to software maintenance contracts. We classify deferred revenue as current or noncurrent based on the timing of when we expect to recognize revenue.

The following table presents changes in our contract assets and liabilities during the years ended December 31, 2017 and 2018 (in thousands):

	Balance at Beginning of Period	Revenue Recognized In Advance of Billings	Billings	Balance at End of Period
Year ended December 31, 2017				
Contract assets:				
Unbilled receivables	$ 2,259	$ 198	$ (1,028)	$ 1,429
Year ended December 31, 2018				
Contract assets:				
Unbilled receivables	$ 1,429	$ 3,278	$ (1,428)	$ 3,279

	Balance at Beginning of Period	Billings	Revenue Recognized	Balance at End of Period
Year ended December 31, 2017				
Contract liabilities:				
Deferred revenue	$ 2,933	$ 4,933	$ (4,934)	$ 2,932
Year ended December 31, 2018				
Contract liabilities:				
Deferred revenue	$ 2,932	$ 5,564	$ (5,397)	$ 3,099

Remaining Performance Obligations

Remaining performance obligations represent the transaction price from contracts for which work has not been performed or goods and services have not been delivered. We expect to recognize revenue on approximately 97% of the remaining performance obligations over the next 12 months, with the remainder recognized thereafter. As of December 31, 2018, the aggregate amount of the transaction price allocated to remaining performance obligations for software maintenance contracts with a duration greater than one year was $0.1 million.

Contract Costs

We recognize an other asset for the incremental costs of obtaining a contract with a customer if we expect the benefit of those costs to be longer than one year. We have determined that certain sales commissions meet the requirements to be capitalized, and we amortize these costs on a consistent basis with the pattern of transfer of the goods and services in the contract. Total capitalized costs to obtain a contract were immaterial during the periods presented and are included in other current and long-term assets on our consolidated balance sheets.

We apply a practical expedient to expense costs as incurred for costs to obtain a contract when the amortization period is one year or less. These costs include sales commissions on software maintenance contracts with a contract period of one year or less as sales commissions paid on contract renewals are commensurate with those paid on the initial contract.

Stock-Based Compensation. We grant stock and stock options to our employees and directors, although stock option grants in recent years have been minimal. We measure stock-based compensation cost at the grant date based on the fair value of the award and recognize it as expense over the applicable vesting period of the award using the straight-line basis.

For stock awards, we determine the fair value of the award by using the fair market value of our stock on the date of grant, provided the number of shares in the grant is fixed on the grant date.

For stock options, we use the Black-Scholes valuation model to estimate the fair value of the award. This valuation model takes into account the exercise price of the award, as well as a variety of significant assumptions. The assumptions used to estimate the fair value of stock options include the expected term, the expected volatility of our stock over the expected term, the risk-free interest rate over the expected term, and our expected annual dividend yield.

Income taxes. As part of the process of preparing our consolidated financial statements we are required to estimate our actual current tax expense. We must also estimate temporary and permanent differences that result from differing treatment of certain items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which are included in our consolidated balance sheet. We must then assess the likelihood that our deferred tax assets will be recovered from future taxable income and to the extent we believe recovery is not likely, we must establish a valuation allowance. To the extent we establish a valuation allowance or increase this allowance in a period for deferred tax assets, which have been recognized, we must include an expense with the tax provision in the statement of operations. Conversely, to the extent we decrease our valuation allowance in a period for deferred tax assets, which have been previously reserved, we must include a tax benefit with the tax provision in the statement of operations.

Significant management judgment is required in determining our provision for income taxes, our deferred tax assets, and any valuation allowance recorded against our net deferred tax assets. Our deferred tax assets primarily relate to: i) research and development tax credit carryforwards related to excess stock compensation benefits, that are now recorded as tax assets as a result of the adoption of ASU 2016-09, that was effective on January 1, 2017; and ii) temporary differences that result from differing treatment of certain items for tax and accounting purposes. As of December 31, 2018, we had a total of $5.2 million of deferred tax assets for which we had recorded no valuation allowance.

We will continue to assess the level of valuation allowance required in future periods. Should evidence regarding the realizability of tax assets change at a future point in time, the valuation allowance will be adjusted accordingly.

Allowance for doubtful accounts. We make judgments as to our ability to collect outstanding receivables and provide allowances for receivables when collection becomes doubtful. Provisions are made based upon a specific review of all significant outstanding invoices. If the judgments we make to determine the allowance for doubtful accounts do not reflect the future ability to collect outstanding receivables, additional provisions for doubtful accounts may be required.

RECENT ACCOUNTING PRONOUNCEMENTS

Recently Adopted Accounting Pronouncements

FASB ASU No. 2014-09. In May 2014, the FASB issued Accounting Standard Update No. 2014-09, Revenue from Contracts with Customers (Topic 606). The core principle of the new guidance is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. We adopted the standard on January 1, 2018 utilizing the full retrospective method.

We implemented new internal controls for the implementation and modified and augmented our existing internal controls that enabled the preparation of financial information on adoption. The most significant impacts of adopting the new standard related to the following:

i) DSL royalty contracts. Under our legacy revenue recognition policy, we recognized DSL royalty revenue in the period in which we received royalty reports, which was typically in the quarter immediately following the quarter in which sales of royalty-bearing products occurred. Under the new standard, we recognize DSL royalty revenue in the quarter in which sales of royalty-bearing products occur. Therefore, we make estimates of royalties earned in the current period and record royalty revenue based on those estimates. This change resulted in a decrease in revenue of $17,000 for fiscal year 2017.

ii) Minimum license/royalty payment contract. One of our revenue contracts required the customer to make a fixed payment for professional services as well as minimum license/royalty payments for software to be distributed to end-users. Under legacy GAAP, we recognized the professional services fee over the period that the services were performed and revenue for the minimum license/royalty payments when those minimum payments became due. Under the new standard we recognized the estimated amount of total consideration, including the professional services fee and our estimate of variable consideration related to the minimum license/royalty payments, in the contract that we expect to be entitled to and recognized revenue in the period(s) that the related licenses and services were transferred to the customer. This change resulted in a decrease in revenue of $800,000 for fiscal year 2017, and an increase in unbilled receivables of $1.4 million in fiscal year 2017.

iii) Sales commissions and other third-party acquisition costs. Under legacy GAAP, sales commissions and other third-party acquisition costs resulting directly from securing contracts with customers were expensed as incurred. ASC 340 requires these costs to be recognized as an asset when incurred and expensed over a period consistent with the period of transfer to the customer of goods or services to which the asset relates. We adopted the practical expedient that if the amortization period of the asset that we otherwise would have recognized is one year or less, we expense the sales commissions and other third-party acquisition costs resulting directly from securing contracts with customers when incurred. The adoption of the new standard resulted in a decrease in expense of approximately $114,000 for fiscal year 2017. For fiscal year 2017, the decrease in expense primarily relates to lower sales commissions due to lower revenue on our minimum license/royalty payment contract as noted above

Revenue recognition related to our other arrangements for software licenses, software maintenance, and services will remain substantially unchanged.

As a practical expedient, for contracts that were modified before the earliest reporting period of application of the standard, we have not retrospectively restated the contracts for those contract modifications. Instead we have reflected the aggregate effect of all modifications that occurred before the earliest reporting period of application when (i) identifying the satisfied and unsatisfied performance obligations, (ii) determining the transaction price, and (iii) allocating the transaction price to the satisfied and unsatisfied performance obligations.

We have not restated contracts that began and were completed within the same annual reporting period. For completed contracts that have variable consideration, we have used the transaction price at the date the contract was completed rather than estimating variable consideration amounts in comparative reporting periods.

For fiscal year 2017, adoption of the standard resulted in an aggregate decrease in revenue of $0.8 million, a decrease in costs and expenses of $0.1 million, a decrease in the provision for income taxes of $0.4 million, and an increase in stockholders' equity of $0.9 million primarily due to the changes noted above. In addition, adoption of the standard resulted in an increase in unbilled receivables of $1.4 million as of December 31, 2017 driven by unbilled receivables from recognition of revenue from the estimate of variable consideration related to the minimum license/royalty payments in one of our contracts; a decrease in deferred tax assets of $0.3 million as of December 31, 2017 driven primarily by a difference in timing of revenue recognition and expenses for book and tax purposes; and an increase in accrued expenses of $0.2 million as of December 31, 2017 driven by sales commissions related to recognition of revenue from the estimate of variable consideration related to the minimum license/royalty payments in one of our contracts. Also, the 2017 opening stockholders' equity balance increased by $1.2 million related to the effect of adoption of the standard from prior periods.

See Impacts of Topic 606 Adoption to Reported Results below for the impact of the adoption of the new standard on our consolidated financial statements.

Impacts of Topic 606 Adoption to Reported Results

Adoption of the new revenue standard impacted our reported results as follows:

(In thousands, except per share data)						**Year Ended December 31, 2017**
		As Reported		**Adjustment**		**As Adjusted**
Consolidated Statements of Income:						
Revenue	$	16,282	$	(817)	$	15,465
Costs and expenses		16,054		(114)		15,940
Provision for income taxes		965		(422)		543
Net income		1,282		(281)		1,001
Net income per share - basic		0.06		(0.01)		0.05
Net income per share - diluted		0.06		(0.01)		0.05

(In thousands)						**December 31, 2017**
		As Reported		**Adjustment**		**As Adjusted**
Consolidated Balance Sheets:						
Accounts and unbilled receivables, net	$	2,401	$	1,417	$	3,818
Prepaid expenses and other current assets		203		13		216
Deferred tax assets		5,402		(331)		5,071
Accrued expenses		1,184		217		1,401
Stockholders' equity		59,652		882		60,534

Adoption of the new revenue standard had no impact to cash from or used in operating, financing, or investing on our consolidated statements of cash flows.

FASB ASU No. 2016-09. In March 2016, the FASB issued Accounting Standard Update No. 2016-09, "Improvements to Employee Share-Based Payment Accounting," which is intended to simplify various aspects of how share-based payments are accounted for and presented in financial statements. The standard is effective prospectively for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2016, with early adoption permitted.

The new standard contains several amendments that will simplify the accounting for employee share-based payment transactions, including the accounting for income taxes, forfeitures, statutory tax withholding requirements, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The changes in the new standard eliminate the accounting for excess tax benefits to be recognized in additional paid-in capital and tax deficiencies recognized either in the income tax provision or in additional paid-in capital. In addition, the new standard eliminates the limitation on recognition of excess stock compensation benefits until such benefits are actually realized, and instead applies the general recognition standard to these deferred tax assets. We adopted ASU 2016-09 in 2017 which was applied using a modified retrospective approach. Upon adoption, we recorded a deferred tax asset of $4.8 million with an offsetting adjustment to retained earnings related to excess stock compensation deductions that were not previously recorded as tax assets. For the year ended December 31, 2017, we recognized all excess tax benefits and tax deficiencies as income tax expense or benefit.

Recent Accounting Pronouncements Not Yet Adopted

FASB ASU No. 2016-13. In June 2016, the FASB issued Accounting Standard Update No. 2016-13, "Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments." This new standard replaces the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. For trade and other receivables, loans, and other financial instruments, entities will be required to use a forward-looking expected loss model rather than the incurred loss model for recognizing credit losses which reflects losses that are probable. Credit losses relating to available-for-sale debt securities will also be recorded through an allowance for credit losses rather than as a reduction in the amortized cost basis of the securities. This standard is effective for fiscal years beginning after December 15, 2019 with early adoption permitted in fiscal years beginning after December 15, 2018. We are currently evaluating the effect this standard will have on our consolidated financial statements and related disclosures.

With the exception of the standards discussed above, there have been no other recently issued accounting pronouncements that are of significance or potential significance to us that we have not adopted as of December 31, 2018.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our exposure to market risk relates primarily to our investment portfolio, and the effect that changes in interest rates would have on that portfolio. Our investment portfolio at December 31, 2018 consisted of one element:

> *Cash and cash equivalents.* As of December 31, 2018, our cash and cash equivalents of $51.6 million were primarily invested in money market funds. The money market funds were invested in high quality, short term financial instruments. Due to the nature, short duration, and professional management of these funds, we do not expect that a general increase in interest rates would result in any material loss.

We do not use derivative financial instruments for speculative or trading purposes.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Aware, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Aware, Inc. and its subsidiary (the Company) as of December 31, 2018 and 2017, the related consolidated statements of income and comprehensive income, stockholders' equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes to the consolidated financial statements (collectively, the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control – Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013 and our report dated February 19, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Adoption of New Accounting Standard

As discussed in Note 2 to the financial statements, the Company has changed its method of accounting for revenue effective January 1, 2018 due to the adoption of Accounting Standards Codification 606, *Revenue from Contracts with Customers.*

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ RSM US LLP

We have served as the Company's auditor since 2012.

Boston, Massachusetts
February 19, 2019

AWARE, INC.
CONSOLIDATED BALANCE SHEETS
(in thousands, except share data)

	December 31, 2018	December 31, 2017
ASSETS		
Current assets:		
Cash and cash equivalents	$51,612	$51,608
Accounts receivable (less allowance for doubtful accounts of $20 at December 31, 2018 and 2017)	2,010	2,389
Unbilled receivables	3,279	1,429
Prepaid expenses and other current assets	284	216
Total current assets	57,185	55,642
Property and equipment, net	4,085	4,304
Deferred tax assets	5,171	5,071
Other assets	-	18
Total assets	$66,441	$65,035
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$126	$166
Accrued expenses	1,319	1,401
Accrued income taxes	-	2
Deferred revenue	3,024	2,805
Total current liabilities	4,469	4,374
Long-term deferred revenue	75	127
Commitments and contingent liabilities (Note 8)		
Stockholders' equity:		
Preferred stock, $1.00 par value; 1,000,000 shares authorized, none outstanding	-	-
Common stock, $.01 par value; shares authorized, 70,000,000 in 2018 and 2017; issued and outstanding 21,515,872 as of December 31, 2018 and 21,493,440 as of December 31, 2017	215	215
Additional paid-in capital	96,376	96,246
Accumulated deficit	(34,694)	(35,927)
Total stockholders' equity	61,897	60,534
Total liabilities and stockholders' equity	$66,441	$65,035

The accompanying notes are an integral part of the consolidated financial statements.

AWARE, INC.
CONSOLIDATED STATEMENTS OF INCOME AND COMPREHENSIVE INCOME
(in thousands, except per share data)

	Years ended December 31,	
	2018	**2017**
Revenue:		
Software licenses	$8,038	$9,139
Software maintenance	5,397	4,923
Services	2,696	1,259
Royalties	-	144
Total revenue	16,131	15,465
Costs and expenses:		
Cost of software licenses	20	274
Cost of services	1,220	601
Research and development	7,105	7,769
Selling and marketing	4,178	3,907
General and administrative	3,296	3,389
Total costs and expenses	15,819	15,940
Patent related income	69	1,582
Operating income	381	1,107
Other income	-	36
Interest income	844	401
Income before provision (benefit) for income taxes	1,225	1,544
Provision (benefit) for income taxes	(8)	543
Net income	$1,233	$1,001
Net income per share – basic	$0.06	$0.05
Net income per share – diluted	$0.06	$0.05
Weighted-average shares - basic	21,544	21,814
Weighted-average shares - diluted	21,605	21,877
Comprehensive income:		
Net income	$1,233	$1,001
Other comprehensive income (net of tax):		
Unrealized gain on available for sale securities	-	19
Comprehensive income	$1,233	$1,020

The accompanying notes are an integral part of the consolidated financial statements.

AWARE, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Years ended December 31,	
	2018	**2017**
Cash flows from operating activities:		
Net income	$1,233	$1,001
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	443	519
Stock-based compensation	580	663
Amortization of discount on investments	-	(4)
Gain on sale of investments	-	(36)
Deferred tax expense on other comprehensive income	-	(10)
Increase (decrease) from changes in assets and liabilities:		
Accounts receivable	379	602
Unbilled receivables	(1,850)	830
Prepaid expenses and other current assets	(68)	74
Deferred tax assets	(100)	13
Accounts payable	(40)	31
Accrued expenses	(82)	(15)
Accrued income taxes	(2)	2
Deferred revenue	167	(1)
Net cash provided by operating activities	660	3,669
Cash flows from investing activities:		
Purchases of property and equipment	(206)	(82)
Sales of investments	-	1,019
Net cash provided by (used in) investing activities	(206)	937
Cash flows from financing activities:		
Proceeds from issuance of common stock	50	61
Proceeds from exercise of stock options	-	13
Payments made for taxes of employees who surrendered shares related to unrestricted stock	(107)	(186)
Repurchase of common stock	(393)	(4,799)
Net cash used in financing activities	(450)	(4,911)
Increase/(decrease) in cash and cash equivalents	4	(305)
Cash and cash equivalents, beginning of year	51,608	51,913
Cash and cash equivalents, end of year	$51,612	$51,608
Supplemental disclosure:		
Cash paid for income taxes	$96	$488

The accompanying notes are an integral part of the consolidated financial statements.

AWARE, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Additional Paid-In	Accumulated Other Comprehensive	(Accumulated	Total Stockholders'
	Shares	Amount	Capital	Loss	Deficit)	Equity
Balance at December 31, 2016	22,371	$224	$100,485	($19)	($41,686)	$59,004
Cumulative effect on adoption of ASC 2016-09 (see Note 2)					4,758	4,758
Exercise of common stock options	4	-	13			13
Issuance of unrestricted stock	143	1	(1)			-
Shares surrendered by employees to pay taxes related to unrestricted stock	(33)	-	(186)			(186)
Issuance of common stock under employee stock purchase plan	13	-	61			61
Stock-based compensation expense			663			663
Repurchase of common stock	(1,005)	(10)	(4,789)			(4,799)
Accumulated other comprehensive loss:						
Unrealized gain on securities				28		28
Deferred tax expense on unrealized gain				(9)		(9)
Net income					1,001	1,001
Balance at December 31, 2017	21,493	215	96,246	-	(35,927)	60,534
Issuance of unrestricted stock	136	1	(1)			-
Shares surrendered by employees to pay taxes related to unrestricted stock	(25)	-	(107)			(107)
Issuance of common stock under employee stock purchase plan	14	-	50			50
Stock-based compensation expense			580			580
Repurchase of common stock	(102)	(1)	(392)			(393)
Net income					1,233	1,233
Balance at December 31, 2018	21,516	$215	$96,376	$-	($34,694)	$61,897

The accompanying notes are an integral part of the consolidated financial statements.

1. NATURE OF BUSINESS

We are a leading provider of software and services to the biometrics industry. Our software products are used in government and commercial biometrics systems, which are capable of determining or verifying an individual's identity. We also offer engineering services related to software customization, integration, and installation, as well as complete systems development. We sell our biometrics software products and services globally through systems integrators, OEMs, and directly to end user customers.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation - The consolidated financial statements include the accounts of Aware, Inc. and its subsidiary ("the Company"). All significant intercompany transactions have been eliminated.

Use of Estimates – The preparation of our financial statements in conformity with accounting principles generally accepted in the United States of America requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenues and expenses during the reporting period. The most significant estimates included in the financial statements pertain to revenue recognition, reserves for doubtful accounts, useful lives of fixed assets, valuation allowance for deferred income tax assets, and accrued liabilities. Actual results could differ from those estimates.

Fair Value Measurements - The Financial Accounting Standards Board ("FASB") Codification defines fair value, and establishes a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to the unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements). The three levels of the fair value hierarchy under the FASB Codification are: i) Level 1 – valuations that are based on quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date; ii) Level 2 – valuations that are based on quoted prices in markets that are not active or for which all significant inputs are observable, either directly or indirectly; and iii) Level 3 – valuations that require inputs that are both significant to the fair value measurement and unobservable.

Cash and cash equivalents, which primarily include money market mutual funds, were $51.6 million at December 31, 2018 and December 31, 2017. We classified our cash equivalents of $47.9 million and $50.0 million as of December 31, 2018 and 2017, respectively, within Level 1 of the fair value hierarchy because they are valued using quoted market prices.

As of December 31, 2018, our assets that are measured at fair value on a recurring basis and whose carrying values approximate their respective fair values include the following (in thousands):

	Fair Value Measurement at December 31, 2018 Using:		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market funds (included in cash and cash equivalents)	$47,939		
Total	$47,939	$-	$-

As of December 31, 2017, our assets that are measured at fair value on a recurring basis and whose carrying values approximate their respective fair values include the following (in thousands):

	Fair Value Measurement at December 31, 2017 Using:		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Money market funds (included in cash and cash equivalents)	$49,986	-	-
Total	$49,986	$-	$-

Cash and Cash Equivalents – Cash and cash equivalents, which consist primarily of money market funds and demand deposits, are stated at fair value. All highly liquid investments purchased with an original maturity of three months or less are considered cash equivalents. Our cash balances exceed the Federal Deposit Insurance Corporation limits. The Company does not believe it is exposed to significant credit risk related to cash and cash equivalents.

Investments - We categorized all investment securities as available-for-sale, since we may liquidate these investments currently. In calculating realized gains and losses, cost is determined using specific identification. Unrealized gains and losses on available-for-sale securities are excluded from earnings and reported in a separate component of stockholders' equity called Accumulated Comprehensive Income.

Realized gains on investments were $36,000 in the year ended December 31, 2017. There were no unrealized gains or losses on investments for the years ended December 31, 2018 and 2017.

Allowance for Doubtful Accounts – Accounts are charged to the allowance for doubtful accounts as they are deemed uncollectible based on a periodic review of the accounts.

For the years ended December 31, 2018 and 2017, changes to and ending balances of the allowance for doubtful accounts were as follows (in thousands):

	Years ended December 31,	
	2018	2017
Allowance for doubtful accounts balance - beginning of year …...	$20	$20
Additions to the allowance for doubtful accounts ….....................	-	19
Deductions against the allowance for doubtful accounts …...........	-	(19)
Allowance for doubtful accounts balance - end of year ….............	$20	$20

Property and Equipment – Property and equipment is stated at cost. Depreciation and amortization of property and equipment is provided using the straight-line method over the estimated useful lives of the assets. Upon retirement or sale, the costs of the assets disposed of and the related accumulated depreciation are removed from the accounts and any resulting gain or loss on disposal is included in the determination of income or loss. Expenditures for repairs and maintenance are charged to expense as incurred.

The estimated useful lives of assets used by us are:

Building	30 years
Building improvements...	5 to 20 years
Furniture and fixtures..	5 years
Computer, office & manufacturing equipment	3 years
Purchased software	3 years

Impairment of Long-Lived Assets – We review long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the undiscounted cash flows estimated to be generated by those assets over their estimated economic life to the related carrying value of those assets to determine if the assets are impaired. If an impairment is indicated, the asset is written down to its estimated fair value. The cash flow estimates used to identify the potential impairment reflect our best estimates using appropriate assumptions and projections at that time. We believe that no significant impairment of our long-lived assets has occurred as of December 31, 2018 and 2017.

Revenue recognition. Effective January 1, 2018, we adopted Accounting Standards Codification ("ASC"), Topic 606, Revenue from Contracts with Customers ("ASC 606"), using the full retrospective transition method. Adoption of the standard using the full retrospective method required us to restate certain previously reported results.

In accordance with ASC 606, revenue is recognized when a customer obtains control of promised goods and services. The amount of revenue recognized reflects the consideration to which we expect to be entitled to receive in exchange for these goods and services. In addition, ASC 606 requires disclosures of the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers.

The core principle of the standard is that we should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which we expect to be entitled in exchange for those goods or services. To achieve that core principle, we should apply the following five step model:

1. Identify the contract with the customer;
2. Identify the performance obligations in the contract;
3. Determine the transaction price;
4. Allocate the transaction price to the performance obligations in the contract; and
5. Recognize revenue when (or as) each performance obligation is satisfied.

1) Identify the contract with the customer

A contract with a customer exists when (i) we enter into an enforceable contract with a customer that defines each party's rights regarding the goods or services to be transferred and identifies the related payment terms, (ii) the contract has commercial substance, and (iii) we determine that collection of substantially all consideration for goods and services that are transferred is probable based on the customer's intent and ability to pay the promised consideration. We apply judgment in determining the customer's intent and ability to pay, which is based on a variety of factors including the customer's historical payment experience, or in the case of a new customer, published credit and financial information pertaining to the customer.

We evaluate contract modifications for the impact on revenue recognition if they have been approved by both parties such that the enforceable rights and obligations under the contract have changed. Contract modifications are either accounted for using a cumulative effect adjustment or prospectively over the remaining term of the arrangement. The determination of which method is more appropriate depends on the nature of the modification, which we evaluate on a case-by-case basis.

We combine two or more contracts entered into at or near the same time with the same customer and account for them as a single contract if (i) the contracts are negotiated as a package with a common commercial objective, (ii) the amount of consideration to be paid in one contract depends on the price or performance of the other contract, or (iii) some or all of the goods or services in one contract would be combined with some or all of the goods and services in the other contract into a single performance obligation. If two or more contracts are combined, the consideration to be paid is aggregated and allocated to the individual performance obligations without regard to the consideration specified in the individual contracts.

2) Identify the performance obligations in the contract

Performance obligations promised in a contract are identified based on the goods and services that will be transferred to the customer that are both capable of being distinct, whereby the customer can benefit from the good or service either on its own or together with other available resources, and are distinct in the context of the contract, whereby the transfer of the good or service is separately identifiable from other promises in the contract. To the extent a contract includes multiple promised goods and services, we apply judgment to determine whether promised goods and services are capable of being distinct and distinct in the context of the contract. If these criteria are not met, the promised goods and services are accounted for as a combined performance obligation. To identify performance obligations, we consider all of the goods or services promised in a contract regardless of whether they are explicitly stated or are implied by customary business practices.

3) Determine the transaction price

The transaction price is determined based on the consideration we expect to be entitled in exchange for transferring promised goods and services to the customer. Determining the transaction price requires significant judgment. To the extent the transaction price includes variable consideration, we estimate the amount of variable consideration that should be included in the transaction price utilizing either the expected value method or the most likely amount method depending on the nature of the variable consideration. Variable consideration is included in the transaction price if, in our judgment, it is probable that a significant future reversal of cumulative revenue recognized under the contract will not occur. Any estimates, including the effect of the constraint on variable consideration, are evaluated at each reporting period. The amount of consideration is not adjusted for a significant financing component if the time between payment and the transfer of the related good or service is expected to be one year or less under the practical expedient in ASC 606-10-32-18. Our revenue arrangements are typically accounted for under such expedient, as payment is typically due within 30 to 60 days. As of December 31, 2018, none of our contracts contained a significant financing component.

4) Allocate the transaction price to performance obligations in the contract

If the contract contains a single performance obligation, the entire transaction price is allocated to the single performance obligation. Contracts that contain multiple performance obligations require an allocation of the transaction price to each performance obligation based on a relative standalone selling price (“SSP”) basis unless the transaction price is variable and meets the criteria to be allocated entirely to a performance obligation or to a distinct service that forms part of a single performance obligation. The consideration to be received is allocated among the separate performance obligations based on relative SSPs. The SSP is the price at which we would sell a promised good or service separately to a customer. The best estimate of SSP is the observable price of a good or service when we sell that good or service separately. A contractually stated price or a list price for a good or service may be the SSP of that good or service. We use a range of amounts to estimate SSP when we sell each of the goods and services separately and need to determine whether there is a discount that needs to be allocated based on the relative SSP of the various goods and services. In instances where SSP is not directly observable, such as when we do not sell the product or service separately, we typically determine the SSP using an adjusted market assessment approach using information that may include market conditions and other observable inputs. We typically have more than one SSP for individual goods and services due to the stratification of those goods and services by customers and circumstances. In these instances, we may use information such as the nature of the customer and distribution channel in determining the SSP.

5) Recognize revenue when or as we satisfy a performance obligation

We satisfy performance obligations either over time or at a point in time as discussed in further detail below. Revenue is recognized over time if 1) the customer simultaneously receives and consumes the benefits provided by our performance, 2) our performance creates or enhances an asset that the customer controls as the asset is created or enhanced, or 3) our performance does not create an asset with an alternative use to us and we have an enforceable right to payment for performance completed to date. If we do not satisfy a performance obligation over time, the related performance obligation is satisfied at a point in time by transferring the control of a promised good or service to a customer.

We categorize revenue as software licenses, software maintenance, services, or royalties. In addition to the general revenue recognition policies described above, specific revenue recognition policies apply to each category of revenue.

Software licenses

Software licenses consist of revenue from the sale of software licenses for biometrics and imaging applications. Our software licenses are functional intellectual property and typically provide customers with the right to use our software in perpetuity as it exists when made available to the customer. We recognize revenue from software licenses at a point in time upon delivery, provided all other revenue recognition criteria are met.

Software maintenance

Software maintenance consists of revenue from the sale of software maintenance contracts for biometrics and imaging software. Software maintenance contracts entitle customers to receive software support and software updates, if and when they become available, during the term of the maintenance contract. Software support and software updates are considered distinct services. However, these distinct services are considered a single performance obligation consisting of a series of distinct services that are substantially the same and have the same pattern of transfer to the customer. We recognize software maintenance revenue over time on a straight-line basis over the contract period.

Services

Service revenue consists of fees from biometrics customers for software engineering services we provide to them. We recognize services revenue over time as the services are delivered using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted), provided all other revenue recognition criteria are met.

Royalties

Royalties consist primarily of royalty payments we receive under DSL silicon contracts with two customers that incorporate our silicon intellectual property ("IP") in their DSL chipsets. We sold the assets of our DSL IP business in 2009, but we continued to receive royalty payments from these customers.

We recognize revenue from sales-based royalties at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Refer to Note 8 – Business Segments and Major Customers for further information on the disaggregation of revenue, including revenue by geography and category.

Arrangements with multiple performance obligations

In addition to selling software licenses, software maintenance and software services on a standalone basis, a significant portion of our contracts include multiple performance obligations. The various combinations of multiple performance obligations and our revenue recognition for each are described as follows:

- Software licenses and software maintenance. When software licenses and software maintenance contracts are sold together, the software licenses and software maintenance are generally considered distinct performance obligations. The transaction price is allocated to the software licenses and the software maintenance based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery, provided all other revenue recognition criteria are met. Revenue allocated to the software maintenance is recognized over time on a straight-line basis over the contract period.

- Software licenses and services. When software licenses and significant customization engineering services are sold together, they are accounted for as a combined performance obligation, as the software licenses are generally highly dependent on, and interrelated with, the associated services and therefore are not distinct performance obligations. Revenue for the combined performance obligation is recognized over time as the services are delivered using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). When software licenses and standard implementation or consulting-type services are sold together, they are generally considered distinct performance obligations, as the software licenses are not dependent on or interrelated with the associated services. The transaction price in these arrangements is allocated to the software licenses and services based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery, provided all other revenue recognition criteria are met. Revenue allocated to the services is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). In arrangements with both software licenses and services, the software license portion of the arrangement is classified as software license revenue and the services portion is classified as services revenue in our consolidated statements of income and comprehensive income.

- Software licenses, software maintenance and services. When we sell software licenses, software maintenance and software services together, we account for the individual performance obligations separately if they are distinct. The transaction price is allocated to the separate performance obligations based on relative SSP. Revenue allocated to the software licenses is recognized at a point in time upon delivery. Revenue allocated to the services is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted). Revenue for the software maintenance is recognized over time on a straight-line basis over the contract period. However, if the software services are significant customization engineering services, they are accounted for with the software licenses as a combined performance obligation, as stated above. Revenue for the combined performance obligation is recognized over time using an input method (i.e., labor hours incurred as a percentage of total labor hours budgeted).

Returns

We do not offer rights of return for our products and services in the normal course of business.

Customer Acceptance

Our contracts with customers generally do not include customer acceptance clauses.

Contract Balances

When the timing of our delivery of goods or services is different from the timing of payments made by customers, we recognize either a contract asset (performance precedes contractual due date) or a contract liability (customer payment precedes performance). Customers that prepay are represented by the deferred revenue below until the performance obligation is satisfied. Contract assets represent arrangements in which the good or service has been delivered but payment is not yet due. Our contract assets consist of unbilled receivables. Our contract liabilities consisted of deferred (unearned) revenue, which is generally related to software maintenance contracts. We classify deferred revenue as current or noncurrent based on the timing of when we expect to recognize revenue.

The following table presents changes in our contract assets and liabilities during the years ended December 31, 2017 and 2018 (in thousands):

	Balance at Beginning of Period	Revenue Recognized In Advance of Billings	Billings	Balance at End of Period
Year ended December 31, 2017				
Contract assets:				
Unbilled receivables	$ 2,259	$ 198	$ (1,028)	$ 1,429
Year ended December 31, 2018				
Contract assets:				
Unbilled receivables	$ 1,429	$ 3,278	$ (1,428)	$ 3,279

	Balance at Beginning of Period	Billings	Revenue Recognized	Balance at End of Period
Year ended December 31, 2017				
Contract liabilities:				
Deferred revenue	$ 2,933	$ 4,933	$ (4,934)	$ 2,932
Year ended December 31, 2018				
Contract liabilities:				
Deferred revenue	$ 2,932	$ 5,564	$ (5,397)	$ 3,099

Remaining Performance Obligations

Remaining performance obligations represent the transaction price from contracts for which work has not been performed or goods and services have not been delivered. We expect to recognize revenue on approximately 97% of the remaining performance obligations over the next 12 months, with the remainder recognized thereafter. As of December 31, 2018, the aggregate amount of the transaction price allocated to remaining performance obligations with a duration greater than one year, comprised of software maintenance contracts, was $0.1 million.

Contract Costs

We recognize an other asset for the incremental costs of obtaining a contract with a customer if we expect the benefit of those costs to be longer than one year. We have determined that certain sales commissions meet the requirements to be capitalized, and we amortize these costs on a consistent basis with the pattern of transfer of the goods and services in the contract. Total capitalized costs to obtain a contract were immaterial during the periods presented and are included in other current and long-term assets on our consolidated balance sheets.

We apply a practical expedient to expense costs as incurred for costs to obtain a contract when the amortization period is one year or less. These costs include sales commissions on software maintenance contracts with a contract period of one year or less as sales commissions paid on contract renewals are commensurate with those paid on the initial contract.

Income Taxes – We compute deferred income taxes based on the differences between the financial statement and tax basis of assets and liabilities using enacted rates in effect in the years in which the differences are expected to reverse. We establish a valuation allowance to offset temporary deductible differences, net operating loss carryforwards and tax credits when it is more likely than not that the deferred tax assets will not be realized.

We recognize the tax benefit from an uncertain tax position only if it is more-likely-than-not that the tax position will be sustained upon examination by the taxing authorities, based on the technical merits of the tax position. The evaluation of an uncertain tax position is based on factors that include, but are not limited to, changes in the tax law, the measurement of tax positions taken or expected to be taken in tax returns, the effective settlement of matters subject to audit, and changes in facts or circumstances related to a tax position. Any changes to these estimates, based on the actual results obtained and/or a change in assumptions, could impact our tax provision in future periods. Interest and penalty charges, if any, related to unrecognized tax benefits would be classified as a provision for income tax in the consolidated statements of income and comprehensive income.

Capitalization of Software Costs – We capitalize certain internally developed software development costs after technological feasibility of the product has been established. No software costs were capitalized during the years ended December 31, 2018 and 2017, because such costs incurred subsequent to the establishment of technological feasibility, but prior to commercial availability, were immaterial.

Research and Development Costs – Costs incurred in the research and development of our products are expensed as incurred.

Concentration of Credit Risk – At December 31, 2018 and 2017, we had cash and cash equivalents, in excess of federally insured deposit limits of approximately $51.4 for both years.

Concentration of credit risk with respect to net accounts receivable and unbilled receivables consisted of amounts owed by the following customers that comprised more than 10% of net accounts receivable and unbilled receivables at December 31:

	2018	2017
Customer A	46%	-%
Customer B	19%	43%

Stock-Based Compensation – We grant stock and stock options to our employees and directors. We measure stock-based compensation cost at the grant date based on the fair value of the award and recognize stock-based compensation expense on a straight-line basis over the requisite service period of the award.

For stock awards, we determine the fair value of the award by using the fair market value of our stock on the date of grant; provided the number of shares in the grant is fixed on the grant date.

For stock options, we use the Black-Scholes option valuation model to estimate the fair value of the award. This valuation model takes into account the exercise price of the award, as well as a variety of significant assumptions. The assumptions used to estimate the fair value of stock options include the expected term, the expected volatility of our stock over the expected term, the risk-free interest rate over the expected term, and our expected annual dividend yield.

Computation of Earnings per Share – Basic earnings per share is computed by dividing income available to common shareholders by the weighted average number of common shares outstanding. Diluted earnings per share is computed by dividing income available to common shareholders by the weighted average number of common shares outstanding plus additional common shares that would have been outstanding if dilutive potential common shares had been issued. For the purposes of this calculation, stock options are considered common stock equivalents in periods in which they have a dilutive effect. Stock options that are antidilutive are excluded from the calculation.

Fair Value of Financial Instruments – The carrying amounts of cash and cash equivalents, accounts receivable, accounts payable and accrued expenses approximate fair value because of their short-term nature. The carrying amount of investments is based on the fair value of the individual securities in our investment portfolio.

Advertising Costs – Advertising costs are expensed as incurred and were not material for 2018 and 2017.

Recent Accounting Pronouncements:

Recently Adopted Accounting Pronouncements

FASB ASU No. 2014-09. In May 2014, the FASB issued Accounting Standard Update No. 2014-09, Revenue from Contracts with Customers (Topic 606). The core principle of the new guidance is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. We adopted the standard on January 1, 2018 utilizing the full retrospective method.

We implemented new internal controls for the implementation and modified and augmented our existing internal controls that enabled the preparation of financial information on adoption. The most significant impacts of adopting the new standard related to the following:

i) DSL royalty contracts. Under our legacy revenue recognition policy, we recognized DSL royalty revenue in the period in which we received royalty reports, which was typically in the quarter immediately following the quarter in which sales of royalty-bearing products occurred. Under the new standard, we recognize DSL royalty revenue in the quarter in which sales of royalty-bearing products occur. Therefore, we make estimates of royalties earned in the current period and record royalty revenue based on those estimates. This change resulted in a decrease in revenue of $17,000 for fiscal year 2017.

ii) Minimum license/royalty payment contract. One of our revenue contracts required the customer to make a fixed payment for professional services as well as minimum license/royalty payments for software to be distributed to end-users. Under legacy GAAP, we recognized the professional services fee over the period that the services were performed and revenue for the minimum license/royalty payments when those minimum payments became due. Under the new standard we recognized the estimated amount of total consideration, including the professional services fee and our estimate of variable consideration related to the minimum license/royalty payments, in the contract that we expect to be entitled to and recognized revenue in the period(s) that the related licenses and services were transferred to the customer. This change resulted in a decrease in revenue of $800,000 for fiscal year 2017, and an increase in unbilled receivables of $1.4 million in fiscal year 2017.

iii) Sales commissions and other third-party acquisition costs. Under legacy GAAP, sales commissions and other third-party acquisition costs resulting directly from securing contracts with customers were expensed as incurred. ASC 340 requires these costs to be recognized as an asset when incurred and expensed over a period consistent with the period of transfer to the customer of goods or services to which the asset relates. We adopted the practical expedient that if the amortization period of the asset that we otherwise would have recognized is one year or less, we expense the sales commissions and other third-party acquisition costs resulting directly from securing contracts with customers when incurred. The adoption of the new standard resulted in a decrease in expense of approximately $114,000 for fiscal year 2017. For fiscal year 2017, the decrease in expense primarily relates to lower sales commissions due to lower revenue on our minimum license/royalty payment contract as noted above.

Revenue recognition related to our other arrangements for software licenses, software maintenance, services, and hardware will remain substantially unchanged.

As a practical expedient, for contracts that were modified before the earliest reporting period of application of the standard, we have not retrospectively restated the contracts for those contract modifications. Instead we have reflected the aggregate effect of all modifications that occurred before the earliest reporting period of application when (i) identifying the satisfied and unsatisfied performance obligations, (ii) determining the transaction price, and (iii) allocating the transaction price to the satisfied and unsatisfied performance obligations.

We have not restated contracts that began and were completed within the same annual reporting period. For completed contracts that have variable consideration, we have used the transaction price at the date the contract was completed rather than estimating variable consideration amounts in comparative reporting periods.

For fiscal years 2017, adoption of the standard resulted in an aggregate decrease in revenue of $0.8 million, a decrease in costs and expenses of $0.1 million, a decrease in the provision for income taxes of $0.4 million, and an increase in opening stockholders’ equity of $0.9 million primarily due to the changes noted above. In addition, adoption of the standard resulted in an increase in unbilled receivables of $1.4 million as of December 31, 2017 driven by unbilled receivables from recognition of revenue from the estimate of variable consideration related to the minimum license/royalty payments in one of our contracts; a decrease in deferred tax assets of $0.3 million as of December 31, 2017 driven primarily by a difference in timing of revenue recognition and expenses for book and tax purposes; and an increase in accrued expenses of $0.2 million as of December 31, 2017 driven by sales commissions related to recognition of revenue from the estimate of variable consideration related to the minimum license/royalty payments in one of our contracts. Also, the 2017 opening stockholders' equity balance increased by $1.2 million related to the effect of adoption of the standard from prior periods.

See Impacts of Topic 606 Adoption to Reported Results below for the impact of the adoption of the new standard on our consolidated financial statements.

Impacts of Topic 606 Adoption to Reported Results

Adoption of the new revenue standard impacted our reported results as follows:

(In thousands, except per share data)			**Year Ended December 31, 2017**
	As Reported	**Adjustment**	**As Adjusted**
Consolidated Statements of Income:			
Revenue	$ 16,282	$ (817)	$ 15,465
Costs and expenses	16,054	(114)	15,940
Provision for income taxes	965	(422)	543
Net income	1,282	(281)	1,001
Net income per share - basic	0.06	(0.01)	0.05
Net income per share - diluted	0.06	(0.01)	0.05

(In thousands)			**December 31, 2017**
	As Reported	**Adjustment**	**As Adjusted**
Consolidated Balance Sheets:			
Accounts and unbilled receivables, net	$ 2,401	$ 1,417	$ 3,818
Prepaid expenses and other current assets	203	13	216
Deferred tax assets	5,402	(331)	5,071
Accrued expenses	1,184	217	1,401
Stockholders' equity	59,652	882	60,534

Adoption of the new revenue standard had no impact to cash from or used in operating, financing, or investing on our consolidated statements of cash flows.

FASB ASU No. 2016-09. In March 2016, the FASB issued Accounting Standard Update No. 2016-09, "Improvements to Employee Share-Based Payment Accounting," which is intended to simplify various aspects of how share-based payments are accounted for and presented in financial statements. The standard is effective prospectively for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2016, with early adoption permitted.

The new standard contains several amendments that will simplify the accounting for employee share-based payment transactions, including the accounting for income taxes, forfeitures, statutory tax withholding requirements, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The changes in the new standard eliminate the accounting for excess tax benefits to be recognized in additional paid-in capital and tax deficiencies recognized either in the income tax provision or in additional paid-in capital. In addition, the new standard eliminates the limitation on recognition of excess stock compensation benefits until such benefits are actually realized, and instead applies the general recognition standard to these deferred tax assets. We adopted ASU 2016-09 in 2017 which was applied using a modified retrospective approach. Upon adoption, we recorded a deferred tax asset of $4.8 million with an offsetting adjustment to retained earnings related to excess stock compensation deductions that were not previously recorded as tax assets. For the year ended December 31, 2017, we recognized all excess tax benefits and tax deficiencies as income tax expense or benefit

Recent Accounting Pronouncements Not Yet Adopted

FASB ASU No. 2016-13. In June 2016, the FASB issued Accounting Standard Update No. 2016-13, "Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments." This new standard replaces the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. For trade and other receivables, loans, and other financial instruments, entities will be required to use a forward-looking expected loss model rather than the incurred loss model for recognizing credit losses which reflects losses that are probable. Credit losses relating to available-for-sale debt securities will also be recorded through an allowance for credit losses rather than as a reduction in the amortized cost basis of the securities. This standard is effective for fiscal years beginning after December 15, 2019 with early adoption permitted in fiscal years beginning after December 15, 2018. We are currently evaluating the effect this standard will have on our consolidated financial statements and related disclosures.

With the exception of the standards discussed above, there have been no other recently issued accounting pronouncements that are of significance or potential significance to us that we have not adopted as of December 31, 2018.

Segments – We organize ourselves into a single segment reporting to the chief operating decision maker. We have sales outside of the United States, which are described in Note 8. All long-lived assets are maintained in the United States.

3. PATENT RELATED INCOME

The composition of patent related income in 2018 and 2017 was as follows:

Years ended December 31, 2018 and 2017. We had $0.1 million and $1.6 million of income from a patent arrangement in 2018 and 2017, respectively. We entered into an arrangement with an unaffiliated third party in 2010 under which we assigned certain patents in return for royalties on proceeds from patent monetization efforts by the third party. Such third party has engaged in various patent monetization activities, including enforcement, litigation and licensing. The party reported and we recorded $0.1 million and $1.6 million of income from this arrangement in the years ended December 31, 2018 and 2017, respectively.

4. PROPERTY AND EQUIPMENT

Property and equipment consisted of the following at December 31 (in thousands):

	2018	2017
Land	$1,056	$1,056
Building and improvements	9,060	9,060
Computer equipment	795	638
Purchased software	81	83
Furniture and fixtures	778	778
Office equipment	138	138
Total	11,908	11,753
Less accumulated depreciation and amortization	(7,823)	(7,449)
Property and equipment, net	$4,085	$4,304

Depreciation expense was $0.4 million for the years ended December 31, 2018 and 2017. In 2018 and 2017, we identified $0.1 million of assets no longer in use and retired the assets and related accumulated depreciation.

5. INCOME TAXES

We recorded a benefit from income taxes of $8,000 in the year ended December 31, 2018. We made provisions for income taxes in the year ended December 31, 2017 of $0.5 million. The components of the provision for income taxes are as follows (in thousands):

	Year ended December 31,	
	2018	2017
Current:		
Federal	54	470
State	38	70
	92	540
Deferred:		
Federal	(22)	71
State	(78)	(68)
	(100)	3
Provision for (benefit from) income taxes	($8)	$543

A reconciliation of the U.S. federal statutory rate to the effective tax rate is as follows:

	Year ended December 31,	
	2018	2017
Federal statutory rate	21%	34%
Enactment of the Tax Cuts and Jobs Act	-	14
State rate, net of federal benefit	6	4
Tax credits	(26)	(15)
Permanent adjustments	1	-
FDII deduction	(4)	-
Other	1	(2)
Effective tax rate	(1)%	35%

Total income tax benefit for the year ended December 31, 2018 was $8,000. Income tax benefit for 2018 was based on: i) the U.S. statutory rate of 21%, ii) increased by state income taxes and permanent adjustments; and iii) reduced by Foreign-Derived Intangible Income (“FDII”) deduction and research tax credits.

Total income tax expense for the year ended December 31, 2017 was $0.5 million. Income tax expense for 2017 was based on: i) the U.S. statutory rate of 34%, ii) increased by the impact of the federal rate change on deferred tax assets due to enactment of the Tax Cuts and Jobs Act, iii) increased by state income taxes; and iv) reduced by research tax credits.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act. This legislation makes significant changes in U.S. tax law including a reduction in the corporate tax rates, changes to net operating loss carryforwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S. corporate tax rate from the then-current rate of 34% to 21%. As a result of the enacted law, the Company was required to revalue deferred tax assets and liabilities at the enacted rate. For the year ended December 31, 2017, this revaluation resulted in a provision of $0.4 million to income tax expense and a corresponding reduction in the deferred tax assets.

As of December 31, 2018 and 2017, we had deferred tax assets for which we had recorded no valuation allowance. The principal components of deferred tax assets were as follows at December 31 (in thousands):

	2018	2017
Depreciation	$327	$330
Stock compensation	87	103
Federal research and development credits	4,689	4,602
Other	68	36
Total	5,171	5,071
Less valuation allowance	(-)	(-)
Deferred tax assets, net	$5,171	$5,071

As of December 31, 2018, we had a total of $5.2 million of deferred tax assets for which we had recorded no valuation allowance. We have assessed the need for a valuation allowance on our deferred tax assets. Based on our assessment of future sources of income, including reversing deferred tax liabilities, and future earnings, we have determined that it is more likely than not that the deferred tax assets will be realized, and therefore there is no valuation allowance required for the deferred tax assets. We will continue to assess the level of valuation allowance in future periods. Should evidence regarding the realizability of tax assets change at a future point in time, a valuation allowance will be required.

A rollforward of the uncertain tax position related to our research and development tax credits is as follows (in thousands):

Uncertain tax positions at December 31, 2016	1,032
Decrease due to positions taken in prior periods	(34)
Uncertain tax positions at December 31, 2017	998
Decrease due to positions taken in prior periods	-
Uncertain tax positions at December 31, 2018	$998

Uncertain tax positions of $0.8 million will impact our tax rate if realized. The difference between this amount and the total uncertain tax positions in the table above is the federal tax effect on state tax credits.

We adopted ASU 2016-09 in 2017 which was applied using a modified retrospective approach. Upon adoption, we recorded a deferred tax asset of $4.8 million with an offsetting adjustment to retained earnings related to excess stock compensation deductions that were not previously recorded as tax assets.

The tax years from 2015 through 2018 are subject to examination by the IRS and the tax years 2002 through 2018 are subject to examination by state tax authorities. In the second quarter of 2017, the Internal Revenue Service commenced an examination of our tax return for the year ended December 31, 2015. In February 2018, the IRS notified us that it had completed its examination and that it had no changes to our reported tax.

6. EQUITY AND STOCK COMPENSATION PLANS

Fixed Stock Option Plan – We have one active fixed stock option plan which is our 2001 Nonqualified Stock Plan ("2001 Plan"). We are authorized to grant nonqualified stock options, stock appreciation rights and stock awards to our employees and directors for up to 8,000,000 shares of common stock under this plan. As of December 31, 2018, there were 4,700,269 shares available for grant under the 2001 Plan.

Options are granted at exercise prices as determined by the Board of Directors and have terms ranging from four to a maximum of ten years. Options generally vest over three to five years.

The following table presents stock-based employee compensation expenses included in our consolidated statements of income and comprehensive income (in thousands):

	Years ended December 31, 2018	2017
Cost of services	$25	$9
Research and development	101	119
Selling and marketing	13	15
General and administrative	441	520
Stock-based compensation expense	$580	$663

Stock-based compensation expense in the preceding table includes expenses associated with grants of: i) stock options; and ii) unrestricted shares of our common stock. The methods used to determine stock-based compensation expense for each type of equity grant are described in the following paragraphs.

Stock Option Grants. We did not grant any stock options in the years ended December 31, 2018 and 2017. When we grant stock options we estimate the fair value of those stock options using the Black-Scholes valuation model. The Black-Scholes valuation model takes into account the exercise price of the award, as well as a variety of significant assumptions. The assumptions used to estimate the fair value of stock options include the expected term, the expected volatility of our stock over the expected term, the risk-free interest rate over the expected term, and our expected annual dividend yield. We do not estimate our forfeiture rates as the actual forfeiture rate is known at the end of each reporting period due to the timing of our stock option vesting.

Unrestricted Stock Grants. Our 2001 Plan permits us to grant shares of unrestricted stock to our directors, officers, and employees. Stock-based compensation expense for stock grants is determined based on the fair market value of our stock on the date of grant; provided the number of shares in the grant is fixed on the grant date. We granted 138,000, and 134,000 shares of unrestricted stock during the years ended December 31, 2018, and 2017, respectively.

The accounting treatment of unrestricted stock awards in 2018 and 2017 is described below:

Year ended December 31, 2018. In March 2018, we granted 138,000 shares of unrestricted stock to directors, officers and employees. The shares were issued in two equal installments shortly after June 30, 2018 and December 31, 2018. We expensed $580,000 of stock-based compensation expense related to this grant in the year ended December 31, 2018. There was no unamortized stock-based compensation charge associated with this stock grant as of December 31, 2018.

We issued shares of common stock related to the March 2018 grant as follows: i) 57,592 net shares of common stock were issued in early July 2018 after employees surrendered 11,408 shares for which we paid $51,000 of withholding taxes on their behalf; and ii) 55,278 net shares of common stock were issued in early January 2019 after employees surrendered 13,722 shares for which we paid $50,000 of withholding taxes on their behalf.

Year ended December 31, 2017. In February 2017, we granted 134,000 shares of unrestricted stock to directors, officers and employees. The shares were issued in two equal installments shortly after June 30, 2017 and December 31, 2017. We expensed $663,000 of stock-based compensation expense related to this grant in the year ended December 31, 2017. There was no unamortized stock-based compensation charge associated with this stock grant as of December 31, 2017.

We issued shares of common stock related to the February 2017 grant as follows: i) 54,014 net shares of common stock were issued in early July 2017 after employees surrendered 12,986 shares for which we paid $67,000 of withholding taxes on their behalf; and ii) 53,378 net shares of common stock were issued in early January 2018 after employees surrendered 13,622 shares for which we paid $64,000 of withholding taxes on their behalf.

A summary of stock option transactions for our fixed stock option plan for the years ended December 31, 2018, and 2017 are presented below:

	2018		2017	
	Shares	Weighted Average Exercise Price	Shares	Weighted Average Exercise Price
Outstanding at beginning of year	28,000	$2.97	86,202	$4.37
Granted	-	-	-	-
Exercised	-	-	(4,168)	3.09
Forfeited or cancelled	(10,000)	3.77	(54,034)	5.20
Outstanding at end of year	18,000	$2.52	28,000	$2.97
Exercisable at year end	18,000	$2.52	28,000	$2.97

Total options outstanding at December 31, 2018 were 18,000. All of those options were vested and had a weighted average exercise price of $2.52.

No stock options were granted in the years ended December 31, 2018, and 2017. No options were exercised in the year ended December 31, 2018. For the year ended December 31, 2017, 4,168 options were exercised which generated proceeds of $13,000.

At December 31, 2018, the weighted average remaining contractual term for total options outstanding and total options exercisable was approximately 0.4 years for each.

At December 31, 2018, the aggregate intrinsic value of options outstanding and options exercisable was $20,000. The intrinsic value of a stock option is the amount by which the market value of the underlying stock exceeds the exercise price of the option.

The following table summarizes the stock options outstanding at December 31, 2018:

	Options Outstanding			Options Exercisable	
Exercise Price Range	Number	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Number	Weighted Average Exercise Price
$2 to $3	18,000	$2.52	.39	18,000	$2.52

At December 31, 2018, there was no unrecognized compensation expense related to non-vested stock options as there were no non-vested stock options.

We issue common stock from previously authorized but unissued shares to satisfy option exercises and purchases under our Employee Stock Purchase Plan.

Employee Stock Purchase Plan - In June 1996, we adopted an Employee Stock Purchase Plan (the "ESPP Plan") under which eligible employees could purchase common stock at a price equal to 85% of the lower of the fair market value of the common stock at the beginning or end of each six-month offering period. On November 29, 2005 we amended the ESPP Plan to provide that eligible employees may purchase common stock at a price equal to 95% of the fair market value of the common stock as of the end of each six-month offering period. There is no stock-based compensation expense related to our Employee Stock Purchase Plan because it is not considered a compensatory plan. The plan does not have a look-back feature, and has a minimal discount of 5% of the fair market value of the common stock as of the end of each six-month offering period. Participation in the ESPP Plan is limited to 6% of an employee's compensation, may be terminated at any time by the employee and automatically ends on termination of employment. A total of 350,000 shares of common stock have been reserved for issuance. As of December 31, 2018 there were 52,722 shares available for future issuance under the ESPP Plan. We issued 13,667, and 13,514 common shares under the ESPP Plan in 2018, and 2017, respectively.

Share Purchases - On April 24, 2018, we announced that our Board of Directors had approved a program authorizing the Company to purchase up to $10 million of our common stock. The shares may be purchased from time to time in the open market or through privately negotiated transactions at management's discretion, depending upon market conditions and other factors. Shares are retired upon repurchase. The authorization to repurchase our stock expires on December 31, 2019. We repurchased 102,205 shares of common stock under this program for a total cost of $0.4 million during the year ended December 31, 2018.

Dividends – We did not pay dividends in the years ended December 31, 2018 and 2017.

7. COMMITMENTS AND CONTINGENT LIABILITIES

Lease Commitments – We own our principal office and research facility in Bedford, Massachusetts, which we have occupied since November 1997. We have no real estate lease commitments and no equipment lease commitments.

Litigation - There are no material pending legal proceedings to which we are a party or to which any of our properties are subject which, either individually or in the aggregate, are expected to have a material adverse effect on our business, financial position or results of operations.

Guarantees and Indemnification Obligations – We enter into agreements in the ordinary course of business that require us: i) to perform under the terms of the contracts, ii) to protect the confidentiality of our customers' intellectual property, and iii) to indemnify customers, including indemnification against third party claims alleging infringement of intellectual property rights. We also have agreements with each of our directors and executive officers to indemnify such directors or executive officers, to the extent legally permissible, against all liabilities reasonably incurred in connection with any action in which such individual may be involved by reason of such individual being or having been a director or officer of the Company.

Given the nature of the above obligations and agreements, we are unable to make a reasonable estimate of the maximum potential amount that we could be required to pay. Historically, we have not made any significant payments on the above guarantees and indemnifications and no amount has been accrued in the accompanying consolidated financial statements with respect to these guarantees and indemnifications.

8. BUSINESS SEGMENTS AND MAJOR CUSTOMERS

We organize ourselves into a single segment that reports to the chief operating decision makers.

We conduct our operations in the United States and sell our products and services to domestic and international customers. Revenues were generated from the following geographic regions (in thousands):

	Year ended December 31, 2018	2017
United States	$7,439	$12,413
United Kingdom	4,004	417
Brazil	2,473	279
Rest of world	2,215	2,356
	$16,131	$15,465

Revenue by product group was (in thousands):

	Year ended December 31, 2018	2017
Biometrics	$15,042	$11,953
Imaging	1,089	3,368
DSL royalties	-	144
	$16,131	$15,465

The portion of total revenue that was derived from major customers was as follows:

	Year ended December 31, 2018	2017
Customer A	20%	-%
Customer B	13%	-%
Customer C	-%	17%

Revenue by timing of transfer of goods or services for the years ended December 31, 2018 and 2017 was (in thousands):

	Year ended December 31, 2018	2017
Goods or services transferred at a point in time	$5,972	$9,283
Goods or services transferred over time	10,159	6,182
	$16,131	$15,465

9. EMPLOYEE BENEFIT PLAN

In 1994, we established a qualified 401(k) Retirement Plan (the "Plan") under which employees are allowed to contribute certain percentages of their pay, up to the maximum allowed under Section 401(k) of the Internal Revenue Code. Our contributions to the Plan are at the discretion of the Board of Directors. Our contributions were approximately $238,000, and $223,000 in 2018 and 2017, respectively.

10. NET INCOME PER SHARE

Net income per share is calculated as follows (in thousands, except per share data):

	Year ended December 31, 2018	2017
Net income	$1,233	$1,001
Shares outstanding:		
Weighted-average common shares outstanding	21,544	21,814
Additional dilutive common stock equivalents	61	63
Diluted shares outstanding	21,605	21,877
Net income per share – basic	$0.06	$0.05
Net income per share - diluted	$0.06	$0.05

11. OFF-BALANCE SHEET ARRANGEMENTS

We do not currently have any arrangements with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities, or variable interest entities which are often established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Accordingly, we are not exposed to any financing, liquidity, market or credit risk if we had such relationships.

12. QUARTERLY RESULTS OF OPERATIONS – UNAUDITED

The following table is a summary of certain items in the consolidated statements of income and comprehensive income for each of our quarters in the two-year period ended December 31, 2018 (in thousands, except per share data).

	2018 Quarters Ended			
	March 31	June 30	September 30	December 31
Revenue	$2,911	$3,760	$5,401	$4,058
Operating income (loss)	(723)	(381)	1,142	343
Net income (loss)	(495)	(188)	1,277	639
Net income (loss) per share – basic	($0.02)	($0.01)	$0.06	$0.03
Net income (loss) per share – diluted	($0.02)	($0.01)	$0.06	$0.03

	2017 Quarters Ended			
	March 31	June 30	September 30	December 31
Revenue	$4,156	$2,542	$5,707	$3,060
Operating income (loss)	222	64	1,492	(671)
Net income (loss)	301	114	1,145	(559)
Net income (loss) per share – basic	$0.01	$0.01	$0.05	($0.03)
Net income (loss) per share – diluted	$0.01	$0.01	$0.05	($0.03)

Quarterly amounts may not sum to annual amounts due to rounding and dilution.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Under the supervision and with the participation of our management, including our chief executive officer and chief financial officer, we conducted an evaluation of our disclosure controls and procedures, as such term is defined under Rule 13a-15(e) promulgated under the Securities Exchange Act of 1934, as amended (the Exchange Act). Based on this evaluation, our chief executive officer and chief financial officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this annual report.

Evaluation of Changes in Internal Control Over Financial Reporting

Under the supervision and with the participation of our management, including our chief executive officer and chief financial officer, we concluded that there were no changes in our internal control over financial reporting that occurred during the quarterly period ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13(a)-15(f) under the Exchange Act. Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control - Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission in 2013. Based on our evaluation under the framework in *Internal Control — Integrated Framework*, our management concluded that our internal control over financial reporting was effective as of December 31, 2018.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by RSM US LLP, an independent registered public accounting firm, as stated in their audit report which is included herein.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Aware, Inc.

Opinion on the Internal Control Over Financial Reporting

We have audited Aware Inc. and its subsidiary's (the Company) internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of Treadway Commission in 2013. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organization of the Treadway Commission in 2013.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of income and comprehensive income, stockholders' equity and cash flows for each of the two years in the period ended December 31, 2018, and the related notes to the consolidated financial statements (collectively, the financial statements), and our report dated February 19, 2019 expressed an unqualified opinion.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting in the accompanying Management's Report on Internal Control over Financing Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures, as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitation

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ RSM LLP

Boston, Massachusetts
February 19, 2019

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by Item 10 of Form 10-K is incorporated by reference from the information contained in the sections captioned *"Directors and Executive Officers", "Corporate Governance*" and *"Section 16(a*) *Beneficial Ownership Reporting Compliance"* in the Proxy Statement that will be delivered to our shareholders in connection with our May 22, 2019 Annual Meeting of Shareholders.

ITEM 11. EXECUTIVE COMPENSATION

The information required by Item 11 of Form 10-K is incorporated by reference from the information contained in the section captioned *"Executive Compensation"* in the Proxy Statement that will be delivered to our shareholders in connection with our May 22, 2019 Annual Meeting of Shareholders.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by Item 12 of Form 10-K is incorporated by reference from the information contained in the section captioned *"Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters"* in the Proxy Statement that will be delivered to our shareholders in connection with our May 22, 2019 Annual Meeting of Shareholders.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information, if any, required by Item 13 of Form 10-K is incorporated by reference from the information contained in the sections captioned *"Corporate Governance"* and *"Certain Relationships and Related Transactions"* in the Proxy Statement that will be delivered to our shareholders in connection with our May 22, 2019 Annual Meeting of Shareholders.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by Item 14 of Form 10-K is incorporated by reference from the information contained in the section captioned *"Independent Accountants"* in the Proxy Statement that will be delivered to our shareholders in connection with our May 22, 2019 Annual Meeting of Shareholders.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULE

The following documents are filed as part of this report:

(a) Financial Statements and Exhibits**:**

(2) Exhibits:

The exhibits listed below are filed with or incorporated by reference in this report.

Exhibit No.	Description of Exhibit
3.1	Amended and Restated Articles of Organization, as amended (filed as Exhibit 3.1 to the Company's Form 10-K for the year ended December 31, 2008 and incorporated herein by reference).
3.2	Amended and Restated By-Laws (filed as Exhibit 3.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on December 10, 2007 and incorporated herein by reference).
10.1*	1996 Employee Stock Purchase Plan, as amended and restated (filed as Exhibit 99.1 to the Company's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 29, 2005 and incorporated herein by reference).
10.2*	Form of Indemnification Agreement for Directors and Officers of Aware, Inc. (filed as Exhibit 10.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on February 22, 2011 and incorporated herein by reference).
10.3*	2001 Nonqualified Stock Plan (filed as Exhibit 99(d)(4) to the Company's Schedule TO filed with the Securities and Exchange Commission on March 3, 2003 and incorporated herein by reference).
10.4*	Form of Nonqualified Stock Option Agreement under the 2001 Nonqualified Stock Plan for options granted to executive officers and directors prior to May 21, 2008 (filed as Exhibit 10.6 to Company's Form 10-K for the year ended December 31, 2006 and incorporated herein by reference).
10.5*	Form of Nonqualified Stock Option Agreement under the 2001 Nonqualified Stock Plan for options granted to executive officers and directors from and after May 21, 2008 (filed as Exhibit 10.8 to Company's Form 8-K on May 22, 2008 and incorporated herein by reference)
10.6*	Form of Unrestricted Stock Award for outside directors of Aware under the 2001 Nonqualified Stock Plan (filed as Exhibit 10.1 to Company's Form 8-K filed with the Securities and Exchange Commission on July 28, 2010 and incorporated herein by reference).
10.7*	Form of Unrestricted Stock Award for officers of Aware under the 2001 Nonqualified Stock Plan (filed as Exhibit 10.2 to Company's Form 8-K filed with the Securities and Exchange Commission on July 28, 2010 and incorporated herein by reference).
10.8	Asset Purchase Agreement by and between Aware, Inc. and Lantiq Broadband Holdco, Inc. and Lantiq Deutschland GmbH dated October 14, 2009 (filed as Exhibit 10.8 to Company's Form 10-K for the year ended December 31, 2009 and incorporated herein by reference).
10.9*	Form of Unrestricted Stock Award for executive officers and directors of Aware, Inc. under the 2001 Nonqualified Plan (filed as Exhibit 10.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on April 4, 2013 and incorporated herein by reference).

10.10*	Form of Change in Control Retention Agreement between Aware, Inc. and Kevin T. Russell (filed as Exhibit 10.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on March 30, 2015 and incorporated herein by reference).
10.11*	Form of Change in Control Retention Agreement between Aware, Inc. and David J. Martin (filed as Exhibit 10.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on March 1, 2017 and incorporated herein by reference).
10.12	Transaction between Aware, Inc. and Richard P. Moberg as described in Form 8-K as filed by Aware, Inc. with the Securities and Exchange Commission on March 9, 2017 and incorporated herein by reference.
10.13*	Aware, Inc. 2018 Executive Bonus Plan (filed as Exhibit 10.1 to the Company's Form 8-K filed with the Securities and Exchange Commission on July 27, 2018 and incorporated herein by reference).
21.1	Subsidiaries of Registrant.
23.1	Consent of Independent Registered Public Accounting Firm.
31.1	Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101	The following financial statements from Aware, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2018, formatted in XBRL (eXtensible Business Reporting Language), as follows: (i) Consolidated Balance Sheets as of December 31, 2018 and December 31, 2017; (ii) Consolidated Statements of Income and Comprehensive Income for the Years Ended December 31, 2018 and December 31, 2017; (iii) Consolidated Statements of Cash Flows for the Years Ended December 31, 2018 and December 31, 2017; (iv) Consolidated Statements of Stockholders' Equity for the Years Ended December 31, 2018 and December 31, 2017; and (v) Notes to Consolidated Financial Statements.

*Management contract or compensatory plan.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

AWARE, INC.

By: /s/ Kevin T. Russell
Kevin T. Russell
Chief Executive Officer & President
General Counsel

By: /s/ David J. Martin
David J. Martin
Chief Financial Officer (Principal Financial and Accounting Officer)

Date: February 19, 2019

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities indicated on the 19th day of February 2019.

Signature	Title
/s/ Kevin T. Russell Kevin T. Russell	Chief Executive Officer, President, General Counsel & Director (Principal Executive Officer)
/s/ David J. Martin David J. Martin	Chief Financial Officer (Principal Financial and Accounting Officer)
/s/ John S. Stafford, Jr. John S. Stafford, Jr.	Chairman of the Board & Director
/s/ John S. Stafford, III John S. Stafford, III	Director
/s/ Adrian F. Kruse Adrian F. Kruse	Director
/s/ Brian D. Connolly Brian D. Connolly	Director
/s/ Brent P. Johnstone Brent P. Johnstone	Director
/s/ Richard P. Moberg Richard P. Moberg	Director

Corporate Information

BOARD OF DIRECTORS

John S. Stafford, Jr.
Chairman
Investor

John S. Stafford, III
Investor

Adrian F. Kruse, C.P.A., J.D.
Audit Partner (retired)
Ernst & Young LLP

Brent P. Johnstone
Managing Director
Quarry Capital Management, LLC

Brian D. Connolly
Portfolio Manager
Millstreet Capital Management, LLC

Richard P. Moberg
Former co-Chief Executive Officer
& co-President
Chief Financial Officer (retired)
Aware, Inc.

Kevin T. Russell
Chief Executive Officer & President
General Counsel
Aware, Inc.

OFFICERS

Kevin T. Russell
Chief Executive Officer & President
General Counsel

David J. Martin
Chief Financial Officer

LEGAL COUNSEL

Foley Hoag LLP
Boston, MA

INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

RSM US LLP
Boston, MA

TRANSFER AGENT

Computershare Investor Services
PO Box 50500
Louisville, KY 40253-5000
877-282-1169
www.computershare.com/investor

ANNUAL MEETING

Wednesday, 10:00 a.m.
May 22, 2019
Aware, Inc.
Bedford, MA

STOCK LISTING

NASDAQ: AWRE

CORPORATE HEADQUARTERS

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